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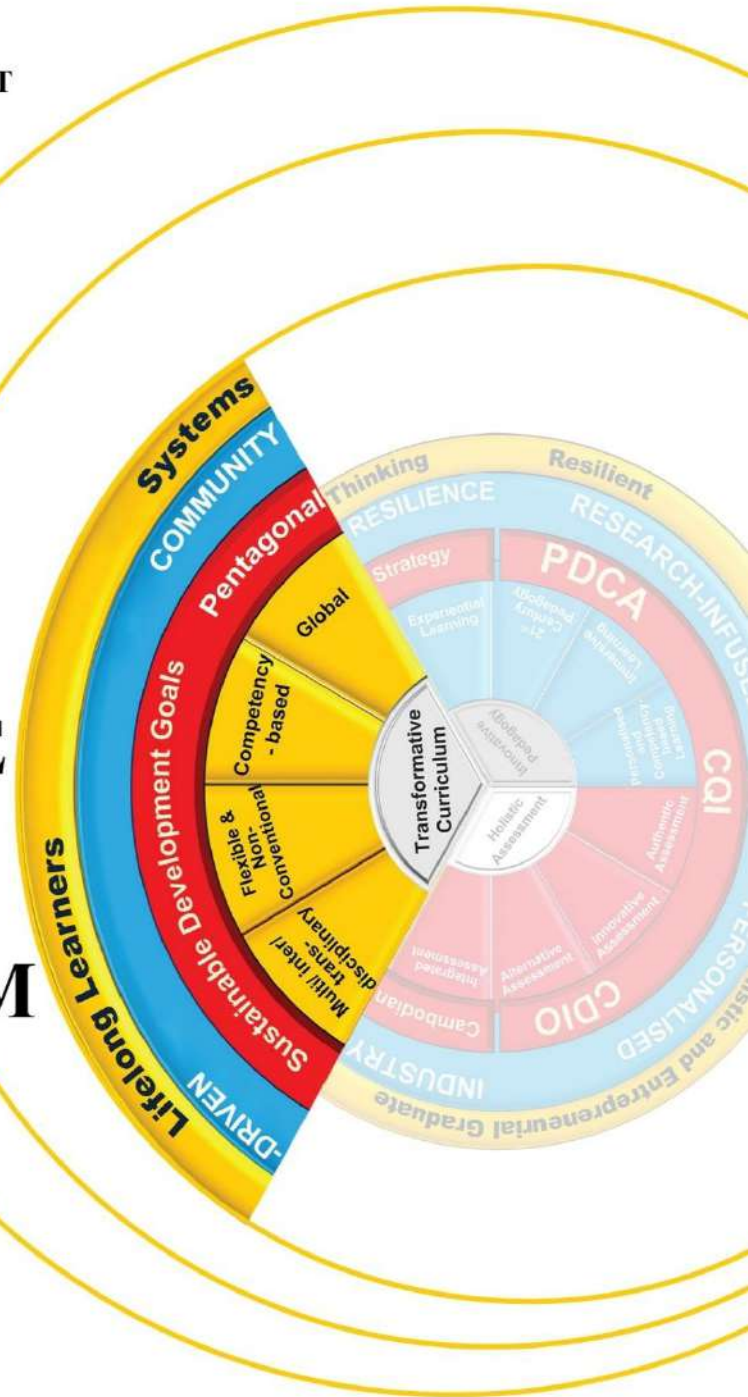
MINISTRY OF EDUCATION, YOUTH AND SPORT

GUIDELINE ON

**TRANSFORMATIVE**

.....

**CURRICULUM**



FUTUREFIT EDUCATIONAL FRAMEWORK FOR OUTCOME-BASED EDUCATION  
IN CAMBODIAN HIGHER EDUCATION

DIRECTORATE GENERAL OF HIGHER EDUCATION

First Printing, 2026

Published by:

Directorate General of Higher Education

Ministry of Education, Youth and Sport

No. 169, Preah Norodom Boulevard,

Phnom Penh, Cambodia

[www.moeys.gov.kh](http://www.moeys.gov.kh)

2026 Directorate General of Higher Education

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‘Source: *Ministry of Education, Youth and Sport*’

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## PREFACE

The Ministry of Education, Youth and Sport is pleased to present this guideline on Transformative Curriculum Design, which has been developed to address the absence of the guideline for higher education institutions in Cambodia to modernize their academic programmes responding to the unique needs of the country and the dynamic global development trends, fast-changing and unpredictable higher education landscape. In this era, HEIs need to continue strengthening its academic system to raise the equitable quality and relevant educational programmes to accelerate development progress for the country to realise the Cambodia Sustainable Development Goals (CSDG) and Pentagonal Strategy development goals.

This guideline will be an important reference in the adoption of systematic methods for transformative curriculum that primarily aims in promoting outcome-based educational programmes. This guideline will be grounded in establishing practical strategies and policy development that could lead to the recognition and/or accreditation of the programme at the national and international levels. This guideline focuses specifically on the academic system to ensure the relevance and quality of educational programmes which respond to current and future needs of the individuals and the country.

In line with the FutureFit Educational Framework (FEF), the Guideline on Transformative Curriculum (GTC) is developed to translate relevant educational theories, policies and standards into real practices from the national to classroom levels. The GTC will detail out the whole process of the programme design, from the initial phase of programme inception to its delivery, monitoring and evaluation, and reporting. This guideline places a strong emphasis on continuous quality improvement (CQI), which requires periodic reviews and assessments of the programme to ensure its relevance, quality and sustainability. In relation to these, it outlines the mechanism to ensure the quality of programmes and to integrate national and international standards. The guideline sets out guiding principles for the program structure and content development of a curriculum that incorporates *Multi-, Inter-, and Trans-Disciplinary, Flexible and Unconventional, Competency-Based, and Global approaches*. Based on the nature and discipline of a degree program, the guideline also indicates new models for curriculum design which embed elements of **‘Research Infused’**, **‘Industry Driven’**, **‘Community Resilience’**, and/or **‘Personalised Experiential Learning’** into the design of the programme. In addition to professional competencies, these new methods of academic programme design and delivery incorporate the five components of graduate attributes, which are **‘life-long learners’**, ‘systems thinking’, ‘resilient’, ‘21<sup>st</sup> century skills’, and ‘holistic and entrepreneurial’.

It is our firm belief that GTC will serve as a valuable resource for Higher Education Institutions and contribute significantly to enhancing transformative curriculum design, fostering innovation, or promoting public trust. In this regard, we encourage all stakeholders to adopt and implement the guide outlined herein, as we work together toward achieving Pentagonal Strategy, Cambodia vision 2030 and 2050 and Cambodian Sustainable Development Goals.

The Ministry of Education, Youth and Sport remains committed to supporting academic programme modernization within Cambodia Higher Education and will continue to collaborate with all relevant partners to ensure the successful implementation of this guideline. We extend our sincere gratitude to DGHE-OBE Team, which consists of the representatives from Directorate General of Higher Education, Royal University of Phnom Penh, Royal University of Agriculture, National University of Battambang, Svay Rieng University and Institute of Technology of Cambodia, who have contributed to this effort and look forward to positive impact on the development of Higher Education in Cambodia.

## LIST OF ABBREVIATIONS

|         |                                                                |
|---------|----------------------------------------------------------------|
| AUN-QA: | ASEAN University Network - Quality Assurance                   |
| CARE:   | Community Resilience Experiential Learning                     |
| CBC:    | Competency-Based Curriculum                                    |
| CLO:    | Course Learning Outcome                                        |
| CQF:    | Cambodia Qualifications Framework                              |
| CQI:    | Continuous Quality Improvement                                 |
| CSDGs:  | Cambodian Sustainable Development Goals                        |
| CSL:    | Community Service Learning                                     |
| ELO:    | Expected Learning Outcome                                      |
| EXCEL:  | Experiential Learning and Competency-Based Education Landscape |
| FEF:    | FutureFit Educational Framework                                |
| GHA:    | Guideline on Holistic Assessment                               |
| GIP:    | Guideline on Innovative Pedagogy                               |
| GLT:    | Guided Learning Time                                           |
| GA:     | Graduate Attribute                                             |
| GTC:    | Guideline on Transformative Curriculum                         |
| HEI:    | Higher Education Institution                                   |
| IDEAL:  | Industry-Driven Experiential Learning                          |
| ILT:    | Independent Learning Time                                      |
| IQA:    | Internal Quality Assurance                                     |
| LD:     | Learning Domain                                                |
| MD:     | Major Domain                                                   |
| ODL:    | Open and Distance Learning                                     |
| PDCA:   | Plan-Do-Check-Act                                              |
| PEO:    | Programme Educational Objective                                |
| PLO:    | Programme Learning Outcome                                     |
| POISE:  | Personalised Experiential Learning                             |
| REAL:   | Research Infused Experiential Learning                         |
| SLT:    | Student Learning Time                                          |
| WBL:    | Work-Based Learning                                            |

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## GLOSSARY

**21<sup>st</sup> Century Skills:** Essential skills needed by students and graduates to succeed in society and workplace, which includes among others, critical thinking, creativity, collaboration, communication, and leadership.

**Academic Programme:** It refers to a programme of studies or training defined by a curriculum which consists of a set of academic courses/subjects that lead to a degree or certificate or credentials.

**Advanced Course:** A course or set of courses that are at the higher or the highest-level courses of the degree programs. These course (s) focus on building up professional competence of the learners.

**Basic Course:** A course or set of courses that contribute to the foundation or basic competence of learners in the areas of specialisation. The basic course(s) also provide learners the foundation competence for the next level of learning of the study program.

**Common Course:** A required course or a set of required courses that are common across various fields that contribute to building specialised or professional competence of learners.

**Community Resilience Experiential Learning:** An approach of academic programme design and delivery that integrates learning with community development to provide learners opportunities to apply their knowledge to real-life challenges.

**Competency-Based Education:** An approach of academic programme design and delivery that is in line with the needs of the actual world by emphasising the development of competencies: knowledge, abilities, and attitudes, which are essential for success in the contemporary world.

**Conceive-Design-Implement-Operate:** An educational model primarily for engineering that combines technical knowledge with practical skills through active, project-based learning. Aimed at preparing students for the demands of modern engineering, it emphasises innovation and system development. Although designed for engineering, CDIO's principles of experiential learning are applicable across disciplines such as computer science, product design, and architecture, underscoring its adaptability and broad relevance.

**Continuous Quality Improvement:** A management approach focused on enhancing and sustaining quality standards. It places emphasis on regular internal assessments to identify potential causes of quality defects, followed by proactive actions aimed at preventing any decline in quality or rectifying issues at an early stage.

**Core Course:** A required course or a set of required courses that are fundamental in contributing to the development of specialised or professional competence of the learners.

**Course Learning Outcome Achievement Rate:** In an academic programme, the CLO achievement rate indicates the extent to which students have successfully met the specific learning outcomes defined for a course. It essentially measures how well students have achieved the knowledge, skills, and/or attitude that the course aims to impart. This rate is typically calculated by assessing student performance on relevant assessments and determining the percentage of students who have reached a predetermined level of achievement for each CLO.

In the case of the national minimum standard, the minimum achievement rate is defined in the Guideline on Transformative Curriculum.

**Course Learning Outcome:** Statement that describes the specific and general knowledge, skills, attitude and competencies that the students should demonstrate upon the completion of the course.

**Course Specifications:** Document that outlines the details of a specific course, including its aims; learning outcomes; content; teaching and learning activities, techniques, and strategies; assessment techniques, etc. It serves as a guide for both students and instructors, ensuring clarity and consistency in course delivery and assessment.

**Credit Transfer:** A process of transferring credit obtained from learning other than the current study programme.

**Double Degree:** A combination of two study programs from *different fields* involving the same institution or two degree-granting institutions that collaborate and are of equal standing, leading to the awarding of *two scrolls* by the involved institutions.

**Double Major:** *Two different fields* of studies pursued, usually in the same institution. It broadens employment opportunities after graduation. Students must fulfil the coursework and requirements for two different majors but only earn *one degree* with specialisations in two fields.

**Dual Degree:** A combination of two study programs from the *same or similar fields* involving *two degree-granting institutions* that collaborate and are of equal standing, leading to the awarding of *two scrolls* by the involved institutions.

**Educational Philosophy:** A set of shared related beliefs of every educational institution and every teacher, which influences what and how students are taught. It represents answers to questions about the purpose of education, a teacher's role, and what should be taught and by what methods.

**Elective Course:** A related course or set of related courses to programmes that the learners can choose based on their professional development needs, goals and interests.

**Entrepreneurial Mindset:** A set of attitudes, skills, and behaviors that enable learners to identify opportunities, take initiatives, and adapt to challenges in a proactive and innovative way.

**Expected Learning Outcomes:** It is a specific statement that describes what a learner will be able to do in some measurable way at a specified time frame, e.g. at the end of a course, at the end of a degree programme, etc. Often a learning taxonomy is used to write a learning outcome. An effective learning outcome statement begins with an active verb (doing), the object (ASK) of the verb followed by a phrase that gives the context (conditions of the performance).

**Flexible and Unconventional Approach:** An approach of academic programme design and delivery that is flexible, allowing for customisation in accordance with personal preferences, areas of interest, and the always changing needs of the industry and society. This ensures relevance and application.

**Global Approach:** An approach of academic programme design and delivery that takes a worldwide viewpoint into account, equipping learners to thrive in a world that is becoming more interconnected and globalised.

**Graduate Attributes:** Are the key knowledge, skills, and attitudes, including values, that an HEI or an academic programme aims for its students to develop during their studies, extending beyond course-specific knowledge. They represent the broader qualities that make graduates employable, prepared for lifelong learning, and equipped to contribute to society. These attributes are often articulated by an HEI to guide curriculum development and student learning experiences.

**Holistic Assessment approach:** It is an assessment approach that provides a comprehensive approach to evaluation of students' knowledge, skills and attitudes (KSA) towards each CLO. In the Guideline on Holistic Assessment, the four key approaches for holistic assessment include authentic assessment, innovative assessment, alternative assessment, and integrated assessment.

**Holistic Perspective:** Understanding and analyzing technical expertise and ethical, national and global issues or concepts by considering all interconnected parts rather than focusing on just one aspect. It emphasizes the big picture and how different elements relate to and influence each other.

**Industry-Driven Experiential Learning:** An approach of academic programme design and delivery that collaborates or develops partnerships with industry stakeholders to provide learners with practical experiences, to align education with current industry standards.

**Innovative Pedagogy:** Refers to a collection of teaching and learning approaches that move beyond passive knowledge transmission. These methods place students at the centre of the learning process, fostering their engagement, collaboration, and problem-solving skills. They leverage technology, real-world experiences, and interactive activities to create a dynamic and stimulating learning environment.

**Intermediate Course:** A course or set of intermediate courses that are the middle levels of courses, built up from the basic courses and to prepare learners for the advanced level of learning.

**Interdisciplinary Approach:** Approach of the academic programme design which involves a combination of several academic disciplines and fields of studies (academic, science and arts) in a single degree programme.

**Joint Degree:** Degree programmes in the different fields of studies with possible overlapping or coordinated degree requirements, carried out in collaboration between a home institution and a host institution or more, and leading to the award of a *single degree* by all institutions.

**Lifelong Learners:** Individuals who continuously seek knowledge and skills and adapt to changes, ensuring personal and professional growth.

**Specialisation:** A more focused area of study within the major or minor. For example, students who major in economics may opt to have specialisation in international economics.

**Minor:** A particular area of study that students may wish to pursue, apart from the main area (major) of study. The required courses for the minor are much less than the major. Most often, the minor complements the major. For example, students may major in Physics and minor in Mathematics.

**Multi-, Inter-, and Trans-Disciplinary:** Multidisciplinary approach involves integrating knowledge from multiple disciplines, combining insights from different fields in addressing a particular issue/problem but it does not involve integration of methods/theories. Interdisciplinary approach involves integration of methods/theories, while transdisciplinary transcends disciplinary boundaries. In the context of academic programmes, adoption of these

approaches allows students to reflect on the interdependence of real-world issues/problems in creating and resolving challenging problems.

**Multidisciplinary Approach:** Approach of the academic programme design which involves the integration of multiple disciplines of the same field of study in one academic programme.

**Plan-Do-Check-Act (PDCA):** A principle, a way of thinking, and a framework that provides a systematic approach to problem solving and quality improvement.

**Personalised Experiential Learning:** Educational pathway that allows students to align their learning with personal interests and career aspirations.

**Programme Educational Objective (PEO):** Statement that describes expected career/professional accomplishment of graduates in the programme within few years after graduation.

**Programme Learning Outcome (PLO):** Statement that describes the specific and general knowledge, skills, attitude and competencies that the students should demonstrate upon completion of the study programme.

**Programme Specification:** A set of documents that describe the study programme. It usually includes the following items: i) A summary of the programme aims and intended learning outcomes; ii) Graduate attributes, educational philosophy and PEOs, iii) An outline of the course structure; iv) A matrix that shows how the programme learning outcomes are achieved through the courses; and v) A set of course specifications.

**Research-Infused Experiential Learning:** An approach of academic programme design and delivery that embeds research skill development into the areas of specialisation in the degree programme.

**Resilience:** Capacity to overcome challenges, adapt to change with a growth mindset, and view obstacles as opportunities for growth.

**Student Learning Time:** The total number of hours that student spends inside and outside the classroom to achieve the CLOs for the course and the entire study programme. It includes attending guided activities, self-directed learning, doing assignments, preparing and taking assessments.

**Systems Thinking:** Ability to understand and address complex problems by viewing them holistically.

**Transdisciplinary:** Approach of the academic programme design that transcends traditional disciplinary boundaries to address complex problems and topics by integrating knowledge and methodologies from multiple disciplines. This approach focuses on collaboration and synthesis to create new frameworks and solutions that cannot be achieved within the confines of a single discipline.

## 1. Introduction

In the effort to modernise academic programmes in Cambodia, a framework was developed as a guide to integrate all the policies, enablers and drivers which are aligned to the Cambodian Sustainable Development Goals (CSDG), Pentagonal Strategy (PS), Plan-Do-Check-Act (PDCA) approach, Continuous Quality Improvement (CQI), and Conceive-Design-Implement-Operate (CDIO) approach. At its core, the FutureFit Educational Framework (FEF) requires academic programmes to adopt the following initiatives: (i) Transformative Curriculum, (ii) Innovative Pedagogy and (iii) Holistic Assessment, with the aim to produce graduates who possess attributes of Lifelong Learners, Systems Thinking, Resilience, 21<sup>st</sup> Century Skills, Holistic and Entrepreneurial Skills (Figure 1)

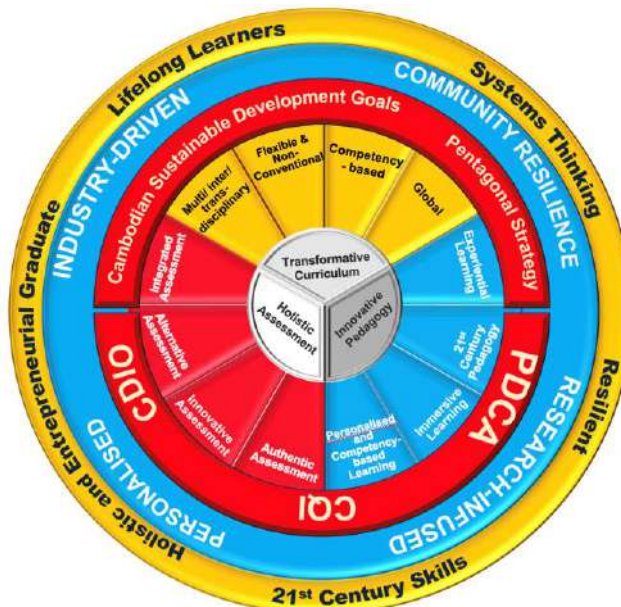


*Figure 1: FutureFit Educational Framework (FEF) for Outcome-Based Education (OBE) in Cambodian Higher Education*

The Guideline on Transformative Curriculum (GTC) is a framework developed to assist Higher Education Institutions (HEIs) in modernising the curriculum to meet the aspirations of the FEF, as well as specific themes under quality assurance in higher education. The GTC is to be read together with the document on FEF, other two guidelines (the Guideline on Innovative Pedagogy (GIP) and the Guideline on Holistic Assessment (GHA) and the three playbooks. The guidelines are developed and written to guide and assist HEIs in implementing the standards outlined in the Cambodia Qualifications Framework (CQF) and ASEAN University Network- Quality Assurance (AUN-QA) guides for assessment at programme level.

The GTC can be used to assist HEIs in meeting the standards of Expected Learning Outcomes (Criterion 1) and Programme Structure and Content (Criterion 2) as stated in the ASEAN University Network-Quality Assurance (AUN- QA) Assessment at Programme Level Version 4.0 (2020). The guideline provides the pertinent elements in the design of an academic curriculum. The HEIs shall merely adopt the guidelines and the examples given in this document or adapt the guideline to meet the specific needs of their institution.

The FEF plays an important role in incorporating innovative teaching methods, interdisciplinary approaches, and real-world applications. Transformative curriculum helps students develop critical thinking skills, problem-solving abilities, and adaptability to the rapidly changing world. It also promotes creativity, collaboration, and a deeper understanding of complex issues, preparing students to succeed in a globalised and interconnected society. Overall, it plays a crucial role in modernising university education to meet the needs of the 21<sup>st</sup> century. HEIs shall have a system for curriculum development and implementation and ensure continuous quality improvement. To have the system, HEIs can adopt GTC developed by MoEYS or develop a system that aligns with the principles and the procedures outlined in GTC.

To make the system function, programmes shall have a functioning mechanism. The programmes shall have a clear organizational management structure, which can be an academic programme committee or taskforce, for curriculum development and implementation. The members in organizational management structure shall be competent experts in curriculum development and implementation. The programmes shall have enough budget for curriculum development and implementation, when required.

HEIs shall establish organizational management comprising a group of competent trainers or lecturers responsible for the curriculum development aligned with GTC. Additionally, programme shall have enough budget for curriculum development and implementation when required.

In accordance with the guidelines set forth by the Internal Quality Assurance (IQA), all programme owners are required to ensure that the development of their respective programs strictly complies with the sub-decree on the Cambodian Qualifications Framework (CQF), the relevant system requirements, and the Guideline on Transformative Curriculum. It is essential that the Educational Learning Outcomes (ELOs) and all program components are aligned with these regulatory frameworks to ensure consistency with national standards, foster quality education, and support the transformative objectives outlined by the Cambodian educational system. Program owners must implement these frameworks at every stage of programme design, review, and enhancement.

Additionally, HEIs shall define clear organizational management practices, designating responsible units or individuals to act as operators, ensuring accountability and efficiency in the implementation of the system. By organizing the internal processes and assigning roles effectively, HEIs can ensure that the mechanism is operational and aligned with GTC. This mechanism will support the systematic execution of the curriculum, ensuring continuous improvement.

### **1.1. What and Why Outcome-Based Education?**

Outcome-Based Education (OBE) is an educational approach that focuses on defining specific learning outcomes or objectives that students should achieve by the end of a course or programme. Instead of focusing on traditional methods of teaching and assessment, OBE emphasises the desired results or outcomes of learning. This approach aims to ensure that students are able to demonstrate mastery of specific knowledge, skills, and competencies. OBE also places importance on continuous assessment and feedback to help students achieve the desired outcomes. The focus of OBE is on the results of learning, where the knowledge, skills, and attitudes that learners are expected to master, are clearly identified and expressed as expected learning outcomes. Outcome-based education is sometimes known as performance-based education which produces graduates with 21<sup>st</sup> century skills, professionalism, competence, talents, resilience, innovations, and lifelong learning skills who are equipped with knowledge and experiences.

In the context of higher education in Cambodia, implementing OBE can be beneficial for several reasons: clarity of expectation, relevance to industry needs, student-centred approach, continuous improvement and quality assurance. To implement OBE effectively for Cambodian HEIs, it is important to develop a curriculum that is transformative, implement innovative pedagogies, and conduct holistic assessments. In support of HEIs to fully embrace OBE, faculty development, resource allocation, stakeholder engagement, assessment strategies, monitoring and evaluation, and continuous quality improvement must be enhanced and prioritised. By adopting OBE, HEIs in Cambodia can better prepare graduates to meet the challenges of 21<sup>st</sup> century skills and contribute to the socio-economic development of the country.

Overall, OBE is designed to enhance the quality of education by focusing on specific learning outcomes, promoting student engagement and success, and preparing students for future challenges in a rapidly changing world.

## **1.2. Snapshot of the Cambodia Qualifications Framework**

Cambodia Qualifications Framework (CQF), released in 2012, is the instrument for the development and classification of qualifications for specific learning levels, based on a set of criteria that is agreed upon nationally. The formulation involved various stakeholders; including government bodies, educational institutions and industry partners to ensure that the framework remains relevant and effective in meeting the needs of the labour market and addressing the evolving needs of the economy and society.

It is also the policy for the quality assurance for education and training that clearly defines learning outcomes, academic levels, and quality of qualification, and is widely recognised in the academic and professional community, both locally and internationally. By reviewing the CQF, the industries and employers could understand the quality and skills of graduates that they might employ. CQF provides a comprehensive and consistent but flexible framework. In CQF, there are five (5) major domains of learning outcomes that are applicable to all levels of learning, which are (i) Knowledge, (ii) Cognitive Skills, (iii) Psychomotor Skills, (iv) Interpersonal Skills and Responsibilities, and (v) Communication, Information Technology and Numerical Skills. CQF indicated that psychomotor skill may not be relevant to some academic programmes. However, each programme should try to incorporate the psychomotor skills, which encompasses technical abilities, in some of the courses to guarantee that students will possess a comprehensive skill set upon entering the workforce.

By setting clear standards for learning outcomes, the CQF is the reference for development of all academic programmes, standardisation of qualifications across various educational and vocational institutions in Cambodia. It also provides clear pathways for students from school to higher education and vocational training.

## **1.3. Transformative Curriculum Based on Cambodian FutureFit Educational Framework**

Cambodian FutureFit Educational Framework (FEF) is designed to support the implementation of higher educational curriculum design guidelines. It consists of three main components which are transformative curriculum, innovative pedagogy, and holistic assessment.

Transformative curriculum is an approach to designing education programmes that aims to create meaningful and impactful learning experiences for students. It goes beyond traditional curriculum design by focusing on fostering critical thinking, creativity, and social change. This type of curriculum design often incorporates real-world problems, multi/inter transdisciplinary learning, flexible and non-conventional learning, competency-based learning and opportunities for students to engage in hands-on, experiential learning. The goal of transformative curriculum is to empower students to become active and engaged learners who are prepared to address complex challenges in the world.

Innovative pedagogy plays a crucial role in implementing a transformative curriculum based on the Cambodian FEF. It refers to the use of creative and cutting-edge teaching methods and strategies to enhance student learning, engagement, and achievement. Innovative pedagogy aims to foster critical thinking, creativity, collaboration, communication, and other FutureFit skills in students by providing them with dynamic and interactive learning experiences. Some examples of innovative pedagogies include project-based learning, inquiry-based learning, gamification, personalised learning, experiential learning, collaborative learning, and technology integration. By embracing innovative pedagogical approaches, educators can create more effective and impactful learning environments that prepare students for success in a rapidly changing world.

By incorporating these innovative pedagogical approaches into teaching practices, dynamic and engaging learning experiences can be created that align with the FEF and empower students to develop essential FutureFit skills for success in the 21<sup>st</sup> century. The Guidelines on Innovative Pedagogies (GIP) provides detailed explanation on the adoption and implementation of the innovative approaches.

Holistic assessment is an approach to evaluating student learning that considers various aspects of a student's performance and development, rather than focusing solely on traditional measures such as tests and exams. It involves assessing students' knowledge, skills, attitudes, behaviours, and values in a comprehensive and integrated manner. Holistic assessment considers the whole student and seeks to provide a more complete picture of their abilities and progress.

In holistic assessment, educators use a variety of assessment methods, such as observations, portfolios, projects, presentations, self-assessments, peer assessments, and reflective journals, to gather information about students' learning and growth. This approach allows for a more nuanced understanding of students' strengths, weaknesses, and areas for improvement.

Overall, holistic assessment aims to promote a more comprehensive and meaningful evaluation of student learning that goes beyond traditional academic measures and supports students in achieving success in all aspects of their education and personal growth. The Guideline on Holistic Assessment (GHA) provides further elaboration on the conduct of assessment to fully realise the essence of OBE.

Figure 2 shows the three main processes in the implementation of a study programme aligned to the FEF, which are transformative curriculum, innovative pedagogy and holistic assessment. These are crucial elements in the development and implementation of a modernised curriculum for Cambodian higher education to meet the future challenges and the evolving needs of the country.

#### **1.4. Cambodia Sustainable Development Goals (CSDGs) and Pentagonal Strategy**

The integration of the CSDGs and Pentagonal Strategy of Cambodia into the curriculum development process is essential for ensuring that the education system is aligned to the national development priorities. This implies that the course contents, learning outcomes, and assessment methods must support these key goals and strategies as outlined in these frameworks. The CSDGs are based on the 17 global Sustainable Development Goals (SDGs) set by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. With the commitment to work towards achieving the SDGs, Cambodia had identified 18 SDGs relevant to Cambodia, which are as follows:

- |                                            |                                                 |
|--------------------------------------------|-------------------------------------------------|
| 1. No Poverty                              | 11. Sustainable Cities and Communities          |
| 2. Zero Hunger                             | 12. Responsible Consumption and Production      |
| 3. Good Health and Well-Being              | 13. Climate Action                              |
| 4. Quality Education                       | 14. Life Below Water                            |
| 5. Gender Equality                         | 15. Life on Land                                |
| 6. Clean Water and Sanitation              | 16. Peace, Justice and Strong Institutions      |
| 7. Affordable and Clean Energy             | 17. Partnership for the Goals                   |
| 8. Decent Work and Economic Growth         | 18. Demining and Explosive Remnant of War (ERW) |
| 9. Industry, Innovation and Infrastructure |                                                 |
| 10. Reduced Inequalities                   |                                                 |

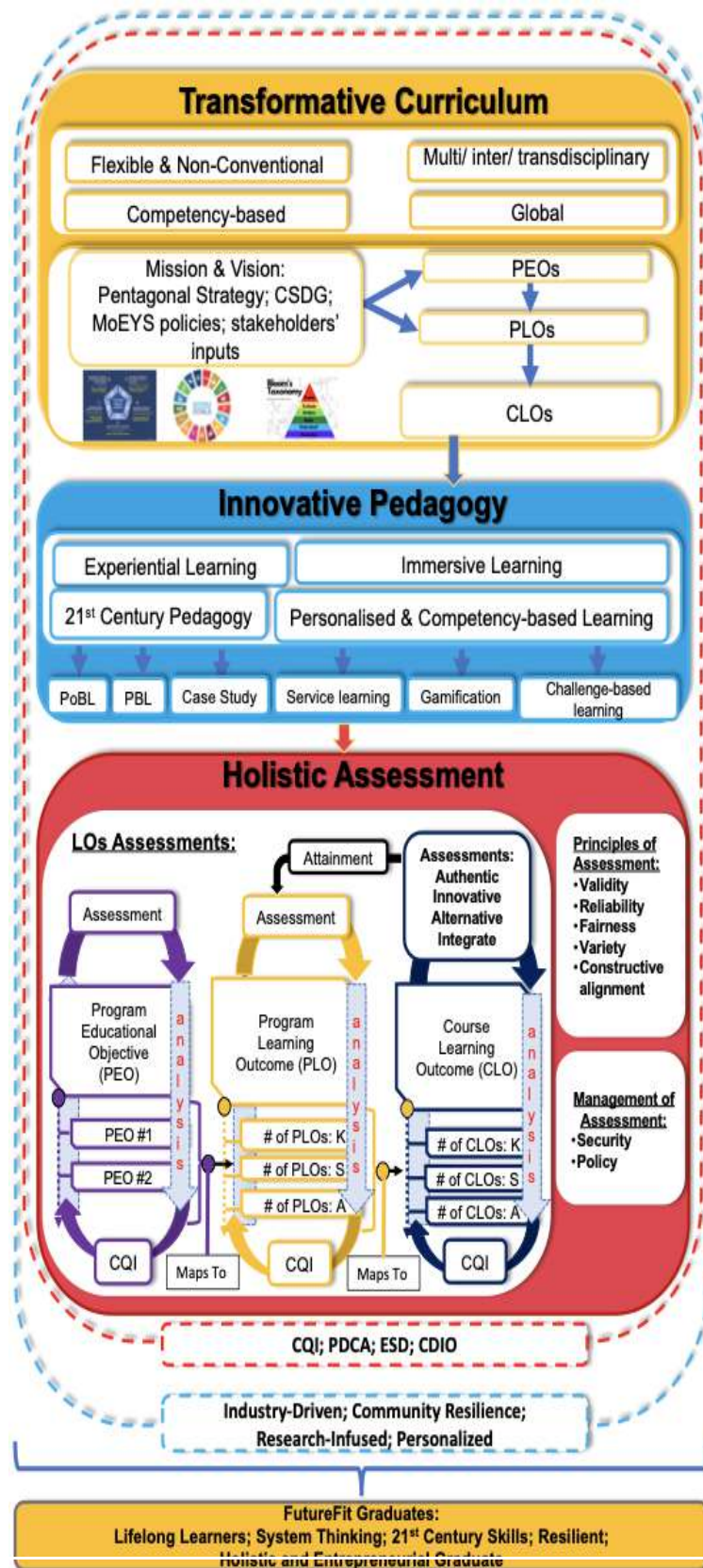


Figure 2: Processes in the Implementation of Study Programmes Aligned with the FutureFit Educational Framework (FEF)

The Pentagonal Strategy is a national development plan for Cambodia, which focuses on five key areas: economic growth, job creation, equity, efficiency and sustainability. It aims to achieve

the vision for Cambodia to be an upper middle-income country by 2030 and a high-income country by 2050.

Hence, the programme coordinator/department must carefully evaluate and select courses that can contribute to the achievement of the CSDGs and the Pentagonal Strategy. It is essential to identify courses that not only meet the requirements of these frameworks but also contribute to the overall objectives and goals of the programme. By mapping courses to these key strategies, the coordinator can ensure that students receive a well-rounded and comprehensive education that prepares them for success in their future careers. As an example, by incorporating elements of community engagement and research into the curriculum, students can gain valuable hands-on experience and develop critical thinking skills that will serve them well beyond the classroom.

To maintain relevance and competitiveness as a higher education provider, while responding to market needs and the changing educational landscape, HEIs must be watchful and alert on the need to expand by offering new study programmes. Alongside, HEIs must also periodically revise the curriculum of the existing programmes every few years (5-year cycle is suggested for undergraduate programmes). Courses within a specific programme can be revised at any time to address immediate needs for improvement, adapt to technological advancements, meet evolving field demands and to better serve educational objectives without the need to wait for the five-year review cycle. Hence, there needs to be a systematic process for proposing and revising a curriculum.

## **2. Programme Development Process**

A formal programme consists of organised activities designed to achieve educational goals. It outlines the order in which programme content is presented, whether through flexible and non-conventional, multi/inter/transdisciplinary, competency-based, or global educational methods and specifies the resources and materials to be utilised. In addition, it establishes the educational aims and expected learning outcomes of the programme.

When planning a programme, HEIs shall consider the availability of staff and the institution's physical and financial resources to support the programme effectively. The institution must ensure that there are adequate resources in place to meet the needs of the student population and the requirements of the programme. This includes ensuring that there is a sustainable allocation of resources to support the successful execution of the programme.

The designed programme must receive official approval from the highest academic authority of HEIs. The HEI shall establish its process for obtaining programme approval, aligning with existing requirements set by the Cambodia Qualifications Framework (CQF) and the Ministry of Education, Youth and Sport (MoEYS).

### **2.1. Process of Proposing a New Academic Programme in HEI**

New academic programmes shall be proposed to address the market demands, industry needs, and emerging fields that require skilled professionals. The flowchart in Figure 3 outlines the process of proposing and developing a new academic programme within an HEI (Higher Education Institution).

- 1. Initial Proposal:** A new programme may be initiated by an academic staff or a group of academics. It may start with informal discussion with members of the department and later with the Head of Department. To formalise the proposal, the idea has to be brought to the departmental meeting. At this point, the person proposing should prepare a concept paper to justify the need and relevance of the new programme to the HEI, industry, country and/or field of study and action plan of new programme development. This preliminary two to three-page document should include the name of the proposed

programme, an explanation of the relevance for the new programme, preliminary learning outcomes, a summary of similar programmes both within and outside of the HEI, anticipated enrolment, financial, facilities and resources required. If supported, the proposal is forwarded to the faculty meeting. If rejected, the proposal is dismissed.

2. **Committee Formation:** If the proposal is agreed upon in the departmental meeting, a small academic programme committee must be established at the departmental level to enhance the concept paper before presenting it at the faculty meeting and subsequently, the Academic Council of the HEI. This committee will also have to develop the full curriculum documentation once the proposal to offer the new programme is endorsed by the Academic Council of the HEI.
3. **Faculty Approval:** After the departmental committee prepares the complete curriculum documentation, it is presented to the faculty meeting. If approved, the proposal is forwarded to the University Academic Council (note: governance structures may vary between HEIs). Additional revisions may be required at this stage.
4. **Curriculum Documentation Preparation:** Once endorsed by the University/Academic Council, the curriculum documentation package is completed. This includes an executive summary, programme specifications, and course specifications. Needs analysis, benchmarking, and situational assessments of the market, policy, resources, and industry are critical during this stage. The needs analysis should include information from stakeholders such as students, alumni, faculty, management, and employers. Importantly, conducting needs and situational analysis (market, policy, staff, facilities, and other related resources) and benchmarking the programme with those offered by reputable institutions are essential in preparing the documentation. The needs analysis involves gathering crucial information regarding the potential audience, their requirements, and the available resources to fulfil those needs. The formulation of the Programme Educational Objectives (PEOs), Programme Learning Outcomes (PLOs), programme structure, and courses should be based on a thorough needs analysis, benchmarking process, and the identification of stakeholder needs, particularly those of external stakeholders. Some key stakeholders for the needs analysis and their respective roles are as follows:
  - **Current students:** They are the main beneficiaries of educational programmes, acquiring and using the knowledge from the programme. In addition to learning, they provide valuable critiques, actively participate in programme activities, and play a significant role in shaping the programme's future direction. Information needed from current students includes feedback on course content, teaching methods, and resources available, as well as their expectations for the programme.
  - **Alumni:** As graduates, they provide crucial insights into the programme's effectiveness in preparing them for their careers. Alumni can share feedback on how well the programme equipped them with necessary skills, their success in the workforce, and any gaps that could be addressed for future cohorts. Information from alumni can help refine programme content to ensure it aligns with evolving industry standards and expectations.
  - **Faculty members:** dean, vice dean, lecturers, academic leaders (check the meaning of faculty member, refer to lecturer)
  - **Management:** The task of maintaining the resources necessary for educational programmes falls onto administrators. Their duties include disbursing funds, managing facilities, and supervising staff. They are also responsible for deciding on programme rules and guidelines.
  - **Employers:** They have an interest in educational programmes because they aim to employ graduates possessing the necessary skills and knowledge for their

organisations. Employers can contribute to the programme content and may propose internships and other avenues for students to gain practical experience. Employers can come from industries and government sectors.

5. **Verification and Review:** Upon endorsement of the faculty meeting regarding the proposed programme, the complete documentation shall be sent to and reviewed by office of Academic Affairs<sup>1</sup>/ HEI- OBE team (the governance structure may differ between HEIs). The office of Academic Affairs shall provide support through the process in terms of technicality and procedure. The set of curriculum and supporting documents shall be submitted to and verified by the Internal Quality Assurance (IQA) Office to ensure the completeness of the documentation and the programme meets all necessary standards, regulations, and requirements for implementation and recognition.
6. **University Academic Council Review:** The University Academic Council shall then review the complete documentation once verified by the IQA office.
7. **MoEYS Approval:** Upon endorsement by the Academic Council, the complete documentation for the new programme shall be submitted to the parent ministries for their endorsement and then forwarded to the Ministry of Education, Youth, and Sports (MoEYS) for approval. The review process for academic programme documentation by MoEYS typically follows these key steps:
  - ***Submission of Documentation:*** HEIs shall submit the proposal along with the required supporting documents to MoEYS. HEIs not under MoEYS supervision must include an additional endorsement letter from their respective parent ministry.
  - ***Documentation review:*** The submitted documentation is reviewed by technical departments under MoEYS. They assess the quality and relevance of the programme based on established criteria.
  - ***Evaluation Criteria:*** The review process evaluates the programme documentation against specific criteria, including academic rigor, alignment with national educational goals, relevance to industry needs, and compliance with regulatory requirements. An on-site visit may also be conducted as part of the evaluation.
  - ***Feedback and Revisions:*** Following the initial review, feedback will be provided to the HEIs regarding any deficiencies or areas for improvement in the programme documentation. The institution may be required to revise the documentation or provide additional information to address the feedback.
  - ***Final Approval:*** Once the documentation meets the required criteria or revisions have been made, the technical departments will proceed with submitting it for final approval from MoEYS. An academic programme must be updated or revised every five years, following the same approval process.

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<sup>1</sup> In some HEIs, OBE team is embedded in academic affairs office.

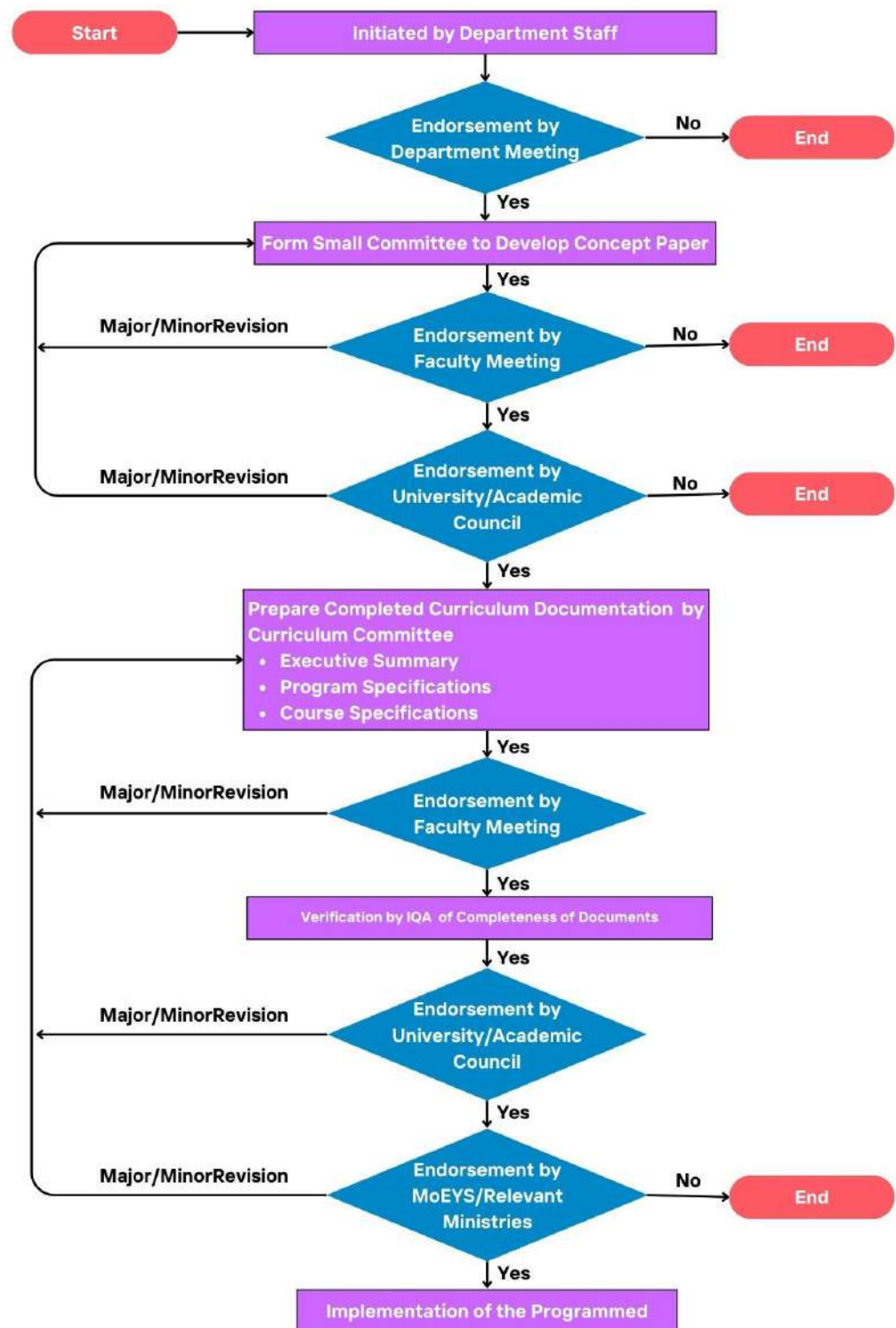


Figure 3: Process in Developing a New Academic Programme

## 2.2. Process of Revision of Existing Academic Programmes

Existing academic programme focuses on curriculum review as a part of the process of improving an academic programme which must be conducted on a periodical and systematic basis to ensure effectiveness, quality and sustainability of the academic programme. Specifically, the revision<sup>2</sup> shall be conducted every five years for undergraduate programmes. However, minor revision<sup>3</sup> can also be conducted to respond to necessary changes anytime within the five years. These curriculum modifications are essential to cater for immediate improvements, to

<sup>2</sup> Full revision: review all parts of academic programme but maintaining the name of the programme

<sup>3</sup> Minor revision: review all parts of course only but maintaining the name of the programme

adapt to technology advancements, to keep up with the changing demands of the field, and to better fulfil their educational goals. Figure 4 illustrates the entire process of curriculum revision.

**Input and factor to revise course and programme are as following:**

| Level            | Input and Factor                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Internal Factor                                                                                                                                                                                                                                                                                                                                                                                | External Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Course</b>    | <b>Student feedback</b> <ul style="list-style-type: none"> <li>Course evaluation</li> <li>Informal feedback</li> <li>Student representative</li> </ul> <b>Teaching reflection</b> <ul style="list-style-type: none"> <li>Self-reflection</li> <li>Pedagogy Research Experimentation</li> <li>Collaboration</li> </ul>                                                                          | <b>Program level review and assessment</b> <ul style="list-style-type: none"> <li>Curriculum mapping</li> <li>Assessment data analysis</li> <li>External review</li> <li>Graduate outcomes</li> <li>Employer and other stakeholder feedback</li> </ul> <b>Institutional Priorities and Resources</b> <ul style="list-style-type: none"> <li>Strategic goals</li> <li>Available resources</li> <li>Policy changes</li> </ul> <b>Disciplinary Advancements</b> <ul style="list-style-type: none"> <li>Disciplinary advancement</li> <li>Technological Development</li> <li>Society needs</li> <li>Professional Standard</li> </ul> |
| <b>Programme</b> | <b>Quality of Program Outcomes</b> <ul style="list-style-type: none"> <li>Change in enrollment</li> <li>Graduate satisfaction</li> <li>Graduation rates</li> <li>Job placement and success</li> <li>Employer satisfaction</li> </ul> <b>Societal Needs and Emerging Issues</b> <ul style="list-style-type: none"> <li>University Strategic Reviews</li> <li>Pedagogical Innovations</li> </ul> | <b>External Demand</b> <ul style="list-style-type: none"> <li>Labor market projections</li> <li>Employer feedback</li> <li>National and state policy/economic projections</li> </ul> <b>Societal Needs and Emerging Issues</b> <ul style="list-style-type: none"> <li>Government Regulations and Policies</li> <li>Pedagogical Innovations</li> </ul> <b>Disciplinary Advancements</b> <ul style="list-style-type: none"> <li>Technological Changes</li> <li>Changes in Professional Standards or Accreditation Requirements</li> </ul>                                                                                          |

#### *Level of revision for course and program*

| Level                | Level of Revision       | Description                                                                                                                                                                                                                                                                            |
|----------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Level</b>  |                         |                                                                                                                                                                                                                                                                                        |
| <b>Course</b>        | <b>Minor revision</b>   | <ul style="list-style-type: none"> <li>Improve Teaching technique and strategy</li> <li>Refine assignment instruction, assessment format</li> <li>Resources enhancement</li> <li>Content Update: incorporating the latest research, case studies, or technology advancement</li> </ul> |
| <b>Course</b>        | <b>Major revision</b>   | <ul style="list-style-type: none"> <li>Learning outcome and PLO alignment revised</li> <li>Course restructuring: reorganizing topics, adding or removing content, changing sequence of learning</li> </ul>                                                                             |
| <b>Program Level</b> |                         |                                                                                                                                                                                                                                                                                        |
| <b>Program</b>       | <b>Minor adjustment</b> | <ul style="list-style-type: none"> <li>Revising course sequencing</li> <li>Adding or removing, modifying credit distribution courses</li> <li>Increase high educational impact practice to the curriculum</li> </ul>                                                                   |
| <b>Program</b>       | <b>Full revision</b>    | <ul style="list-style-type: none"> <li>Updating program learning outcome</li> <li>Develop new specialization or tract, structure or modalities, realigning curriculum with program outcome</li> </ul>                                                                                  |

Process and approval level of course minor or full revision, and program minor revision will be set by HEI. For full program revision will be follow the following procedure. Figure 4 illustrates the entire process of curriculum revision.

The full program revision and minor programme revision shall be informed and recognized by the parent ministry and MoEYS

1. The department or faculty curriculum committee is responsible to monitor the maturity of the programmes since they were last endorsed for implementation by MoEYS. Any programmes that have reached maturity in their implementation cycle would require a full revision. Otherwise, minor revision can be conducted to check on the relevancy and currency of the courses.
2. The programme owner must constantly evaluate the relevance, currency and comprehensiveness of the programme. Typically, the periodic evaluation of the programme must take into account various factors. Among others, these factors encompass feedback from market needs analysis, tracer study of the alumni, input from external examiner reports, the continuous quality improvement (CQI) report, stakeholders' feedback and the benchmarking process, student enrollment.
3. For programmes that require full revision to be conducted, the department/curriculum development committee needs to revise the relevance of the programme structure and the courses. This needs to be done in many series of meetings at the departmental level. After the department reaches a consensus on the revised programme structure, it is imperative to assess and enhance all the courses. Certain courses may be retained, while others may be merged or some may be completely eliminated. It is highly probable that there is a need to introduce new courses.

Documents for submission to the faculty meeting comprise of the executive summary, programme specifications, course specifications and needs analysis reports (market, staff and facilities). Office of Academic Affairs (the governance structure may differ between HEIs), the office of Academic Affairs shall provide support through the process in term of technical and procedure. Upon endorsement of the faculty meeting regarding the revised programme, and Office of Academic Affairs, the complete documentation shall undergo verification by the Internal Quality Assurance (IQA) Office to ensure completeness of the documentation. The IQA Office of the HEI shall assist in ensuring that the curriculum revision documentations are complete. The IQA office shall also ensure that the programme meets all necessary standards, regulations, and requirements for implementation.

- Upon endorsement of the Academic Council, the complete curriculum documentations shall be then submitted to the DGHE or relevant ministries for information. For programmes that have not reached maturity in its cycle of implementation, the CQI practice shall be implemented at Program and Course level to ensure relevancy and currency, however for the CQI process, the revision can be in the form: program minor revision or program full revision. Within the program minor revision, it can include certain course minor or major revision.
  - Program minor revision includes: 1) revising course sequencing, 2) adding or removing, modifying credit distribution (20%) courses, or 3) adjust high educational impact practice to the curriculum.
  - Course minor revision includes 1) Improve Teaching technique and strategy, 2) Refine assignment instruction, assessment format, or 3) Resources and content update.

- Course major revision includes: 1) Learning outcome and PLO alignment revised, or 2) course restructuring.

The revision of these categories, procedure and approval level shall be further set by individual HEI. Report/minutes of meetings have to be produced for record and documentation purposes. Any changes to the courses must be reported to department or the faculty for full set of documents and CQI process.

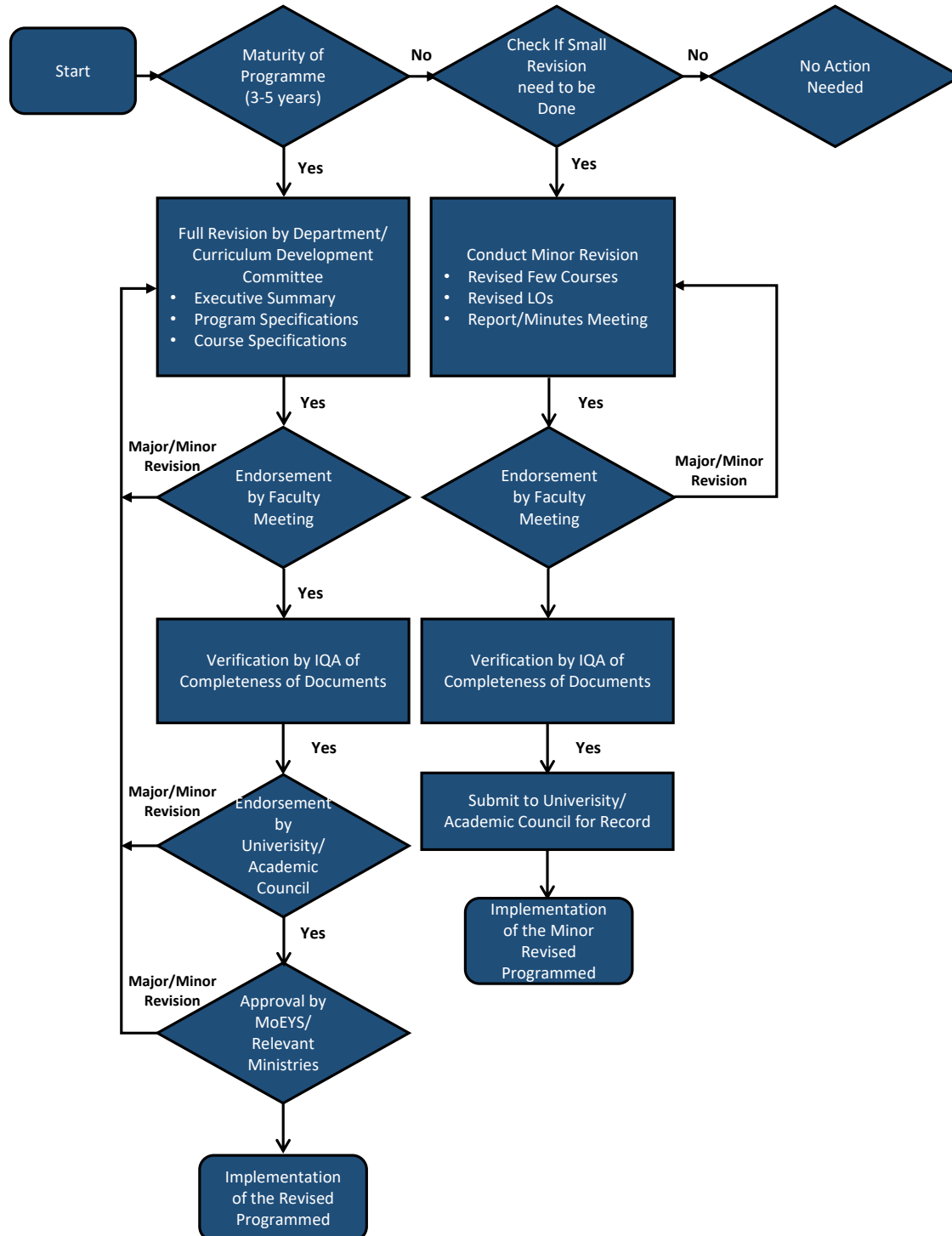


Figure 4: Processes in Revision of Existing Programmes

### 3. Expected Learning Outcomes

Learning outcomes are concerned with the achievements of the learner. They are statements of what a learner is expected to know, understand and/or be able to demonstrate after completion

of a process of learning. Aims or objectives, on the other hand, are concerned with teaching and the teacher's intentions as expressed in the aims or objectives of a course or lesson. Learning outcomes are commonly divided into different categories of outcomes such as discipline-specific outcomes that relate to the subject discipline and the knowledge and/or skills related to it; and generic (sometimes called transferable skills) outcomes that non-discipline-specific e.g. written, oral, problem-solving, information technology, and team working skills etc. Bloom's taxonomy is popularly adopted for writing learning outcomes. The guidelines for writing learning outcomes are listed below.

- Begin each learning outcome with an action verb, followed by the object of the verb and a phrase that gives the context. For example, "To apply economics and business management concepts to solve business problems in the real world".
- Use only one action verb per learning outcome.
- Avoid vague terms like know, understand, learn, be familiar with, be exposed to, be acquainted with, and be aware of. These terms are associated with teaching objectives rather than learning outcomes.
- Avoid long sentences. If necessary, use more than one sentence to ensure clarity.
- Ensure that the learning outcomes of the lesson support the learning outcomes of the module which in turn are aligned to the overall outcomes of the programme.
- The learning outcomes must be observable, measurable and capable of being assessed.
- When writing learning outcomes, bear in mind that they are realistic and achievable within the period of study.
- Use higher order thinking skills for learning outcomes as learner progresses to a higher level of study.
- Review and rewrite the learning outcomes to keep them current and relevant.

Developing a flexible, multidisciplinary, competency-based, and global academic curriculum requires the programme developer to set up the high-quality, specific, and measurable expected learning outcomes at every level or layer such as stakeholders' inputs, vision and mission of faculty and/or specific programme, programme educational objectives (PEO), programme learning outcomes (PLO), course learning outcomes (CLO), and even lesson learning outcomes (LLO). The mapping mechanism from one layer to another must be well-constructed for tracking the effectiveness of curriculum implementation (Figure 5).

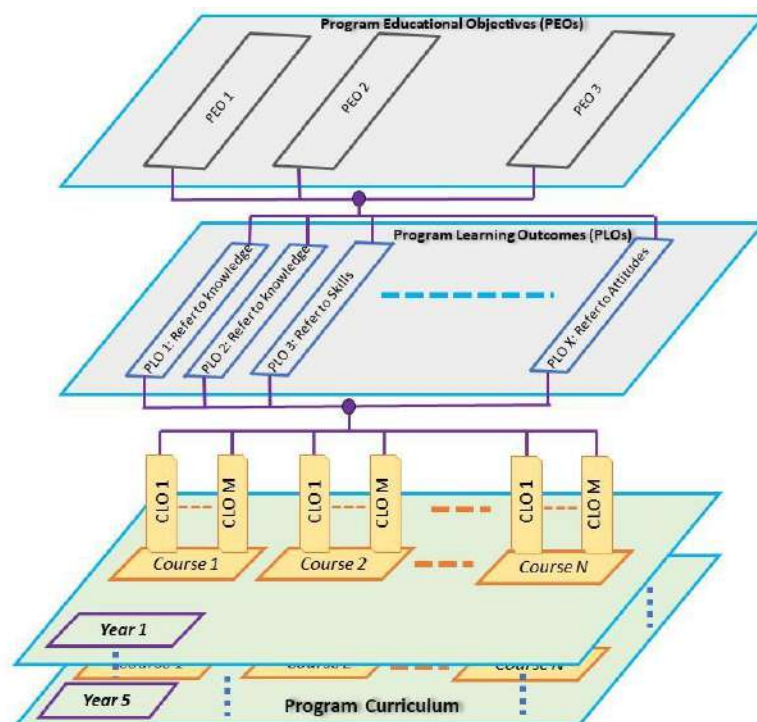


*Figure 5: Relationship between PEO, PLO, and CLO*

PEO statements describe the career and professional accomplishments that graduates are to obtain based on the attribute skills in the outer layer of FEF (see Figure 1). Each PEO statement must be consistent with the vision and mission statements of the programme. PEO must be supported by a well-defined curriculum and the teaching-learning process.

PLO statements of an academic programme show what learners are expected to know and their ability to perform the acquired skills and attributes by the time of graduation. PLO statements demonstrate what are the crucial knowledge (K), technical skills (S), and attitudes (A) that the learners acquire from the programme. The curriculum and course structures must be designed and executed accordingly so that by the time of graduation, students have achieved an acceptable minimum level of K-S-A addressed by the PLOs. The number of PLO statements of each programme must meet the requirements of the CQF. In this guideline, action verbs in Bloom's Revised Taxonomy are recommended for formulating both PLO and CLO statements for the cognitive domain. Table 3.1 provides a list of recommended action verbs for writing PLO and CLO statements in different domains associated with their respective levels.

Table 3. 1: List of Recommended Action Verbs for Writing PLO and CLO Statements

| Domain                             | Label | Level         | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Example                                                                                                                | Illustrative verbs                                                                                                                                                                                                     |
|------------------------------------|-------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Knowledge<br/>(Cognitive-C)</b> | C1    | Remembering   | Recognizing or recalling knowledge from memory. Remembering is when memory is used to produce or retrieve definitions, facts, or lists, or recite previously learned information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The student can recall the steps of the scientific method and list them in order.                                      | identify, relate, list, define, recall, memorize, repeat, record, name, recognize, acquire...                                                                                                                          |
|                                    | C2    | Understanding | Constructing meaning from different types of functions be they written or graphic messages or activities like interpreting, exemplifying, classifying, summarizing, inferring, comparing, or explaining.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The student can explain the process of photosynthesis and describe how plants convert sunlight into energy.            | restate, locate, report, recognize, explain, express, identify, discuss, describe, review, infer, Illustrate, interpret, conclude, represent, differentiate...                                                         |
|                                    | C3    | Applying      | Carrying out or using a procedure through executing or implementing. Applying relates to or refers to situations where learned material is used through products like models, presentations, interviews or simulations.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The student can use the formula for calculating the area of a circle to solve real-world problems related to geometry. | apply, relate, develop, translate, use, operate, organize, employ, restructure, interpret, demonstrate, illustrate, practice, calculate, show, exhibit, dramatize...                                                   |
|                                    | C4    | Analyzing     | <p>Breaking materials or concepts into parts, determining how the parts relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in this function are differentiating, organizing, and attributing, as well as being able to distinguish between the components or parts. When one is analyzing, he/she can illustrate this mental function by creating spreadsheets, surveys, charts, or diagrams, or graphic representations.</p> <p>Analyzing is about <b>breaking things down</b> into smaller parts to understand how they work together. You look at something closely and see its pieces.</p> | The student can compare and contrast two different economic theories, identifying their strengths and weaknesses.      | analyze, compare, probe, inquire, examine, contrast, categorize, differentiate, contrast, investigate, detect, survey, classify, deduce, experiment, scrutinize, discover, inspect, dissect, discriminate, separate... |

|                                   |              |              |                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                |                                                                                                                                                                                              |
|-----------------------------------|--------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | C5           | Evaluating   | Making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy, evaluating comes before creating as it is often a necessary part of the precursory behavior before one creates something.                                            | The student can assess the validity of a scientific experiment by evaluating its methodology and results                                       | judge, assess, compare, evaluate, conclude, measure, deduce, argue, decide, choose, rate, select, estimate, validate, consider appraise, value, criticize, infer...                          |
|                                   | C6           | Creating     | Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. Creating requires users to put parts together in a new way, or synthesize parts into something new and different creating a new form or product. This process is the most difficult mental function in the new taxonomy.                   | The student can design an experiment to test the effects of different fertilizers on plant growth, incorporating proper controls and variables | Judge, assess, compare, evaluate conclude measure deduce argue decide choose rate select estimate validate consider appraise value criticize infer...                                        |
| <b>Domain</b>                     | <b>Label</b> | <b>Level</b> | <b>Explanation</b>                                                                                                                                                                                                                                                                                                                                                                                             | <b>Example</b>                                                                                                                                 | <b>Illustrative verbs</b>                                                                                                                                                                    |
| <b>Attitude<br/>(Affective-A)</b> | A1           | Receiving    | refers to the student's willingness to attend to phenomena of stimuli (classroom activities, textbook, music, etc.). Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain.                                                                 | The student listens attentively during a class discussion on environmental issues, showing an interest in the topic.                           | ask, listen, focus, attend, take part, discuss, acknowledge, hear, retain, follow, concentrate, read, do, feel...                                                                            |
|                                   | A2           | Responding   | refers to active participation on the part of the student. At this level he or she not only attends to a particular phenomenon but also reacts to it in some way. Learning outcomes in this area may emphasize acquiescence in responding (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). The higher | The student participates actively in the class discussion, offering thoughtful comments on the importance of sustainability.                   | react, respond, seek clarification, interpret, clarify, provide other references and examples, contribute, question, present, cite, become animated or excited, help team, write, perform... |

|  |    |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                               |                                                                                                         |
|--|----|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  |    |            | levels of this category include those instructional objectives that are commonly classified under “interest”; that is, those that stress the seeking out and enjoyment of particular activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                               |                                                                                                         |
|  | A3 | Valuing    | <p>is concerned with the worth or value a student attaches to a particular object, phenomenon, or behavior. This ranges in degree from the simpler acceptance of a value (desires to improve group skills) to the more complex level of commitment (assumes responsibility for the effective functioning of the group). Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behavior. Learning outcomes in this area are</p> <p>concerned with behavior that is consistent and stable enough to make the value clearly identifiable. Instructional objectives that are commonly classified under “attitudes” and “appreciation” would fall into this category.</p> | The student demonstrates a commitment to recycling by consistently participating in school initiatives aimed at reducing waste.                               | argue, challenge, debate, refute, confront, justify, persuade, criticise...                             |
|  | A4 | Organising | <p>is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. Thus, the emphasis is on comparing, relating, and synthesizing values. Learning outcomes may be concerned with the conceptualization of a value (recognizes the responsibility of each individual for improving human relations) or with the organization of a value system (develops a vocational plan that satisfies his or her need for both economic security and social service). Instructional objectives relating to the development of a philosophy of life would fall into this category.</p>                                                                              | The student prioritizes environmental conservation by integrating sustainable practices into personal and academic life, such as reducing energy consumption. | build, develop, formulate, defend, modify, relate, prioritise, reconcile, contrast, arrange, compare... |

|                                  | A5    | Internalising   | <p>The individual has a value system that has controlled his or her behavior for a sufficiently long time for him or her to develop a characteristic “life-style.” Thus, the behavior is pervasive, consistent, and predictable. Learning outcomes at this level cover a broad range of activities, but the major emphasis is on the fact that</p> <p>the behavior is typical or characteristic of the student.</p> <p>Instructional objectives that are concerned with the student's general patterns of adjustment (personal, social, emotional) would be appropriate here.</p> | The student consistently advocates for social justice and equality in both school and community settings, reflecting a deeply ingrained value of fairness and equity | act, discriminate, display, influence, modify, perform, practice, propose, qualify, question, revise, serve, solve, use, verify...                |
|----------------------------------|-------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Domain                           | Label | Level           | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Example                                                                                                                                                              | Illustrative verbs                                                                                                                                |
| <b>Skill<br/>(Psychomotor-P)</b> | P1    | Perception      | The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.                                                                                                                                                                                                                                                                                                                                                                                                                                             | The student can identify the appropriate tools required to safely cut different materials in a woodworking project.                                                  | choose, describe, detect, differentiate, distinguish, identify, isolate, relate, select, separate...                                              |
|                                  | P2    | Set             | Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets).                                                                                                                                                                                                                                                                                                                                                                                  | The student prepares to play a musical instrument by positioning it correctly and adjusting posture before starting to play.                                         | begin, display, explain, move, proceed, react, respond, snow, start, volunteer...                                                                 |
|                                  | P3    | Guided Response | The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.                                                                                                                                                                                                                                                                                                                                                                                                                                      | The student can follow a teacher's instructions to perform basic dance steps, requiring some guidance and correction.                                                | assemble, build, calibrate, construct, dismantle, display, dissect, fasten, fix, grind, heat, manipulate, measure, mend, mix, organize, sketch... |
|                                  | P4    | Mechanism       | This is the intermediate stage in learning a complex skill. Learned responses have become                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The student can independently assemble a simple mechanical device,                                                                                                   | assemble, build, calibrate, construct, dismantle, display, dissect, fasten, fix, grind, heat,                                                     |

|  |    |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                               |                                                                                                                                                   |
|--|----|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|  |    |                        | habitual and the movements can be performed with some confidence and proficiency.                                                                                                                                                                                                                                                                                                                                                                                                         | such as a model car, without requiring step-by-step instructions.                                                                                                                                                             | manipulate, measure, mend, mix, organize, sketch...                                                                                               |
|  | P5 | Complex Overt Response | The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce. | Student dismantles and reassembles various components of an automobile quickly with no errors.<br><br>The student can proficiently perform a gymnastics routine, executing advanced movements with coordination and fluidity. | assemble, build, calibrate, construct, dismantle, display, dissect, fasten, fix, grind, heat, manipulate, measure, mend, mix, organize, sketch... |
|  | P6 | Adaptation             | Skills are well developed and the individual can modify movement patterns to fit special requirements.                                                                                                                                                                                                                                                                                                                                                                                    | The student has such ability that they can combine and integrate related aspects of the skill without guidance.                                                                                                               | adapt, alter, change, rearrange, reorganize, revise, vary...                                                                                      |
|  | P7 | Origination            | Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.                                                                                                                                                                                                                                                                                                                              | The student creates an innovative new dance routine, integrating various styles and choreographing the entire performance from scratch.                                                                                       | arrange, combine, compose, construct, create, design, originate...                                                                                |

### ***Sources:***

- Anderson, L. W., & Krathwohl, D. R. (eds.) (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. New York: Longman.
- Bloom, B., Englehart, M. Furst, E., Hill, W., & Krathwohl, D. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York, Toronto: Longmans, Green
- Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An Overview. *Theory Into Practice*, 41(4), 212–218.
- Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). Taxonomy of educational objectives: The classification of educational goals, Hand book II: Affective domain. New York: David McKay Company Incorporated.

Formulation of expected learning outcomes shall begin with the gathering of the needs of the stakeholders including faculty members, current and past students, employers, relevant government ministries/agencies, accreditation bodies, professional bodies, and employers. These needs are usually written in the form of graduate profile or competencies. They are then translated into programme learning outcomes using educational taxonomy such as the Bloom's taxonomy. Programme learning outcomes describe what the learner will be able to do at the end of the programme. They describe learning that is significant and related to what learners will be expected to do in the "real world. In writing a programme learning outcome (PLO) and course learning outcome (CLO), the following principles shall be used:

- i. It must be specific, precise, and clear.
- ii. It must be observable and measurable to allow instructors to assess achievements of the outcomes. Vague verbs in the outcome statements such as understand and know cannot be used since it is hard to measure if a person understands or knows something. It is clearer if it is stated more specifically, such as able to discuss or compute.
- iii. It has to be achievable and realistic to ensure that the outcomes can be achieved by the students within a specific time frame.
- iv. It has to be relevant to the course, programme, and broader goals such as the vision and mission of the university, CSDG, or the Pentagonal Strategy.
- v. It is time-bound, which specifies when the outcomes are to be achieved. For example, at the end of the programme or by the end of the class.

Academic programmes shall have a formal system for the development of Expected Learning Outcomes (ELOs). Academic program can develop their own system or adapt systematic procedure outlined in GTC developed by MoEYS for developing ELOs. This system shall be accessible via internal policies, guidelines, must outline the clear, ordered operative steps for contextualizing and implementing the MoEYS Guideline on Transformative Curriculum (GTC) within the institution, ensuring compliance with its principles

HEIs shall ensure that their Expected Learning Outcomes (ELOs) are developed in strict compliance with the sub-decree on the Cambodian Qualifications Framework (CQF), the established system, and the Guideline on Transformative Curriculum.

### **3.1. Curriculum Development within the FEF-OBE Framework**

As mentioned in Section 2, curriculum development requires a clear framework and process. Figure 6 illustrates a comprehensive process for curriculum development within the OBE framework. This process is thoroughly designed to cover the essential stakeholders and activities required for the effective implementation of OBE. It outlines four main steps that must be followed sequentially to develop an academic curriculum successfully.

1. Realise the vision and mission statements of the university/institution based on all relevant stakeholders' inputs.
2. Develop the programme educational objectives (PEOs) statements and these statements must be mapped to the vision and mission statements.
3. Formulate the programme learning outcomes (PLOs) statements which must be mapped to PEOs' statements.
4. Determine the programme structure where the programme developer must decide on the structure (eg. single major, major-minor), identify courses, contents, and implement teaching and learning activities.

Assessment must be conducted in every step and data collected must be analysed to identify strengths, weaknesses and areas for improvement. This data-driven approach helps instructors make informed decisions on the curriculum design, teaching approaches, assessment methods and resources as part of the continuous quality improvement (CQI) process.

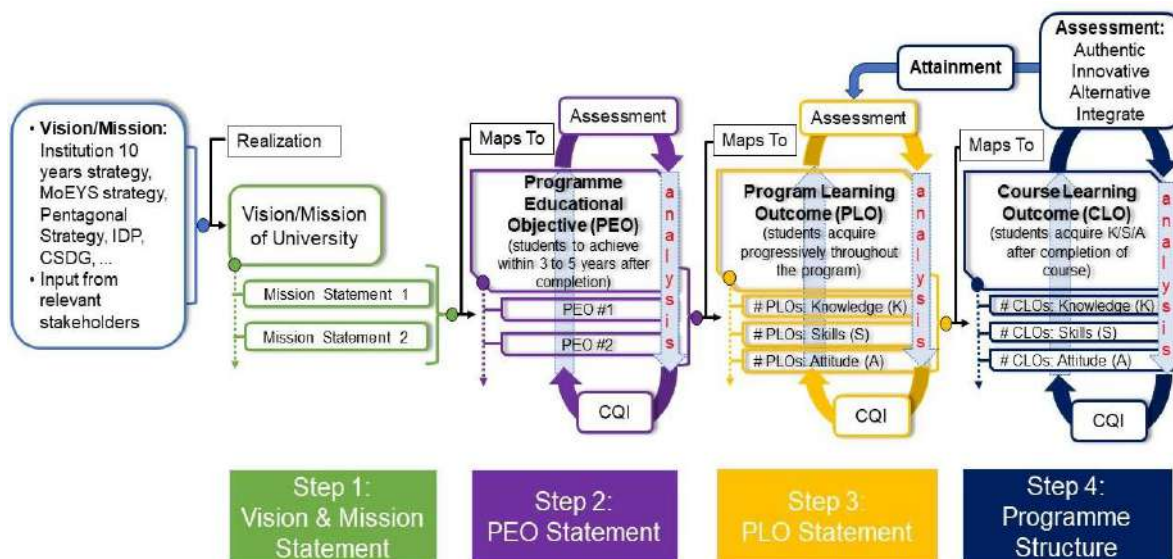


Figure 6: Curriculum Development Process from Inputs to Programme Structure

### 3.2. Formulating Programme Educational Objectives (PEOs)

The main guiding principle in formulating PEOs is the HEI's vision and mission. The PEOs must also be aligned to the FEF and meet stakeholders' expectations. It must also meet the requirements of the CQF and bodies that award recognition or accreditation to the programme.

#### 3.2.1. Aligning PEOs to University/Institution's Vision and Mission

Institutional vision and mission outline the overarching goals and purposes of the institution. The vision and mission of the institution must be aligned to the national policies, strategies, and needs of relevant stakeholders. Vision and mission statements can also be formulated for the programme level and must show the commitment and action preparing for success for all learners.

Table 3.2 outlines the vision and mission statements of the university and the academic programme in electronics and automation. Programme's vision and mission must be aligned with the institution/university. In this case, the vision and mission are cited in the 10-year strategic plan of the institute (see <https://itc.edu.kh/>). Some programmes may not have specific vision and mission statements, hence the PEOs will then be made aligned to the university/institution's vision and mission.

PEOs formulated for each academic programme shall be aligned to the institutional vision and mission to ensure that the programme fulfils the broader objectives of the institution. PEOs shall be mapped to the vision and mission and this need to be communicated to all relevant stakeholders, including faculty, students and employers.

Table 3. 2: Example of Vision/mission Statements of the Institution and an Electronics and Automation (EA) Engineering Programme

| Vision Statement                                                                                                                                                                                                                                                                              | Mission Statements                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>University/Institution Level</b>                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                 |
| <b>Vision:</b> The vision is to become a prominent institution that produces graduates with 21 <sup>st</sup> century skills and research and innovation who will contribute to the technology-led vision of the country in STEM and emerging globalisation.                                   | <b>Mission - #1:</b> Provide quality and equitable education in science and technology to become engineers with high professional ethics, entrepreneurial ability, creativity, innovation, virtue, morality, conscience, patriotism, social responsibility, and high awareness. |
|                                                                                                                                                                                                                                                                                               | <b>Mission - #2:</b> Develop scientific research, and transfer technology to the national community to enhance production capacity and harmonise for the country's vision 2030/2050.                                                                                            |
| <b>Programme Level</b>                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                 |
| <b>Vision:</b> The vision is to become a prominent EA Engineering Program that produces graduates with 21 <sup>st</sup> century skills and innovation who will contribute to the technology-led vision of the country in electronics, smart automation, robotics, and emerging globalisation. | <b>Mission - #1:</b> Produce graduates with high skills (technical skills and soft skills) for innovation for the country's vision 2030/2050 as well as for the emergence of globalisation in the related field.                                                                |
|                                                                                                                                                                                                                                                                                               | <b>Mission - #2:</b> Produce graduates who are lifelong learners and entrepreneurs through applied research and development (R&D) projects.                                                                                                                                     |

### 3.2.2. Writing Programme Educational Objectives (PEO) Statements

In writing the PEO statements, programme developers must have a good understanding of the institutional vision and mission. By identifying the key themes and objectives embedded in the vision and mission statements, the programme owner must describe the expected accomplishments of graduates within a few years (3 - 5 years) after graduation. As a recommendation, an undergraduate programme shall consider engaging with **three to five PEOs** for optimal outcomes. The PEOs should include pursuing post-graduate studies since undergraduate programmes are meant to prepare students for further studies. Table 3.3 and Table 3.4 show three main steps to write a good PEO statement and the set of examples of PEOs in an engineering programme and pharmacy programme.

Table 3. 3: Steps to Write Programme Educational Objectives (PEO) Statements

| Step     | Description                                                  | Example                                                                                                                            |
|----------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | To write a condition (verb)                                  | <b>PEO 1: To produce ...</b>                                                                                                       |
| <b>2</b> | To describe the career expectations for graduates to achieve | <b>PEO 1: To produce <i>qualified engineers in ...</i></b>                                                                         |
| <b>3</b> | To set up a criterion for success for graduates              | <b>PEO 1: To produce qualified engineers in <i>electronics and automation to meet market needs nationally/internationally.</i></b> |

Following the guideline from Table 3.3, examples of PEO statements of an Electronics and Automation (EA) Engineering Programme and in Pharmacy Programme are provided in Table 3.4 and Table 3.5. The mapping with the mission statements is also demonstrated. For ensuring that PEO statements are aligned to the mission of the university/faculty, at least one PEO must map to one mission statement.

Table 3. 4: Example of PEO and Mission Statements Mapping of an Engineering Programme

| PEO Statements        |                                                                                                                                  | Mission Statements |    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------|----|
|                       |                                                                                                                                  | #1                 | #2 |
| Engineering Programme | <b>PEO - 1:</b> To produce qualified engineers in electronics and automation to meet market needs nationally or internationally. | ✓                  |    |
|                       | <b>PEO – 2:</b> To produce lifelong learners who contribute significantly to the electronics and automation field.               |                    | ✓  |
|                       | <b>PEO – 3:</b> To pursue post-graduate education in fields related to electronics and automation.                               |                    | ✓  |
|                       | <b>PEO – 4:</b> To produce entrepreneurs in the field of electronics and automation or other related sectors.                    | ✓                  | ✓  |

Table 3. 5: Example of PEO and Mission Statements Mapping of a Pharmacy Programme

| PEO Statements     |                                                                                                                                                                                                 | Mission Statements |    |    |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----|----|
|                    |                                                                                                                                                                                                 | #1                 | #2 | #3 |
| Pharmacy Programme | <b>PEO – 1:</b> To produce pharmacists with profound knowledge in various fields of Pharmaceutical Sciences according to the needs of Pharmaceutical industry, community and Hospital Pharmacy. | ✓                  | ✓  |    |
|                    | <b>PEO – 2:</b> To produce graduates who can conduct research and extend their knowledge to create novel herbal and synthetic pharmaceutical products for the benefit of life.                  |                    | ✓  | ✓  |
|                    | <b>PEO – 3:</b> To produce graduates who excel in post-graduate programmes in pharmacy or related fields.                                                                                       | ✓                  |    | ✓  |

### 3.2.3. Assessment of Program Educational Objectives (PEOs)

The assessment of PEOs involves evaluating the extent to which graduates have achieved the intended outcomes, typically conducted 3 to 5 years after graduation.

This has to be a systematic process, conducted by the programme owners (or by the Alumni Office) which involves tracing the alumni, collecting data, analysing, reporting and making informed decisions on what measures need to be taken to enhance the quality of the programme.

For evaluating the effectiveness of the programme, the PEOs attainment shall be measured periodically, that is between three to five years after the student's graduation, and the assessment can be performed in the form of a tracer study. Apart from that, data collection can also be done through surveys, focus group discussions, and interviews with alumni and employers. For data collection with alumni, a minimum of 65% of responses or answers shall be collected to judge the achievement of defined PEOs and enough data for deciding on curriculum modification and improvement. A minimum of one technical seminar with a group of employees shall also be done to collect the stakeholder needs for the up-to-date situation.

Table 3. 6: Example of PEOs with Performance Indicators and Achievement Targets for EA Engineering Programme

| No. | PEO Statement                                                                                                    | CQF<br>(Major Domain)                                                                                         | Performance Criteria*                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                  |
|-----|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
|     |                                                                                                                  |                                                                                                               | Indicator                                                                                                                                                                                                                                                                                                                                                                                                                    | Target                                                           |
| 1   | To produce qualified engineers in electronics and automation to meet market needs nationally or internationally. | Knowledge<br>Cognitive<br>Psychomotor<br>Communication,<br>information<br>technology, and<br>numerical skills | <ul style="list-style-type: none"> <li>● Graduates who have obtained a job in the fields related to EA</li> <li>● Graduates who are promoted to a higher rank in the organisation.</li> <li>● Graduates who have led and completed at least one main project of the organisation.</li> <li>● Graduates who have participated in and completed at least one main project of the organisation as a key team member.</li> </ul> | <b>70%</b><br><br><b>30%</b><br><br><b>30%</b><br><br><b>60%</b> |
| 2   | To produce lifelong learners who contribute significantly to the electronics and automation field.               | Interpersonal skills and responsibility                                                                       | ● Graduates who are engaged in non-formal education or continuous professional development activities or courses for at least one course or 20 hours per year.                                                                                                                                                                                                                                                               | <b>60%</b>                                                       |
| 3   | To pursue post-graduate education in fields related to electronics and automation.                               | Interpersonal skills and responsibility                                                                       | ● Graduates who are pursuing or have completed post graduate studies.                                                                                                                                                                                                                                                                                                                                                        | <b>15%</b>                                                       |
| 4   | To produce entrepreneurs in the field of electronics and automation or other related sectors.                    | Interpersonal skills and responsibility                                                                       | <ul style="list-style-type: none"> <li>● Graduates who are involved in joint-venture project/s or have established a small medium enterprise in the electronics and automation field.</li> <li>● Graduates who are involved in research and development (R&amp;D) in the scope for future business at least one R&amp;D project funded by the business organisation.</li> </ul>                                              | <b>15%</b><br><br><b>65%</b>                                     |

*\*Measured at 3 – 5 years after graduation, which can be increased as part of the continuous quality improvement (CQI) process of the PEOs.*

The direct survey questions can be about salary range and increased trends, position and promotion in the organisation, professional career development, professional skills (hard and soft) development, research and innovation skills, management/leading a big project, etc. Before allowing students to leave the university completely, faculty must have a full database of the graduates such as e-mail, contact person, phone number, student identity number, etc. This information will be used later as a main contact source for data collection to measure the achievement of PEOs of each graduate. Perception-based or subjective questions that are related to indirect measurements can be included using the appropriate rating scale, such as a Likert scale. To increase its measurability and facilitate the analysis of its results, performance criteria in the form of indicators with targets may be defined for each PEO statement. An example of

PEO statements for an Electronics and Automation (EA) Engineering programme, with the corresponding performance indicators and achievement targets, is illustrated in Table 3.6. The targets can be determined based on current achievement, which can be considered as the baseline. From time to time, the set target can be incrementally increased.

As the PEOs indicate attributes and qualities of the graduates during their early working and professional life, it is vital to measure these defined graduate attributes expected by the external society, including the employers, in which graduates are joining and working within a measurable time frame. The suitable time frame for measuring the graduate attributes shall be within three to five years after their graduation to provide them enough time to adjust to the working environment as part of their career growth.

### 3.3. Formulating Programme Learning Outcomes (PLOs)

Once the PEOs are defined, the next step is to define the PLOs. PLOs provide clarity of the expectations on what students shall be able to know and do upon completion of the programme and must be mapped to the PEOs, to support the attainment of the PEOs.

#### 3.3.1. Definition of Programme Learning Outcomes (PLOs)

PLO statements of an academic programme show what learners are expected to know and their ability to perform by the time of graduation. PLO statements demonstrate what are the crucial knowledge (K), technical skills (S), and attitudes (A) that the learners shall acquire within the programme during their study years.

Knowledge (cognitive) refers to not only facts or information, but also encompasses the competent to think critically, connect ideas and solve problems in creative or innovative ways.

Attitudes (affective) refers to the development of students' attitudes, emotions, values, and social skills, including how they communicate, work with others, take responsibility, and make ethical and professional decisions in various situations.

Technical skills (psychomotor) refer to the abilities of learners to perform physical and technical tasks smoothly and automatically, combining different actions consistently, and doing them accurately, often with/without needing to watch someone else demonstrate.

The curriculum and course structures must be designed and executed accordingly so that by the time of graduation, students have achieved an acceptable minimum level of K-S-A addressed by the PLOs (see Table 3.7). The number of PLO statements of each program can be determined based on a national and international qualification framework.

In the Cambodian Qualification Framework (CQF), the expected PLOs for students are categorised into two major sets of competencies, basic, and core. These competencies are further organised into five major domains (MDs). Given that MD4 (interpersonal skills and responsibility) and MD5 (communication, information technology, and numerical skills) consist of several different skills which are equally important, it is best to expand these **five Major Domains** into **10 Learning Domains (LDs)** that every HEI must address. The five MDs and 10 LDs are as follows:

- **MD1: Knowledge**
  - **LD1: Knowledge**, the ability to:
    - know the basic elements to acquaint with a discipline or solve problems,
    - organise the information and ideas (including theories and principles) to enable them to function together,
    - carry out the techniques and methods for identifying and solving the problems for subject-specific,

- understand thinking and learning, which is considered abstract knowledge,
- **MD2: Cognitive skills**
  - **LD2: Cognitive skills**, the ability to:
    - apply remembering and understanding of the concepts, principles, theories, and processes in critical thinking and problem solving,
    - analyse and evaluate problems or given tasks that faced with an unanticipated new situation,
    - develop or create problem-solving skills,
- **MD3: Psychomotor/Technical skills**
  - **LD3: Psychomotor/Technical skills**, the ability to:
    - performs one or more skills with ease and becomes automatic with limited physical or mental exertion,
    - performs combining than one skill in sequence with harmony and consistency,
    - reproduces a skill with accuracy proportion; and exactness and is usually performed independent of source,
    - performs skill according to instruction rather than observation,
- **MD4: Interpersonal skills and responsibility**
  - **LD4: Interpersonal skills**, the ability to:
    - establish and enhance personal and work-based relationships characterised by effective communication and conflict resolution,
  - **LD5: Responsibility**, the ability to:
    - take responsibility for their own learning and continuing personal and professional development,
    - work effectively in groups and exercise leadership when appropriate,
    - act responsibly in personal and professional relations,
  - **LD6: Entrepreneurial skills**, the ability to:
    - demonstrate entrepreneurial competency with selected or set-up project(s),
  - **LD7: Ethics and Professionalism**, the ability to:
    - identify ethical issues, make decisions ethically, and act professionally within the varied social and professional environment and practice as well as local and global issues relating to science, technology, business, and environment,
- **MD5: Communication, information technology, and numerical skills**
  - **LD8: Communication**, the ability to:
    - develop effective communication in clear, coherent, and persuasive language appropriate to purpose, occasion, and audience,
    - communicate effectively in oral and written form,
  - **LD9: Information technology or digital skills**, the ability to:
    - apply information and communication technology (ICT),
    - use a broad range of information, media, and technology applications to support study and/or work,
  - **LD10: Numerical skills**, the ability to:
    - use basic mathematical and statistical techniques,
    - work with numbers including the use of mathematical formulas,

Table 3.7 demonstrates the alignment between the major domains, PLOs and the learning domains. For MD5 (communication, information technology, and numerical skills), the PLOs/LDs can be categorised as knowledge or skills or attitude, depending on the focus/context. For instance, if the instructor focusses on the ability to write for effective communication, it can be categorised as knowledge (K). However, if the focus is on the skills in communicating, then it can be classified as skills (S).

Table 3.7: Alignment between K-S-A and CQF Learning Domains (MDs and LDs)

| Cat.  | Major Domains (MDs)                                              | Programme Learning Outcomes (PLOs) | Learning Domains (LDs)                          |
|-------|------------------------------------------------------------------|------------------------------------|-------------------------------------------------|
| K     | MD1: Knowledge                                                   | PLO1                               | LD1: Knowledge                                  |
|       | MD2: Cognitive skills                                            | PLO2                               | LD2: Cognitive skills                           |
| S     | MD3: Psychomotor/ Technical skills                               | PLO3                               | LD3: Psychomotor/Technical skills               |
| A     | MD4: Interpersonal skills and responsibility                     | PLO4                               | LD4: Interpersonal skills                       |
|       |                                                                  | PLO5                               | LD5: Responsibility                             |
|       |                                                                  | PLO6                               | LD6: Entrepreneurial skills                     |
|       |                                                                  | PLO7                               | LD7: Ethics and Professionalism                 |
| K/S/A | MD5: Communication, information technology, and numerical skills | PLO8                               | LD8: Communication*                             |
|       |                                                                  | PLO9                               | LD9: Information technology or digital skills * |
|       |                                                                  | PLO10                              | LD10: Numerical skills *                        |

K – Knowledge, S – Skills, A – Attitude

\*can be K or S or A depending on the focus/contexts

### 3.3.2. Writing Programme Learning Outcomes (PLOs) for Each Domain

Figure 7 illustrates a guide in developing PLO statements that consist of four parts: a short starting phrase, an action verb, a learning statement, and a conditional phrase.

1. *A short starting phrase*: indicates who the target learners are and specify when the outcome should be achieved.
2. *Action verb*: reflects on learner behaviour that can reflect observable and measurable outcomes such as identifying, creating, and performing (see list of action verbs for writing PLOs and CLOs in Table 3.1).
3. *Learning statement*: reflects Knowledge (K), Skills (S), and Attitudes (A) that will need to be acquired by the learner.
4. *Conditional phrase*: included to clarify the communication of learning outcomes.

#### Development of a PLO statement:

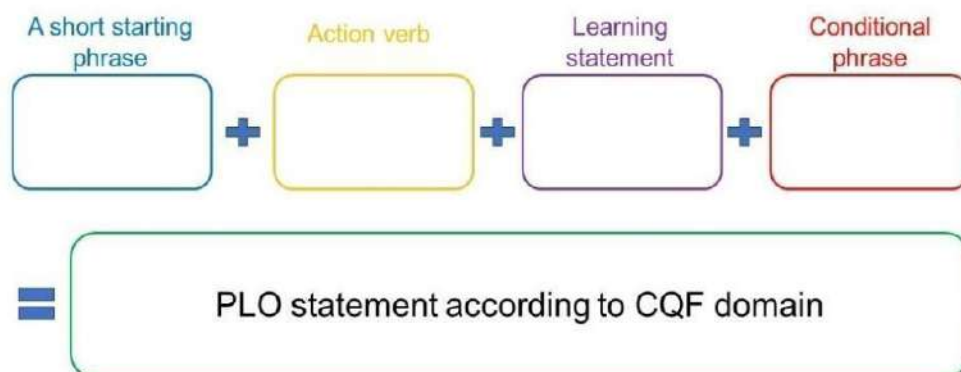


Figure 7: Guide in Writing a PLO Statement

Table 3.8 provides an example of a PLO based the guide above, which consists of the four parts. This is a useful guide in writing PLOs.

Table 3. 8: Example for Formulating PLO Statement

|                                |                                                                                                                                                              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A short starting phrase</b> | On successful completion of the educational programme, the students are be able to...                                                                        |
| <b>Action verb</b>             | apply engineering design...                                                                                                                                  |
| <b>Learning statement</b>      | to produce solutions...                                                                                                                                      |
| <b>Conditional phrase</b>      | that meet specified needs with consideration of public health, safety, welfare, cultural, social, environmental, and economic factors in the field of study. |

As a recommendation, a newly developed or revised undergraduate programme shall set the levels of the PLOs for the cognitive, affective and psychomotor domains to an **average of C4 (analysing), A4 (organising), and P4 (mechanism)** to ensure that the educational programme will produce graduates that fit the defined outcomes of the FEF. As an example, if three courses claim that the highest cognitive levels of each are C3 (applying), C4 (analysing) and C5 (evaluating), then the average is C4. This has to be calculated for all the courses within the programme.

Here are some examples of PLO statements in each CQF domain:

- **Knowledge domain (MD1):**
  - **PLO1 – Knowledge (LD1):** At the end of this (*educational programme xxx*), students are able to apply new knowledge in the fields of electronics and smart automation systems.
- **Cognitive domain (MD2):**
  - **PLO2–Cognitive skills (LD2):** On successful completion of the educational programme xxx, students are able to design engineering products/solutions that meet the specified needs with consideration of social economic factors in the field of electronics and automation.
- **Psychomotor/Technical domain (MD3):**
  - **PLO3 – Psychomotor/Technical skills (LD3):** By the completion of the (*educational programme xxx*), students are able to conduct appropriate experimentation with data interpretation to conclude the scope of a specific system design.
- **Interpersonal skills and responsibility (MD4):**
  - **PLO4 – Interpersonal Skills (LD4):** Upon completion of the (*educational programme xxx*), students are able to develop teamwork skills whose members provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
  - **PLO5 – Responsibility (LD5):** By the completion of the (*educational programme xxx*), the students are able to demonstrate responsibility and accountability towards society and the environment.
  - **PLO6 - Entrepreneurial skills (LD6):** On successful completion of the (*educational programme xxx*), the students are able to identify business problems accurately and effectively across a wide range of business domains, including management practice, accounting and financial management, operations, marketing, and strategic management.
  - **PLO7 - Ethics and Professionalism (LD7):** At the end of this (*educational programme xxx*), students are able to recognize ethical and professional responsibilities in the engineering context with consideration to the societal impacts.
- **Communication, information technology, and numerical skills:**

- **PLO8 – Communication (LD8):** Students in (*educational programme xxx*) are able to apply written, oral, and graphical communication with appropriate usage of the technical literature.
- **PLO9 - Information technology or digital skills (LD9):** By the successful completion of the (*educational programme xxx*), students are able to use computer software for data analysis and solving complex problems.
- **PLO10 – Numerical Skills (LD10):** Students in (*educational programme xxx*) are able to use both quantitative and qualitative techniques to forecast change that will affect a business venture in the future.

### 3.3.3. Mapping Programme Learning Outcomes (PLOs) into Domains of CQF

As previously illustrated, a minimum of 10 PLOs must be established for one undergraduate programme. These PLOs must be mapped to the five major domains (MD) and 10 learning domains (LD) to make sure that the delivered program is well aligned to the national standard in which domain statements were developed to support the needs of the country and global trends. Table 3.9 illustrates the PLOs and their mapping to the five major domains (MD) and 10 learning domains (LD) in CQF. At least one PLO should support each learning domain in CQF.

Table 3. 9: Mapping of PLOs against the Learning Domains (LDs) and Major Domains (MDs)

| PLO | MD1 | MD2 | MD3 | MD4 |     |     |     | MD5   |       |       |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|
|     | K   | K   | S   | A   | A   | A   | A   | K/S/A | K/S/A | K/S/A |
|     | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8   | LD9   | LD10  |
| 1   | ✓   |     |     |     |     |     |     |       |       |       |
| 2   |     | ✓   |     |     | ✓   |     |     |       |       |       |
| 3   |     |     | ✓   |     |     |     | ✓   |       |       |       |
| 4   | ✓   |     |     | ✓   |     |     |     |       |       |       |
| 5   |     |     |     |     | ✓   |     |     |       |       |       |
| 6   |     |     |     | ✓   |     | ✓   |     |       |       |       |
| 7   |     |     |     |     |     |     | ✓   |       | ✓     |       |
| 8   |     |     |     |     |     |     |     | ✓     |       |       |
| 9   |     | ✓   |     |     |     |     |     |       | ✓     |       |
| 10  |     |     |     |     |     |     |     |       |       | ✓     |
| ... |     |     | ✓   |     |     |     |     | ✓     |       |       |

### 3.3.4. Alignment of Programme Learning Outcomes (PLOs) to PEOs

An educational programme usually has three to five PEO statements. According to the OBE curriculum development process (see Figure 3.1), to ensure the success of the defined vision and mission of the university and faculty, the PEOs must be well-defined and must support the vision and mission statements of the programme. Furthermore, for tracking the implementation of the undergraduate programme, each PEO statement must be supported by one or a few PLOs. Take note that all PLOs must align to at least one PEO. Table 3.10 shows the format of mapping between the PLOs and the PEOs.

Table 3. 10: Example of Mapping between the PLOs and the PEOs

| PLO    | Programme Educational Objectives (PEOs) |       |       |       |
|--------|-----------------------------------------|-------|-------|-------|
|        | PEO 1                                   | PEO 2 | PEO 3 | PEO n |
| PLO 1  | ✓                                       |       |       | ✓     |
| PLO 2  | ✓                                       | ✓     |       |       |
| PLO 3  | ✓                                       |       | ✓     |       |
| PLO 4  |                                         | ✓     |       | ✓     |
| PLO 5  |                                         | ✓     |       |       |
| PLO 6  | ✓                                       |       | ✓     |       |
| PLO 7  |                                         |       |       | ✓     |
| PLO 8  |                                         | ✓     | ✓     |       |
| PLO 9  |                                         | ✓     |       | ✓     |
| PLO 10 | ✓                                       |       | ✓     |       |
| ...    |                                         |       |       |       |

According to the AUN-QA document, a study programme must comprise of subject specific outcomes and generic outcomes. To comply with AUN's classification, the expected learning outcomes shall consist of both subject-specific and generic outcomes. The subject-specific outcomes include the knowledge (MD1), cognitive (MD2), and psychomotor (MD3) domains, while the generic outcomes encompass interpersonal skills and responsibility (MD4), as well as communication, information technology, and numerical skills (MD5).

Apart from this classification, the CLOs can also be categorised as cognitive, affective, psychomotor (CAP) or more known as knowledge, skills, attitude (K, S, A) based on the CQF terminology. Knowledge is the cognitive component; skills is the psychomotor component and attitude is the affective component. The psychomotor component also includes technical skills.

The CQF Knowledge Domain (MD1/LD1) encompasses all six levels of Bloom's Revised Taxonomy. Bloom refers to the taxonomy as a cognitive domain. It is cognitive but it needs to be differentiated with the Cognitive Domain (MD2/LD2) of the CQF. Here, the Cognitive Domain focuses on abilities such as problem solving, critical thinking, and analytical thinking which require more advanced thinking skills.

In developing CLOs, each course shall outline the important points such as specific, measurable, achievable, relevant, time-bound, and accessible CLOs. This will need to be detailed out as Lesson Learning Outcomes (LLOs) for weekly teaching and learning activities. Appropriate teaching methods, design-based problems for appropriate learning activities, and assessment methods must be planned to ensure achievement of each proposed CLO. The same principles apply in formulating CLOs. Table 3.11 shows an example of CLO for knowledge domain (LD1) at C4 (analysing). Note that the cognitive, affective and psychomotor domains are based on the learning taxonomies. Hence, the learning outcomes to be achieved are in levels which are hierarchical.

Table 3. 11: Example for Formulating CLO Statement for LD1 at Level of Analysis (C4)

|                                |                                                    |
|--------------------------------|----------------------------------------------------|
| <b>A short starting phrase</b> | At the end of the course, students are able to...  |
| <b>Action verb</b>             | Select...                                          |
| <b>Learning statement</b>      | the power electronics components and structures... |
| <b>Conditional phrase</b>      | for suitable application purposes.                 |

The following is an example of CLO focusing on communication (LD8) for MD5. For MD4 and MD5, there are no levels of achievement to be indicated. That applies only for the cognitive, affective and psychomotor domains.

*Table 3. 12: Example for Formulating CLO Statement for LD8*

|                                |                                                         |
|--------------------------------|---------------------------------------------------------|
| <b>A short starting phrase</b> | At the end of the course, students are able to...       |
| <b>Action verb</b>             | Develop...                                              |
| <b>Learning statement</b>      | effective communication skills for power electronics... |
| <b>Conditional phrase</b>      | in scientific and non-scientific communities.           |

As a recommendation to the curriculum developer and course principal lecturer, **each course must include three to five CLOs and must have a combination of Cognitive – Affective – Psychomotor (C-A-P) or C-A or C-P**, clearly specifying the levels for each CLO.

One may easily get confused between main domains, learning domains and domains for taxonomy of learning, which are Cognitive, Affective and Psychomotor. The main domains show the wide coverage of outcomes to be achieved by students, which are from MD1 to MD5 which comprises of knowledge (cognitive) to skills (psychomotor) to attitude (affective) (C-A-P or K-S-A). The integration of the taxonomies (levels for the cognitive, affective and psychomotor domains) indicates the depth of the learning outcomes expected.

### 3.3.5. CQF Learning Outcomes Domains

In CQF, CLOs must be classified according to the learning domain (cognitive - C, affective - A, or psychomotor/technical skills - P) and should correlate with one or more of the five major domains in CQF. As a guide, all academic courses must have at least one CLO to support the Knowledge domain (MD1) and/or Cognitive domain (MD2) which can be assessed through tests, exams, projects etc., as opposed to a course that only focus on skill development (focus mainly on MD3 and may not have tests or exams). Table 3.13 presents an example of CLO statements of the course ‘Power Electronics’ in the EA engineering programme and the predetermined levels of learning domains.

*Table 3. 13: Sample of CLO Statements for a Course and Their Corresponding CQF and Learning Domains*

| <b>Course Learning Outcomes - CLOs</b><br><br>At the end of the course, students are able to:                          | <b>CQF Major Domain</b> | <b>Learning Domain</b> | <b>Levels in Learning Domain</b><br><b>Knowledge (Cognitive – C),</b><br><b>Attitudes (Affective – A),</b><br><b>Skills (Psychomotor – P)</b> |          |          |
|------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|
|                                                                                                                        |                         |                        | <b>C</b>                                                                                                                                      | <b>A</b> | <b>P</b> |
| <b>CLO1:</b> Select the power electronics components and structures for suitable application purposes. (MD1 - LD1, C4) | MD1                     | LD1                    | 4                                                                                                                                             |          |          |
| <b>CLO2:</b> Design a suitable and economical power electronics converter for                                          | MD2<br>MD3              | LD2<br>LD3             | 6                                                                                                                                             |          | 6        |

|                                                                                                                                         |     |     |  |   |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----|-----|--|---|--|
| requirement specification. (MD2 - LD2, C6, MD3 - LD3, P6)                                                                               |     |     |  |   |  |
| <b>CLO3:</b> Develop effective communication skills for power electronics in scientific and non-scientific communities. (MD5 - LD8, A4) | MD5 | LD8 |  | 4 |  |

### 3.3.6. Alignment of CLOs to PLOs

Aligning the CLOs to PLOs is crucial to ensure the tracking and effective course implementation. It also ensures that each course contributes significantly to the PLO. Attainment of CLOs implies attainment of PLOs. Hence, the courses must be properly planned to meet the PLOs which correspond to the 10 LDs (Note: Each programme must have at least 10 PLOs. However, some programmes may have more than 10 PLOs).

Figure 8 shows the assessment and evaluation methods for the attainment of CLOs and corresponding PLOs for a student. As shown in this figure, the mapping between CLOs and PLOs statements is a must for all educational programmes for measuring and evaluating the PLO attainment for each student under the OBE framework. For a more detailed explanation on CLO and PLO attainment, refer to the Guidelines on Holistic Assessment (GHA).

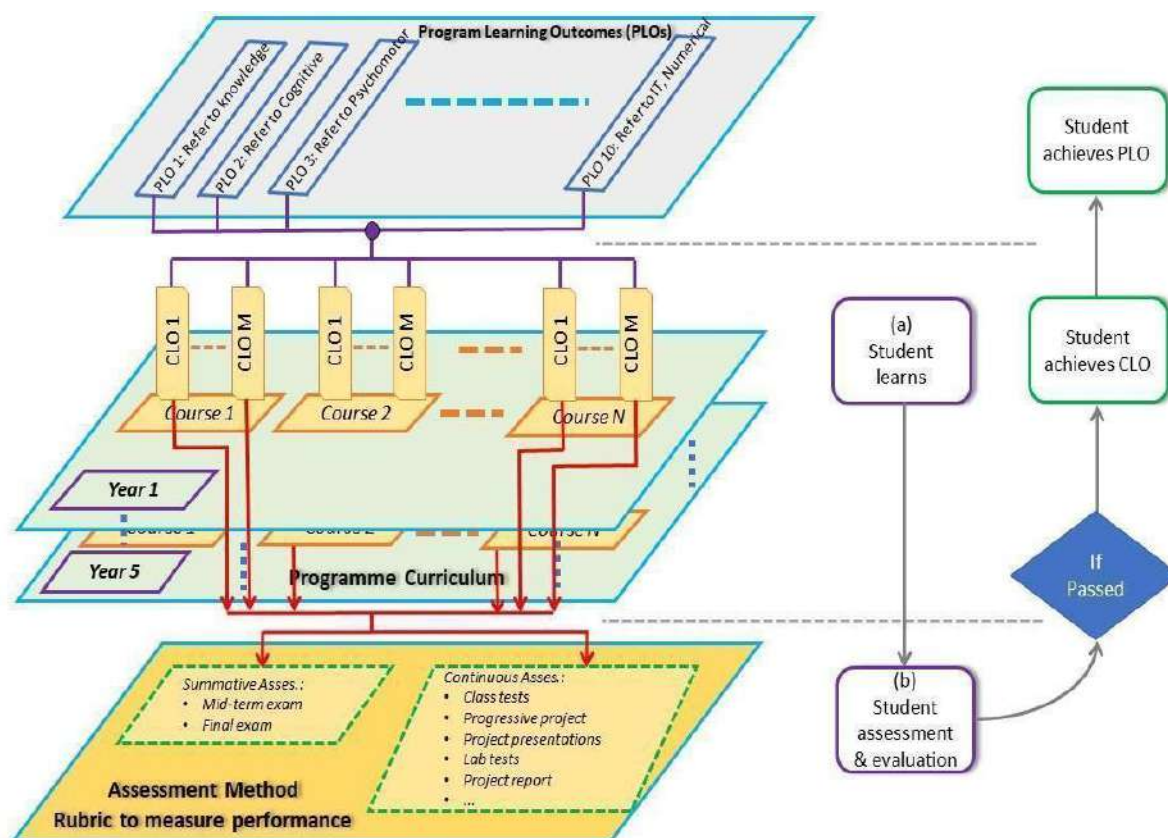


Figure 8: CLOs-PLOs Mapping and their Attainment

Table 3.14 illustrates the mapping of courses to PLOs. While some mappings only indicate the PLOs that courses contribute to by ticking (✓), they do not demonstrate the extent of the contribution. In this guideline, the use of F (fully), M (moderately), and P (partially) is recommended to indicate the extent of contribution. This will enable instructors to determine the extent that each course contributes to the PLOs.

The identification of P, F, or M determines the emphasis on the specific PLO. This will also determine the allocation of time for teaching and learning activities, as well as the weightage for assessing the CLOs that are aligned to the PLOs. As a recommendation, fully (F) indicates a focus of more than 50% on this PLO in the course, moderate (M) indicates a focus of 30% - 50%, and partial (P) indicates a focus of less than 30% for the PLO.

Table 3. 14: An Example of the Mapping of Courses to PLOs

| Year  | Sem. | Course Code | Course Title                     | Credit | Programme Learning Outcomes (PLOs) |   |   |   |   |   |   |   |   |    |
|-------|------|-------------|----------------------------------|--------|------------------------------------|---|---|---|---|---|---|---|---|----|
|       |      |             |                                  |        | 1                                  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1     | 1    | DTCI11KLC   | Khmer Language for Communication | 2      | P                                  |   |   | P |   |   |   | F |   |    |
|       |      | DTCI11HAC   | Humanity and Civilization        | 2      | P                                  |   |   |   | F |   | P |   |   |    |
|       |      | DTCI11FRE   | French I                         | 2      | P                                  |   |   | M |   |   |   | M |   |    |
|       |      | DTCI11GEO   | Geometry                         | 2      | P                                  |   | P |   |   |   |   |   |   | M  |
|       |      | DTCI11MEC   | Mechanics I                      | 3      | P                                  | M | P |   |   |   |   |   |   |    |
|       |      | DTCI11ENV   | Environment                      | 2      | P                                  |   |   |   |   |   | M | P |   |    |
|       |      | DTCI22VAW   | Vibration and Wave               | 3      | P                                  |   | P |   |   |   |   |   |   | M  |
|       |      | .....       |                                  |        |                                    |   |   |   |   |   |   |   |   |    |
| 5     | 1    | GEEI51ENG   | English for Work                 | 1      | P                                  |   |   | P |   |   | M | P |   |    |
|       |      | GEEI51MIP   | Module d’insertion Profesionnel  | 1      | P                                  |   |   | P |   |   | M | P |   |    |
|       |      | GEEI51PRM   | Project Management               | 2      | F                                  | P |   |   |   |   |   |   | P | P  |
|       |      | GEEI51SPP   | Student Project Part III         | 1      | P                                  |   | P | P | P |   |   |   | P | P  |
|       |      | GEEI51EME   | Embedded Electronics             | 3      | F                                  |   | F |   |   |   |   |   |   |    |
|       |      | GEEI51INA   | Industrial Automation            | 3      | F                                  |   | F |   |   |   |   |   |   |    |
|       |      | GEEI51TEC   | Technopreneurship                | 1      | P                                  |   |   |   | P | F |   |   |   |    |
|       |      | GEEI51ELV   | Extra-low Voltage Design         | 3      |                                    | F | F |   |   |   |   |   |   |    |
|       |      | GEEI51WSP   | Work-life and Social Psychology  | 1      | P                                  |   |   |   | M |   | M |   |   |    |
|       | 2    | GEEI52FYI   | Final Year Internship            | 12     | P                                  | P | P | P | P | P | P | P | P | P  |
| Total |      |             | 63 courses                       | 144    | F= ...<br>P= ...<br>M= ...         |   |   |   |   |   |   |   |   |    |

Table 3.15 shows the course mapping to CSDGs for ensuring that the proposed programme identified specific courses/contents to support some of those 18 CSDGs of the country.

Table 3. 15: Courses Mapping to CSDG

| Course                | Cre. | CSDG          |                |                               |                      |                    |                               |                                |                                    |                                            |                          |                                        |                                            |                    |                      |                  |                                            |                               |                    |
|-----------------------|------|---------------|----------------|-------------------------------|----------------------|--------------------|-------------------------------|--------------------------------|------------------------------------|--------------------------------------------|--------------------------|----------------------------------------|--------------------------------------------|--------------------|----------------------|------------------|--------------------------------------------|-------------------------------|--------------------|
|                       |      | 1. No Poverty | 2. Zero Hunger | 3. Good Health and Well-Being | 4. Quality Education | 5. Gender Equality | 6. Clean Water and Sanitation | 7. Affordable and Clean Energy | 8. Decent Work and Economic Growth | 9. Industry, Innovation and Infrastructure | 10. Reduced Inequalities | 11. Sustainable Cities and Communities | 12. Responsible Consumption and Production | 13. Climate Action | 14. Life Below Water | 15. Life on Land | 16. Peace, Justice and Strong Institutions | 17. Partnership for the Goals | 18. Demining & ERW |
| Clean Energy          | 3    |               |                |                               |                      |                    | ✓                             | ✓                              |                                    |                                            |                          |                                        |                                            | ✓                  |                      |                  |                                            |                               |                    |
| Sustainable Energy    | 3    |               |                |                               |                      |                    |                               | ✓                              |                                    | ✓                                          |                          | ✓                                      |                                            | ✓                  |                      |                  |                                            |                               |                    |
| Environment           | 2    |               |                |                               |                      |                    | ✓                             |                                |                                    |                                            |                          |                                        |                                            | ✓                  | ✓                    | ✓                |                                            |                               |                    |
| Industrial Automation | 3    |               |                |                               | ✓                    |                    |                               |                                | ✓                                  | ✓                                          |                          |                                        |                                            |                    |                      |                  |                                            |                               |                    |
| ...                   |      |               |                |                               |                      |                    |                               |                                |                                    |                                            |                          |                                        |                                            |                    |                      |                  |                                            |                               |                    |

## **4. Programme Structure**

A programme structure refers to the organisation of courses within an academic programme according to categories of required cluster of courses. For guidelines on programme structures used in other countries, it also indicates the range (number of credits and percentage) for each cluster of courses to be taken, to ensure standardisation between institutions. Thus, for Cambodia, the team had also produced a guide on different programme structures to be adopted by HEIs. It provides guidance on options available and the required credits range, for example single major, double major, major-minor, and major with specialisation. In moving forward, programmes such as joint degree and dual degree programmes should also be considered by the HEIs.

### **4.1. Guiding Principles in Structuring Academic Programmes Based on FutureFit Educational Framework**

In designing an academic programme, a strategic approach needs to be taken to ensure that the programme meets the educational goals of the institution/faculty/programme, needs of the country, students, industry and other stakeholders, as well as aligning it to the standards set by CQF, MoEYS and accreditation standards. In meeting the needs of students and societal demands and in producing the competent workforce of tomorrow as illustrated by FEF, some of the guiding principles are as follows:

#### **Global and Future-Oriented Perspective**

The academic programme design should take a worldwide viewpoint into account, equipping students to thrive in a world that is becoming more interconnected and globalized. The programme shall incorporate with any angle of the Cambodian Sustainable Development Goals (CSDG), Pentagonal Strategy (PS) and other development policies of the country. Curriculum design shall be competency-focused, multi, inter and trans-disciplinary, as well as providing global perspectives and experience for students, while still allowing some flexibility in the structure.

In general, the programme content and structure are conceptualised around the Global Framework and practices in related fields of studies. The design of the curriculum should incorporate the global view and contribution to local and global development agenda in each specific area of specialisation to provide students with practical professional skill development in their field of studies. In addition to the subject contents, the programmes should also provide students the ‘Global Education opportunities’ through different learning development programmes. To achieve programme educational outcomes, HEIs need to broaden both local and international linkages or partnership programmes with relevant HEIs, industries, institutions/organizations to promote ‘Global Education Opportunities’ for students. As part of the degree programmes, a range of ‘Global Education Opportunities’ can be created/ promoted such as international internship, international practicum, international student exchange, international volunteering, international short courses or diploma and international joint degree programmes.

#### **Developing Balanced Graduates**

The design of the programmes must equip students with professional competence in their area of specialisation through core courses, as well as support their overall development with courses that contribute to their broader attributes. Approximately 75% (90 of 120 credits for undergraduate programme) of the courses must focus on core courses that build professional competencies or subject specific outcomes. Meanwhile, around 25% of the courses shall be dedicated to supporting courses that enhance the development of additional competencies or

generic outcomes. These supportive courses should be integrated into the curriculum design both explicitly and implicitly.

### **Giving Students Choice: Flexibility**

The programmes should also provide flexibility for students to choose in terms of the types of programmes and the duration of studies. The design of the programme should provide options for students to choose either ‘by research’ or ‘by course work’ to fit their career development goals and available resources and time. The programme by research takes longer time than by coursework because it requires students to complete the research project/theses. For example, the Master of Physical Education by research is a two-year degree programme. Whereas the programme by ‘coursework’ takes only one year because the learners are required to complete coursework and a small project, not the research theses/projects.

Flexibility in the design can also be in the form of different programme structures such as single major, major with minor, double majors etc. This enhances the accessibility and relevance of education, catering to the needs of the students and the evolving demands of the job market and academic disciplines.

### **Interdisciplinary Opportunities**

Designing *multi-, inter-, and trans-disciplinary* programmes requires dismantling of disciplinary boundaries and fosters a holistic perspective of the curriculum that reflects the interdependence of real-world issues and solutions. To create and resolve challenging problems, it pushes students to utilise and integrate knowledge from several fields. For instance, a multidisciplinary approach in academic programme design involves the integration of multiple disciplines of the same field of study in one academic programme.

#### ***Example 1: Transdisciplinary Programme (Double Major) - Bachelor of Engineering and Education***

Transdisciplinary academic programme design involves a combination of several disciplines to create a holistic approach or integration of different disciplines in a harmonious manner to construct knowledge. HEIs design a double major (different fields), for example, Bachelor programme in Engineering and Education. The structure of the programme consists of 147 credits which include 12 credits of the basic courses, 30-50 credits of the common courses, 45-60 credits of Engineering major courses, and 45-60 credits of Education major courses. Upon completion of the programme, students are awarded the Bachelor of Engineering and Education.

The curriculum is made to be flexible, allowing for customisation in accordance with personal preferences, areas of interest, and the always changing needs of the industry and society. This ensures relevance and application.

#### ***Example 2: Flexible and Unconventional - Bachelor of Education in Teaching English as a Foreign Language; and Bachelor of Arts in English for Work Skills***

The curriculum is made to be flexible, allowing for customisation in accordance with personal preferences, areas of interest, and the always changing needs of the industry and society. This ensures relevance and application. For instance, the Bachelor of Education in Teaching English as a Foreign Language; and Bachelor of Arts in English for Work Skills is a four-year bachelor programme offered by one public HEIs and the other by a private HEIs. The programme is designed to equip students with English language proficiency and a specialization in English based on their personal interests and professional careers. The programmes are structured to have the first third of the same foundation and English language courses which aim to equip students

with the English-language proficiency. Having completed their third year, students can have the options to choose one specialization in a specific area of English either in Education (Teaching), or English for Work Skills English (in the fourth year. Upon completion of all programme requirements, students are awarded the degree of B.Ed. in Teaching English as a Foreign Language or Bachelor of Arts in English for Work Skills i.e. English Language for Translation and Interpretation, Tourism, Hospitality...). Having received the degrees, the students can also apply to study for one-year certificate program for another professional skill.

### ***Example 3: Global Curriculum - Master of Arts in International Relation and Diplomacy***

The M.A. in International Relation and Diplomacy is a flexible, interdisciplinary and international study programme aims at providing specialist study in the field of 'International Relation and Diplomacy'. It is a two-year joint degree programme offered by one public HEI in Cambodia and its international university partners. Within the four semesters, students have to spend at least one semester at the host university to earn a certain number of credits. The programme content development and delivery within content knowledge and the framework of relevant humanitarian and International Laws/policies, 'Global Politics' 'Political Landscape', and it is based on theoretical perspectives across international relation and social science for the interdisciplinary basis in the area of this specialization. It is a combination of REAL and IDEAL (refer to Sections 5.1 and 5.2) programme structure which place a research-based and work-based experiential learning in the industry or INGOs (i.e. UNESCO, UNDP, World Bank, UNICEF...) at least for one semester. As part of programme requirement, students must undertake the work-based experiential learning in the industry or INGOs at least for one semester and produce a research report to fulfil the degree requirement. These experiential learning settings consist of a multidisciplinary and multi-culture-built environment.

## **4.2. Programme Structure Based on Programme Types**

The transformative curriculum of the FEF must consist of a range of courses to contribute to development of graduate attributes and all domains and levels of learning outcomes. Hence, the programme structure must be clear and the succession of the courses must be well-planned to support student learning.

A well-structured educational programme provides a clear path for students to develop their knowledge, skills and attitude. As an example, the Bachelor of Science (B.Sc.) programme in Cambodia is a four-year programme and is designed to train students for specific fields. The programme is structured according to five clusters of courses including i. Basic course, ii. Core Courses (for major field of study), iii. Core Courses (for minor field of study, if applicable), iv. Elective courses, and v. Specialised courses and Research work (Thesis), Advanced Studies, or an alternative option of taking extra courses to complete the 120 credits required.

The structure of a programme can be based on the distribution of credits and percentage for each cluster of courses within the programme. Below is the classification of courses that HEIs need to incorporate in the academic programmes:

### **4.2.1. Types of Courses**

The differentiation of programme structures is based on the proportion of various courses that need to be completed. Consequently, having knowledge about the different categories of courses will enhance understanding of the programme structures.

**Basic course:** An introductory level course that provides the foundation for further study in a particular subject. Basic courses are typically offered at the beginning of a programme of study

and are designed to teach students the essential concepts and skills they will need to succeed in more advanced courses.

**Core course (for major field of study):** A foundational course required for a specific academic major. These courses provide students with the necessary knowledge and skills to succeed in their chosen field of study.

**Core course (for minor field of study):** A secondary field of study that a student pursues alongside a major. It typically consists of 15-25 credit hours of coursework, which is fewer than the number of credits required for a major. Minors allow students to explore a field of interest that is different from their major, or to gain additional knowledge and skills that complement their major.

**Elective course:** A course that students get to choose from a variety of options. Unlike core courses, which are required for a particular degree or diploma, elective courses allow students to explore their interests and learn about subjects outside of their major field of study.

**Specialised course:** A course taken within a major that allows students to pursue a specific specialisation. Specialisation can happen at various levels of education, from undergraduate degrees to professional certifications.

The core, specialised, electives courses can also be further categorised as intermediate or advanced courses. Definitions of these courses are as follows:

**i. Intermediate Course**

A course or set of courses that are in the middle levels of the courses that are built up from the basic courses/levels and to prepare learners for the advanced level of learning.

**ii. Advanced Course**

Advanced courses are the higher or the highest-level courses of the degree programs. These course(s) focus on building up professional competence of the learners.

These three levels of courses from basic to intermediate to advanced must provide progressive understanding and proficiency that heightened students' abilities in handling more complex tasks. Hence, the organisation of the courses must align with the knowledge requirements necessary to undertake them.

#### **4.2.2. Course Sequence**

The structure of the course must encompass a well-rounded construction of curriculum modules from the basic/foundation to intermediate to advanced courses, and contribute to building up of professional competence of learners from the basic to advanced levels in the area of specialisations. The programme structure must be clear and the succession of courses from year to year must be well planned to support students for the next level of learning to achieve expected PLOs.

#### **4.2.3. Types of Programmes Based on Structure**

There are different programme structures which HEIs may choose to offer. These structures open more benefits to students by widening their interdisciplinary learning, academic excellence, career readiness while catering for the diverse interest of the students. Among the structures that can be designed for the programme are Single Major, Major with Minor, Major with Specialisation, Double Majors, Double Degree, and Dual Degree.

The following Table 4.1 was formulated in a workshop in January 2024. After a lengthy deliberation and comparing several programme structures adopted by different countries, a comprehensive guide for programme structure was approved by the team by integrating the best practices in terms of total credit requirement and credits range for each category of courses (basic, major, minor, electives, specialisation).

The approved programme structure has a basic course worth 15 credits, with 6 credits from the MoEYS and 9 credits from the HEIs. MoEYS recommends course themes such as:

1. Basic Entrepreneurship
2. Digital Literacy
3. Moral and Civic
4. Global Citizenship
5. Khmer Civilization
6. Association of Southeast Asian Nations (ASEAN)
7. Cambodian Sustainable Developmental Goals (CSDGs)

Table 4. 1: Distribution of Credits for Different Programme Structures

| TYPES OF PROGRAMMES BASED ON STRUCTURE                                                                                                                              |                                                                                                                                                                            |                             |         |                               |         |                            |         |                                                      |                                                                |                                                      |                                                           |                                                      |                                                           |                                                            |                                                                 |                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------|-------------------------------|---------|----------------------------|---------|------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                     |                                                                                                                                                                            | 1                           |         | 2                             |         | 3                          |         | 4                                                    |                                                                | 5                                                    |                                                           | 6                                                    |                                                           | 7                                                          |                                                                 | 8                                                                                                                                                                  |
| No                                                                                                                                                                  | Types of course                                                                                                                                                            | Programme With Single Major |         | Programme With Specialisation |         | Programme With Major-Minor |         | Programme With Double Major (Same Field)             |                                                                | Programme With Double Major (Different Fields)       |                                                           | Programme With Dual Degree                           |                                                           | Programme With Double Degree                               |                                                                 | Programme With Professional Bodies                                                                                                                                 |
|                                                                                                                                                                     |                                                                                                                                                                            | Credit                      | %       | Credit                        | %       | Credit                     | %       | Credit                                               | %                                                              | Credit                                               | %                                                         | Credit                                               | %                                                         | Credit                                                     | %                                                               | Credit                                                                                                                                                             |
| 1                                                                                                                                                                   | Basic Courses (MoEYS)*<br>1. Basic Entrepreneurship<br>2. Digital Literacy<br>3. Moral and Civic<br>4. Global Citizenship<br>5. Khmer Civilization<br>6. ASEAN<br>7. CSDGs | 6                           | 5       | 6                             | 5       | 6                          | 5       | 6                                                    | 4.6                                                            | 6                                                    | 4                                                         | 6                                                    | 4                                                         | 6                                                          | 4                                                               | 6                                                                                                                                                                  |
| 2                                                                                                                                                                   | Basic Courses (HEI)                                                                                                                                                        | 9                           | 7.5     | 9                             | 7.5     | 9                          | 7.5     | 9                                                    | 7                                                              | 9                                                    | 6                                                         | 9                                                    | 6                                                         | 9                                                          | 5                                                               | 9                                                                                                                                                                  |
| 3                                                                                                                                                                   | Major Core Courses Including:<br>By course work:<br>(Internship/Industrial training/Community outreach Or By Research)                                                     | 78-85                       | 65-70   | 63-70                         | 52.5-58 | 63-70                      | 52.5-58 | Major A: 35-40<br>Major B: 35-40<br>Com. Core: 45-50 | Major A: 26.9-30.7<br>Major B: 26.9-30.7<br>Com.Core: 4.6-38.5 | Major A: 45-50<br>Major B: 45-50<br>Com. Core: 42-50 | Major A: 30.6-34<br>Major B: 30.6-34<br>Com.Core: 28.5-34 | Major A: 45-50<br>Major B: 45-50<br>Com. Core: 42-50 | Major A: 30.6-34<br>Major B: 30.6-34<br>Com.Core: 28.5-34 | Major HEIA: 50-60<br>Major HEIB: 50-60<br>Com. Core: 52-60 | Major HEIA: 30-35.9<br>Major HEIB: 30-35.9<br>Com.Core: 31-35.9 | Follow National/International Professional Bodies, In several crucial fields affecting the society<br>e.g:<br>- Medical<br>- Engineering<br>- Food Safety<br>- Law |
| 4                                                                                                                                                                   | Minor Core Courses                                                                                                                                                         | x                           |         | x                             |         | 30-35                      | 25-29   | x                                                    |                                                                | x                                                    |                                                           | x                                                    |                                                           | x                                                          |                                                                 |                                                                                                                                                                    |
| 5                                                                                                                                                                   | Elective Courses                                                                                                                                                           | 27-35                       | 22.5-30 | 12-15                         | 10-13   | 12-15                      | 10-13   | x                                                    |                                                                | x                                                    |                                                           | x                                                    |                                                           | x                                                          |                                                                 |                                                                                                                                                                    |
| 6                                                                                                                                                                   | Specialised Courses                                                                                                                                                        | x                           |         | 30-35                         | 25-29   | x                          |         | x                                                    |                                                                | x                                                    |                                                           | x                                                    |                                                           | x                                                          |                                                                 |                                                                                                                                                                    |
| 9                                                                                                                                                                   | Total                                                                                                                                                                      | 120                         | 100     | 120                           | 100     | 120                        | 100     | 130                                                  | 100                                                            | 147                                                  | 100                                                       | 147                                                  | 100                                                       | 167                                                        | 100                                                             |                                                                                                                                                                    |
| Maximum Credits                                                                                                                                                     |                                                                                                                                                                            | 130                         |         | 135                           |         | 135                        |         | 145                                                  |                                                                | 165                                                  |                                                           | 165                                                  |                                                           | 195                                                        |                                                                 |                                                                                                                                                                    |
| Note: * These are the main themes. HEIs can develop courses aligned with these themes. For example, a history course could fall under the Khmer civilization theme. |                                                                                                                                                                            |                             |         |                               |         |                            |         |                                                      |                                                                |                                                      |                                                           |                                                      |                                                           |                                                            |                                                                 |                                                                                                                                                                    |

#### **4.2.3.1. Programme with Single Major**

A single major is the main area of study that a student concentrates on during their undergraduate degree program. It typically consists of a set of required courses, electives, and a culminating project or thesis. Students who choose a single major typically do so because they have a strong interest in a particular field and want to gain in-depth knowledge and expertise in that area. The students who choose a single major need to fulfill a minimum of 120 credits which include 15 credits of the basic courses from a selection provided by 6 credits from MoEYS and 9 credits from the HEI, 78-85 credits of major core courses, and 27-35 credits of elective courses.

#### **4.2.3.2. Programme with Specialisation**

Program with specialisation within an academic program involves choosing a major focus and adding specific courses that focus on a particular area of expertise within that field. One may choose to major in Economics with a specialization in Microeconomics. The students who choose the major with the specialisation need to follow the credits distribution of the minimum 120 credits of all courses which include 15 credits of the basic courses from a selection provided by 6 credits from MoEYS and 9 credits from the HEI, 63-70 credits of major core courses, 30-35 credits of specialized courses, and 12-15 credits of elective courses. The student will earn a degree, for example, a Bachelor of Arts in Economics (Microeconomics).

#### **4.2.3.3. Programme with Major – Minor**

In the context of an academic degree, a major is the primary field of study that a student focuses on during their undergraduate studies. A minor is a secondary field of study that students can choose to complement their major. A minor typically requires fewer courses than a major, and it may or may not be directly related to the student's major. The students who choose the major with minor need to follow the credits distribution of the minimum 120 credits of all courses which include 15 credits of the basic courses from a selection provided by 6 credits from MoEYS and 9 credits from the HEI, 63-70 credits of major core courses, 30-35 credits of minor core courses and 12-15 credits of elective courses. For example, a student who is majoring in computer science might choose to minor in mathematics or business administration. The student will earn the degree, for example, a Bachelor of Science in Computer Science with Mathematics.

#### **4.2.3.4. Programme with Double Major (same field and different field)**

A double major is an academic program in which a student completes the requirements for two majors, resulting in a single bachelor's degree with two focus areas. This provides opportunities for students to deepen their knowledge in two different fields, develop a more well-rounded skill set, and increase their career options. The students who choose the double major structure need to follow a more intensive course load and study plan to meet the requirements of both majors.

Credit distribution of a minimum of 130 credits is required if the two majors are in the same field. The credit requirement includes 15 credits of the basic courses from a selection provided by 6 credits of MoEYS and 9 credits of the HEI, 35-40 credits of first major courses, 35-40 credits of second major courses, and 45-50 credits of the common courses. For example, Bachelor of Science in Computer Science and Mathematics.

However, the requirement for taking up two majors from different fields would require a minimum of 147 credits including 15 credits of the basic courses from a selection provided by 6 credits of MoEYS and 9 credits of the HEI, 45-50 credits of the first major courses, 45-50 credits of second major courses, and 42-50 credits of the common courses. For example, students can take a Bachelor of Science in Computer Science and Management or a Bachelor of Science in Chemistry and English.

The credit requirement depends on how much overlapping exists between the courses of the two majors chosen. The student will earn one degree with the two majors stated, for example, Bachelor of Science in Computer Science and Mathematics.

#### **4.2.3.5. Programme with Dual Degree**

Dual degree programmes combine two study programmes from the same or similar fields involving two degree-granting institutions that collaborate and are of equal standing, leading to the awarding of two scrolls by the involved institutions. For example, a bachelor's degree in finance from University A and a bachelor's degree in Banking from University B. The credit requirement is a minimum of 147 credits including 15 credits of the basic courses from a selection provided by MoEYS (6 credits) and 9 credits of the HEI, 45-50 credits of the first major courses from University A, 45-50 credits of second major courses from University B, and 42-50 credits of the common courses based on each university (A and B).

#### **4.2.3.6. Programme with Double Degree**

Double degree is a combination of two study programmes from different fields involving the same institution or two degree-granting institutions that collaborate and are of equal standing, leading to the awarding of two scrolls by the involved institutions. It requires fulfilling the requirements for both degrees. This can be a great way to broaden the student's knowledge and skills, making them more well-rounded for graduate school or the workforce and increasing opportunities for better jobs. The students who choose the double degree need to follow the credits distribution of the minimum 167 credits of all courses which include 15 credits of the basic courses from a selection provided by MoEYS (6 credits) and 9 credits of the HEI, 50-60 credits of courses from major program of University A, 50-60 credits of courses from the major program of University B and 15-30 credits of the common courses from each University (A and B). The student will earn two degrees, for example, a Bachelor of Science in Computer Science and a Bachelor of Arts in English Literature, or a Bachelor of Science in Mathematics and a Bachelor of Business Administration.

#### **4.2.3.7. Programme with Joint Degree**

A joint degree is a special academic programme where students earn a single degree combining coursework and expertise from two institutions or academic disciplines. This means students will graduate with one degree that reflects the knowledge and skills they gained from both programs.

The credit distribution for joint degrees is based on which structure they are using, a single major, double major, etc. Then the two universities involved will have to decide on how much each is handling. There has to be a mutual agreement between the two universities to decide on the credit requirement of the degree.

### **5. Programme Structure Based on Models**

Programme structures based on models are academic programmes designed, developed, or revised according to a specific model, such as the Experiential Learning and Competency-Based Education Landscape (EXCEL) introduced in the Malaysian universities (Malaysian Ministry of Higher Education MoHE, 2021). The following are programme structures based on the EXCEL model, with modifications to suit the Cambodian context.

#### **5.1. Research-Infused Experiential Learning**

Research-infused experiential learning (REAL) is a curriculum structure that requires the involvement of research to prepare graduates to be ready for the workplace or as researchers. Three REAL approaches are mostly used for industry-driven curricula which are i. research-based learning (>80%), ii. research-infused learning (50 – 70%), and iii. final-year project (10%). The percentage indicates the extent of research infusion in the programmes.

## **Why is REAL Learning Important?**

The common concern from Cambodian society is the low percentage of R&D personnel in business enterprises as compared to other countries in the region. REAL is a key model for tackling the research mismatch and is a source of solutions that drive students to get knowledge, skills, and the right attitude to perform competent research in their future workplace. Table 5.1 shows the mapping between the REAL spectrum, CQF learning domains, and the three approaches. According to the table, REAL's final year project needs to have 10% of courses dedicated to supporting the research activity up to Level 2 of practical experience. REAL's research-infused learning needs to have the courses from 50% to 70% dedicated to supporting the research activity up to Level 4 of research-intensive competence in producing research. REAL's research-based learning needs to have at least 80% of courses linked to the main research activity that leads the research spectrum up to Level 7 of research mentor competency in guiding other students to perform research.

Table 5. 1: Mapping between REAL Spectrum, CQF Domains, and Approaches

| Year | REAL Spectrum                | Research competency                                   | Description                                                                                                                                                                                                                                                                             | CQF CLUSTER |                  |             |               |                |                         |                                          |                                          |                  |  | REAL approaches (Curriculum)                                                                                                                                                                                                                   |
|------|------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|-------------|---------------|----------------|-------------------------|------------------------------------------|------------------------------------------|------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                              |                                                       |                                                                                                                                                                                                                                                                                         | Knowledge   | Cognitive skills | Psychomotor | Interpersonal | Responsibility | Entrepreneurship skills | Ethics and Professionalism communication | Information technology or digital skills | Numerical skills |  |                                                                                                                                                                                                                                                |
| 1    | Level 1: Research Oriented   | Have research knowledge                               | Students are provided with research knowledge and scientific methodological skills to progress from awareness to understanding of research                                                                                                                                              | ✓           |                  |             |               |                |                         |                                          |                                          |                  |  | Final year project <ul style="list-style-type: none"><li>● 10% courses dedicated to research activities.</li><li>● Engage in a research internship at a university or industry.</li><li>● Competency: Level 2 (practical experience)</li></ul> |
| 2    | Level 2: Research immersion  | Practical experience                                  | Focuses on the development of research and inquiry skills and techniques through practical research sessions or attachment with scientists/researchers on an ongoing research project; students may become observers/assistants                                                         |             | ✓                |             |               | ✓              |                         |                                          |                                          |                  |  |                                                                                                                                                                                                                                                |
|      | Level 3: Research Apprentice | Conduct research                                      | Students are assigned to work with scientists/ researchers on an ongoing research project. Guided on how to perform research tasks and have the opportunity to collaborate with other researchers                                                                                       |             |                  | ✓           |               |                |                         | ✓                                        |                                          |                  |  | Research-Infused Learning <ul style="list-style-type: none"><li>● 50 – 70% of courses used for research activities.</li></ul>                                                                                                                  |
| 3    | Level 4: Research Intensive  | Produce research output (guided)<br>Initiate research | Students become active participants, rather than passive recipients, to develop research ideas and contribute to knowledge production under close guidance by experienced researchers/scientists. Students are personally and professionally supported to develop their research skills | ✓           |                  |             | ✓             |                |                         |                                          |                                          |                  |  | ● Competency: Level 4 (produce research output, initiate research)                                                                                                                                                                             |

|     |                                               |                                                |                                                                                                                                                                                                                                                            |  |  |  |   |   |   |   |   |  |   |  |   |  |  |                                                                                                                                                   |
|-----|-----------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---|---|---|---|---|--|---|--|---|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <b>Level 5:<br/>Research<br/>Practitioner</b> | Produce<br>research<br>output<br>(independent) | Students become active participants, rather than passive recipients, to develop research ideas and contribute to the production of knowledge under minimal guidance. Students are personally and professionally supported to develop their research skills |  |  |  |   | ✓ |   |   | ✓ |  |   |  |   |  |  | Research-Based Learning<br>● More than 80% of courses are engaged with research activities.<br>● Competency: Level 7 (guiding others on research) |
|     | <b>Level 6:<br/>Research<br/>Producer</b>     | Disseminate<br>research<br>output              | Students demonstrate the capability to disseminate research output through publications (in respective fields) and communicate the research findings on various platforms                                                                                  |  |  |  | ✓ |   | ✓ |   |   |  |   |  |   |  |  |                                                                                                                                                   |
| 4/5 | <b>Level 7:<br/>Research<br/>Mentor</b>       | Guiding<br>others on<br>research               | Students become mentors to guide, coach or train the inexperienced juniors to pursue their interests and goals in research. They provide support and opportunities to inexperienced juniors to find their research interests and areas                     |  |  |  |   |   |   | ✓ |   |  | ✓ |  | ✓ |  |  |                                                                                                                                                   |

### REAL's Characteristic

Research engagement curriculum design, delivery mode, and assessment strategy, and overall programme management are three main elements to be considered for the successful implementation of REAL approaches. Table 5.2 demonstrates a sample of one academic programme that implements a research-infused learning approach (50% research involvement). The table shows the research level, indicator, name of courses, learning activities, and evidences.

*Table 5. 2: Example of Research-infused Learning Implementation*

| Level and Indicator                    | Indicator                                                                                           | Course Code | Course                      | Teaching Approaches         | Learning Activities         | Evidences           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------|-------------|-----------------------------|-----------------------------|-----------------------------|---------------------|
| <b>Level 1<br/>(Research Oriented)</b> | Students are provided with research knowledge and scientific methodological skills to progress from |             | General Physics             | Depends on the course owner | Depends on the course owner | Presentation slides |
|                                        |                                                                                                     |             | Mechanics I                 |                             |                             |                     |
|                                        |                                                                                                     |             | Electricity and Magnetism I |                             |                             |                     |
|                                        |                                                                                                     |             | Physics Lab I_I             |                             |                             |                     |
|                                        |                                                                                                     |             | Mechanics II                |                             |                             |                     |

|                                          |                                                                                                                                                                                                                               |  |                                |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|                                          | awareness to understanding of research.                                                                                                                                                                                       |  | Electricity and Magnetism II   |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Physics Lab I_II               |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
| <b>Level 2<br/>(Research Immersion)</b>  | Focuses on the development of research and inquiry skills and techniques through research practical sessions or attachment with scientists/researchers on an on-going research project; students are frequently as observers. |  | Thermodynamics I               | Practical classes                                    | Depends on the course owner                                                                                                                                                                                                                                                                                                                                                                                                                            | 1) Psychomotor skill assessment<br>2) Lab reports                                                           |
|                                          |                                                                                                                                                                                                                               |  | Modern Physics I               |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Electrical Circuit Analysis I  |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Oscillation and Wave I         |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Physics Lab II_I               |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Thermodynamics II              |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Oscillation and Wave II        |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Physics Lab II_II              |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Thermodynamics I               |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
| <b>Level 3<br/>(Research Apprentice)</b> | Students are assigned to work with scientists/researchers on an on-going research project. They will be guided on how to perform research tasks and have the opportunity to collaborate with other researchers.               |  | Renewable Energy-I             | - Student rotation in research lab<br>- Presentation | 1) Lecturer will host students in their own research lab/have an ongoing research<br>2) Students will undergo 4 hours/subject/semester<br>3) Students will identify the research equipment in the lab<br>4) Students will record log of the activities<br>5) Students will conduct research tasks<br>6) Students will write a reflection on the skills that they have learnt<br>7) Students will write an SOP for an experiment/usage of lab equipment | 1) Log of the activities<br>2) Reflection<br>3) SOP documents<br>4) Written report<br>5) Media presentation |
|                                          |                                                                                                                                                                                                                               |  | Electronic devices I           |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Atomic and molecular physics I |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Electrodynamics I              |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Quantum mechanics I            |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Physics Lab III_I              |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |
|                                          |                                                                                                                                                                                                                               |  | Renewable Energy-II            |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                             |

|                                            |                                                                                                                                                                                                                                                                                                   |  |                                    |                             |                             |                                                                                                                                            |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------|-----------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Level 4<br/>(Research Intensive)</b>    | Students become active participants, rather than passive recipients, to develop research ideas and contribute to the production of knowledge under closed guidance by experienced researchers/ scientists. Students are personally and professionally supported to develop their research skills. |  | Electronic Devices II              | Depends on the course owner | Depends on the course owner | 1) Systematic review article<br>2) Project report<br>3) Reflection<br>4) Presentation<br>5) Psychomotor skill assessment<br>6) Lab reports |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Atomic and molecular physics II    |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Electrodynamics II                 |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Quantum Mechanics II               |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Physics Lab III _II                |                             |                             |                                                                                                                                            |
| <b>Level 5<br/>(Research Practitioner)</b> | Students become active participants, rather than passive recipients, to develop research ideas and contribute to the production of knowledge under minimal guidance. Students are personally and professionally supported to develop their research skills.                                       |  | Photonics and Laser I              | Final Year Project          | Depends on the course owner | Proposal                                                                                                                                   |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Semiconductor Physics I            |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Solid state physics I              |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Nuclear Physics and Application-I  |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Astrophysics                       |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Research Methodology               |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Physics Lab IV _I                  |                             |                             |                                                                                                                                            |
| <b>Level 6<br/>(Research Producer)</b>     | Students demonstrate capability to disseminate research output through publications (in respective fields) and communicate the research findings at various platforms.                                                                                                                            |  | Photonics and Laser II             | Final Year Project          | Depends on the course own   | Dissertation                                                                                                                               |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Semiconductor Physics II           |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Solid State Physics II             |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Nuclear Physics and Application-II |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Particle Physics                   |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Physics Lab IV _II                 |                             |                             |                                                                                                                                            |
|                                            |                                                                                                                                                                                                                                                                                                   |  | Seminar                            |                             |                             |                                                                                                                                            |

## 5.2. Industry-Driven Experiential Learning

Industry-driven experiential learning (IDEAL) is a curriculum structure that requires the involvement of industry to prepare graduates to be ready for the workplace. Three IDEAL approaches are mostly used for industry-driven curricula such as: i. Industry-infused (requires about 20% of curriculum courses to be from or engage with industry), ii. Cooperative education (requires about 30% - 50% of curriculum, and iii. Apprenticeship (requires a minimum of 70% curriculum courses or time are directly in the industry).

### Why is IDEAL Learning Important?

The common concern from employers is the gap in graduate's knowledge, skills, and attitude that is required in their future workplace. IDEAL is a key model for tackling the skill mismatch and is a source of solutions that drive students to get knowledge, skills, and the right attitude at their future workplace. Table 5.3 shows the connection among IDEAL approaches, industry-driven curriculum, and mapping to the PLOs. Possible operational modes for each IDEAL approach are technical courses that are in the form of guest lectures, industry projects, or internship. Programmes such as two years in university and two years in the industry (2u2i), three years in university and one year in the industry (3u1i), one year in university and three years in the industry (1u3i) can be conducted and are also highlighted in this table. Figure 9 demonstrates examples of curriculum structure for the diverse IDEAL approaches, which are a) Industry infused, b) Cooperative Education, and c) Apprenticeship.

| <u>Industry infused</u> |            |                             |                                                      |                            |
|-------------------------|------------|-----------------------------|------------------------------------------------------|----------------------------|
| Year                    | Semesters  | Guest lecture from industry | Student projects (engagement with industry projects) | Internship in the industry |
| Year 1                  | Semester 1 |                             |                                                      |                            |
|                         | Semester 2 |                             |                                                      |                            |
| Year 2                  | Semester 1 |                             |                                                      |                            |
|                         | Semester 2 |                             |                                                      |                            |
| Year 3                  | Semester 1 |                             |                                                      |                            |
|                         | Semester 2 |                             |                                                      |                            |
| Year 4                  | Semester 1 |                             |                                                      |                            |
|                         | Semester 2 |                             |                                                      |                            |

| <u>Cooperative Education</u> |            |              |              |
|------------------------------|------------|--------------|--------------|
| Year                         | Semesters  | Courses 2u2i | Courses 3u1i |
| Year 1                       | Semester 1 |              |              |
|                              | Semester 2 |              |              |
| Year 2                       | Semester 1 |              |              |
|                              | Semester 2 |              |              |
| Year 3                       | Semester 1 |              |              |
|                              | Semester 2 |              |              |
| Year 4                       | Semester 1 |              |              |
|                              | Semester 2 |              |              |

| <u>Apprenticeship</u> |            |              |
|-----------------------|------------|--------------|
| Year                  | Semesters  | Courses 1u3i |
| Year 1                | Semester 1 |              |
|                       | Semester 2 |              |
| Year 2                | Semester 1 |              |
|                       | Semester 2 |              |
| Year 3                | Semester 1 |              |
|                       | Semester 2 |              |
| Year 4                | Semester 1 |              |
|                       | Semester 2 |              |

Figure 9: Example of Curriculum Structures for Diverse IDEAL Approaches: Industry Infused, Cooperative Education, and Apprenticeship

Table 5. 3 IDEAL Approaches and Their Mapping to PLOs

| IDEAL Approaches      | Description                                                                                                                                                       | Curriculum                                                                                                                                                                                                                      | CQF (Learning Domains/PLO) |                  |                    |                      |                |                         |                            |               |                                          |                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|--------------------|----------------------|----------------|-------------------------|----------------------------|---------------|------------------------------------------|------------------|
|                       |                                                                                                                                                                   |                                                                                                                                                                                                                                 | PLO1                       | PLO2             | PLO3               | PLO4                 | PLO5           | PLO6                    | PLO7                       | PLO8          | PLO9                                     | PLO10            |
|                       |                                                                                                                                                                   |                                                                                                                                                                                                                                 | Knowledge                  | Cognitive skills | Psychomotor skills | Interpersonal skills | Responsibility | Entrepreneurship skills | Ethics and Professionalism | Communication | Information technology or digital skills | Numerical skills |
| Industry Infuse       | Infuse work-based experience through Project Based Learning (PBL), Work-Based Learning (WBL)                                                                      | <ul style="list-style-type: none"> <li>15% - 20% of courses are from industry or industry engagement.</li> <li>Technical courses Competency: technical</li> </ul>                                                               | ✓                          | ✓                | ✓                  | ✓                    | ✓              | ✓                       | ✓                          | ✓             | ✓                                        | ✓                |
| Cooperative Education | Obtain professional work experience at the workplace/ industry at least 1 year before graduation. Mentorship by industry experts and engage in industry projects. | <ul style="list-style-type: none"> <li>30% - 50% of courses or time are in industry</li> <li>Model: 2u2i or 3u1i (4 years programme), 3u2i or 4u1i (5 years programme)</li> <li>Competency: technical, personal</li> </ul>      | ✓                          | ✓                | ✓                  | ✓                    | ✓              | ✓                       | ✓                          | ✓             | ✓                                        | ✓                |
| Apprenticeship        | Obtain professional work experience at the workplace/ industry minimum 3 years before graduation. Recruitment and mentorship by industry.                         | <ul style="list-style-type: none"> <li>70% - 80% of courses or time is in the industry</li> <li>Model: 1u3i (4 years programme) or 2u3i (5 years programme)</li> <li>Competency: technical, personal, organisational</li> </ul> | ✓                          | ✓                | ✓                  | ✓                    | ✓              | ✓                       | ✓                          | ✓             | ✓                                        | ✓                |

Note: ✓ Less weight ✓ More weight

#### IDEAL's Characteristic

Industry engagement curriculum design, delivery mode and assessment strategy, and overall programme management are three main elements to be considered for successful implementation of IDEAL approaches. Table 5.4 demonstrates a sample of one engineering programme that implemented an industry-infused approach (10-20% industry involvement). It is a five-year programme (2 years foundation and 3 years specialisation). From semester 2 year 3 to semester

2 year 5, a series of courses ‘Student Project’ Part 1 to 4 and internship in industry are established to create a pathway for some students to engage or work in industry projects with mentorship from industry experts. In this table, the expected activities, role of industry, level of Bloom’s taxonomy, and assessment strategies are also illustrated to track the teaching and learning methodology and evaluate the success of each learner.

*Table 5. 4: Example of an Implemented Industry-infused Approach*

| Category       | Year | Sem. | Courses<br>(industry<br>relevant) | Activities                                                                                                                 | Role of<br>industry                                         | Level of Bloom’s<br>Taxonomy                              | Assessment                                                                                                             |
|----------------|------|------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Foundation     | 1    | 1    |                                   |                                                                                                                            |                                                             |                                                           |                                                                                                                        |
|                |      | 2    |                                   |                                                                                                                            |                                                             |                                                           |                                                                                                                        |
|                | 2    | 1    |                                   |                                                                                                                            |                                                             |                                                           |                                                                                                                        |
|                |      | 2    |                                   |                                                                                                                            |                                                             |                                                           |                                                                                                                        |
| Specialisation | 3    | 1    |                                   |                                                                                                                            |                                                             |                                                           |                                                                                                                        |
|                |      | 2    | Student<br>Project<br>Part 1      | Some of students<br>will join project<br>with industry.                                                                    | Issues from<br>the industry<br>proposed                     | Understanding<br>the industry<br>project/context          | Evaluation from<br>industry<br>Abstract about project<br>Synthesis report                                              |
|                | 4    | 1    | Student<br>Project<br>Part 2      | Students continuous<br>working in<br>industry’s project<br>and have ability to<br>produce a simulation<br>or 1st prototype | Coaching /<br>mentoring<br>from<br>industry                 | Applying<br>knowledge in<br>industry<br>project/context   | Evaluation from<br>industry<br>Project poster<br>Synthesis report<br>Simulation result or 1 <sup>st</sup><br>prototype |
|                |      | 2    | Student<br>Project<br>Part 3      | Finalizing the<br>simulation work or<br>improvement the<br>prototype                                                       | Coaching /<br>mentoring<br>from<br>industry                 | Analysing and<br>evaluating the<br>project                | Evaluation from<br>industry<br>Synthesis report<br>Simulation result or<br>improvement<br>prototype                    |
|                | 5    | 1    | Student<br>Project<br>Part 4      | Develop a draft<br>business model of<br>created prototype.                                                                 | Coaching /<br>mentoring /<br>networking<br>from<br>industry | Creating the<br>opportunity for<br>future<br>entrepreneur | Evaluation from<br>industry<br>Business opportunity<br>of prototype or idea                                            |
|                |      |      | Techno-<br>Entrepre-<br>neurship  |                                                                                                                            | Guest lecture                                               |                                                           | Business plan                                                                                                          |
|                |      | 2    | Final year<br>internship          | Minimum 3 months<br>internship in<br>industry.<br>Academic<br>supervised by<br>assigned lecturer for<br>thesis manuscript. | Mentorship<br>mainly by<br>industry<br>experts.             | Analysing,<br>evaluating, and<br>creating                 | Evaluation from<br>industry<br>Thesis manuscript<br>Thesis defend                                                      |
|                |      |      |                                   |                                                                                                                            |                                                             |                                                           |                                                                                                                        |

### 5.3. Community Resilience Experiential Learning (CARE)

Community Resilience Experiential learning is a curriculum thrust that promotes student learning by addressing community needs and ultimately creating positive social change through immersive community-based learning approaches. It serves to enhance student learning of course content, teach civic responsibility, and strengthen communities (Ministry of Higher Education Malaysia, 2021).

In the context of Cambodia, communities are local residents, non-profit organisations, government and community-based organisations. CARE is in line with several national policies and initiatives related to community engagement. These include the National Community Policy and the Rural Development Policy, CSDG and Pentagonal Strategy. Introducing the HEIs for the community or society initiative and development helps enhance student learning experience

through community engagement. CARE programme design and delivery is through immersive community-based learning or Community Service Learning (CSL) in Cambodia and/or abroad.

The CARE program structure incorporates the CSL to the formal learning conducted in the HEI/University to expose students to real community learning experiences and/or to work in the industry (Ministry of Higher Education Malaysia, 2021). The curriculum design has to plan for specific courses for the certain academic year or semester for the formal learning in the university and the service-learning in the community. Students can spend at least one whole semester engaging in work in the community. During the whole semester in the community, students can learn and observe specific unsolved problems, to identify the community problems and propose solutions. During their time in the community, students can also learn from the community. Table 5.5 demonstrates the conduct for different programme structures for the CARE models.

*Table 5. 5: CARE Programme Structure*

| Model       | Possible CARE Model |      |        |      |        |      |        |      |        |      |
|-------------|---------------------|------|--------|------|--------|------|--------|------|--------|------|
|             | Year 1              |      | Year 2 |      | Year 3 |      | Year 4 |      | Year 5 |      |
|             | Sem1                | Sem2 | Sem1   | Sem2 | Sem1   | Sem2 | Sem1   | Sem2 | Sem1   | Sem2 |
| <b>3U1C</b> | Uni                 | Uni  | Uni    | Uni  | Uni    | Uni  | Comm   | Comm |        |      |
| <b>2U2C</b> | Uni                 | CSL  | Uni    | CSL  | Uni    | CSL  | Uni    | CSL  |        |      |
| <b>COOP</b> | Uni                 | Uni  | Comm   | Ind  | Uni    | CSL  | Uni    | CSL  |        |      |
|             | Uni                 | Comm | Uni    | Comm | Ind    |      |        |      |        |      |

Comm – community, CSL – community service learning, Ind – industry, Uni – university

As shown in Table 5.6, the first level of the CARE curriculum can be incorporated with service learning in the last academic year or last two semesters of the academic programme. Service Learning refers to credit bearing courses or projects which require students to complete through their engagement or involvement in solving the community problems or developing the community. The higher level of CARE curriculum design is to increase the courses and learning time in the community. Additionally, the curriculum can be a combination of the CSL in the community and work-based experience in the industry. For such a programme, specific courses for certain academic year or semester for the CSL and Industrial Experiential learning must be developed.

*Table 5. 6: Mapping of CARE Learning Spectrum to CQF Programme Outcomes*

| CQF CLUSTER    |                                                                                                | Knowledge | Cognitive skills | Psychomotor skills | Interpersonal skills | Responsibility | Entrepreneurship skills | Ethics and Professionalism | Communication | Information technology or digital skills | Numerical skills |
|----------------|------------------------------------------------------------------------------------------------|-----------|------------------|--------------------|----------------------|----------------|-------------------------|----------------------------|---------------|------------------------------------------|------------------|
| CARE Spectrum  |                                                                                                |           |                  |                    |                      |                |                         |                            |               |                                          |                  |
| <b>Level 1</b> | Students are able to interact with the community while conducting the service-learning course. | ✓         | ✓                | ✓                  | ✓                    | ✓              | ✓                       | ✓                          | ✓             | ✓                                        | ✓                |

|                |                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|
| <b>Level 2</b> | Students are assigned to collaborate with at least one external stakeholder (i.e. industry/government agency/NGO-Quadruple Helix concept)                                                                           | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| <b>Level 3</b> | Students actively involved in community projects and work closely with various stakeholders (industry/government agency/NGO-Quadruple Helix) in conducting final year research in community.                        | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| <b>Level 4</b> | Students undergo Work-based Learning (WBL) by spending a minimum period of one semester at industry/government agency/NGO before conducting final year research in community focusing on Social Innovation Project. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Table 5.7 shows the mapping of the CARE learning criteria with the competency that students should demonstrate as the outcome. The criteria and competency to be achieved is also indicated according to the CARE learning levels.

*Table 5. 7: Mapping of CARE Learning Criteria with Competency*

| CARE Learning Level | Description                                                                                           | Criteria                                                               |                                                                          |                                                                         |                                                                                                                                                                         | Identified Competency                                                 |
|---------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|                     |                                                                                                       | Minimum two Service Learning Courses embedded courses in the programme | Minimum three Service Learning Courses embedded courses in the programme | Minimum four Service Learning Courses embedded courses in the programme | Minimum four Service Learning Courses embedded courses in the programme of one semester of research in community and one semester of placement in industry 2u1ilc model |                                                                       |
| 1                   | Students are able to interact with the community while conducting the community service               | ✓                                                                      |                                                                          |                                                                         |                                                                                                                                                                         | Ability to develop inter-and intrapersonal skills in civic engagement |
| 2                   | Students are assigned to collaborate with at least one external stakeholder (i.e. industry/government | ✓                                                                      | ✓                                                                        |                                                                         |                                                                                                                                                                         | Ability to work collaboratively within community                      |

|   |                                                                                                                                                                                                                    |   |   |   |   |                                                                   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|-------------------------------------------------------------------|
|   | agency/NGO-Quadruple Helix concept)                                                                                                                                                                                |   |   |   |   | and may include International partner.                            |
| 3 | Students actively involved in government projects and work closely with various stakeholders (industry/government agency/NGO-Quadruple Helix) in conducting final year research in community                       | ✓ | ✓ | ✓ |   | Ability to conduct research in community focusing on SDG          |
| 4 | Students undergo Work-based Learning (WBL) by spending a minimum period of one semester at industry/government agency/NGO before conducting final year research in community focusing on Social Innovation Project | ✓ | ✓ | ✓ | ✓ | Ability to provide research-based industry solutions in community |

#### 5.4. Personalised Experiential Learning (POISE)

Personalised Experiential Learning (POISE) is a curriculum structure that expands access to a range of high-quality higher education options. It provides students with diverse interests in obtaining academic qualifications with opportunities for lifelong learning. It also provides learners in HEIs with industry-driven learning materials, agile curriculum material, and buffet-style learning with standardised guidance.

In terms of experience, the learning cycle of POISE is explicated below:

- i. concrete experience (Based on personalised and individual needs),
- ii. reflective observation (Provide autonomy/ flexibility in deciding academic pathways),
- iii. abstract conceptualization (Agile Curriculum, juke box, buffet-style learning with structured guidance),
- iv. active experimentation (Flexible pathways based on passion, competency and mastery driven).

#### Why Is Personalised Learning Important?

POISE offers new redesigned academic pathways to ensure higher education systems remain relevant and within reach for all. It aims to provide autonomy and flexibility to students in deciding their most preferred pathway in line with their passion, interest or career needs. The redesigned curriculum structure is poised to transform how Cambodia gains access to higher education without being confined to the traditional pathway. Table 5.8 shows the mapping of the POISE approaches to the competency and General Criteria. Table 5.9 shows the connection among POISE approaches, curriculum, and mapping to the learning domains or PLOs in CQF.

Table 5. 8: Mapping of the POISE Approaches to the Competency and General Criteria

| POISE Approaches  | Competency  |          |                 |         |            |               |            | General Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-------------|----------|-----------------|---------|------------|---------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | Versatility | Adaptive | Decision Making | Agility | Skill-full | Market Driven | Specialist |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Passion-driven    | ✓           | ✓        | ✓               | ✓       |            | ✓             |            | <ul style="list-style-type: none"> <li>- Multiple entries - Compulsory Entry Assessment (Competency and Mastery-Driven)</li> <li>- Compulsory Courses - HEI decides the percentage and courses</li> <li>- Program Area - HEI will decide on the percentage and courses</li> <li>- Package provided by HEI</li> <li>- Based on credits only</li> <li>- Flexible Time and Semester reduced</li> <li>- Self-learning mode via micro credential</li> <li>- Competency based assessment - band (rubric, based on programmes)</li> <li>- Dedicated Academic Coach - Training will be provided</li> <li>- A special unit that oversee POISE is recommended</li> </ul> |
| Competency driven | ✓           | ✓        | ✓               | ✓       | ✓          | ✓             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Mastery-driven    | ✓           |          |                 | ✓       | ✓          |               | ✓          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 5. 9: POISE Approaches and Their Mapping to PLOs

| POISE Approaches | Description                                                                                                                                                                                                                                                                                                                | Curriculum                                                                                                                                                                                  | CQF (Learning Domains/PLO) |                  |                    |                      |                |                         |                            |               |                                          |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|--------------------|----------------------|----------------|-------------------------|----------------------------|---------------|------------------------------------------|
|                  |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                             | Knowledge                  | Cognitive skills | Psychomotor skills | Interpersonal skills | Responsibility | Entrepreneurship skills | Ethics and Professionalism | Communication | Information technology or digital skills |
|                  |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                             | PLO1                       | PLO2             | PLO3               | PLO4                 | PLO5           | PLO6                    | PLO7                       | PLO8          | PLO9                                     |
| Passion-driven   | <ul style="list-style-type: none"> <li>- Learners can spend up to 120 credit hours learning various subjects that they are passionate about.</li> <li>- Learners can also design their curriculum where they will spend up to 80 credits hours being competent or up to 40 credit hours in the knowledge areas.</li> </ul> | <ul style="list-style-type: none"> <li>- Flexible time – No full time or part time with maximum 7 years of study duration</li> <li>- Percentage Credits – based on % of major as</li> </ul> | ✓                          | ✓                | ✓                  | ✓                    |                | ✓                       |                            | ✓             | ✓                                        |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                     |   |   |   |   |   |  |   |   |   |   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|--|---|---|---|---|
| <b>Competency driven</b> | <ul style="list-style-type: none"> <li>- Learners spend all of their learning hours to be competent at one knowledge area or/and many knowledge areas.</li> <li>- Learners can also design their curriculum where all 120 credit hours are spent driven by the niche area that they want to be competent with.</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>in programme structure guide</li> <li>- General curriculum structure needs to be designed before-hand, mix and match existing courses to form academic programmes</li> </ul> | ✓ | ✓ | ✓ | ✓ | ✓ |  | ✓ | ✓ |   | ✓ |
| <b>Mastery- driven</b>   | <ul style="list-style-type: none"> <li>- Learners spend up to 120 credit hours learning various to master a specific area but spends little time or no time to explore their passion (up to 40 credit hours) and to be competent (up to 80 credit hours).</li> <li>- Learners can also design their curriculum where all 120 credit hours are spent driven by the niche area that they want to master.</li> </ul> | <ul style="list-style-type: none"> <li>- Passion-driven – Bachelor of General Studies</li> <li>- Competency/ Mastery Driven – Bachelor with Honours – naming based on major</li> </ul>                              | ✓ | ✓ | ✓ | ✓ | ✓ |  | ✓ |   | ✓ |   |

#### 5.4.1. Multi-thrust

Based on the natures of the programmes, fields of studies and expected learning outcomes, the curriculum design of a programme can be embedded with more than one model (i.e. REAL; CARE; POISE; IDEAL) (Ministry of Higher Education Malaysia, 2021). The combination of the two or more thrusts can make the programme more flexible and operational based on the HEI situational context. Also, the multi-thrust curriculum designs allow to have less amount of academic requirement and duration of practices of a specific model than a single thrust programme. For example, a single thrust of CARE programme requires students to study at the university for two years and to conduct the Community Service Learning (CSL) in the community for two years. A REAL programme requires to incorporate research-based learning up 80% in the curriculum. For the multi-thrust of the CARE and REAL shall require having CSL less than two academic years of time and the research-based learning less than 80%. Thus, the combination of these two models made a programme more flexible and operational in terms of duration and number of practices for each specific model rather than a single thrust. Below are the examples of the potential combination of two and more thrust programme structures.

#### REAL-CARE

A multi-thrust curriculum design of the Research Infused and Community Resilience Experiential Learning embedded in a degree programme (Ministry of Higher Education Malaysia, 2021). This type of programme design aims to equip students with professional and research competency within a specialized field. The programme places a research-based experiential learning in the community, that is, to conduct research to identify real courses of problems/issues in the community and to propose solution or develop the community based on empirical evidence. Through the research and community engagement, the students not only help solve community problems, but they can also learn from the community. The curriculum can be structured to have a certain academic year(s) or semester(s) to develop research competency-based and to conduct community service learning.

## **REAL-IDEAL**

A multi-thrust curriculum design which combines a research-infused and an Industrial Driven Experiential Learning model in a degree programme (Ministry of Higher Education Malaysia, 2021). The programme aims to equip students with research competencies to address specific industrial problems or industrial development in the field of study. The REAL-IDEAL curriculum places a research-based experiential learning in the industry, that is, students spend at least one semester (to work) in the industry and/or to conduct research in the industry to address industrial problems or for industrial development based empirical evidence or research findings. The curriculum is structured to have research-based learning within two or three years to enable students to conduct industrial research and development. In addition, the curriculum is designed to provide students work-based experience in the industry to expose them to real world experiences.

## **CARE – POISE**

A multi-thrust curriculum design which combines a Community Resilience Experiential Learning and Personalised Experiential Learning models in an academic programme (Ministry of Higher Education Malaysia, 2021). The programme aims at providing specialised study in the field through immersive community-based learning or CSL in Cambodia and multi-academic pathways to obtain the degree. The CARE – POISE curriculum places an emphasis on CSL, that is, students spend at least one semester (to work) in the industry and/or to community to expose them to real world experiences. The structure of the programme also provides students the options to complete the study within formal duration of studies or complete certain numbers of credits of coursework and get jobs for a certain period of time before returning to the university to complete all programme requirements to earn the degree.

### **5.4.2. Competency-Based Curriculum Design**

Competency-Based Curriculum (CBC) is a curriculum that emphasises what students are expected to do rather than mainly focusing on what they are expected to know (UNESCO, 2017). The aims of CBC design are to conform with the ‘international standards’, ‘programme accreditation’ and ‘professional standards. It also aims to promote profession degree programme (i.e. Engineering, medical, agriculture etc.) which required students to demonstrate mastery to perform the tasks. CBC, similar to the OBE, is the backward design or top-down approach to which the competency determines the curriculum design, delivery, assessment and evaluation. All level of learning outcome development (i.e. PEOs, PLOs, CLOs, LLOs) demonstrate the competency and/or performance standards in line with the national and regional competency standards. The structure and content of the programme are conceptualised around the core competency or performance outcomes to be achieved link to curriculum development, delivery against performance can be measured. There are three main steps of the CBC design:

- i. Identifying competencies: Predetermine competency which focus on outcomes or real-world performance,
- ii. Linking competencies to courses: Set of competencies for a specific course,
- iii. Assessing competencies in curriculum: Students are assessed at various competencies, Instructors are required to identify learning outcomes in terms of behaviours and Performance including the appropriate criteria levels to be used evaluating performance.

## **6. Academic Programme Delivery**

Two general types of programme delivery systems can be noted in higher education: conventional and open and distance learning (ODL). Each has a set of characteristics and modes of implementation.

## **6.1. Conventional Program Delivery**

The conventional mode of program delivery involves complete face-to-face learning and teaching; lectures, tutorials, and practical, which include industrial training, as defined by the study period. This involves a direct meeting between the lecturers and students at the institution's facilities. Conventional delivery methods emphasise physical presence in a classroom or laboratory setting, enabling fast feedback, hands-on activities, and real-time discussions. It provides an old-school experience in education as students can communicate with instructors and fellow students personally. It is perfect for those classes that require real-time practical demonstration, lab work, or fieldwork so that the student is well-equipped with real hands-on experience and direct mentorship.

### **Methods of Delivery:**

- **Lectures:** Traditional face-to-face class-based teaching sessions where an instructor leads and imparts information in a structured manner.
- **Tutorials:** These are smaller, interactive sessions focusing on discussion, problem-solving, and more in-depth study of topics covered in lectures.
- **Practical Sessions:** Hands-on activities and lab work supporting theoretical learning required for subjects such as Sciences and Engineering.
- **Industrial Training:** This is the practical, industry-based training that exposes actual work experiences, which are fundamental for vocational and technical training.
- **Blended Learning:** Conventional programs may contain a blend of online learning elements, such that material for e-learning forms between 30% to 60% of the total teaching delivery. This mix provides additional flexibility without materially reducing contact time.

Blended Learning is a technique that takes the best of both worlds in face-to-face and online teaching, trying to achieve a delicate balance between flexibility and interaction. As such, students will feel all the comfort they would get from a structured environment physically while interacting. This methodology can support diverse learning styles and improve the overall educational experience because of the use of various teaching aids and resources.

There are various ways of encouraging meaningful learning activities besides traditional classroom learning and teaching. This is by using blended, hybrid, or online learning. 'Blended' is essentially a face-to-face instruction with a few sessions offered online. Technology facilitates activities, content delivery, and students' assessment. Hybrid is a combination of the traditional face-to-face method and online; minimal time spent in the conventional class because most of the internet activities get integrated within learning. This method may or may not involve on-site orientation or proctored exams.

Blended learning combines the aspect of asynchronous learning, which is facilitated by media such as e-mail and discussion boards. It optimizes working relations between the learners and teachers even if the participants are not necessarily online simultaneously. Blended learning supplementation involves minimum of 30% of online activities apart from face-to-face interactions, while blended learning substitution replaces the physical contact hours.

### **Blended Learning Delivery Modes:**

- **Online Lectures:** These are the pre-recorded or even live-streamed lecture sessions that complement the face-to-face sessions. They add much-needed flexibility to student requirements.

- Digital Tutorials: Online interactive sessions of a discussion go hand in hand with face-to-face discussions where students participate and continue such engagement even outside the physical class.
- Online Practical Sessions: Virtual activities involving laboratories that supplement the practical in-class activities and provide simulations of and remote access to experiments.
- E-learning modules: Web content that extends classroom-based instruction, providing support such as but not limited to media and other resources, self-assessment, and follow-up activities.
- Integrated Assessments: Combination of face-to-face and web-based assessments to measure student learning that would provide an in-depth method of evaluation.

## **6.2. Open and Distance Learning (ODL)**

Open and Distance Learning (ODL) refers to a method of learning and teaching with anything practically being undertaken with the use online, whereby the online components account for more than 60% of all course delivery. This is designed to offer more comprehensive flexibility to students accessing learning materials and provides an avenue to engage in learning activities.

A highly flexible learning environment is provided by ODL, through which education is brought to a broader audience encompassing working professionals, remote learners, and individuals with personal commitments limiting their time for attending conventional classes. Such an approach majorly focuses on self-paced learning, enabling a student to go with their pace of understanding and cover the study curriculum. The use of digital media in this regard is vast, allowing students to have access to resources, interactive learning activities, and online support on an ongoing basis.

### **Methods of Delivery:**

- Online Lectures: Fully online lectures that students can be remote, and in most cases on-demand.
- Virtual Tutorials: Online, interactive forums that have the potential for conversing and engaging in discussion on video conferencing and discussion board platforms.
- Online Practical Sessions: Simulated or virtual laboratory activities undertaken online, where students can perform experiments from their respective places.
- E-Learning Modules: Detailed, interactive modules containing multimedia elements, activities, and quizzes to address diverse learning preferences.
- Online Assessments: Exams and online evaluation mechanisms can, therefore, gauge student learning by offering flexibility and access to distributed students.

### **Considerations for Program Delivery**

All these must be put into consideration when designing and implementing academic programs.

- Student Needs: Assess the student population and their learning preferences and needs to determine the most appropriate method of delivery.
- Resource Availability: Ensure the availability of needed technology and infrastructure resources to support the desired mode of delivery.
- Quality Assurance: Ensure that there is rigorous quality assurance to maintain high standards of education, irrespective of the mode of delivery.
- Flexibility: Provide flexible learning options for diverse student schedules and commitments.

The comprehensive details of various methods of program delivery and assessment can be referred to Guideline on 'Innovative Pedagogy and Guideline on 'Holistic Assessment respectively.

## **7. Student Learning Time and Credit System**

In higher education, the course credit hour and student learning time (SLT) (also referred to student workload) are essential components used to measure and quantify the academic progress and workload of students. To ensure that the SLT for a credit hour is standardised across HEIs, course providers must determine that the SLT for the course reflects the credit hours. The SLT implies the time required by students to fulfil the requirements of the course.

### **7.1. Notion of SLT**

The notion of SLT refers to the amount of time a student is expected to be actively engaged in various learning activities for a course, including attending lectures, participating in seminars, conducting independent study, completing assignments, and preparing for assessments. In other words, SLT is the learning time taken for teaching and learning activities and assessments, including the final assessment to achieve the course learning outcomes (CLOs).

Based on the CQF, the allocation of hours for 1 credit varies depending on the type of activity. For teaching and instruction, 15 hours are designated for 1 credit, which for laboratory/workshop teaching activities, 30 hours are allocated for 1 credit. Additionally, for field work or internship training activities, 45 hours are assigned for 1 credit. It is important to note that the CQF guideline solely focuses on teaching time, such as the 15 hours for 1 credit. However, for SLT, students' independent work must also be factored in. For instance, a student may spend 15 hours attending lectures, 15 hours on self-study, and additional 10 hours on assignments and assessment, totalling 40 hours of Student Learning Time (SLT). It is crucial to emphasize that 1 credit should never equate to less than 40 hours of SLT.

One credit hour equates to 40 notional hours of student effort in learning. Forty (40) hours is used as a baseline, considering it is the amount of time that an average student can effectively spend on learning activities per week. When deciding on the SLT, the following elements are of relevance:

1. The student has a fixed amount of time depending on the programme he/she is taking.
2. The number of credits allocated to courses.
3. The specific learning outcomes to be achieved and the competences to be obtained.
4. The educational activities which are more relevant to reach the learning outcomes of /course unit.
5. The average student work time required for each of the activities selected for the course unit.

### **7.2. Calculation and Template for SLT**

The calculation of SLT includes both formal contact hours (time spent in direct interaction with instructors either F2F or non-F2F) and non-formal contact hours (time spent on independent learning and coursework outside of the scheduled classes). SLT is typically measured in hours per semester and varies depending on the academic level, program of study and specific course. In today's conduct of teaching, it consists of both face-to-face (F2F) and non-face-to-face (nonF2F) activities (see Table 6.1. Note: This table is adopted from Table 4 v2.0 June 2020 of the Summary of Course Information Template by Malaysian Qualifications Agency).

The F2F learning and teaching activities are the form of structured learning with a set of outcomes and delivery methods set by the instructor. Activities for F2F learning include the following:

1. Physical class, such as lectures (L), practical sessions (P) and field work (F). The physical classes are based on the learning time specified in CQF. However, this can be changed according to the practices of the HEI. For example, some universities have tutorial sessions. This can be added or changed for one of the L, P, F.
2. Technology mediated (synchronous) teaching and learning such as online learning, blended learning, hyflex learning etc). This is more applicable for open distance learning programmes. (Note: Leave this blank if it is not applicable for your course)

The calculation for SLT during internship, industrial attachment, or clinical experience is one (1) credit for every two (2) weeks of attachment. If a day is considered as eight (8) hours of engagement, then two weeks would amount to 10 days, resulting in a total of 80 hours for the two-week period. However, the effective learning time taken into account for calculating SLT during attachment is 50% of the total hours. This implies that the SLT for a 2-week attachment is only 40 hours, even though students are involved for the entire two weeks. Consequently, 4 credit hours for attachment would necessitate 8 weeks, while 6 credit hours would require 12 weeks.

Table 6. 1: Template for Calculating Student Learning Time (SLT) for a Course

| Course Content Outline and Subtopics | CLOs | Learning and Teaching Activities* |   |   |   |                                                          |   |   |   | Total SLT                                   |                              |
|--------------------------------------|------|-----------------------------------|---|---|---|----------------------------------------------------------|---|---|---|---------------------------------------------|------------------------------|
|                                      |      | Face-to-Face (F2F)                |   |   |   |                                                          |   |   |   |                                             | Non F2F Independent Learning |
|                                      |      | Physical Class                    |   |   |   | Online/Technology-mediated (Synchronous) (if applicable) |   |   |   |                                             |                              |
|                                      |      | L                                 | T | P | F | L                                                        | T | P | F |                                             |                              |
| 1                                    | 1    |                                   |   |   |   |                                                          |   |   |   |                                             |                              |
| 2                                    | 2    |                                   |   |   |   |                                                          |   |   |   |                                             |                              |
| ...                                  | ...  |                                   |   |   |   |                                                          |   |   |   | Subtotal SLT                                |                              |
| Continuous Assessment                | %    | Face-to-Face (F2F)                |   |   |   |                                                          |   |   |   | Non F2F Independent Learning for Assessment |                              |
|                                      |      | Physical                          |   |   |   | Online/Technology-mediated (Synchronous) (if applicable) |   |   |   |                                             |                              |
| 1                                    |      |                                   |   |   |   |                                                          |   |   |   |                                             |                              |
| 2                                    |      |                                   |   |   |   |                                                          |   |   |   |                                             |                              |
|                                      |      |                                   |   |   |   |                                                          |   |   |   | Subtotal SLT                                |                              |
| Final Assessment                     | %    | Face-to-Face (F2F)                |   |   |   |                                                          |   |   |   | Non F2F Independent Learning for Assessment |                              |
|                                      |      | Physical                          |   |   |   | Online/Technology-mediated (Synchronous) (if applicable) |   |   |   |                                             |                              |
| 1                                    |      |                                   |   |   |   |                                                          |   |   |   |                                             |                              |
| ....                                 |      |                                   |   |   |   |                                                          |   |   |   | Subtotal SLT                                |                              |
|                                      |      |                                   |   |   |   |                                                          |   |   |   | Grand Total SLT                             |                              |
|                                      |      |                                   |   |   |   |                                                          |   |   |   | Grand Total/40                              |                              |

\*L – lecture, T– tutorial, P – practical, F – field work

(These can be changed according to the practices of the HEI eg. T – tutorial/seminar can be added if that is the practice)

Note that the grand total for SLT should be approximately 80 for a 2-credits course and 120 for a 3-credits course. The  $SLT = \text{course credits} \times 40$ , as discussed above in Section 6.1 where one credit hour equates to 40 notional hours of student effort in learning. The last column in Table 6.1 above indicates whether the activities planned/conducted for the course commensurate with the credit load for the course. If it is not so, then the SLT for the activities should be revised. As an example, the total Student Learning Time (SLT) required for a 3-credit course may vary between 120 and 128 hours. When this SLT is divided by 40, the result falls within the range of 3 to 3.2, which corresponds to a 3-credit course.

Table 6.1 is to be included as part of the course specifications. The summary of the SLT for all courses within the programme is to be included as one of the appendices for Program Specifications (Table of Total Student Learning Time).

As a guide in calculating SLT, consider the effort needed to do the various learning activities and assessments and allocate the time accordingly. Below is a suggestive guide on determining independent learning (ILT) for guided learning time (GLT) and assessment:

Independent learning is a non-structured learning, in the form of voluntary learning activities by students for preparation of the guided learning activities, revision of past lessons and including working on assignments such as project-based learning or case study, studio work, and industrial training. Table 6.2 provides a guide on calculation of hours needed for independent learning. As an example, students may need two hours of independent study time to digest the lecture materials for every one hour of lecture.

*Table 6. 2: Guide in Determining Independent Learning Time for Guided Learning Activities*

| <b>Activities</b>                | <b>Guided Learning Time</b>                                                                                                                                                            | <b>Proposed Independent Learning Time (ILT) for Guided Learning Activities</b> |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Lecture                          | 1 hour                                                                                                                                                                                 | 1-2 hours/Lecture Hour                                                         |
| Tutorial                         | 1 hour                                                                                                                                                                                 | 1-2 hours/ Tutorial Hour                                                       |
| Laboratory/Practical             | 1 hour                                                                                                                                                                                 | 0*-2 hours/ Practical Hour                                                     |
| Online Learning                  | 1 hour                                                                                                                                                                                 | 1-2 hours/ Online Activity                                                     |
| <b>Activity</b>                  | <b>Assessment</b>                                                                                                                                                                      | <b>Independent Learning Time (ILT) for Assessment Activity</b>                 |
| Presentation                     | 1 hour                                                                                                                                                                                 | 2-3 hours                                                                      |
| Examination (Final etc.)         | 1 hour*                                                                                                                                                                                | 3-5 hours/exam hour*                                                           |
| Term paper/project               | 1-2 hours per page or 400 words count or depending on the extensiveness of the work required.<br>Eg. Project may take 20 hours to complete                                             |                                                                                |
| Internship/Industrial attachment | 1 credit = 2 weeks<br>Effective learning time = $(10 \text{ days} \times 8 \text{ hours})/2 = 40 \text{ hours}$<br>6 credits = 12 weeks (3 months)<br>12 credits = 24 weeks (6 months) |                                                                                |
| Final year thesis/dissertation   | 6 credits = 240 hours<br>12 credits = 480 hours                                                                                                                                        |                                                                                |

\* 0 indicates that the lab/practical report is completed during the class time, thus no ILT required to complete the task.

Continuous assessment activities may also be in the form of physical class or online F2F (tests, quizzes, midterms) or non-F2F (reports, practical work). As indicated in Table 6.2, a one-hour test/exam may require three to five (3 – 5) hours of study time.

Final assessment can be in the form of a final examination or it can be a project, performance, portfolio, oral presentation etc. In OBE, there should be less dependence on testing as a way of

evaluating whether students have achieved the CLOs. Student learning can be gauged through various methods.

In the Cambodian context, courses are indicated according to the amount spent on i. teaching and instruction, ii. laboratory/workshop teaching activities, and iii. field work or internship training activities. The matching of the teaching time with the SLT has been discussed earlier in Section 6.1. The SLT calculation for internship is discussed in Section 6.2.

In Cambodia, some HEIs indicate their credit hours according to the time spent for the three main activities, teaching – laboratory – field work. For example, 3 credits may be arranged as 3-0-0, 1-1-1, 1-2-0 or even 0-0-3. Table 6.3 illustrates the calculation of SLT for the courses based on the three main activities, using the following guide as specified in CQF.

- a. 1 credit for teaching and instruction = 15 hours (L)
- b. 1 credit for laboratory/workshop teaching activities = 30 hours (P)
- c. 1 credit for field work = 45 hours (F)

The total Student Learning Time (SLT) required for a 3-credit course may vary between 120 and 128 hours. When this SLT is divided by 40, the result falls within the range of 3 to 3.2, which appropriately corresponds to a 3-credit course. However, courses that is fully field work may exceed the required SLT as shown in Course G below and that can be an exception.

*Table 6. 3: Sample Calculations for Student Learning Time*

| Course<br>(L-P-F)     | Physical Face<br>to Face (F2F) |    |     | Non F2F    |          |                         | Assessment     |               | Total<br>SLT |
|-----------------------|--------------------------------|----|-----|------------|----------|-------------------------|----------------|---------------|--------------|
|                       | L                              | P  | F   | Non<br>F2F | Revision | Preparation<br>for exam | Assignmen<br>t | Test/<br>Exam |              |
| Course A<br>3 (1-1-1) | 15                             | 30 | 45  | 15         |          | 2                       | 15             | 1             | 123          |
| Course B<br>3 (1-2-0) | 15                             | 60 |     | 15         |          | 8                       | 20             | 2             | 120          |
| Course C<br>3 (1-0-2) | 15                             |    | 90  | 15         |          | 2                       |                | 1             | 123          |
| Course D<br>3 (2-1-0) | 30                             | 30 |     | 30         |          | 8                       | 20             | 2             | 120          |
| Course E<br>3 (2-0-1) | 30                             |    | 45  | 30         |          | 4                       | 15             | 1             | 125          |
| Course F<br>3 (3-0-0) | 45                             |    |     | 45         |          | 8                       | 20             | 2             | 120          |
| Course G<br>3(0-0-3)  | 0                              | 0  | 135 |            |          |                         |                |               | 135          |

**Course A: 3(1-1-1):** 3 credits indicate the total credit value of the course with one credit for instruction or lecture, one credit for practice or laboratory or tutorial and one credit for fieldwork. One credit for teaching is equivalent to 15 hours per semester, hence approximately 15 hours is required for self-study. Practical work requires 30 hours SLT for one credit and for the fieldwork, 1 credit is equivalent to 45 hours and the remaining hours are reserved for assessment.

**Course B: 3(1-2-0):** 3 credits indicate the total credit value of the course with one credit for instruction or lecture, two credits for practice or laboratory or tutorial and no fieldwork for that course. One credit for teaching is equivalent to 15 hours per semester, and 15 hours are required for self-study. Practical work requires 60 hours for two credits and the rest are for assessment.

**Course C: 3(1-0-2):** 3 credits indicate the total credit value of the course with one credit for instruction or lecture, and two credits for fieldwork. One credit for teaching is equivalent to 15 hours per semester, and 15 hours are required for self-study. Moreover, fieldwork requires 90 hours for two credits and the balance is for assessment.

**Course D: 3(2-1-0):** 3 credits indicate the total credit value of the course with two credits for instruction or lecture and one credit for practice or laboratory. Two credits for teaching is equivalent to 30 hours per semester, and approximately 30 hours are required for self-study. Practical or laboratory work requires 30 hours for one credit and the rest are for assessment.

**Course E: 3(2-0-1):** 3 credits indicate the total credit value of the course with two credits for instruction or lecture and one credit for fieldwork. Two credits for teaching is equivalent to 30 hours per semester, of which approximately 30 hours are required for self-study. Moreover, for fieldwork, 1 credit is equivalent to 45 hours and the balance are for assessment.

**Course F: 3(3-0-0):** 3 credits indicate the total credit value of the course with three credits for instruction or lecturer. Three credits for teaching is equivalent to 45 hours per semester, which approximately 45 hours are required for self-study and the rest are for assessment.

**Course G: 3(0-0-3):** 3 credits indicate the total credit value of the course. Three credits for fieldwork is equivalent to approximately 135 hours per semester. Assessment on the field may be conducted for such courses, hence no SLT is required for assessments.

### **7.3. Determining Credit Hours**

Credit hour is a representative measure that reflects the academic load of a course and the whole academic programme. According to CQF, as an example, the minimum credit for a Bachelor's Degree is 120 credit hours.

One credit typically represents a specific amount of SLT, often expressed as the number of hours a student is expected to spend on coursework, including lectures, tutorials, labs, assignments, and self-study. As a guide, 1 credit hour is equivalent to 40 notional hours. Hence, in terms of SLT, a course that has a credit bearing of 1 hour should have SLT of 40 hours. Consequently, 80 hours for a 2-credit course and 120 hours for a 3-credit course. This takes into consideration the semester system and assumption of availability of learning hours of average students to complete various learning activities, guided or independent learning and non-face-to-face learning.

The credit system assigns a numerical value to courses based on the expected workload and learning outcomes. Each course is assigned a certain number of credits, which reflects the amount of time and effort required to successfully complete the course.

The credit system allows students to accumulate credits as they progress through their academic program. Upon successful completion of a course, students earn the corresponding number of credits, which contribute to their overall academic progress and qualification requirement.

The SLT and credit system work together to produce a structured framework for organising and assessing students' academic workload and progress. By quantifying the time and effort required for learning activities and assignments, students, instructors, and academic institutions can effectively plan, monitor, and evaluate the teaching and learning process, additionally, the credit system facilitates the transferability of credits between institutions and the recognition of prior learning, enabling students to pursue further education or enter the workforce with recognized qualifications.

## 8. Coding System for Courses

Creating a coding system for courses involves developing a structured method to categorise and identify courses uniquely. This can be useful for HEIs to manage and organize their curriculum. A course code typically consists of several components, each representing specific information about the course.

The core consideration for designing or developing the course code should cover the course identification which include the following:

- i. level of the programme (i.e. Bachelor, Master, PhD ...),
- ii. discipline/sub-discipline/course category based on faculty/department's categorisation and series that indicates the level of complexity.

Table 7.1 illustrates a guide in assigning codes for courses. This general framework for course code system can be adapted in HEIs with some modifications. As shown in Table 7.1, certain numbers are used as the first digit for course codes in two different levels of study. For instance, the number 4 signifies a bachelor's or master's degree course. The number 3 is also used for bachelor's level course codes. However, the use of 4 for a bachelor's degree programme suggests that it is at an advanced level and is typically offered in the final two years of the programme.

*Table 7. 1: General Framework for Coding System for Courses*

| [Department/<br>Faculty<br>Code] | [Course Level]                                                                                                                                    | [Discipline/Sub-<br>Discipline/Course Category]                          | [Course<br>Series]                        |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|
| 2-3 alphabets                    | 1 <sup>st</sup> digit<br>0 - Foundation<br>1 - Diploma<br>2 - Diploma/Bachelor<br>3 - Bachelor<br>4 - Bachelor/Masters<br>5 - Masters<br>6 - Ph.D | 2 <sup>nd</sup> digit<br>Faculty's categorisation for<br>courses offered | 3 <sup>rd</sup> and 4 <sup>th</sup> digit |

The choice on the use of the alphabets code for department or faculty depends on the size of the faculty and the number of courses offered. For example, if the Faculty of Science is small, then SCI can be used for all courses offered. The various fields in the faculty (eg. Physics, Chemistry, etc.) can be distinguished using the second digit which is used for discipline/sub-discipline/course category. Example, 1 for Physics, 2 for Chemistry and so on. Thus, SCI3200 would be a basic undergraduate Chemistry course, offered by Faculty of Science.

| [Faculty Code] | [Course Level] | [Discipline]   | [Course Series]                         |
|----------------|----------------|----------------|-----------------------------------------|
| SCI            | 3<br>Bachelor  | 2<br>Chemistry | 00<br>Most basic course in<br>chemistry |

If the faculty is large, the department code can be used to differentiate the courses offered by the various departments. For instance, CHM is used for all Chemistry courses. Here, the sub-discipline can be included.

| [Department Code] | [Course Level] | [Sub-Discipline]       | [Course Series]                                 |
|-------------------|----------------|------------------------|-------------------------------------------------|
| CHM               | 3<br>Bachelor  | 2<br>Organic Chemistry | 00<br>Most basic course in<br>organic chemistry |

Based on the above framework, the second digit is reserved for the discipline/sub-discipline/course category. This much depends on the categorisation created by the faculty. For instance, for Faculty of Education (EDUxxxx), the 2<sup>nd</sup> digit that indicates the sub-disciplines can be set as follows:

**Common courses for Education programmes:**

1. Philosophy of Education (EDU3104, EDU3107 ...)
2. Sociology of Education (EDU3211, EDU4223 ...)
3. Psychology of Education
4. Educational Technology
5. Teaching Methodology

**Courses in the major subject for the student teachers:**

1. Physical Education
2. Teaching of English as Second Language
3. Teaching of Khmer as First Language, etc

Certain codes can be designated for common courses across faculties, as practiced in Universiti Putra Malaysia, Malaysia. Number 9 is reserved for the second digit for course codes for Bachelor Dissertation, Bachelor Project, and Industrial/ Clinical Training. For instance, the code for Industrial Training is xxx4901, Bachelor Dissertation is xxx4959 and Bachelor Project is xxx4949. The uniform use of the same digit allows for easy identification of the same courses across faculties, such as EDU4959, ENG4959, and ECN4959.

Third and fourth digit indicate the series or order in the field or course, based on the level of complexity. These digits range from 00 to 99. For example, CHM3201 would indicate higher level of complexity compared to CHM3200.

## **9. Nomenclature of Academic Programmes**

Nomenclature refers to the naming convention of an academic programme. It reflects the level and structure of the program. By introducing programme structures such as double major and major-minor options, the nomenclature of the programme should reflect the emphasis. The naming of a programme as Bachelor of Science and Bachelor of Arts should be based on clear distinction on the focus and the academic disciplines it covers. Generally, Bachelor of Art has the emphasis on humanities (literature, philosophy, history), social sciences (psychology, sociology), and/or fine arts and foreign language courses. Examples of majors for Bachelor of Arts are Political Science, Communications, Fine Arts, English and Anthropology. Bachelor of Science focus more on sciences and mathematics. Examples of majors in Natural Science are Biology, Chemistry and Physics and in Applied Science, the majors are Engineering, Computer Science, Agriculture Science and Food Technology.

Differences in the emphasis in the courses also reflect the nomenclature, as in the difference between Bachelor of Engineering and B.Sc. Engineering. The Bachelor of Engineering programme focus more on the engineering principles and the theoretical applications while the B. Sc. Engineering provides more balance between the theoretical aspects and applied aspects of engineering. However, the emphasis varies between countries. Thus, general distinctions of the programmes need to be considered for the nomenclature.

### **9.1. Principles for Nomenclature**

Nomenclature of academic programmes refers to the standardised naming conventions used to denote different academic degrees and qualifications. The principles for nomenclature adopted in Cambodian HEIs is in compliance with the national and international norms and practices. The overarching principles for giving the title of the qualification are as the following:

1. Complying with CQF by using qualification titles that clearly and consistently describe the education sectors, the qualification level, the field of study of specialisations.
2. Conforming to national and international norms, and

3. Conforming to any accreditation body guidelines.

CQF had outlined the nomenclature of the Higher Education Programmes based on the ‘Award Titles by CQF levels and Qualification Types’. However, the list is only provided for programmes with single major as shown in Table 8.1 below:

Table 8. 1: Nomenclature for Single Major Programmes

| CQF Level      | CQF Quali.                | Academic Stand                                                                                                |                                                           | Professional Stand                                                                                                                          |                                                                                                         |
|----------------|---------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                |                           | Qualification Type                                                                                            | Qualification Abbreviation                                | Qualification Type                                                                                                                          | Qualification Abbreviation                                                                              |
| <b>Level 5</b> | Diploma/ Associate Degree | Associate Degree of Arts /or Science...<br><i>Example: Associate Degree of Science in Physical Education.</i> | AA/AS in ...<br><i>Example: AS in Physical Education.</i> | Associate Degree of (area of Specialisation)<br><i>Example: Associate Degree of Agriculture</i>                                             | Associate Degree of.<br><i>Example: Associate Degree of Electricity.</i>                                |
| <b>Level 6</b> | Bachelor Degree           | Bachelor of Science<br><i>Example: Bachelor of Science in Physics</i>                                         | B.Sc.<br><i>Example: B.Sc in Physics</i>                  | Bachelor of (Name of Professional field –Business, Engineering)<br><i>Example: Bachelor of Engineering in Data Science</i>                  | B. (Name of Professional field –Business, Engineering)<br><i>Example: B. Eng in Data Science</i>        |
| <b>Level 7</b> | Masters’ Degree           | Master of Science or /Master of Arts<br><i>Example: Master of Sciences in Physics</i>                         | M.Sc. in<br><i>Example: M.Sc. in Physics</i>              | Master of (Name of Professional field –Business, Engineering): Professional Master<br><i>Example: Master of Engineering in Data Science</i> | M. (Name of Professional field –Business, Engineering)<br><i>Example: M. Eng in Data Science.</i>       |
| <b>Level 8</b> | Doctoral Degree           | Doctor of Philosophy (Research Doctorate)<br><i>Example: Doctor of Philosophy in Psychology</i>               | <i>Example: Ph.D. in Psychology</i>                       | Doctor of (Name of Professional field –Business, Engineering): Professional Doctorate                                                       | D. (Name of Professional field –Business, Engineering)<br><i>Example: D. of Business Administration</i> |

|  |  |  |  |                                            |  |
|--|--|--|--|--------------------------------------------|--|
|  |  |  |  | Example: Doctor of Business Administration |  |
|--|--|--|--|--------------------------------------------|--|

## 9.2. Naming Convention for Academic Programmes of Different Structures

In the modernisation programmes for Cambodian HEIs, more programmes will adopt the different programme structures to enhance the marketability and employability of the graduates. It is also offered for students to pursue their interests. Table 8.2 outlines the naming conventions of the degrees offered. Part of these naming conventions outlined here is based on the Guidelines on Nomenclature of Malaysian Higher Education Programme (Malaysian Qualifications Agency, 2019).

Table 8. 2: Naming Convention for Academic Programmes of Different Structures

| Program Type                     | Naming Conventions                                                                                                                   | Abbreviation                                                     | Explanation                                         |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------|
| <b>Single Major</b>              | Example: Bachelor of Science in Physics                                                                                              | Example: B.Sc. in Physics                                        |                                                     |
| <b>Major with Specialisation</b> | Example: Bachelor in Computer Science (Programming)                                                                                  | Example: B. Computer Science (Programming)                       | Specialisation is indicated using brackets          |
| <b>Major-Minor</b>               | Example: Bachelor in Economics with Mathematics                                                                                      | Example: B.Sc. in Economics with Mathematics                     | Use of ‘with’ for the minor                         |
| <b>Double Major</b>              | Example: Bachelor of Science in Computer Science and Mathematics.                                                                    | Example: B.Sc. in Computer Science and Mathematics.              | Use of ‘and’ for the second major                   |
| <b>Dual Degree</b>               | Example: Bachelor of Science in Computer Science from one university<br>Bachelor of Science in Mathematics from the other university | Example: B.Sc. in Computer Science<br>B.Sc. in Mathematics       | Two degrees in same or similar fields – two scrolls |
| <b>Double Degree</b>             | Example: Bachelor of Science in Computer Science<br>Bachelor of Arts in English Literature                                           | Example: B.Sc. in Computer Science<br>B.A. in English Literature | Two degrees in different fields – two scrolls       |

## 10. Credit Transfer and Exemption

Credit system is the crucial mechanism to facilitate part-time studies or combination between full-time and part-time studies. Transferring credit is officially recognized by an HEI on all subjects in which students have successfully completed in another HEI.

The difference between credit transfer and exemption is that a credit transfer reduces the number of credits required to complete one’s programme. An exemption may be granted where the

student prior learning is recognised as a substitute for a course or courses listed in the programme requirements. An exemption does not reduce the number of credits required for completion of the programme. Instead, students need to take a different course in place of the one that has been exempted.

Overall, credit transfer and credit exemption in the curriculum support flexibility, recognition of prior learning, and the optimization of resources, ensuring a more student-centred and efficient educational experience. Each HEI need to do credit transfer and credit exemption in curriculum for the following reasons:

1. **Transferability of Credits:** When students transfer from one institution to another, it is essential to ensure that their previous coursework is recognised and their credits can be transferred. Credit transfer allows students to receive acknowledgment for the courses they have already completed, enabling them to continue their education seamlessly.
2. **Prior Learning Recognition:** Credit exemption provides an opportunity for students to get recognition for the skills and knowledge they have acquired through prior learning experiences, such as work experience, self-study, or professional certifications. By granting credit exemptions, HEIs acknowledge the relevance and applicability of prior learning to the OBE curriculum.
3. **Optimisation of Resources:** Credit transfer and exemption can optimise resources for both students and institutions. It reduces redundancy by eliminating the need for students to repeat courses they have already taken, thereby saving their time and effort. Additionally, it allows institutions to efficiently allocate their resources by recognising previous coursework and focusing on imparting new knowledge and skills.
4. **Customisation and Individualisation of Education:** OBE curricula aim to tailor education to individual student needs and goals. Credit transfer and exemption enable students to personalise their educational path by recognizing their unique background and prior achievements. It facilitates a more customised learning experience and promotes student-centred education.
5. **Recognition of Program Equivalence:** OBE curricula vary across institutions, and different programmes may have similar learning outcomes. Credit transfer and exemption help in recognising the equivalence of programmes offered by different institutions. This recognition ensures comparability and quality assurance in education while promoting the mobility of students among different HEIs.

### 10.1. Condition and Process for Credit Transfer

Credit transfer is the process to transfer credit obtained from one institution to another institution. It involves recognition and acceptance of a course taken in one institution as an equivalent course in the new institution, hence the student does not have to repeat taking the course. Thus, the grade obtained is not carried to the new institution, but the credits are awarded and counted towards the degree requirement at the new institution.

Some institutions may have transfer agreements; else it has to be done on case-by-case basis. Generally, HEIs accept the credits of a course from an accredited programme. However, the final decision to accept another HEI's credits is at the discretion of the individual institution. To facilitate the credit transfer process:

1. The institution to award the credit transfer must establish a clear policy for the credit transfer.
2. The programme coordinator or course instructor must check when the student had taken the course. Only courses completed within the last five years can be considered for credit transfer evaluation and only courses that had earned a grade C or better is eligible to be assessed.
3. The student must apply from his/her previous institution the complete transcripts, with clear description of the subjects studied, the credit values and the score/grade obtained in each subject, and detailed explanation of how the scores/grades and GPA are given.

Normally, the previous institution will directly send the information to the person in charge at the new institution.

4. The programme coordinator or course instructor must verify that the course contents have similarity of at least 80% to syllabus of the course applied. This can be assessed by reviewing the content coverage, credit hours, and assessments. Additional information may be requested by the institution if necessary.

As a recognition for prior learning and in navigating pathways for students, normally students who have completed a higher diploma of technology in a college of technology in a recognised institution may be eligible to receive about 30 credit hours of credit transfer. It may also be necessary to make provision for special transitional programmes in subject areas that are prerequisite for more advanced studies in the discipline concerned, such as from a certificate to diploma programme and from a diploma to a bachelor degree programme.

## **10.2. Condition and Process for Credit Exemption**

Credit exemption allows students to be exempted from taking a required course in the new programme/institution. It can be based on prior learning through a course taken in another institution as non-credit course (not for a degree) or through professional experience or prior learning. Students may be eligible for credit exemption if they can demonstrate mastery of the required learning outcomes or competencies of a particular course. This may be done through various forms of assessment, such as exams, portfolios, projects, or presentations. If the students show good mastery of the course applied for exemption, then the students will be exempted from taking the required course but no credits are awarded for the exempted course. To complete the credit requirement for the degree, the student will have to take other courses agreed upon by the new programme/institution. To facilitate the credit exemption process:

1. The institution to award the credit exemption must establish a clear policy for the credit exemption.
2. The programme coordinator or course instructor must assess the students' prior learning by getting the students to sit for an exam, requiring students to do a presentation or by to submit portfolios or projects. If the student can demonstrate that they have acquired the CLOs for the course applied for exemption, then the students may be awarded the exemption.
3. The programme coordinator or course instructor will then suggest other courses for students to undertake to fulfil the credit requirements for the programme.

## **11. Quality Improvement for Academic Programme**

Quality Improvement is utmost importance in the implementation of OBE. It is essential in ensuring student learning outcomes are achieved and that the HEIs are constantly taking measures to improve the quality and relevance of their educational programmes.

### **11.1. Continuous Quality Improvement (CQI)**

The curriculum design cycle shall adhere to the CQI principle, which encompasses several stages: planning, implementation, monitoring and reviewing, and improvement stages as follows:

1. Planning stage: the market or stakeholders' needs are analysed in order to determine the graduate competencies and learning outcomes. The curriculum is then designed to align with these learning outcomes.
2. Implementation stage: innovative pedagogy takes place and an assessment is conducted.
3. Monitoring and reviewing stage: the results of the holistic assessment are analysed, and feedback and evaluation of students and faculty members are considered.
4. Improvement stage: if the learning outcomes have been achieved, the curriculum design, innovative teaching methods, and assessments are standardized. Areas that require improvement are identified, and changes are implemented in the subsequent PDCA (Plan-Do-Check-Act) cycle (Malaysian Qualifications Agency, 2023).

CQI is a management approach focused on enhancing and sustaining quality standards. It places emphasis on regular internal assessments to identify potential causes of quality defects, followed by proactive actions aimed at preventing any decline in quality or rectifying issues at an early stage (Malaysian Qualifications Agency, 2023). A constructive alignment is an approach to transformative curriculum design where all aspects of innovative pedagogy and holistic assessment are tuned to support and encourage higher-order learning processes to support CQI. In this stage, three steps need to carry out: i) Continual Quality Improvement of the Programme Educational Objectives (PEOs), ii) Continual Quality Improvement of the Programme Learning Outcomes (PLOs), and iii) Continual Quality Improvement of the Course Learning Outcome (CLOs):

1. Like other elements of a curriculum, such as PLOs and courses, the PEO also requires systematic and structured processes of monitoring, reviewing, and CQI in accordance with the academic quality assurance procedures or the institution's quality management system. To ensure ongoing enhancement and alignment of the PEO statements with regulatory requirements and stakeholders' needs. For evaluating the effectiveness of the programme, the PEO attainment should be measured three to five years after students' graduation. This CQI process encompasses the measurement and evaluation of PEOs and their achievements.
2. The monitoring and review process can be achieved through constructive engagement with stakeholders, including alumni and employers, as well as external experts whose views are considered for the CQI. The department explores the connections between courses and their PLOs to gather relevant and valuable data. This practice is an integral part of the monitoring system aimed at enhancing the quality of the student experience through continuous evaluation, identifying areas for improvement, and implementing timely responses (Malaysian Qualifications Agency, 2023). To measure the effectiveness of PLOs, various inputs need to be considered. These include analysing students' performance in mid-term and final examinations, assignment scores, project scores, final marks, as well as summarising and analysing the achievement of each PLO. It is important that each course should outline the important points such as specific, measurable, achievable, relevant, and accessible CLOs and LLOs. By examining these data points, it becomes possible to assess whether the targeted performance has been attained and to determine the programme's effectiveness in ensuring students acquire the intended learning outcomes and competencies.
3. CLOs and their assessment provide different data than student achievement rate. CLOs help to inform programme developers/faculty what students are learning in the classroom and provide a measure of the quality of learning. Assessment of CLOs achievement is essential for programme developers to act with, and it is the potential evident to improve/modernise the programme. CLOs must be assessed by instructors/programme developers in every semester.

## **11.2. Plan-Do-Check-Act (PDCA) Model**

PDCA is a principle, a way of thinking, and a framework that provides a systematic approach to problem solving and quality improvement (Deming, 1982). Use PDCA model in:

- i. Improving PEOs, PLOs, CLOs, and LLOs, regardless of whether they are achieved or not achieved,
- ii. Assessing appropriateness of curriculum design and delivery,
- iii. Determining staff goal setting and evaluation,
- iv. Identifying provision of students' services and support services,
- v. Evaluating class instruction,
- vi. Starting a new improvement,
- vii. Developing a new improved design,
- viii. Defining a repetitive work process,
- ix. Planning data collection and analysis in order to verify and prioritise problems or root causes,
- x. Implementing any change,

- xi. Working toward continuous improvement.

**Plan:** the planning stage is for mapping out what thing(s) is/are going to do to try to solve a problem or otherwise change a process and identify and analyse the problem or opportunity for change. In this step, students' needs are analysed for everything from grades to performance on standardised tests. Considering the following questions:

- i. What is the core problem we need to solve on the curriculum?
- ii. Is this the right problem to work on?
- iii. What information do we need to fully understand the problem and its root cause?
- iv. Is it feasible to solve it?
- v. What resources do we need?
- vi. What resources do we have?
- vii. How will the results from a small trial translate to a full-scale implementation?

**Do:** in this step, teaching staff also plans curricula by looking at what is taught at earlier and later levels and in other disciplines to ensure a clear continuity of instruction throughout the university education. Instructors develop individual goals to improve their instruction where the "analyse" step showed any gaps.

**Check:** this step is the time to review and analyse the results/outcomes. This stage is important because it shows and evaluates the solution and revise plans as necessary.

**Act:** in this step, when goals are met, the curriculum design and teaching methods are considered standardised. If not, try to figure out the root course by take in-depth in the "Plan" stage. Then follow by the PDCA cycle process flow.

## PDCA CYCLE PROCESS FLOW



Figure 10: PDCA Cycle Processes

In the OBE approach, learning outcomes (LOs) are indicators of the success of an academic course/programme. LOs provide a clear idea of what can be achieved by joining a particular programme or a course. Primarily, there are three outcomes must be assessed, which are the PEOs, PLOs, and CLOs. In order to improve PEOs of the programme, assessment of the PEOs must be conducted in every three to five years. Assessment of the PLOs and CLOs achievement must be conducted in every semester. The achievement of CLOs in each course are the ultimate output that programme implementers can work on to re-evaluate and/or revise the curriculum or individual courses, teaching strategies, and assessment methods to improve the achievement of

the PLOs. It is also essential to monitor and verify the alignment of LLOs with CLOs, CLOs with PLOs, and PLOs with PEOs. HEIs shall establish and implement a clearly defined system for curriculum development that is aligned with the Guideline on Transformative Curriculum issued by MoEYS. This system should consist of operative steps—documented in manuals, policies, or digital formats—that ensure the curriculum remains up-to-date and responsive to labor market demands. The system must include interconnected elements such as input from stakeholders, development and revision processes, curriculum outcomes, and mechanisms for feedback, enabling continuous improvement and relevance to national and global workforce needs.

HEIs shall develop mechanisms that are in place to ensure the effective functioning of the curriculum development system. These mechanisms should guarantee that the curriculum is developed in full compliance with the sub-decree on the Cambodian Qualifications Framework (CQF), Prakas 1435, the system, and the Guideline on Transformative Curriculum issued by MoEYS. The mechanisms should involve clear roles, structured processes, and regular reviews to ensure that the curriculum aligns with national standards and effectively responds to the evolving needs of the labor market."

In examining PEOs attainment, the focus is on aligning the mission and vision of HEIs with the PEOs of the programme. This is achieved by gathering survey inputs from industry professionals with whom the students are working, alumni, and conducting a thorough analysis of current market needs. These inputs are then integrated into the programme. When discussing PLOs attainment, the actions are primarily driven by HEIs themselves, with a key emphasis on aligning CLOs attainment with the PLOs of the programme. This alignment is thoroughly assessed through the Guideline for Holistic Assessment Guideline (GHA). To assess the PEO attainment, the PDCA cycle process flow as shown in Table 10.1 can be referred to as an example.

*Table 8. 3: Example of Conducting PDCA to Improve a PEO*

| <b>PDCA</b>  | <b>Implementation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |               | <b>Person in Charge</b>            |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------|------------------------------------|
|              | <b>PEO statement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Indicators</b>                                      | <b>Target</b> | Dean of faculty<br>Programme owner |
|              | To produce qualified engineers in electronics and automation (EA) to meet market needs nationally and internationally.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Graduates who obtain a job in the fields related to EA | 70%           |                                    |
| <b>Plan</b>  | <ul style="list-style-type: none"> <li>Conduct tracer study to determine if target of 70% is achieved</li> <li>If achieved, think of ways to improve it further</li> <li>If not achieved, think of ways to improve it through discussions at departmental and faculty levels. Start with analysing the PLOs attainment of the past and present batches of students. Analyse appropriateness of teaching methods and assessment strategies</li> <li>Gain more evidence by conducting surveys, focus group discussions, interviews with alumni</li> <li>Analyse stakeholder reports</li> <li>Conduct staff and facilities analysis</li> </ul> |                                                        |               | Dean of faculty<br>Programme owner |
| <b>Do</b>    | <ul style="list-style-type: none"> <li>Implement the action plan that was proposed after analysing the situation</li> <li>After another year, collect data again with the next batch of graduates to analyse the trend</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |               | Programme owner                    |
| <b>Check</b> | <ul style="list-style-type: none"> <li>Analyse and monitor trends</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |               | Programme owner                    |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
|               | <ul style="list-style-type: none"> <li>Determine if the achievement of the PEO is the same or much improved</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |
| <b>Action</b> | <ul style="list-style-type: none"> <li>If the PEO is achieved (70% of graduate get job related to EA), then programme owner must keep tracking the achievement and set plan to improve further for the programme to be more developed and sustainable</li> <li>If the PEO is not achieved, find the areas for improvement. The programme owner needs to find the root cause why it is not achieved by taking more actions on: <ul style="list-style-type: none"> <li>Programme characteristic/structure such as the enrolment criteria (students' background and interest in the programme)</li> <li>Industry engagement (engagement locally or internationally, students' internship)</li> <li>Teaching methodology, and so on</li> </ul> </li> </ul> | Dean of faculty Programme owner |

## 12. Programme Documentation

Programme documentation refers to the process of recording and organising information related to a curriculum, including its goals, objectives, content, instructional strategies, assessment methods, and resources. This documentation serves as a reference guide for educators, administrators, and other stakeholders involved in designing, implementing, and evaluating the curriculum.

The documentation must be compiled for the submission of both a new academic programme proposal and for the revision of an existing programme. For a revised programme, additional requirements must be met, which include:

1. alumni/stakeholders' feedback on the existing programme,
2. evaluation reports e.g. external assessor,
3. comparison of the existing programme with the revised version to indicate changes made, new courses offered, existing courses omitted/revised.

The programme documentation comprises of the (i) Executive Summary and (ii) Programme Specifications and other related resources. The course specifications are included in the Programme Specifications. The documentation must be submitted to several meetings at the university level and lastly to MoEYS for approval to offer the new and revised programme or notification purposes before the implementation of the new/revised programme. These documents must be completed, made available and shared with key stakeholders.

### 12.1. Executive Summary

The executive summary provides an overview of the key components of the curriculum. The components to be highlighted in the executive summary are as follows:

1. Purpose
2. Background
3. Justification
4. Programme Educational Objectives (PEOs)
5. Programme Learning Outcomes (PLOs)
6. Programme Structure
7. Approval of Programme
8. Recommendation

The following are two examples of executive summaries for submission of revised programmes to MoEYS. The format can be modified in seeking approval of the department, faculty and Academic Board of the HEIs.

**EXAMPLE 1: EXECUTIVE SUMMARY**  
**PROPOSAL FOR REVISION OF BACHELOR OF SCIENCE IN HORTICULTURE**  
**PROGRAMME TO MoEYS**

## **1.0 Purpose**

The purpose of this paper is to apply for consideration and approval of the MoEYS Meeting on the proposed revision of the Bachelor of Science of Horticulture, offered by the Faculty of Agriculture and Food Processing in the National University of Battambang.

## **2.0 Background**

### **[Background of faculty**

- **When was it established?**
- **Number of programmes currently offered**
- **Number of graduates**
- **Number of current students according to programmes etc.]**

National University of Battambang was established in 2007 as a public university ideally located in the historic and beautiful city of Battambang under the jurisdiction of the Ministry of Education, Youth and Sport. Faculty of Agriculture and Food Processing (FAFP) is one of the five faculties at the National University of Battambang, Cambodia. FAFP has earned a reputation for its high-calibre teaching programmes and its friendly, helpful staff. Students benefit not only from the expertise of staff in the faculty, but also from the close proximity of other faculties on campus, federal research facilities, and a vibrant Winnipeg-based agricultural community. Currently, there are four bachelor programmes and one associate programme under FAFP. There are around 750 students who are registered in the five programmes, and more than 100 students graduate each year. All curricula on Food Processing, Animal Science, Horticulture and Agroecology have been completely improved by the end 2023. All of these programmes were launched during the school year 2023-2024.

## **3.0 Justification**

### **[State the justification to offer a new programme or to revise the programme]**

The decision to revise the Bachelor of Science of Horticulture programme at FAFP is driven by the faculty's commitment to excellence in education. To align with global educational standards and enhance the quality of our programme, we propose develop the curriculum to adopt an Outcome-Based Education (OBE) approach where we need to determine the Programme Educational Objectives (PEOs) which are supported by the combination of Programme Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs). The feedback, inputs and suggestions collected from the stakeholders (220 students, 220 students' parents, 36 industries, 39 professional organisations, 36 lecturers, 48 public universities and 121 private companies) were considered for the programme learning outcomes, in consultation with the technical team of the Pennsylvania State University (PSU), USA.

- Our programme fits well with the situation in the northwest Cambodia
- Research and innovation
- Global competitiveness
- Increased flexibility and accessibility

## **4.0 Programme Educational Objectives (PEOs)**

In the market and the institutional need, the PEOs statements of this programme are list below:

**PEO1:** To produce qualified horticulturists (in crop cultivation techniques) and entrepreneurs to meet national and international job market needs.

**PEO2:** To cultivate lifelong learners, thereby increasing the number of horticultural scientists in the field.

**PEO3:** To produce entrepreneurs in the field of Horticulture or other areas.

## 5.0 Programme Learning Outcomes (PLOs)

To support the above three main PEOs, 10 PLOs have been developed as follows:

At the end of the programme, students are able to:

- **Knowledge domain (MD1):**
  - **PLO1 – Knowledge (LD1):** Apply concepts of horticulture science to select, manage and improve plants and their products.
- **Cognitive domain (MD2):**
  - **PLO2 – Cognitive skills (LD2):** Analyse the current events and issues that are occurring in agriculture and how they affect futuristic agriculture and innovative manner.
- **Psychomotor domain (MD3):**
  - **PLO3 – Psychomotor skills (LD3):** Conduct proficient planting and propagation techniques for a variety of horticultural crops, including fruits, vegetables and ornamentals.
- **Interpersonal skills and responsibility (MD4):**
  - **PLO4 – Interpersonal Skills (LD4):** Facilitate teamwork and collaboration with national, international, community development partners and the private sector related to the ethical and professional horticultural sector.
  - **PLO5 – Responsibility (LD5):** Conduct technical advice on precision agriculture and horticulture crop production.
  - **PLO6 – Entrepreneurial skills (LD6):** Develop components of agribusiness and economics of market by scientists, marketers, producers and decision making at various levels enhance the success of an agricultural enterprise.
  - **PLO7 – Ethics and Professionalism (LD7):** Develop thoughtful, clear, and consistent perspectives on ethical and moral issues related to horticulture.
- **Communication, information technology, and numerical skills (MD5):**
  - **PLO8 – Communication (LD8):** Perform communication effectively with various audiences using oral, written, and visual presentation skills, and contemporary networking or social media technologies.
  - **PLO9 – Information technology or digital skills (LD9):** Develop new ideas and thoughts by using modern techniques and tools (e.g., UAV -) in the field of Horticulture.
  - **PLO10 – Numerical Skills (LD10):** Interpret horticultural data, including measurements, calculations, and statistical analyses, to support decision-making processes related to crop management, drone operation and financial planning.

The mapping between the PLOs to PEOs are shown below:

| PLO Statements | PEO Statements |      |      |
|----------------|----------------|------|------|
|                | PEO1           | PEO2 | PEO3 |
| PLO1           | ✓              |      |      |
| PLO2           | ✓              |      |      |
| PLO3           | ✓              | ✓    |      |
| PLO4           |                |      | ✓    |

|       |   |   |   |
|-------|---|---|---|
| PLO5  |   | ✓ |   |
| PLO6  |   | ✓ |   |
| PLO7  |   |   | ✓ |
| PLO8  |   |   | ✓ |
| PLO9  | ✓ |   |   |
| PLO10 | ✓ | ✓ |   |

## 6.0 Programme Structure

A programme structure refers to the organisation of courses within an academic programme according to categories of required cluster of courses. For some programme structures, they also indicate the range (in number of credits and percentage) for each cluster of courses. They also provide guidance on options available and the required credits range, for example single major, double major, major-minor, and major with specialisation. In moving forward, programmes such as joint degree and dual degree programmes may also be considered by the HEIs. Since the programme is based on FEF, hence the guiding principles for the programme structure is also discussed.

This curriculum is designed for Bachelor of Science in Horticulture degree which illustrates the whole four-year programme.

### a) Basic Courses (MoEYS)

| Current Curriculum   |             |                                  |           | Revised Curriculum   |                                   |        | Justification for Change/No change                                                                                                                         |
|----------------------|-------------|----------------------------------|-----------|----------------------|-----------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No                   | Course Code | Course Name                      | Credit    | Course Code          | Course Name                       | Credit |                                                                                                                                                            |
| 1                    |             | Khmer Language for Communication | 3         | KLC.BM11             | Khmer Language for Communication  | 2      |                                                                                                                                                            |
| 2                    |             | Humanity and Civilization        | 3         | HAC.BM11             | Humanity and Civilization         | 1      |                                                                                                                                                            |
| 3                    |             | Agribusiness                     | 2         | AAE.BM22             | Agribusiness and Entrepreneurship | 3      | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders. |
| 4                    |             | Entrepreneurship                 | 1         |                      |                                   |        |                                                                                                                                                            |
| 5                    |             | General Chemistry                | 3         |                      |                                   |        |                                                                                                                                                            |
| <b>Total Credits</b> |             |                                  | <b>12</b> | <b>Total Credits</b> |                                   |        | <b>6</b>                                                                                                                                                   |
| <b>Percentage</b>    |             |                                  | <b>10</b> | <b>Percentage</b>    |                                   |        | <b>5</b>                                                                                                                                                   |

**b) Basic Courses (HEI)**

| Current Curriculum   |             |                                                |             | Revised Curriculum   |                                            |        | Justification for Change/No change                                                                                                     |
|----------------------|-------------|------------------------------------------------|-------------|----------------------|--------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------|
| No                   | Course Code | Course Name                                    | Credit      | Course Code          | Course Name                                | Credit |                                                                                                                                        |
| 1                    |             | Introduction to Microbiology                   | 3           | ITM.BH11             | Introduction to Microbiology               | 3      |                                                                                                                                        |
| 2                    |             | Statistical Methods for Horticultural Research | 3           | 07SRM.BH12           | Statistics for Research Methodology        | 3      | The new name suggests that the course covers statistical methods applicable to a wide range of research fields, not just horticulture. |
| 3                    |             | Scientific Writing and Communication Skill     | 3           | SWC.BH32             | Scientific Writing and Communication Skill | 3      |                                                                                                                                        |
| 4                    |             | Applied Mathematics                            | 3           |                      |                                            |        |                                                                                                                                        |
| 5                    |             | Biochemistry                                   | 3           |                      |                                            |        |                                                                                                                                        |
| <b>Total Credits</b> |             |                                                | <b>15</b>   | <b>Total Credits</b> |                                            |        | <b>9</b>                                                                                                                               |
| <b>Percentage</b>    |             |                                                | <b>12.5</b> | <b>Percentage</b>    |                                            |        | <b>7.5</b>                                                                                                                             |

**c) Major Core Courses**

| Current Curriculum |             |                                           |        | Revised Curriculum |                                           |        | Justification for Change/No change |
|--------------------|-------------|-------------------------------------------|--------|--------------------|-------------------------------------------|--------|------------------------------------|
| No                 | Course Code | Course Name                               | Credit | Course Code        | Course Name                               | Credit |                                    |
| 1                  |             | Botany                                    | 3      | BTN.MC12           | Botany                                    | 3      |                                    |
| 2                  |             | Applied Soil Science                      | 3      | ASS.CC12           | Applied Soil Science                      | 3      |                                    |
| 3                  |             | Research Methodology: Experimental Design | 3      | RME.CC22           | Research Methodology: Experimental Design | 3      |                                    |
| 4                  |             | Plant Physiology                          | 3      | PPN.CC21           | Plant Physiology                          | 3      |                                    |

|    |  |                                     |   |          |                                               |   |                                                                                                                                                                                               |
|----|--|-------------------------------------|---|----------|-----------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |  | gy and Nutrition                    |   |          | -gy and Nutrition                             |   |                                                                                                                                                                                               |
| 5  |  | Applied Entomology                  | 3 | AEN.CC11 | Applied Entomology                            | 3 |                                                                                                                                                                                               |
| 6  |  | Ornamental Plant Production Systems | 3 | OPS.CC21 | Ornamental Plant Production Systems           | 3 |                                                                                                                                                                                               |
| 7  |  | Landscape Planting Design           | 3 | LPD.EC22 | Landscape Planting Design                     | 3 |                                                                                                                                                                                               |
| 8  |  | Nursery and Greenhouse Management   | 3 | NGM.CC31 | Nursery and Greenhouse Management             | 3 |                                                                                                                                                                                               |
| 9  |  | Plant Tissue Culture                | 3 | PTC.CC31 | Plant Tissue Culture                          | 3 |                                                                                                                                                                                               |
| 10 |  | Farm Management                     | 3 | FCA.CC32 | Farm Management and Climate smart agriculture | 3 | The new name indicates that the course now includes content on climate-smart agriculture, which involves practices that help mitigate the effects of climate change and adapt to its impacts. |
| 11 |  | Weed Management                     | 3 | WMM.CC21 | Weed Management                               | 3 |                                                                                                                                                                                               |
| 12 |  | Plant Health                        | 3 | PHC.CC31 | Plant Health and Crop Protection              | 3 | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders.                                    |
|    |  | Horticultural Crop Protection       | 3 |          |                                               |   |                                                                                                                                                                                               |
| 13 |  | Small Fruit Production              | 3 | STP.CC22 | Small Fruit and Tree Fruit Production         | 3 | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the                                                                   |
|    |  | Tree Fruit Production               | 3 |          |                                               |   |                                                                                                                                                                                               |

|                      |  |                                                 |           |                      |            |    |                                                                                                                                                            |
|----------------------|--|-------------------------------------------------|-----------|----------------------|------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      |  |                                                 |           |                      |            |    | meeting with the stakeholders.                                                                                                                             |
| 14                   |  | Seminar                                         | 1         | SEM.CC41             | Seminar    | 3  |                                                                                                                                                            |
| 15                   |  | Internship                                      | 3         | INT.CC41             | Internship | 6  |                                                                                                                                                            |
| 16                   |  | Agricultural Field Work I                       | 1         | FDW.CC41             | Field Work | 3  | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders. |
|                      |  | Agricultural Field Work II                      | 1         |                      |            |    |                                                                                                                                                            |
| 17                   |  | Thesis                                          | 9         | THS.CC42             | Thesis     | 12 |                                                                                                                                                            |
| 18                   |  | Introduction to Horticulture                    | 3         |                      |            |    |                                                                                                                                                            |
| 19                   |  | Logistic and supply chain management            | 3         |                      |            |    |                                                                                                                                                            |
| 20                   |  | Post-harvest technology for horticultural crops | 3         |                      |            |    |                                                                                                                                                            |
| 21                   |  | Plant breeding and Biotechnology                | 3         |                      |            |    |                                                                                                                                                            |
| <b>Total Credits</b> |  |                                                 | <b>72</b> | <b>Total Credits</b> |            |    | <b>63</b>                                                                                                                                                  |
| <b>Percentage</b>    |  |                                                 | <b>60</b> | <b>Percentage</b>    |            |    | <b>52.5</b>                                                                                                                                                |

**d) Minor Core Courses**

| Current Curriculum |             |                     |        | Revised Curriculum |                     |        | Justification for Change/No change |
|--------------------|-------------|---------------------|--------|--------------------|---------------------|--------|------------------------------------|
| No                 | Course Code | Course Name         | Credit | Course Code        | Course Name         | Credit |                                    |
| 1                  |             | English for Career  | 3      | EFC.MC12           | English for Career  | 3      |                                    |
| 2                  |             | English for Science | 3      | EFS.MC11           | English for Science | 3      |                                    |

|                      |  |                            |            |                      |                                      |   |                                                                                                                                                                                                                 |
|----------------------|--|----------------------------|------------|----------------------|--------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3                    |  | Founda-<br>tion<br>English | 3          | GRI.MC11             | Gramma<br>r I                        | 3 | The new name explicitly indicates that the course primarily focuses on grammar. This specificity helps students understand exactly what they will be learning, as opposed to the broader and more general term. |
| 4                    |  |                            |            | GRIL.MC12            | Gramma<br>r II                       | 3 | e new course is introduced because it more relevant to the new technologies used in this area. It is offered by most renowned institutions offering this programme.                                             |
| 5                    |  |                            |            | AEI.MC21             | Academi<br>c writing<br>I            | 3 |                                                                                                                                                                                                                 |
| 6                    |  |                            |            | AWIL.MC2<br>2        | Academi<br>c writing<br>II           | 3 |                                                                                                                                                                                                                 |
| 7                    |  |                            |            | AWIIL.MC3<br>1       | Academi<br>c writing<br>III          | 3 |                                                                                                                                                                                                                 |
| 8                    |  |                            |            | AWIV.MC3<br>2        | Academi<br>c writing<br>IV           | 3 |                                                                                                                                                                                                                 |
| 9                    |  |                            |            | EFC.MC31             | English<br>for<br>Commu-<br>nication | 3 |                                                                                                                                                                                                                 |
| 10                   |  |                            |            | MBL.MC32             | Model<br>Business<br>letters         | 3 |                                                                                                                                                                                                                 |
| <b>Total Credits</b> |  |                            | <b>9</b>   | <b>Total Credits</b> |                                      |   | <b>30</b>                                                                                                                                                                                                       |
| <b>Percentage</b>    |  |                            | <b>7.5</b> | <b>Percentage</b>    |                                      |   | <b>25</b>                                                                                                                                                                                                       |

**e) Electives Courses**

| <b>Current Curriculum</b> |                    |                                              |               | <b>Revised Curriculum</b> |                            |               | <b>Justification for Change/No change</b>                                                        |
|---------------------------|--------------------|----------------------------------------------|---------------|---------------------------|----------------------------|---------------|--------------------------------------------------------------------------------------------------|
| <b>No</b>                 | <b>Course Code</b> | <b>Course Name</b>                           | <b>Credit</b> | <b>Course Code</b>        | <b>Course Name</b>         | <b>Credit</b> |                                                                                                  |
| 1                         |                    | Soilless Culture: Hydroponics and Aquaponics | 3             | HAA.EC32                  | Hydroponics and Aquaponics | 3             | The new name may better represent and to align with current terminology and trends in the field. |
| 2                         |                    | Project Develop-                             | 3             | PDM.EC32                  | Project Develop-           | 3             |                                                                                                  |

|                      |            |                                        |           |                      |                                         |   |                                                                                                                                                                                         |
|----------------------|------------|----------------------------------------|-----------|----------------------|-----------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      |            | ment and Manage-ment                   |           |                      | ment and Manage-ment                    |   |                                                                                                                                                                                         |
| 3                    | SAA.M1-B12 | Sustaina-ble Agricul-ture Applica-tion | 3         | IPA.EC31             | Introduc-tion to Precision Agricul-ture | 3 | The new name may better represent the integration of advanced technologies such as GPS, sensors, drones, and data analytics in agriculture, which are central to precision agriculture. |
| 4                    |            |                                        |           | GIS.EC21             | Introduc-tion to GIS                    | 3 | The new course is introduced because it more relevant to the new technologies used in this area. It is offered by most renowned institutions offering this programme.                   |
| 5                    |            | Agroeco-system                         | 3         |                      |                                         |   | The Course is omitted from the current curriculum. It is no longer relevant as raised by the external examiners.                                                                        |
| <b>Total Credits</b> |            |                                        | <b>12</b> | <b>Total Credits</b> |                                         |   | <b>12</b>                                                                                                                                                                               |
| <b>Percentage</b>    |            |                                        | <b>10</b> | <b>Percentage</b>    |                                         |   | <b>10</b>                                                                                                                                                                               |

Comparison of the programme structure for the current and revised curriculum.

| Curriculum Component  | Range (MoEYS Guideline) * | Current Curriculum | Revised Curriculum |
|-----------------------|---------------------------|--------------------|--------------------|
|                       |                           | Current            | Major with Minor   |
|                       | Major with Minor (%)      | Credit hour (%)    | Credit hour (%)    |
| Basic Courses (MoEYS) | 5                         | 12 (10)            | 6 (5)              |
| Basic Courses (HEI)   | 7.50                      | 15 (12.5)          | 9 (7.5)            |
| Major Core Courses    | 52.5-58                   | 72 (60)            | 63(52.5)           |
| Minor Core Courses    | 25-29                     | 9 (7.5)            | 30 (25)            |
| Elective Courses      | 10-13                     | 12 (10)            | 12 (10)            |
| <b>Total</b>          | <b>100</b>                | <b>120</b>         | <b>120</b>         |

## 7.0 Approval of Programme

| N | Approval   | Date         |
|---|------------|--------------|
| 1 | Department | October 2022 |

|   |                                        |               |
|---|----------------------------------------|---------------|
| 2 | Faculty                                | December 2022 |
| 3 | University Academic Board              | March 2023    |
| 4 | Ministry of Education, Youth and Sport |               |

## 8.0 Recommendation

It is hoped that the meeting of the MoEYS will consider and approve the proposed revision of the Bachelor of Science of Horticulture, by the Faculty of Agriculture and Food processing in the National University of Battambang to be offered in the first semester year 2024.

## EXAMPLE 2: EXECUTIVE SUMMARY

### PROPOSAL FOR REVISION OF ENGINEER DEGREE IN ELECTRONICS AND AUTOMATION TO ENGINEER DEGREE IN ELECTRONICS AND AUTOMATION (DOUBLE MAJOR, SAME FIELD) TO MoEYS

#### 1.0. Purpose

The purpose of this paper is to present the revision of the Engineering degree in Electronics and Automation (EA) programme of Institute of Technology of Cambodia. This programme is modernized within the framework of FutureFit Educational Framework (FEF) of Cambodia and will be offered as Engineer Degree in Electronics and Automation with Double Major.

#### 2.0. Background

At the national level, the Royal Government of Cambodia aims to reach a country with a high middle-income economy by 2030 and a high-income economy by 2050. Human resource development is one of the pillars of the pentagonal strategy phase 1 (PS1) intending to strengthen the quality of education, sciences, and technology. Cambodia's recent economic success (average 7.6% growth for the last two decades) has been built largely on the expansion of relatively low technology, low wage/skill production in such industries as textiles, apparel, and basic electronics, and sustained by a steady flow of foreign investment. To remain competitive, Cambodia must address an increasingly serious human resource constraint in the form of rising shortages in Science, Technology, Engineering, and Mathematics (STEM) produced by the universities. Improvement of higher education in STEM will produce highly skilled graduates who can fill leadership roles in Cambodia's technological transformation.

As clearly cited in the 10-year strategy of ITC, new program development is one of the priority missions to support the fast-changing growth and to full-fill the requirement of new skills in the market. Department of Electrical and Energy Engineering (GEE), one of the oldest departments at ITC, provides currently 4 programs (2 at Engineering levels and 2 at Diploma levels).

Currently, the educational landscape faces several challenges and innovations that need to be addressed and responded to for academic institutions to be at par with the standard. The challenges include producing employable graduates with 21<sup>st</sup>-century skills, meeting global standards, and delivering industry-responsive curricula to satisfy workplace requirements. Outcome-Based Education (OBE) is a concept focusing on organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of learning experiences. This means starting with a clear picture of what is important for the student to be able to do, then, organizing the curriculum, instruction, and assessment to make sure this learning ultimately happens. Figure 1 proposes a comprehensive OBE framework, which is precise and compact to address the key stake and activity that needs to be accomplished for the successful adoption of OBE within an Engineering Program. According to this framework, there should have 2 main processes which need to be executed in sequences. The

first main process is the process inception (program level), which covers the program's visions and missions – program educational objectives (PEOs) – program learning outcomes (PLOs), which have to be conducted. Once the task of program structure is accomplished, the process execution (course level) has to be developed to design the program curriculum for responding to the defined PLOs in the previous process.

In the OBE concept, Programme Educational Objectives (PEOs) must be well-defined for making sure that our graduates gain knowledge, skills, and attitudes that respond to the policies of the government, and market needs. Hence, four PEOs, that we want our graduates to achieve after 3-5 years of graduation, are defined: 1) Our graduates will become fully qualified engineers in the field of EA, 2) Our graduates will have long-life learning skills, 3) can pursue higher education, and 3) Our graduates are able to become future techno-entrepreneurship. To achieve these outcomes, we implemented project-based learning (PBL) and adaptive learning system (ALS) methodologies in our new EA curricula. Each student has to do a research project in the department or with industry for more than 2 years before graduation. As a result, we expect our graduates to be equipped with 21<sup>st</sup>-century skills including higher skills in digital programming and other crucial soft skills for being successful in their future careers.

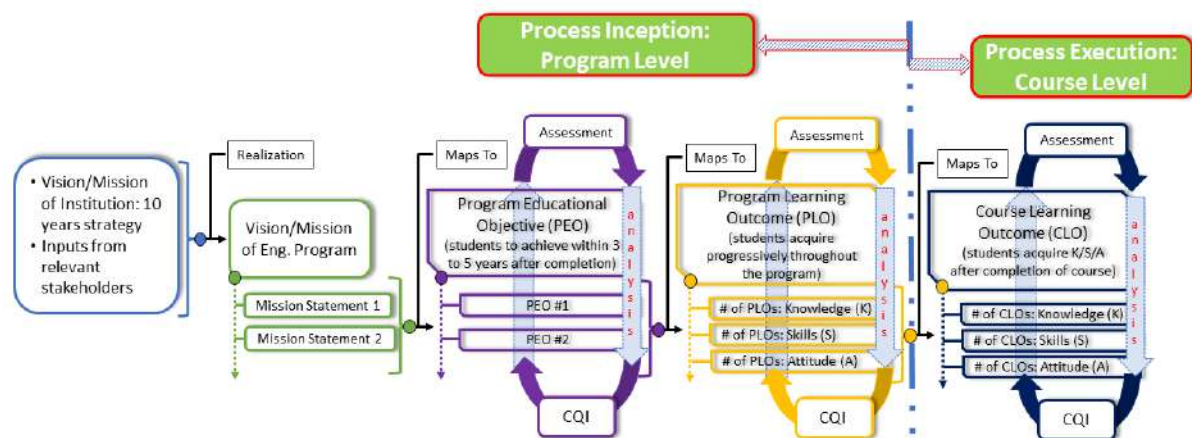


Figure 11: Diagram Showing the Purpose, Relation, and Dependency among Vision/mission, PEOs, PLOs, and CQI of an Engineering Programme

### 3.0. Justification

The new curriculum was developed by using the Outcome-Based Education method where we need to determine the Program Educational Objectives (PEOs) which are supported by the combination of Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs). PEOs of the EA engineering program are obtained from a) industries' skills need (from questionnaire surveys: 50 samples, 11 technical/soft-skills needed, b) missions and visions of the institution, c) feedback/surveys from alumni.

As a result, we defined

- Four PEOs for an improved curriculum,
- Ten PLOs were proposed,
- Revised and developed new 27 courses out of 33 main technical subjects,
- Introduce innovative (peer teaching, PoBL, ...) pedagogy in course implementation
- Develop assessment rubrics, system, and platform for assessing all courses and storage,
- Introduce the CQI mechanism.

### 4.0. Programme Educational Objectives (PEOs)

In response to the market and the institutional need, the Programme's Educational Objectives (PEOs) of this programme are listed as follows:

PEO1: To produce qualified engineers in Electronics and Automation to meet market needs nationally/internationally.

PEO2: To produce lifelong learners who contribute significantly to the electronics and automation field.

PEO3: To pursue post-graduate education in the field related to Electronics and Automation.

PEO4: To produce entrepreneurs in the field of electronics and automation or other sectors.

| No. | PEO Statement                                                                                                        | CQF (Major Domain)                                                                                         | Performance Criteria                                                                                                                                                                                             |            |
|-----|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
|     |                                                                                                                      |                                                                                                            | Indicator                                                                                                                                                                                                        | Target*    |
| 1   | To produce <i>qualified engineers</i> in electronics and automation to meet market needs nationally/internationally. | Knowledge<br>Cognitive<br>Psychomotor<br>Communication,<br>information technology,<br>and numerical skills | ● Graduates who obtain a job in the right field and are promoted to a higher rank in the organisation.                                                                                                           | <b>70%</b> |
|     |                                                                                                                      |                                                                                                            | ● Graduates who led and completed at least one main project of the organisation.                                                                                                                                 | <b>50%</b> |
|     |                                                                                                                      |                                                                                                            | ● Graduates who have participated in and completed at least one main project of the organisation as a key team member.                                                                                           | <b>60%</b> |
| 2   | To produce <i>lifelong learners</i> who contribute significantly to the electronics and automation field.            | Interpersonal skills and responsibility                                                                    | ● Graduates who are pursuing their study in a formal education leading to a higher degree or engaging in continuous professional development activities or courses for at least one course or 20 hours per year. | <b>60%</b> |
| 3   | To <i>pursue post-graduate education</i> in fields related to electronics and automation.                            | Interpersonal skills and responsibility                                                                    | ● Graduates who are engaged in learning opportunities outside the formal school at least one new skill or tool per year.                                                                                         | <b>15%</b> |
| 4   | To produce <i>entrepreneurs</i> in the field of electronics and automation or other related sectors.                 | Interpersonal skills and responsibility                                                                    | ● Graduates who are joint-venture or create an SME in the electronics and automation field after three years of graduation.                                                                                      | <b>15%</b> |
|     |                                                                                                                      |                                                                                                            | ● Graduates who are involved in R&D in the scope for future business at least one R&D project funded by the business organisation.                                                                               | <b>65%</b> |

## 5.0. Programme Learning Outcomes (PLOs)

To support the above four main PEOs, 10 Program Learning Outcomes (PLOs) have been developed following the Cambodia Qualifications Framework (CQF):

- **Knowledge domain (MD1):**
  - **PLO1 – Knowledge (Learning Domain 1 (LD1)):** At the end of the EA programme, students are able to apply new knowledge in the fields of electronics and smart automation systems.
- **Cognitive domain (MD2):**
  - **PLO2 – Cognitive skills (Learning Domain 2 (LD2)):** On successful completion of the programme, students are able to design engineering products/solutions that meet the

specified needs with consideration of social economic factors in the field of electronics and automation.

- **Psychomotor domain (MD3):**
  - **PLO3 – Psychomotor skills (Learning Domain 3 (LD3)):** Students are able to conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions in the scope of electronics and automation systems development.
- **Interpersonal skills and responsibility (MD4):**
  - **PLO4 – Interpersonal Skills (Learning Domain 4 (LD4)):** By the completion of the EA programme, students are able to develop a team or teamwork whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
  - **PLO5 – Responsibility (Learning Domain 5 (LD5)):** By the end of the EA programme, students are able to demonstrate professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
  - **PLO6 - Entrepreneurial skills (Learning Domain 6 (LD6)):** On successful completion of the EA programme, students are able to identify business problems accurately and effectively across a wide range of business domains.
  - **PLO7 - Ethics and Professionalism (Learning Domain 7 (LD7)):** Students in EA programme are able to recognize ethical and professional responsibilities in the engineering context with consideration to the societal impacts.
- **Communication, information technology, and numerical skills (MD5):**
  - **PLO8 – Communication (Learning Domain 8 (LD8)):** Students in EA programmes are able to apply written, oral, and graphical communication with appropriate usage of the technical literature.
  - **PLO9 - Information technology or digital skills (Learning Domain 9 (LD9)):** By the successful completion of the EA programme, students are able to use computer software for data analysis and solving the complex problem.
  - **PLO10 – Numerical Skills (Learning Domain 10 (LD10)):** Students in EA programme are able to use both quantitative and qualitative techniques to forecast the trend in electronics and automation.

The mapping between PLOs to CQF domains and PEOs

| PLO   | MD1            | MD2                   | MD3                     | MD4                       |                     |                              |                                 | MD5                |                                               |                        |
|-------|----------------|-----------------------|-------------------------|---------------------------|---------------------|------------------------------|---------------------------------|--------------------|-----------------------------------------------|------------------------|
|       | K              | S                     | S                       | S                         | A                   | S                            | A                               | A                  | S                                             | S                      |
|       | LD1: Knowledge | LD2: Cognitive skills | LD3: Psychomotor skills | LD4: Interpersonal skills | LD5: Responsibility | LD6: Entrepreneurship skills | LD7: Ethics and Professionalism | LD8: communication | LD9: Information technology or digital skills | LD10: Numerical skills |
| 1     | ✓              |                       |                         |                           |                     |                              |                                 |                    |                                               |                        |
| 2     |                | ✓                     |                         |                           |                     |                              |                                 |                    |                                               |                        |
| 3     |                |                       | ✓                       |                           |                     |                              |                                 |                    |                                               |                        |
| 4     |                |                       |                         | ✓                         |                     |                              |                                 |                    |                                               |                        |
| 5     |                |                       |                         |                           | ✓                   |                              |                                 |                    |                                               |                        |
| 6     |                |                       |                         |                           |                     | ✓                            |                                 |                    |                                               |                        |
| 7     |                |                       |                         |                           |                     |                              | ✓                               |                    |                                               |                        |
| 8     |                |                       |                         |                           |                     |                              |                                 | ✓                  |                                               |                        |
| 9     |                |                       |                         |                           |                     |                              |                                 |                    | ✓                                             |                        |
| 10    |                |                       |                         |                           |                     |                              |                                 |                    |                                               | ✓                      |
| Total | 1              | 1                     | 1                       | 1                         | 1                   | 1                            | 1                               | 1                  | 1                                             | 1                      |

### Mapping between the PLO and the PEO statements

| PLO    | Program Educational Objectives (PEOs) |       |       |       |
|--------|---------------------------------------|-------|-------|-------|
|        | PEO 1                                 | PEO 2 | PEO 3 | PEO 4 |
| PLO 1  | ✓                                     | ✓     | ✓     | ✓     |
| PLO 2  | ✓                                     | ✓     | ✓     |       |
| PLO 3  | ✓                                     | ✓     | ✓     |       |
| PLO 4  | ✓                                     | ✓     | ✓     | ✓     |
| PLO 5  | ✓                                     | ✓     |       | ✓     |
| PLO 6  |                                       |       |       | ✓     |
| PLO 7  | ✓                                     | ✓     | ✓     | ✓     |
| PLO 8  | ✓                                     | ✓     | ✓     | ✓     |
| PLO 9  | ✓                                     |       | ✓     |       |
| PLO 10 | ✓                                     |       | ✓     |       |
| Total  | 9                                     | 7     | 8     | 6     |

### 6.0. Programme Structure

This curriculum is designed for an engineering degree which illustrates the whole five-year Engineering Programme in Electronics and Automation in the Department of Electrical and Energy Engineering from 1<sup>st</sup> year to 5<sup>th</sup> year.

#### Curriculum for 1<sup>st</sup> year

| Semester | Course Code | Course Title                     | Credit<br>(L, TD, TP) |
|----------|-------------|----------------------------------|-----------------------|
| 1        | DTCI11KLC   | Khmer Language for Communication | 2                     |
|          | DTCI11HAC   | Humanity and Civilization        | 2                     |
|          | DTCI11FRE   | French I                         | 2                     |
|          | DTCI11GEO   | Geometry                         | 2                     |
|          | DTCI11MEC   | Mechanics I                      | 3                     |
|          | DTCI11ENV   | Environment                      | 2                     |
| 2        | DTCI12FRE   | French II                        | 2                     |
|          | DTCI12CAL   | Calculus I                       | 3                     |
|          | DTCI12THE   | Thermodynamic                    | 3                     |
|          | DTCI12TED   | Technical drawing                | 3                     |
|          | DTCI12INF   | Informatic                       | 2                     |
|          | DTCI12SAE   | Business and Entrepreneurship    | 2                     |

#### Curriculum for 2<sup>nd</sup> year

| Semester | Course Code | Course Title       | Credit |
|----------|-------------|--------------------|--------|
| 1        | DTCI21FRE   | French III         | 2      |
|          | DTCI21ENG   | English I          | 2      |
|          | DTCI21MEC   | Mechanics II       | 3      |
|          | DTCI21CAL   | Calculus II        | 3      |
|          | DTCI21CHE   | Chemistry          | 3      |
|          | DTCI21ELE   | Electricity        | 3      |
| 2        | DTCI22FRE   | French IV          | 2      |
|          | DTCI22CHE   | English II         | 2      |
|          | DTCI22LIA   | Linear algebra     | 3      |
|          | DTCI22PRO   | Probability        | 3      |
|          | DTCI22VAW   | Vibration and wave | 3      |

Curriculum for 3<sup>rd</sup> year

| Semester | Course Code | Course Title                             | Credit |
|----------|-------------|------------------------------------------|--------|
| <b>1</b> | GEEI31COP   | Computer Programming                     | 1      |
|          | GEEI31SAS   | Signal and systems                       | 2      |
|          | GEEI31FRE   | French V                                 | 1      |
|          | GEEI31ENG   | English III                              | 1      |
|          | GEEI31STA   | Statistics                               | 3      |
|          | GEEI31ELC   | Electrical circuit                       | 3      |
|          | GEEI31ELA   | Electronics analogue                     | 3      |
| <b>2</b> | GEEI32FRE   | French VI                                | 1      |
|          | GEEI32ENG   | English IV                               | 1      |
|          | GEEI32FCS   | Feedback control systems                 | 3      |
|          | GEEI32NMO   | Numerical method and optimization        | 2      |
|          | GEEI32DIE   | Digital Electronics                      | 2      |
|          | GEEI32MIA   | Microprocessor architecture              | 2      |
|          | GEEI32CIR   | Communication and interpersonal relation | 1      |
|          | GEEI32ELM   | Electrical machine                       | 3      |

Curriculum for 4<sup>th</sup> year

| Semester | Course Code | Course Title                                | Credit |
|----------|-------------|---------------------------------------------|--------|
| <b>1</b> | GEEI41ENG   | English V                                   | 1      |
|          | GEEI41FRE   | French VII                                  | 1      |
|          | GEEI41PEL   | Power Electronics                           | 3      |
|          | GEEI41REM   | Research Methodology                        | 2      |
|          | GEEI41MOD   | Motor drive                                 | 3      |
|          | GEEI41MCS   | Modern control systems                      | 3      |
|          | GEEI41INP   | Industrial network protocol                 | 2      |
|          | GEEI41SPP   | Student Project Part I                      | 1      |
| <b>2</b> | GEEI42SPP   | Student Project Part II                     | 1      |
|          | GEEI42SAA   | Sensor and actuators                        | 3      |
|          | GEEI42PLC   | Programmable logic controller               | 4      |
|          | GEEI42ECD   | Electronic circuit design and manufacturing | 2      |
|          | GEEI42DCD   | Digital circuit design                      | 2      |
|          | GEEI42FRE   | French VIII                                 | 1      |
|          | GEEI42ENG   | English VI                                  | 1      |

Curriculum for 5<sup>th</sup> year

| Semester | Course Code | Course Title                     | Credit |
|----------|-------------|----------------------------------|--------|
| <b>1</b> | GEEI51ENG   | English for work                 | 1      |
|          | GEEI51MIP   | Module d'insertion professionnel | 1      |
|          | GEEI51PRM   | Project management               | 2      |
|          | GEEI51SPP   | Student Project Part III         | 1      |
|          | GEEI51EME   | Embedded electronics             | 3      |
|          | GEEI51INA   | Industrial automation            | 3      |
|          | GEEI51TEC   | Technopreneurship                | 1      |
|          | GEEI51ELV   | Extra-low voltage design         | 3      |
|          | GEEI51WSP   | Work-life and social psychology  | 1      |
| <b>2</b> | GEEI52FYI   | Final Year Internship            | 12     |

## Programme Structure

| Curriculum Component  | Range (MoEYS Guideline) * (%) | Current Curriculum |            | Revised Curriculum |            |
|-----------------------|-------------------------------|--------------------|------------|--------------------|------------|
|                       |                               | Credit hour        | %          | Credit hour        | %          |
| Basic Courses (MoEYS) | 4.6                           | --                 | --         | 6                  | 4          |
| Basic Courses (HEI)   | 7                             | 61                 | 35         | 9                  | 7          |
| Core Courses          | 34.6-38.5                     | 60                 | 50         | 51                 | 35         |
| Major Electronics     | 26.9-30.7                     | 23                 | 15         | 38                 | 27         |
| Major Automation      | 26.9-30.7                     | 23                 | 15         | 38                 | 27         |
| <b>Total</b>          | <b>100</b>                    | <b>144</b>         | <b>100</b> | <b>144</b>         | <b>100</b> |

### 7.0. Approval of Programme

| No. | Approval                               | Date     |
|-----|----------------------------------------|----------|
| 1   | Department                             | ... 2024 |
| 2   | University Academic Board              | ... 2024 |
| 3   | Ministry of Education, Youth and Sport |          |

### 8.0. Recommendation

It is hoped that the meeting of the MoEYS will consider and approve the proposed revision of the Bachelor Engineering in Electronics and Automation, by the Faculty of Engineering in the Institute of Technology Cambodia, to be offered in the first semester year...

### 12.2. Programme Specifications

After the executive summary, the programme documentation must include the programme specifications, appendices, and all course specifications. These documents must be completed, made available, and shared with key stakeholders. An academic programme specification is a formal document that outlines the vision-mission, objectives, structure, content, and requirements of an academic programme offered by an HEI. It provides a detailed description of the programme's curriculum, learning outcomes, assessment methods, and how it aligns with institutional vision-mission, and professional standards. It is essential for establishing a clear framework for designing, delivering, and assessing an academic program. This document is usually created for the purpose of accreditation, curriculum development, or ensuring consistency in the academic offerings. In this guideline, programme specification consists of 31 elements and 10 appendices (see section 12.2 and 12.3).

The programme specifications serve as a source of information for:

1. potential and current students seeking to understand the programme or in deciding whether to enrol in it,
2. employers, particularly on the knowledge and transferable skills developed by the programme,
3. professional and statutory bodies that accredit higher education programmes, which can lead to a profession or regulated occupation. Programme specifications should identify those aspects of a programme that are designed to meet the requirements of relevant bodies,
4. institutional and teaching teams to promote discussion and reflection on new and existing programmes, and to ensure that there is common understanding of the expected learning outcomes. The programme specifications should enable the programme to satisfy themselves that the expected learning outcomes can be achieved and demonstrated. The programme specifications can serve as a reference point for internal review and monitoring of its performance,

5. academic reviewers and external examiners who need to understand the aims and intended outcomes of the programme,
6. gaining feedback from students or recent graduates on the extent to which the expected learning outcomes of the programme have been achieved.

The following are two examples of the full proposal for revised programmes submitted to MoEYS for approval. The format is adapted from the Guideline in Preparing Academic Programme Documentations (Universiti Putra Malaysia, 2022) and it can be modified when seeking approval from the department, faculty and University Academic Council of the HEIs.

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**EXAMPLE 1: PROGRAMME SPECIFICATIONS**  
**PROPOSAL FOR REVISED CURRICULUM FOR BACHELOR OF SCIENCE OF**  
**HORTICULTURE PROGRAMME SUBMITTED TO MoEYS**

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| No.                                                                                                                                                                                   | Items                                                                                                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
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| 1                                                                                                                                                                                     | University/<br>Institution                                                                                                          | <i>[Insert either university's name and the name of partner university, if joint award]</i><br>National University of Battambang                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
| 2                                                                                                                                                                                     | Purpose                                                                                                                             | <i>[The purpose of this paper is to apply for consideration and approval of the MoEYS Meeting on the proposed revision of the Bachelor_____ , offered by the Faculty of _____ in the _____ (name of university)]</i><br>The purpose of this paper is to apply for consideration and approval of the MoEYS Meeting on the proposed revision of the Bachelor of Science of Horticulture, offered by the Faculty of Agriculture and Food Processing (FAFP) in the National University of Battambang.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
| 3                                                                                                                                                                                     | Vision, Mission and Education Goal of HEI                                                                                           | <i>[State the vision and mission statements and educational goals of the HEI. You may also state the faculty's vision and mission].</i> <table><tr><th>Vision Statement</th><th>Mission Statements</th></tr><tr><th colspan="2">University/Institution Level</th></tr><tr><td rowspan="2"><b>Vision:</b> NUBB will be a prestigious, multidisciplinary and research higher education institution that meets and exceeds regional and international standards.</td><td><b>Mission #1:</b> To educate students with competence at the national and international levels that respond to labor market needs.</td></tr><tr><td><b>Mission #2:</b> To conduct scientific research that serves productivity and national economic development.</td></tr><tr><th colspan="2">Faculty Level</th></tr><tr><td rowspan="2"><b>Vision:</b> The Faculty of Agriculture and Food Processing at the National University of Battambang is an adapted ASEAN university standard for undergraduate studies in Cambodia.</td><td><b>Mission #1:</b> To educate undergraduates according to national and international standards to prepare them for the job market</td></tr><tr><td><b>Mission #2:</b> To conduct scientific research that enhances domestic productivity and fosters national economic growth.</td></tr></table><br><b>University Educational Goal</b> <ul style="list-style-type: none"><li>- To develop the governance system and strengthen institutional capacity to promote Quality of Management and Leadership,</li></ul> | Vision Statement | Mission Statements | University/Institution Level |  | <b>Vision:</b> NUBB will be a prestigious, multidisciplinary and research higher education institution that meets and exceeds regional and international standards. | <b>Mission #1:</b> To educate students with competence at the national and international levels that respond to labor market needs. | <b>Mission #2:</b> To conduct scientific research that serves productivity and national economic development. | Faculty Level |  | <b>Vision:</b> The Faculty of Agriculture and Food Processing at the National University of Battambang is an adapted ASEAN university standard for undergraduate studies in Cambodia. | <b>Mission #1:</b> To educate undergraduates according to national and international standards to prepare them for the job market | <b>Mission #2:</b> To conduct scientific research that enhances domestic productivity and fosters national economic growth. |
| Vision Statement                                                                                                                                                                      | Mission Statements                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
| University/Institution Level                                                                                                                                                          |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
| <b>Vision:</b> NUBB will be a prestigious, multidisciplinary and research higher education institution that meets and exceeds regional and international standards.                   | <b>Mission #1:</b> To educate students with competence at the national and international levels that respond to labor market needs. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
|                                                                                                                                                                                       | <b>Mission #2:</b> To conduct scientific research that serves productivity and national economic development.                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
| Faculty Level                                                                                                                                                                         |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |
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|                                                                                                                                                                                       | <b>Mission #2:</b> To conduct scientific research that enhances domestic productivity and fosters national economic growth.         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                    |                              |  |                                                                                                                                                                     |                                                                                                                                     |                                                                                                               |               |  |                                                                                                                                                                                       |                                                                                                                                   |                                                                                                                             |

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|----|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                      | <ul style="list-style-type: none"> <li>- To produce 3,762 competent students at both national and international levels to respond to the labour market,</li> <li>- To produce 677 research results that support the nation's productivity and economic growth,</li> </ul>                                                                                                                                                                                                                                                                                            |
| 4  | Educational Philosophy               | <p><b><i>[State the Educational Philosophy of the HEIs. Note – the following is just an example is just an example]</i></b></p> <p>The university prioritises on the comprehensive growth of every student, empowering them to become engaged and accountable members of society, and to unlock their maximum potential. This twofold dedication guarantees that students not only acquire the necessary knowledge and skills for personal achievement but also cultivate a sense of purpose to make positive contributions to the advancement of our community.</p> |
| 5  | Faculty/Department                   | <p><b><i>[State the name of the faculty that is proposing the new programme].</i></b></p> <p>Faculty of Agriculture and Food Processing (FAFP)</p>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 6  | Academic Programme Proposed          | <p><b><i>[State the name of programme]</i></b></p> <p>Bachelor of Science in Horticulture</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 7  | Awarding University/ Institution     | <p><b><i>[If different eg. in the case of jointly awarded programme]</i></b></p> <p>National University of Battambang</p>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 8  | Name of Degree                       | <p><b><i>[Name of the final award - Programme title]</i></b></p> <p>Bachelor of Science in Horticulture</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 9  | Accreditation                        | <p><b><i>[Details of accreditation by professional or statutory body (if applicable)]</i></b></p> <p>None</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 10 | Partnership University/Institution   | <p><b><i>[State the name of the institution and the form of partnership, type of involvement]</i></b></p> <p>Pennsylvania State University (PSU)</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 11 | CQF Qualifications Level             | Level 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 12 | Academic Session to be Offered       | Semester I, 2024/2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 13 | Credits for Graduation               | <p><b><i>[State the total credits to be taken for graduation]</i></b></p> <p>Total credits for graduation: 120 credits</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 14 | Duration of Study                    | <p><b><i>[State the number of semester/year]</i></b></p> <p>Full-time study (8 semesters, 4 years)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 15 | Mode of Delivery                     | <p><b><i>[State mode of delivery]</i></b></p> <p>This programme will be offered as full-time course through the conventional mode</p> <ul style="list-style-type: none"> <li>- Face to face classes and laboratory work,</li> <li>- Mediated technical learning materials,</li> <li>- Field work,</li> </ul>                                                                                                                                                                                                                                                         |
| 16 | Justification for Programme Revision | <p><b><i>[State the justification as to why the revision is made or new programme proposed.</i></b> To further strengthen the justification, may include the current needs of the country in certain sub-disciplines, the advancement in the field of study etc. as in the case of offering a new specialisation or courses in the revised curriculum. Include relevant benchmark reports, external and internal reference points, that may be used to provide information on the attainment of the</p>                                                              |

|                                                                                                                                                                        |                                                                                                                                                              | <p>Programme Educational Objectives (PEOs) and the programme learning outcomes (PLOs). It should reflect why the PEOs and PLOs and subsequently the CLOs are revised/modified].</p> <p>The feedback, inputs and suggestions collected from the stakeholders (220 students, 220 students’ parents, 36 industries, 39 professional organisations, 36 lecturers, 48 public universities and 121 private companies) were considered for the programme learning outcomes, in consultation with the technical team of the Pennsylvania State University (PSU), USA.</p>                                                                                                                                                                                                                                                                                               |                 |  |                                                                                                                                                                        |                                                                                                                                        |                                                                                                                                                              |
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| 17                                                                                                                                                                     | Vision and Mission of Programme                                                                                                                              | <p><b>[optional]</b></p> <table><tr><th colspan="2">Programme Level</th></tr><tr><td rowspan="2"><b>Vision:</b> An educational programme promoting ASEAN-standard education and research contributing to Cambodia's technology-driven vision 2030-2050 in horticulture.</td><td><b>Mission #1:</b> To generate graduates with knowledge, innovative technologies, and abilities required in the field of horticulture.</td></tr><tr><td><b>Mission #2:</b> To establish a network of regional lifelong learners through applied horticultural research, fostering economic benefits for the country.</td></tr></table>                                                                                                                                                                                                                                          | Programme Level |  | <b>Vision:</b> An educational programme promoting ASEAN-standard education and research contributing to Cambodia's technology-driven vision 2030-2050 in horticulture. | <b>Mission #1:</b> To generate graduates with knowledge, innovative technologies, and abilities required in the field of horticulture. | <b>Mission #2:</b> To establish a network of regional lifelong learners through applied horticultural research, fostering economic benefits for the country. |
| Programme Level                                                                                                                                                        |                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |  |                                                                                                                                                                        |                                                                                                                                        |                                                                                                                                                              |
| <b>Vision:</b> An educational programme promoting ASEAN-standard education and research contributing to Cambodia's technology-driven vision 2030-2050 in horticulture. | <b>Mission #1:</b> To generate graduates with knowledge, innovative technologies, and abilities required in the field of horticulture.                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |  |                                                                                                                                                                        |                                                                                                                                        |                                                                                                                                                              |
|                                                                                                                                                                        | <b>Mission #2:</b> To establish a network of regional lifelong learners through applied horticultural research, fostering economic benefits for the country. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |  |                                                                                                                                                                        |                                                                                                                                        |                                                                                                                                                              |
| 18                                                                                                                                                                     | Programme Aim                                                                                                                                                | <p><b>[State the programme aims]</b></p> <p>The aims of the Horticulture programme are as follows:</p> <ul style="list-style-type: none"><li>- equip students with technical knowledge, skills and business creation in horticulture,</li><li>- strengthens research and innovative capacity in horticulture, business, and other related fields,</li><li>- transfers appropriate techniques and sensor technologies for horticulture development to stakeholders.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                    |                 |  |                                                                                                                                                                        |                                                                                                                                        |                                                                                                                                                              |
| 19                                                                                                                                                                     | Graduate Attributes                                                                                                                                          | <p><b>[State the graduate attributes]</b></p> <p>The FAFP enables our Graduates to become Lifelong learner, Systems Thinking, Resilient, 21st Century and Holistic and Entrepreneurial Graduate skills.</p> <p>Our graduates will be expected to:</p> <ul style="list-style-type: none"><li>- possess the ability to gather knowledge, integrate it, interpret and apply it and to think and act in a problem-solving manner,</li><li>- be well-informed citizens able to contribute to their communities wherever they choose to live and work,</li><li>- set a positive example with regard to social responsibilities and obligations,</li><li>- accept and strive for the highest standards of knowledge, and</li><li>- be creative and innovative to attaining the status of academic prowess and professional consultancy and inter-dependency.</li></ul> |                 |  |                                                                                                                                                                        |                                                                                                                                        |                                                                                                                                                              |

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|----|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20 | Programme Educational Objectives (PEOs) | <p><b>[State the PEOs]</b></p> <p>PEO statements of HTC programme are below:</p> <p><b>PEO1:</b> To produce qualified horticulturists (in crop cultivation techniques) and entrepreneurs to meet national and international job market needs.</p> <p><b>PEO2:</b> To cultivate lifelong learners, thereby increasing the number of horticultural scientists in the field.</p> <p><b>PEO3:</b> To produce entrepreneurs in the field of Horticulture or other areas.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 21 | Programme Learning Outcomes (PLOs)      | <p><b>[State the PLOs. Include the PLOs – PEO matrix]</b></p> <p>PLO statements: At the end of the HTC programme, students are able to:</p> <ul style="list-style-type: none"> <li>● <i>Knowledge domain (MD1):</i> <ul style="list-style-type: none"> <li>- <i>PLO1 – Knowledge (LD1):</i> Apply concepts of horticulture science to select, manage and improve plants and their products.</li> </ul> </li> <li>● <i>Cognitive domain (MD2):</i> <ul style="list-style-type: none"> <li>- <i>PLO2 – Cognitive skills (LD2):</i> Analyze the current events and issues that are occurring in agriculture and how they affect futuristic agriculture and innovative manner.</li> </ul> </li> <li>● <i>Psychomotor domain (MD3):</i> <ul style="list-style-type: none"> <li>- <i>PLO3 – Psychomotor skills (LD3):</i> Conduct proficient planting and propagation techniques for a variety of horticultural crops, including fruits, vegetables and ornamentals.</li> </ul> </li> <li>● <i>Interpersonal skills and responsibility (MD4):</i> <ul style="list-style-type: none"> <li>- <i>PLO4 – Interpersonal Skills (LD4):</i> Facilitate teamwork and collaboration with national, international, community development partners and the private sector related to the ethical and professional horticultural sector.</li> <li>- <i>PLO5 – Responsibility (LD5):</i> Conduct technical advice on precision agriculture and horticulture crop production.</li> <li>- <i>PLO6 – Entrepreneurial skills (LD6):</i> Develop components of agribusiness and economics of market by scientists, marketers, producers and decision making at various levels enhance the success of an agricultural enterprise.</li> <li>- <i>PLO7 – Ethics and Professionalism (LD7):</i> Develop thoughtful, clear, and consistent perspectives on ethical and moral issues related to horticulture.</li> </ul> </li> <li>● <i>Communication, information technology, and numerical skills (MD5):</i> <ul style="list-style-type: none"> <li>- <i>PLO8 – Communication (LD8):</i> Perform communication effectively with various audiences using oral, written, and visual presentation skills, and contemporary networking or social media technologies.</li> <li>- <i>PLO9 - Information technology or digital skills (LD9):</i> develop new ideas and thoughts by using modern techniques and tools (e.g., UAV-) in the field of Horticulture.</li> </ul> </li> </ul> |

|                       |                                 | <div>- <i>PLO10 – Numerical Skills (LD10)</i>: Interpret horticultural data, including measurements, calculations, and statistical analyses, to support decision-making processes related to crop management, drone operation and financial planning.</div> <div>The mapping between the PLOs to PEOs are shown below:</div> <table><tr><th rowspan="2">PLO Statements</th><th colspan="3">PEO Statements</th></tr><tr><th>PEO1</th><th>PEO2</th><th>PEO3</th></tr><tr><td>PLO1</td><td>✓</td><td></td><td></td></tr><tr><td>PLO2</td><td>✓</td><td></td><td></td></tr><tr><td>PLO3</td><td>✓</td><td>✓</td><td></td></tr><tr><td>PLO4</td><td></td><td></td><td>✓</td></tr><tr><td>PLO5</td><td></td><td>✓</td><td></td></tr><tr><td>PLO6</td><td></td><td>✓</td><td></td></tr><tr><td>PLO7</td><td></td><td></td><td>✓</td></tr><tr><td>PLO8</td><td></td><td></td><td>✓</td></tr><tr><td>PLO9</td><td>✓</td><td></td><td></td></tr><tr><td>PLO10</td><td>✓</td><td>✓</td><td></td></tr></table>                                                                                 | PLO Statements       | PEO Statements            |                    |                    | PEO1    | PEO2             | PEO3                 | PLO1            | ✓               |                       |     | PLO2    | ✓     |                     |      | PLO3      | ✓       | ✓                  |         | PLO4    |          |                    | ✓     | PLO5    |         | ✓                |       | PLO6    |         | ✓     |     | PLO7 |     |  | ✓ | PLO8 |  |  | ✓ | PLO9 | ✓ |  |  | PLO10 | ✓ | ✓ |  |
|-----------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|--------------------|--------------------|---------|------------------|----------------------|-----------------|-----------------|-----------------------|-----|---------|-------|---------------------|------|-----------|---------|--------------------|---------|---------|----------|--------------------|-------|---------|---------|------------------|-------|---------|---------|-------|-----|------|-----|--|---|------|--|--|---|------|---|--|--|-------|---|---|--|
| PLO Statements        | PEO Statements                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
|                       | PEO1                            | PEO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PEO3                 |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO1                  | ✓                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO2                  | ✓                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO3                  | ✓                               | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO4                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ✓                    |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO5                  |                                 | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO6                  |                                 | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO7                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ✓                    |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO8                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ✓                    |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO9                  | ✓                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| PLO10                 | ✓                               | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| 22                    | Programme Structure and Changes | <div><i>[For the revised programme, provide the programme structure and indicate the changes made.]</i></div> <div>The programme structure and the changes made in this programme is presented as follows:</div> <table><tr><th rowspan="3">Curriculum Component</th><th rowspan="2">Range (MoEYS Guideline) *</th><th>Current Curriculum</th><th>Revised Curriculum</th></tr><tr><th>Current</th><th>Major with Minor</th></tr><tr><th>Major with Minor (%)</th><th>Credit hour (%)</th><th>Credit hour (%)</th></tr><tr><td>Basic Courses (MoEYS)</td><td>5</td><td>12 (10)</td><td>6 (5)</td></tr><tr><td>Basic Courses (HEI)</td><td>7.50</td><td>15 (12.5)</td><td>9 (7.5)</td></tr><tr><td>Major Core Courses</td><td>52.5-58</td><td>72 (60)</td><td>63(52.5)</td></tr><tr><td>Minor Core Courses</td><td>25-29</td><td>9 (7.5)</td><td>30 (25)</td></tr><tr><td>Elective Courses</td><td>10-13</td><td>12 (10)</td><td>12 (10)</td></tr><tr><td>Total</td><td>100</td><td>120</td><td>120</td></tr></table> <div>*Applicable to all revision effective from Jan 2025</div> | Curriculum Component | Range (MoEYS Guideline) * | Current Curriculum | Revised Curriculum | Current | Major with Minor | Major with Minor (%) | Credit hour (%) | Credit hour (%) | Basic Courses (MoEYS) | 5   | 12 (10) | 6 (5) | Basic Courses (HEI) | 7.50 | 15 (12.5) | 9 (7.5) | Major Core Courses | 52.5-58 | 72 (60) | 63(52.5) | Minor Core Courses | 25-29 | 9 (7.5) | 30 (25) | Elective Courses | 10-13 | 12 (10) | 12 (10) | Total | 100 | 120  | 120 |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Curriculum Component  | Range (MoEYS Guideline) *       | Current Curriculum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                           | Revised Curriculum |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
|                       |                                 | Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      | Major with Minor          |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
|                       | Major with Minor (%)            | Credit hour (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Credit hour (%)      |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Basic Courses (MoEYS) | 5                               | 12 (10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 6 (5)                |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Basic Courses (HEI)   | 7.50                            | 15 (12.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9 (7.5)              |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Major Core Courses    | 52.5-58                         | 72 (60)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 63(52.5)             |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Minor Core Courses    | 25-29                           | 9 (7.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30 (25)              |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Elective Courses      | 10-13                           | 12 (10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 12 (10)              |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Total                 | 100                             | 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 120                  |                           |                    |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| 23                    | Projection on Enrolment         | <div><i>[State the projection, enrolment and number of graduates in the next five years]</i></div> <table><tr><td>Year</td><td>Current year eg. 2025</td><td>2026</td><td>2027</td><td>2028</td><td>2029</td></tr><tr><td>Enrolment projection</td><td>50</td><td>110</td><td>180</td><td>260</td><td>290</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Year                 | Current year eg. 2025     | 2026               | 2027               | 2028    | 2029             | Enrolment projection | 50              | 110             | 180                   | 260 | 290     |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Year                  | Current year eg. 2025           | 2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2027                 | 2028                      | 2029               |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |
| Enrolment projection  | 50                              | 110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 180                  | 260                       | 290                |                    |         |                  |                      |                 |                 |                       |     |         |       |                     |      |           |         |                    |         |         |          |                    |       |         |         |                  |       |         |         |       |     |      |     |  |   |      |  |  |   |      |   |  |  |       |   |   |  |

|                                              |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                   |               |                   |                             |          |           |         |                                              |          |     |         |
|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------|---------------|-------------------|-----------------------------|----------|-----------|---------|----------------------------------------------|----------|-----|---------|
|                                              |                                                               | <table><tr><td>Enrolment</td><td>50</td><td>60</td><td>70</td><td>80</td><td>80</td></tr><tr><td>Graduated</td><td></td><td></td><td></td><td>50</td><td>60</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Enrolment                              | 50                | 60            | 70                | 80                          | 80       | Graduated |         |                                              |          | 50  | 60      |
| Enrolment                                    | 50                                                            | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 70                                     | 80                | 80            |                   |                             |          |           |         |                                              |          |     |         |
| Graduated                                    |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | 50                | 60            |                   |                             |          |           |         |                                              |          |     |         |
| 24                                           | Admission Criteria/Requirements                               | <p><b><i>[State the admission criteria/requirements. (if applicable, state also the English proficiency level)]</i></b></p> <p>The University’s Admissions Policy applies equally to all programmes of study. The following are the criteria to be used for selecting candidates for admission. The university’s approved equivalencies for the requirements will also be acceptable.</p> <ul style="list-style-type: none"><li>- High school examination: Passed,</li><li>- Grade preference of the high school certificate: A, B or C,</li><li>- Basic competency in Biology, Chemistry and Mathematics</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                   |               |                   |                             |          |           |         |                                              |          |     |         |
| 25                                           | Programme Benchmarking with Similar Programmes in the Country | <p><b><i>[State at least two HEIs that are offering similar programmes in the country. State the similarities, differences and strengths of the proposed/revised programmes with those of other HEIs].</i></b></p> <ul style="list-style-type: none"><li>- SRU is a public university that provides Agronomy with 129 credits.</li><li>- UHST is a public university that provides Agronomy with 149 credits.</li></ul> <p>The strengths of NUBB are:</p> <ul style="list-style-type: none"><li>- 24 staff members (5 PhD &amp; 19 Master’s),</li><li>- 2 visiting professors (1 French visiting professor on Soil Science and 1 German expert on Agribusiness),</li><li>- 16 laboratories and 1 farm to support research and education,</li><li>- fitting well with the situation in the northwest of Cambodia</li><li>- strong relationship with Penn State University (PSU), United States to assist for develop the curriculum,</li><li>- good cooperation and support have been received from public and private institutions for lecturing and internship panels for students during their academic study and recruitment after graduation, and</li><li>- HTC programme will meet the national standards by 2029.</li></ul> <table><tr><td>Name of HEI</td><td>Name of Programme</td><td>Total Credits</td><td>Duration of Study</td></tr><tr><td>Svay Rieng University (SRU)</td><td>Agronomy</td><td>129</td><td>4 years</td></tr><tr><td>University of Heng Samrin Thbongkhmum (UHST)</td><td>Agronomy</td><td>149</td><td>4 years</td></tr></table> | Name of HEI                            | Name of Programme | Total Credits | Duration of Study | Svay Rieng University (SRU) | Agronomy | 129       | 4 years | University of Heng Samrin Thbongkhmum (UHST) | Agronomy | 149 | 4 years |
| Name of HEI                                  | Name of Programme                                             | Total Credits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Duration of Study                      |                   |               |                   |                             |          |           |         |                                              |          |     |         |
| Svay Rieng University (SRU)                  | Agronomy                                                      | 129                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 years                                |                   |               |                   |                             |          |           |         |                                              |          |     |         |
| University of Heng Samrin Thbongkhmum (UHST) | Agronomy                                                      | 149                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 years                                |                   |               |                   |                             |          |           |         |                                              |          |     |         |
| 26                                           | Integration of Experiential Learning Approaches (ELA) of FEF  | <p><b><i>[State how experiential learning as in the FEF is integrated in the programme. State at least one]</i></b></p> <p>Table below shows the alignment of HTC programme to FEF. This programme is designed to support a more research infused approach in the field of horticulture.</p> <table><tr><td>Experiential Learning Approaches (ELA)</td><td>Tick</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Experiential Learning Approaches (ELA) | Tick              |               |                   |                             |          |           |         |                                              |          |     |         |
| Experiential Learning Approaches (ELA)       | Tick                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                   |               |                   |                             |          |           |         |                                              |          |     |         |

|    |                                                       |                                                                                       |                      |                                               |                   |  |
|----|-------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------|-----------------------------------------------|-------------------|--|
|    |                                                       |                                                                                       | Industry Driven      |                                               |                   |  |
|    |                                                       |                                                                                       | Community Resilience | ✓                                             |                   |  |
|    |                                                       |                                                                                       | Research Infused     | ✓                                             |                   |  |
|    |                                                       |                                                                                       | Personalised         |                                               |                   |  |
|    |                                                       | For the approach chosen, list the courses that adopt the approach.                    |                      |                                               |                   |  |
|    |                                                       | ELA                                                                                   | Course Code          | Course Name                                   | Number of credits |  |
|    |                                                       | Community Resilience                                                                  | AAE.BM22             | Agribusiness and Entrepreneurship             | 3                 |  |
|    |                                                       |                                                                                       | GIS.EC21             | Introduction to GIS                           | 3                 |  |
|    |                                                       |                                                                                       | PDM.EC32             | Project Development and Management            | 3                 |  |
|    |                                                       |                                                                                       | FCA.CC32             | Farm management and Climate smart agriculture | 3                 |  |
|    |                                                       |                                                                                       | NGM.CC31             | Nursery and Greenhouse Management             | 3                 |  |
|    |                                                       |                                                                                       | INT.CC41             | Internship                                    | 6                 |  |
|    |                                                       |                                                                                       | FDW.CC41             | Field work                                    | 3                 |  |
|    |                                                       |                                                                                       | SEM.CC41             | Seminar                                       | 3                 |  |
|    |                                                       | Research Infused                                                                      | THS.CC42             | Thesis                                        | 12                |  |
|    |                                                       |                                                                                       | SWC.BH32             | Scientific writing and communication skill    | 3                 |  |
|    |                                                       |                                                                                       | SRM.BH12             | Statistics Research Methodology               | 3                 |  |
|    |                                                       |                                                                                       | RME.CC22             | Research Methodology: Experimental Design     | 3                 |  |
|    |                                                       | Total of credits                                                                      |                      |                                               | 48                |  |
|    |                                                       | Percentage of integration of ELA                                                      |                      |                                               | 40                |  |
| 27 | Integration of the National and Societal Goals of FEF | [State how national and societal goals as in the FEF are integrated in the programme. |                      |                                               |                   |  |

**Note: All programmes must integrate the Pentagonal Strategy (PS) and Cambodia Sustainable Developmental Goals (CSDG)].**

The integration of national and societal goals in the Horticulture program using the Future Fit Framework involves a comprehensive approach that aligns the objectives of the program with broader societal and national priorities.

| Enablers/Drivers                                | Tick |
|-------------------------------------------------|------|
| Pentagonal Strategy (PS)                        | ✓    |
| Cambodia Sustainable Developmental Goals (CSDG) | ✓    |
| Conceive-Design-Implement-Operate (CDIO)        |      |
| Plan-Do-Check-Act (PDCA)                        | ✓    |

For the enablers/drivers chosen, list the courses that support them.

| Drivers            | Course Code | Course Name                                   | Number of credits |
|--------------------|-------------|-----------------------------------------------|-------------------|
| PS<br>CSDG<br>PDCA | AAE.BM22    | Agribusiness and entrepreneurship             | 3                 |
|                    | SRM.BH12    | Statistical for Research Methodolgy           | 3                 |
|                    | FCA.CC32    | Farm management and climate smart agriculture | 3                 |
|                    | NGM.CC31    | Nursery and Greenhouse Management             | 3                 |
|                    | PDM.EC32    | Project Development and Management            | 3                 |
|                    | INT.CC41    | Internship                                    | 6                 |
|                    | THS.CC42    | Thesis                                        | 12                |
|                    | FDW.CC41    | Field work                                    | 3                 |
|                    | SEM.CC41    | Seminar                                       | 3                 |

|                                   |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
|-----------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------|-------------------|---------------|-------------------|-----------------------------------|----------|--------------|---------------|----|-----------------------------|------------|--------------|-------|----|
| 28                                | Programme Benchmarking with Overseas Programmes | <p><b><i>[Highlight on how well the programme meet the standards of the leading universities - their core courses? programme structure? Electives and specialisations offered? Research experience?]</i></b></p> <p>Both Ubon Ratchathani University (UBU) and Penn State University (PSU) offer valuable horticulture programmes tailored to their respective contexts. While UBU specializes in tropical horticulture, PSU provides a comprehensive education covering a wide range of horticultural disciplines. Collaboration and exchange of knowledge between these institutions could further enrich the educational experiences of students in both programmes.</p> <table><tr><td>Name of HEI</td><td>Country</td><td>Name of Programme</td><td>Total Credits</td><td>Duration of Study</td></tr><tr><td>Ubon Ratchathani University (UBU)</td><td>Thailand</td><td>Horticulture</td><td>59</td><td>4Y</td></tr><tr><td>Penn State University (PSU)</td><td>USA</td><td>Horticulture</td><td>125</td><td>4Y</td></tr></table> | Name of HEI   | Country           | Name of Programme | Total Credits | Duration of Study | Ubon Ratchathani University (UBU) | Thailand | Horticulture | 59            | 4Y | Penn State University (PSU) | USA        | Horticulture | 125   | 4Y |
| Name of HEI                       | Country                                         | Name of Programme                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Total Credits | Duration of Study |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| Ubon Ratchathani University (UBU) | Thailand                                        | Horticulture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 59            | 4Y                |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| Penn State University (PSU)       | USA                                             | Horticulture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 125           | 4Y                |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 29                                | Staff/Physical/ Financial Implications          | <p><b><i>[ State on the adequacy of current staff and current physical facilities/resources. State the financial implications (whether it can be conducted using internal funding or requires additional funding from the ministry)]</i></b></p> <p>The Bachelor of Science in Horticulture currently has:</p> <ul style="list-style-type: none"><li>- 24 Staff (5 PhD &amp; 19 Master)</li><li>- 2 Visiting professors (1 French visiting professor on Soil Science and 1 German expert on Agribusiness)</li><li>- 16 Laboratories and 1 farm to support research and education.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 30                                | Initial Approval of Programme                   | <b><i>[State the date of approval and semester/year it was first offered]</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 31                                | Approval Dates of the Revised Programme         | <table><tr><td>No</td><td>Approval</td><td>Date</td></tr><tr><td>1</td><td>Department</td><td>October 2022</td></tr><tr><td>2</td><td>Faculty</td><td>December 2022</td></tr><tr><td>3</td><td>University Academic Council</td><td>March 2023</td></tr><tr><td>4</td><td>MoEYS</td><td></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No            | Approval          | Date              | 1             | Department        | October 2022                      | 2        | Faculty      | December 2022 | 3  | University Academic Council | March 2023 | 4            | MoEYS |    |
| No                                | Approval                                        | Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 1                                 | Department                                      | October 2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 2                                 | Faculty                                         | December 2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 3                                 | University Academic Council                     | March 2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |
| 4                                 | MoEYS                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                   |                   |               |                   |                                   |          |              |               |    |                             |            |              |       |    |

## EXAMPLE 2: PROGRAMME SPECIFICATIONS

### Proposal for Revision of Engineering Programme in Electronics and Automation to MoEYS

| No                                                                                                                                                                                                                                                                                                    | Items                                                                                                                                                                                                             | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                  |                   |                   |  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                       |                          |  |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                              |
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| 1                                                                                                                                                                                                                                                                                                     | University/Institution                                                                                                                                                                                            | Institute of Technology of Cambodia (ITC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                   |                   |  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                       |                          |  |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                              |
| 2                                                                                                                                                                                                                                                                                                     | Purpose                                                                                                                                                                                                           | This paper is submitted to gain consideration and approval of the MoEYS on the revision of an academic programme ‘Engineer Degree in Electronics and Automation’ by the Department of Electrical and Energy Engineering to be offered in Semester 1, Year 2024-2025.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                  |                   |                   |  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                       |                          |  |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                              |
| 3                                                                                                                                                                                                                                                                                                     | Vision, Mission and Education Goal of HEI                                                                                                                                                                         | <table><tr><th>Vision Statement</th><th>Mission Statement</th></tr><tr><th colspan="2">Institution level</th></tr><tr><td rowspan="2"><b>Vision:</b> To become a prominent institution that produces graduates with 21<sup>st</sup> century skills research and innovation who will contribute to the technology-led vision of the country in STEM and emerging globalization.</td><td><b>Mission #1:</b> To provide quality and equitable education in science and technology to become engineers with high professional ethics, entrepreneurial ability, creativity, innovation, virtue, morality, conscience, patriotism, social responsibility, and high awareness.</td></tr><tr><td><b>Mission #2:</b> To develop scientific research, and transfer technology to the national community to enhance production capacity and harmonize for the country’s vision 2030/2050.</td></tr><tr><th colspan="2">Faculty/Department level</th></tr><tr><td rowspan="2"><b>Vision:</b> To become a prominent Electrical and Energy Engineering Department that produces graduates with 21<sup>st</sup>-century skills and innovation who will contribute to the technology-led vision of the country in electrical, energy, automation systems, and emerging globalization.</td><td><b>Mission #1:</b> To produce graduates with high skills (technical skills and soft skills) for innovation for the country’s vision 2030/2050 as well as for the emergence of globalization in the related field.</td></tr><tr><td><b>Mission #2:</b> To produce graduates who are lifelong learners and entrepreneurs through applied research and development (R&amp;D) projects.</td></tr></table> | Vision Statement                                                                                                                                                                                                                                                                 | Mission Statement | Institution level |  | <b>Vision:</b> To become a prominent institution that produces graduates with 21 <sup>st</sup> century skills research and innovation who will contribute to the technology-led vision of the country in STEM and emerging globalization. | <b>Mission #1:</b> To provide quality and equitable education in science and technology to become engineers with high professional ethics, entrepreneurial ability, creativity, innovation, virtue, morality, conscience, patriotism, social responsibility, and high awareness. | <b>Mission #2:</b> To develop scientific research, and transfer technology to the national community to enhance production capacity and harmonize for the country’s vision 2030/2050. | Faculty/Department level |  | <b>Vision:</b> To become a prominent Electrical and Energy Engineering Department that produces graduates with 21 <sup>st</sup> -century skills and innovation who will contribute to the technology-led vision of the country in electrical, energy, automation systems, and emerging globalization. | <b>Mission #1:</b> To produce graduates with high skills (technical skills and soft skills) for innovation for the country’s vision 2030/2050 as well as for the emergence of globalization in the related field. | <b>Mission #2:</b> To produce graduates who are lifelong learners and entrepreneurs through applied research and development (R&D) projects. |
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|                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   | Institution level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                  |                   |                   |  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                       |                          |  |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                              |
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|                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Mission #2:</b> To develop scientific research, and transfer technology to the national community to enhance production capacity and harmonize for the country’s vision 2030/2050.                                                                                            |                   |                   |  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                       |                          |  |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                              |
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| 4                                                                                                                                                                                                                                                                                                     | Educational Philosophy                                                                                                                                                                                            | GEE-ITC was founded on the philosophy of "learning for the real workplace and world" and "nurturing intellectual and emotional intelligence," and our educational goal is to develop students into caring and trustworthy individuals who can gain respect for their work. Based on these founding philosophies and this educational goal, we are committed to sending forth into society, graduates who have initiative, creativity, systems thinking, 21st century skills, entrepreneur mindset, and a solid educational foundation in the sciences, engineering, and technology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                  |                   |                   |  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                       |                          |  |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                   |                                                                                                                                              |

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| 5  | Faculty/Department                   | <ul style="list-style-type: none"> <li>The Department of Electrical and Energy Engineering was established in 1963,</li> <li>Offering programmes: 4 programmes (2 engineering degrees and 2 associated degrees),</li> <li>Total number of students: 762 (419 Engineers, 343 Associated Degrees),</li> <li>Programme under revision (FFE-OBE Framework): 1 (Electronics and Automation Engineering level),</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6  | Academic Programme Proposed          | Electronics and Automation Engineering (Double Major, Same Field)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 7  | Awarding University or Institution   | Institute of Technology of Cambodia - ITC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 8  | Name of Degree                       | Engineer Degree in Electronics and Automation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 9  | Accreditation                        | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10 | Partnership University/Institution   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 11 | CQF Qualifications Level             | Level 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 12 | Academic Session to be Offered       | Semester I, 2024-2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 13 | Credits for Graduation               | Total credit for graduation: 144 credits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 14 | Duration of Study                    | 5 Years/ 10 Semesters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 15 | Mode of Delivery                     | <p>The mode of delivery for this programme are:</p> <ul style="list-style-type: none"> <li>- In-person learning</li> <li>- Blended learning</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 16 | Justification for Programme Revision | <p>The new curriculum was developed by using the Outcome-Based Education method where we need to determine the Program Educational Objectives (PEOs) which are supported by the combination of Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs). PEOs of the EA engineering program are obtained from a) industries' skills need (from questionnaire surveys: 50 samples, 11 technical/soft skills needed, b) missions and visions of the institution, c) feedback/surveys from alumni. As a result, we defined:</p> <ul style="list-style-type: none"> <li>• 4 PEOs for an improved curriculum (3 PEOs for the previous version),</li> <li>• 10 PLOs (7 PLOs for previous version),</li> <li>• 27 new and revised courses out of 33 main technical subjects,</li> <li>• innovative pedagogy (peer teaching, PoBL, ...) in course implementation</li> <li>• assessment methods, rubrics, system, and platform for assessing all courses and storage,</li> <li>• CQI mechanism.</li> </ul> |

| 17                                                                                                                                                                                                                                                                              | Vision and Mission of Programme                                                                                                                                                                                   | <table><tr><th colspan="2">Programme level</th></tr><tr><td rowspan="2"><b>Vision:</b> To become a prominent EA Engineering Program that produces graduates with 21<sup>st</sup> century skills and innovation who will contribute to the technology-led vision of the country in electronics, smart automation, robotics, and emerging globalisation.</td><td><b>Mission #1:</b> To produce graduates with high skills (technical skills and soft skills) for innovation for the country’s vision 2030/2050 as well as for the emergence of globalisation in the related field.</td></tr><tr><td><b>Mission #2:</b> To produce graduates who are lifelong learners and entrepreneurs through applied research and development (R&amp;D) projects.</td></tr></table> | Programme level |  | <b>Vision:</b> To become a prominent EA Engineering Program that produces graduates with 21 <sup>st</sup> century skills and innovation who will contribute to the technology-led vision of the country in electronics, smart automation, robotics, and emerging globalisation. | <b>Mission #1:</b> To produce graduates with high skills (technical skills and soft skills) for innovation for the country’s vision 2030/2050 as well as for the emergence of globalisation in the related field. | <b>Mission #2:</b> To produce graduates who are lifelong learners and entrepreneurs through applied research and development (R&D) projects. |
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| Programme level                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |  |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                              |
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| 18                                                                                                                                                                                                                                                                              | Programme Aim                                                                                                                                                                                                     | <p>The aim of the updated EA programme is as follows:</p> <ul style="list-style-type: none"><li>• Train and develop engineers with higher technical skills and soft skills in response to the current and future market need,</li><li>• Provide students with knowledge and innovative skills through research work for developing new electronics devices in the context of IR.4.0,</li><li>• Provide students with higher skills in problem-solving in the field of electronics and automation systems in industry,</li><li>• Provide students with a set of skills in project management as well as leadership skill and teamwork which also lead to become an entrepreneur in the future.</li></ul>                                                              |                 |  |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                              |
| 19                                                                                                                                                                                                                                                                              | Graduate Attributes                                                                                                                                                                                               | <ul style="list-style-type: none"><li>• Lifelong Learner Skills</li><li>• Systems Thinking Skills</li><li>• Resilient Skills</li><li>• 21<sup>st</sup> Century Skills</li><li>• Holistic and Entrepreneurial Graduate Skills</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |  |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                              |
| 20                                                                                                                                                                                                                                                                              | Programme Educational Objectives (PEOs)                                                                                                                                                                           | <p>PEO statements of this EA programme are below:</p> <ul style="list-style-type: none"><li>• PEO 1: To produce qualified engineers in electronics and automation to meet market needs nationally/internationally.</li><li>• PEO 2: To produce lifelong learners who contribute significantly to the electronics and automation field.</li><li>• PEO 3: To pursue post-graduate education in fields related to electronics and automation.</li><li>• PEO 4: To produce entrepreneurs in the field of electronics and automation or other related sectors.</li></ul>                                                                                                                                                                                                  |                 |  |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                              |
| 21                                                                                                                                                                                                                                                                              | Programme Learning Outcomes (PLOs)                                                                                                                                                                                | <p>PLO statements of this EA programme are below:</p> <p>Knowledge domain (MD1):</p> <ul style="list-style-type: none"><li>- PLO1 – Knowledge (Learning Domain 1 (LD1)): At the end of the EA programme, students are able to apply new knowledge in the fields of electronics and smart automation systems.</li></ul> <p>Cognitive domain (MD2):</p> <ul style="list-style-type: none"><li>- PLO2 – Cognitive skills (Learning Domain 2 (LD2)): On successful completion of the programme, students are able to design engineering products/solutions that meet the specified</li></ul>                                                                                                                                                                             |                 |  |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |                                                                                                                                              |

needs with consideration of social economic factors in the field of electronics and automation.

Psychomotor domain (MD3):

- PLO3 – Psychomotor skills (Learning Domain 3 (LD3)): Students are able to conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to conclude the scope of electronics and automation systems development.

Interpersonal skills and responsibility (MD4):

- PLO4 – Interpersonal Skills (Learning Domain 4 (LD4)): By the completion of the EA programme, students are able to develop a team or teamwork whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- PLO5 – Responsibility (Learning Domain 5 (LD5)): By the end of the EA programme, students are able to demonstrate professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- PLO6 – Entrepreneurial skills (Learning Domain 6 (LD6)): On successful completion of the EA programme, students are able to identify business problems accurately and effectively across a wide range of business domains.
- PLO7 – Ethics and Professionalism (Learning Domain 7 (LD7)): Students in EA programme are able to recognize ethical and professional responsibilities in the engineering context with consideration to the societal impacts.

Communication, information technology, and numerical skills:

- PLO8 – Communication (Learning Domain 8 (LD8)): Students in EA programmes are able to apply written, oral, and graphical communication with appropriate usage of the technical literature.
- PLO9 – Information technology or digital skills (Learning Domain 9 (LD9)): By the successful completion of the EA programme, students are able to use computer software for data analysis and solving the complex problem.
- PLO10 – Numerical Skills (Learning Domain 10 (LD10)): Students in EA programme are able to use both quantitative and qualitative techniques to forecast the trend in electronics and automation.

The mapping between PLOs to PEOs are shown below:

| PLO Statements | PEO Statements |       |       |       |
|----------------|----------------|-------|-------|-------|
|                | PEO 1          | PEO 2 | PEO 3 | PEO 4 |
| PLO 1          | ✓              | ✓     | ✓     | ✓     |
| PLO 2          | ✓              | ✓     | ✓     |       |
| PLO 3          | ✓              | ✓     | ✓     |       |
| PLO 4          | ✓              | ✓     | ✓     | ✓     |

|                       |                                                               | <table><tr><td>PLO 5</td><td>✓</td><td>✓</td><td></td><td>✓</td></tr><tr><td>PLO 6</td><td></td><td></td><td></td><td>✓</td></tr><tr><td>PLO 7</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>PLO 8</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>PLO 9</td><td>✓</td><td></td><td>✓</td><td></td></tr><tr><td>PLO 10</td><td>✓</td><td></td><td>✓</td><td></td></tr><tr><td>Total</td><td>9</td><td>7</td><td>8</td><td>6</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PLO 5                | ✓                            | ✓                  |                   | ✓                  | PLO 6                  |                      |         |             | ✓                                      | PLO 7                 | ✓       | ✓         | ✓  | ✓  | PLO 8 | ✓                   | ✓  | ✓         | ✓  | PLO 9 | ✓  |              | ✓         |    | PLO 10 | ✓  |    | ✓                 |           | Total | 9  | 7  | 8  | 6                |           |    |    |    |    |       |  |     |     |     |     |
|-----------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------|--------------------|-------------------|--------------------|------------------------|----------------------|---------|-------------|----------------------------------------|-----------------------|---------|-----------|----|----|-------|---------------------|----|-----------|----|-------|----|--------------|-----------|----|--------|----|----|-------------------|-----------|-------|----|----|----|------------------|-----------|----|----|----|----|-------|--|-----|-----|-----|-----|
| PLO 5                 | ✓                                                             | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      | ✓                            |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| PLO 6                 |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      | ✓                            |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| PLO 7                 | ✓                                                             | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ✓                    | ✓                            |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| PLO 8                 | ✓                                                             | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ✓                    | ✓                            |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| PLO 9                 | ✓                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ✓                    |                              |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| PLO 10                | ✓                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ✓                    |                              |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Total                 | 9                                                             | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8                    | 6                            |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| 22                    | Programme Structure and Changes                               | <p>The programme structure and change of this programme is presented as follows:</p> <table><tr><th rowspan="2">Curriculum Component</th><th rowspan="2">Range (MoEYS Guideline)* (%)</th><th colspan="2">Current Curriculum</th><th colspan="2">Revised Curriculum</th></tr><tr><th>Credit hour</th><th>%</th><th>Credit hour</th><th>%</th></tr><tr><td>Basic Courses (MoEYS)</td><td>4.6</td><td>--</td><td>--</td><td>6</td><td>4</td></tr><tr><td>Basic Courses (HEI)</td><td>7</td><td>61</td><td>35</td><td>9</td><td>7</td></tr><tr><td>Core Courses</td><td>34.6-38.5</td><td>60</td><td>50</td><td>51</td><td>35</td></tr><tr><td>Major Electronics</td><td>26.9-30.7</td><td>23</td><td>15</td><td>38</td><td>27</td></tr><tr><td>Major Automation</td><td>26.9-30.7</td><td>23</td><td>15</td><td>38</td><td>27</td></tr><tr><td colspan="2">Total</td><td>144</td><td>100</td><td>144</td><td>100</td></tr></table> | Curriculum Component | Range (MoEYS Guideline)* (%) | Current Curriculum |                   | Revised Curriculum |                        | Credit hour          | %       | Credit hour | %                                      | Basic Courses (MoEYS) | 4.6     | --        | -- | 6  | 4     | Basic Courses (HEI) | 7  | 61        | 35 | 9     | 7  | Core Courses | 34.6-38.5 | 60 | 50     | 51 | 35 | Major Electronics | 26.9-30.7 | 23    | 15 | 38 | 27 | Major Automation | 26.9-30.7 | 23 | 15 | 38 | 27 | Total |  | 144 | 100 | 144 | 100 |
| Curriculum Component  | Range (MoEYS Guideline)* (%)                                  | Current Curriculum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                              | Revised Curriculum |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
|                       |                                                               | Credit hour                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | %                    | Credit hour                  | %                  |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Basic Courses (MoEYS) | 4.6                                                           | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | --                   | 6                            | 4                  |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Basic Courses (HEI)   | 7                                                             | 61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 35                   | 9                            | 7                  |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Core Courses          | 34.6-38.5                                                     | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50                   | 51                           | 35                 |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Major Electronics     | 26.9-30.7                                                     | 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 15                   | 38                           | 27                 |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Major Automation      | 26.9-30.7                                                     | 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 15                   | 38                           | 27                 |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Total                 |                                                               | 144                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 100                  | 144                          | 100                |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| 23                    | Projection on Enrolment                                       | <p>The projection, enrolment, and number of graduates in the next five years for EA programme:</p> <table><tr><td>Year</td><td>Current year 2024</td><td>2025</td><td>2026</td><td>2027</td><td>2028</td></tr><tr><td>Enrolment projection</td><td>60</td><td>70</td><td>70</td><td>70</td><td>70</td></tr><tr><td>Enrolment</td><td>60</td><td>70</td><td>70</td><td>70</td><td>70</td></tr><tr><td>Graduated</td><td>50</td><td>50</td><td>60</td><td>70</td><td>70</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                          | Year                 | Current year 2024            | 2025               | 2026              | 2027               | 2028                   | Enrolment projection | 60      | 70          | 70                                     | 70                    | 70      | Enrolment | 60 | 70 | 70    | 70                  | 70 | Graduated | 50 | 50    | 60 | 70           | 70        |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Year                  | Current year 2024                                             | 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2026                 | 2027                         | 2028               |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Enrolment projection  | 60                                                            | 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 70                   | 70                           | 70                 |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Enrolment             | 60                                                            | 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 70                   | 70                           | 70                 |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Graduated             | 50                                                            | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 60                   | 70                           | 70                 |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| 24                    | Admission Criteria/Requirements                               | <ul style="list-style-type: none"><li>High school students have to pass national exam,</li><li>Students have to pass ITC entrance exam: Mathematics, Physics, Chemistry, Logic.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                              |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| 25                    | Programme Benchmarking with Similar Programmes in the Country | <p>There are at least two universities in Phnom Penh providing EA programme.</p> <ul style="list-style-type: none"><li>Norton University (NU) is a private university that provides electrical engineering with 140 credits and has 4 faculty staffs and 3 labs to support teaching and learning.</li><li>National Polytechnic Institute of Cambodia (NPIC) is a public institute that provides electrical and electronics engineering with 120 credits and has 10 faculty staffs and 6 labs.</li></ul> <table><tr><th>Name of HEIs</th><th>Name of Programme</th><th>Total Credits</th><th>Duration of Study</th></tr><tr><td>NU</td><td>Electrical Engineering</td><td>140</td><td>5 years</td></tr><tr><td>NPIC</td><td>Electrical and Electronics Engineering</td><td>120</td><td>4 years</td></tr></table>                                                                                                                  | Name of HEIs         | Name of Programme            | Total Credits      | Duration of Study | NU                 | Electrical Engineering | 140                  | 5 years | NPIC        | Electrical and Electronics Engineering | 120                   | 4 years |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| Name of HEIs          | Name of Programme                                             | Total Credits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Duration of Study    |                              |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| NU                    | Electrical Engineering                                        | 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5 years              |                              |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |
| NPIC                  | Electrical and Electronics Engineering                        | 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4 years              |                              |                    |                   |                    |                        |                      |         |             |                                        |                       |         |           |    |    |       |                     |    |           |    |       |    |              |           |    |        |    |    |                   |           |       |    |    |    |                  |           |    |    |    |    |       |  |     |     |     |     |

| 26                                              | Integration of Experiential Learning Approaches (ELA) of FEF | <p>Table below shows the alignment of EA programme to FutureFit Educational Framework. This programme is designed to support more to industrial in the field of electronics design and automation systems:</p> <table><tr><td>Experiential Learning Approaches (ELA)</td><td>Tick</td></tr><tr><td>Industry Driven</td><td>✓</td></tr><tr><td>Community Resilience</td><td></td></tr><tr><td>Research Infused</td><td></td></tr><tr><td>Personalised</td><td></td></tr></table> <p>For the approach chosen, list the courses that adopt the approach.</p> <table><tr><th>ELA</th><th>Course Code</th><th>Course Name</th><th>Number of credits</th></tr><tr><td rowspan="13">Industry Driven</td><td>GEEI41SPP</td><td>Student Project Part I</td><td>1</td></tr><tr><td>GEEI42SPP</td><td>Student Project Part II</td><td>1</td></tr><tr><td>GEEI51SPP</td><td>Student Project Part III</td><td>2</td></tr><tr><td>GEEI52FYI</td><td>Final Year Internship</td><td>12</td></tr><tr><td>GEEI51ENT</td><td>Entrepreneurship</td><td>1</td></tr><tr><td>GEEI41REM</td><td>Research Methodology</td><td>1</td></tr><tr><td>GEEI32CIR</td><td>Communication and Interpersonal Relations</td><td>1</td></tr><tr><td>GEEI51WSP</td><td>Work-life and social psychology</td><td>1</td></tr><tr><td>GEEI51PRM</td><td>Project Management</td><td>2</td></tr><tr><td>GEEI51ENG</td><td>English for Work</td><td>1</td></tr><tr><td>GEEI51MIP</td><td>Module d’Insertion Professionel</td><td>1</td></tr><tr><td colspan="2">Total of credits</td><td>24</td></tr><tr><td colspan="2">Percentage of integration of ELA</td><td>16.67%</td></tr></table> | Experiential Learning Approaches (ELA) | Tick | Industry Driven          | ✓ | Community Resilience                            |   | Research Infused                         |   | Personalised             |   | ELA     | Course Code | Course Name | Number of credits | Industry Driven            | GEEI41SPP | Student Project Part I | 1 | GEEI42SPP | Student Project Part II | 1 | GEEI51SPP | Student Project Part III | 2 | GEEI52FYI | Final Year Internship | 12 | GEEI51ENT | Entrepreneurship | 1 | GEEI41REM | Research Methodology | 1 | GEEI32CIR | Communication and Interpersonal Relations | 1 | GEEI51WSP | Work-life and social psychology | 1                                           | GEEI51PRM | Project Management | 2         | GEEI51ENG              | English for Work | 1 | GEEI51MIP | Module d’Insertion Professionel | 1 | Total of credits |  | 24 | Percentage of integration of ELA |  | 16.67% |
|-------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------|--------------------------|---|-------------------------------------------------|---|------------------------------------------|---|--------------------------|---|---------|-------------|-------------|-------------------|----------------------------|-----------|------------------------|---|-----------|-------------------------|---|-----------|--------------------------|---|-----------|-----------------------|----|-----------|------------------|---|-----------|----------------------|---|-----------|-------------------------------------------|---|-----------|---------------------------------|---------------------------------------------|-----------|--------------------|-----------|------------------------|------------------|---|-----------|---------------------------------|---|------------------|--|----|----------------------------------|--|--------|
| Experiential Learning Approaches (ELA)          | Tick                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Industry Driven                                 | ✓                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Community Resilience                            |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Research Infused                                |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Personalised                                    |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| ELA                                             | Course Code                                                  | Course Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Number of credits                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Industry Driven                                 | GEEI41SPP                                                    | Student Project Part I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI42SPP                                                    | Student Project Part II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51SPP                                                    | Student Project Part III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI52FYI                                                    | Final Year Internship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12                                     |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51ENT                                                    | Entrepreneurship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI41REM                                                    | Research Methodology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI32CIR                                                    | Communication and Interpersonal Relations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51WSP                                                    | Work-life and social psychology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51PRM                                                    | Project Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51ENG                                                    | English for Work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51MIP                                                    | Module d’Insertion Professionel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | Total of credits                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 24                                     |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | Percentage of integration of ELA                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 16.67%                                 |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| 27                                              | Integration of the National and Societal Goals of FEF        | <p>State how national and societal goals as in the FutureFit Framework are integrated in the programme.</p> <p>Note: All programmes must integrate the Pentagonal Strategy (PS) and Cambodia Sustainable Developmental Goals (CSDG).</p> <table><tr><td>Enablers/Drivers</td><td>Tick</td></tr><tr><td>Pentagonal Strategy (PS)</td><td>✓</td></tr><tr><td>Cambodia Sustainable Developmental Goals (CSDG)</td><td>✓</td></tr><tr><td>Conceive-Design-Implement-Operate (CDIO)</td><td>✓</td></tr><tr><td>Plan-Do-Check-Act (PDCA)</td><td>✓</td></tr></table> <p>For the enablers/drivers chosen, list the courses that support them.</p> <table><tr><th>Drivers</th><th>Course Code</th><th>Course Name</th><th>Number of credits</th></tr><tr><td rowspan="7">PS<br/>CSDG<br/>CDIO<br/>PDCA</td><td>GEEI41SPP</td><td>Student Project Part I</td><td>1</td></tr><tr><td>GEEI42SPP</td><td>Student Project Part II</td><td>1</td></tr><tr><td>GEEI51SPP</td><td>Student Project Part III</td><td>2</td></tr><tr><td>GEEI52FYI</td><td>Final Year Internship</td><td>12</td></tr><tr><td>GEEI51ENT</td><td>Entrepreneurship</td><td>1</td></tr><tr><td>GEEI41REM</td><td>Research Methodology</td><td>1</td></tr><tr><td>GEEI41SPP</td><td>Student Project Part I</td><td>1</td></tr><tr><td></td><td>GEEI42ECD</td><td>Electronic circuit design and manufacturing</td><td>1.5</td></tr><tr><td></td><td>GEEI42DCD</td><td>Digital circuit design</td><td>2</td></tr></table>                                                                                                                                                               | Enablers/Drivers                       | Tick | Pentagonal Strategy (PS) | ✓ | Cambodia Sustainable Developmental Goals (CSDG) | ✓ | Conceive-Design-Implement-Operate (CDIO) | ✓ | Plan-Do-Check-Act (PDCA) | ✓ | Drivers | Course Code | Course Name | Number of credits | PS<br>CSDG<br>CDIO<br>PDCA | GEEI41SPP | Student Project Part I | 1 | GEEI42SPP | Student Project Part II | 1 | GEEI51SPP | Student Project Part III | 2 | GEEI52FYI | Final Year Internship | 12 | GEEI51ENT | Entrepreneurship | 1 | GEEI41REM | Research Methodology | 1 | GEEI41SPP | Student Project Part I                    | 1 |           | GEEI42ECD                       | Electronic circuit design and manufacturing | 1.5       |                    | GEEI42DCD | Digital circuit design | 2                |   |           |                                 |   |                  |  |    |                                  |  |        |
| Enablers/Drivers                                | Tick                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Pentagonal Strategy (PS)                        | ✓                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Cambodia Sustainable Developmental Goals (CSDG) | ✓                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Conceive-Design-Implement-Operate (CDIO)        | ✓                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Plan-Do-Check-Act (PDCA)                        | ✓                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| Drivers                                         | Course Code                                                  | Course Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Number of credits                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
| PS<br>CSDG<br>CDIO<br>PDCA                      | GEEI41SPP                                                    | Student Project Part I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI42SPP                                                    | Student Project Part II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51SPP                                                    | Student Project Part III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI52FYI                                                    | Final Year Internship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12                                     |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI51ENT                                                    | Entrepreneurship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI41REM                                                    | Research Methodology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI41SPP                                                    | Student Project Part I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI42ECD                                                    | Electronic circuit design and manufacturing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1.5                                    |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |
|                                                 | GEEI42DCD                                                    | Digital circuit design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2                                      |      |                          |   |                                                 |   |                                          |   |                          |   |         |             |             |                   |                            |           |                        |   |           |                         |   |           |                          |   |           |                       |    |           |                  |   |           |                      |   |           |                                           |   |           |                                 |                                             |           |                    |           |                        |                  |   |           |                                 |   |                  |  |    |                                  |  |        |

| 28          | Programme Benchmarking with Overseas Programmes | <ul style="list-style-type: none"><li>Benchmarking the current EA programme to Universitat Autònoma de Barcelona (UAB) (Spain):<ul style="list-style-type: none"><li>UAB ranks 35<sup>th</sup> in the country</li><li>Price per credit: 122.34 euros/credit</li><li>Language: Catalan and English</li><li>It is a 4-year programme</li><li>Students: 5,806</li><li>Learning mode: On-site</li></ul></li></ul> <table><tr><th>Name of HEI</th><th>Country</th><th>Name of Programme</th><th>Total Credits</th><th>Duration of Study</th></tr><tr><td>UAB</td><td>Spain</td><td>Bachelor's Degree in Automation and Industrial Electronics Engineering</td><td>240</td><td>4 Years</td></tr></table> | Name of HEI   | Country           | Name of Programme | Total Credits | Duration of Study | UAB      | Spain | Bachelor's Degree in Automation and Industrial Electronics Engineering | 240      | 4 Years |                                        |  |
|-------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------|-------------------|---------------|-------------------|----------|-------|------------------------------------------------------------------------|----------|---------|----------------------------------------|--|
| Name of HEI | Country                                         | Name of Programme                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Total Credits | Duration of Study |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| UAB         | Spain                                           | Bachelor's Degree in Automation and Industrial Electronics Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 240           | 4 Years           |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| 29          | Staff/Physical/Financial Implications           | <ul style="list-style-type: none"><li>Total number of EA staffs: 14 (3 PhDs, 10 Master's, 1 Engineer)</li><li>Total number of EA Lab: 5 (H202, H101, B312, B313, J401)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                   |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| 30          | Initial Approval of Programme                   | Date:...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                   |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| 31          | Approval Dates of the Revised Programme         | <table><tr><th>No</th><th>Approval</th><th>Date</th></tr><tr><td>1</td><td>Department</td><td>... 2024</td></tr><tr><td>2</td><td>University Academic Board</td><td>... 2024</td></tr><tr><td>3</td><td>Ministry of Education, Youth and Sport</td><td></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                          | No            | Approval          | Date              | 1             | Department        | ... 2024 | 2     | University Academic Board                                              | ... 2024 | 3       | Ministry of Education, Youth and Sport |  |
| No          | Approval                                        | Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                   |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| 1           | Department                                      | ... 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                   |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| 2           | University Academic Board                       | ... 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                   |                   |               |                   |          |       |                                                                        |          |         |                                        |  |
| 3           | Ministry of Education, Youth and Sport          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                   |                   |               |                   |          |       |                                                                        |          |         |                                        |  |

### 12.3. Appendices and Templates for Appendices in Programme Specifications

Several appendices must be compiled together in the curriculum documentation, which include, but not limited to, the following:

|             |                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Appendix A* | Comparison of Courses in the Current and Revised Curriculum according to Curriculum Components (based on course categories – Basic, Core, Electives, etc.) |
| Appendix B  | Mapping of Programme Learning Outcomes (PLOs) to CQF Learning Domains                                                                                      |
| Appendix C  | Mapping of Programme Learning Outcomes (PLOs) to Programme Educational Objectives (PEOs)                                                                   |
| Appendix D  | Mapping of Courses to PLOs (based on course categories – Basic, Core, Electives, etc.)                                                                     |
| Appendix E  | Mapping of Courses to Learning Taxonomies (Cognitive-Affective-Psychomotor (CAP) (based on course categories – Basic, Core, Electives, etc.)               |
| Appendix F  | Student Learning Time (SLT) for the programme                                                                                                              |
| Appendix G  | Study Scheme                                                                                                                                               |
| Appendix H  | Experiential Learning Immersion in Programme                                                                                                               |
| Appendix I  | Coding System                                                                                                                                              |
| Appendix J  | Course Specifications <sup>#</sup>                                                                                                                         |
| Appendix K  | Nomination of Lead Committee, Technical Committees and Secretariat                                                                                         |

\* Only for curriculum revision

<sup>#</sup> Course specifications for all courses within the programme must be included in the documentation, including those offered by different faculties.

The templates for the appendices for programme specifications are as follows:

## Appendix A

Comparison of Courses in the Current and Revised Curriculum according to Curriculum Components (based on course categories – Basic, Core, Electives, etc.)

| No                    | Current Curriculum |                                                |        | Revised Curriculum |                                             |        | Justification for addition/omission/change in courses                                                                                                      |
|-----------------------|--------------------|------------------------------------------------|--------|--------------------|---------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Course Code        | Course Name                                    | Credit | Course Code        | Course Name                                 | Credit |                                                                                                                                                            |
| Basic Courses (MoEYS) |                    |                                                |        |                    |                                             |        |                                                                                                                                                            |
| 1                     | IMB.M1-B11         | Khmer Language for Communication               | 3      | KLC.BM11           | Khmer Language for Communication            | 2      |                                                                                                                                                            |
| 2                     | SMR.M1-B21         | Humanity and Civilization                      | 3      | HAC.BM11           | Humanity and Civilization                   | 1      |                                                                                                                                                            |
| 3                     | SWC.M1-B32         | Agribusiness                                   | 3      | AAE.BM22           | Agribusiness and Entrepreneurship           | 3      | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders. |
|                       |                    | Entrepreneurship                               | 3      |                    |                                             |        |                                                                                                                                                            |
| Basic Courses (HEI)   |                    |                                                |        |                    |                                             |        |                                                                                                                                                            |
| 1                     | IMB.M1-B11         | Introduction to Microbiology                   | 3      | ITM.BH11           | Introduction to Microbiology                | 3      |                                                                                                                                                            |
| 2                     | SMR.M1-B21         | Statistical Methods for Horticultural Research | 3      | SRM.BH12           | Statistics for Research Methodology         | 3      | The new name suggests that the course covers statistical methods applicable to a wide range of research fields, not just horticulture.                     |
| 3                     | SWC.M1-B32         | Scientific Writing and Communication Skill     | 3      | SWC.BH32           | Scientific writing and communication skills | 3      |                                                                                                                                                            |
| Major Core Courses    |                    |                                                |        |                    |                                             |        |                                                                                                                                                            |
| 1                     | BTN.M1-B21         | Botany                                         | 3      | BTN.MC12           | Botany                                      | 3      |                                                                                                                                                            |
| 2                     | ASS.M1-B21         | Applied Soil Science                           | 3      | ASS.CC12           | Applied Soil Science                        | 3      |                                                                                                                                                            |

|    |            |                                           |   |          |                                               |   |                                                                                                                                                                                               |
|----|------------|-------------------------------------------|---|----------|-----------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3  | RME.M1-B22 | Research Methodology: Experimental Design | 3 | RME.CC22 | Research Methodology: Experimental Design     | 3 |                                                                                                                                                                                               |
| 4  | PPN.M1-B22 | Plant Physiology and Nutrition            | 3 | PPN.CC21 | Plant Physiology and Nutrition                | 3 |                                                                                                                                                                                               |
| 5  | APE.M3-B22 | Applied Entomology                        | 3 | AEN.CC11 | Applied Entomology                            | 3 |                                                                                                                                                                                               |
| 6  | OPP.M3-B31 | Ornamental Plant Production Systems       | 3 | OPS.CC21 | Ornamental Plant Production Systems           | 3 |                                                                                                                                                                                               |
| 7  | LPD.M3-B31 | Landscape Planting Design                 | 3 | LPD.EC22 | Landscape Planting Design                     | 3 |                                                                                                                                                                                               |
| 8  | NGM.M2-B41 | Nursery and Greenhouse Management         | 3 | NGM.CC31 | Nursery and Greenhouse Management             | 3 |                                                                                                                                                                                               |
| 9  | PTC.M3-B32 | Plant Tissue Culture                      | 3 | PTC.CC31 | Plant Tissue Culture                          | 3 |                                                                                                                                                                                               |
| 10 | FMN.M4-B31 | Farm Management                           | 3 | FCA.CC32 | Farm Management and Climate smart agriculture | 3 | The new name indicates that the course now includes content on climate-smart agriculture, which involves practices that help mitigate the effects of climate change and adapt to its impacts. |
| 11 | WMN.M3-B32 | Weed Management                           | 3 | WMM.CC21 | Weed Management                               | 3 |                                                                                                                                                                                               |
| 12 | PHL.M3-B22 | Plant Health                              | 3 | PHC.CC31 | Plant Health and Crop Protection              | 3 | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders.                                    |
|    | HCP.M3-B31 | Horticultural Crop Protection             | 3 |          |                                               |   |                                                                                                                                                                                               |
| 13 | SFP.M3-B21 | Small Fruit Production                    | 3 | STP.CC22 | Small Fruit and Tree Fruit Production         | 3 | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders.                                    |
|    | TFP.M3-B32 | Tree Fruit Production                     | 3 |          |                                               |   |                                                                                                                                                                                               |

|                   |            |                                              |   |            |                            |    |                                                                                                                                                                                                                 |
|-------------------|------------|----------------------------------------------|---|------------|----------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14                | SEM.M3-B41 | Seminar                                      | 1 | SEM.CC41   | Seminar                    | 3  |                                                                                                                                                                                                                 |
| 15                |            | Internship                                   | 3 | INT.CC41   | Internship                 | 6  |                                                                                                                                                                                                                 |
| 16                |            | Field Work I                                 | 1 | FDW.CC41   | Field Work                 | 3  | The two courses are combined because there are overlapping in the two courses currently offered. Suggestion was made in the meeting with the stakeholders.                                                      |
|                   |            | Field Work II                                | 1 |            |                            |    |                                                                                                                                                                                                                 |
| 17                |            | Thesis                                       | 8 | THS.CC42   | Thesis                     | 12 |                                                                                                                                                                                                                 |
| Minor Core Course |            |                                              |   |            |                            |    |                                                                                                                                                                                                                 |
| 1                 | EFC.F1-B22 | English for Career                           | 3 | EFC.MC12   | English for Career         | 3  |                                                                                                                                                                                                                 |
| 2                 | EFS.F1-B21 | English for Science                          | 3 | EFS.MC11   | English for Science        | 3  |                                                                                                                                                                                                                 |
| 3                 | FDE.F1-B11 | Foundation English                           | 3 | GRI.MC11   | Grammar I                  | 3  | The new name explicitly indicates that the course primarily focuses on grammar. This specificity helps students understand exactly what they will be learning, as opposed to the broader and more general term. |
| 4                 |            |                                              |   | GRII.MC12  | Grammar II                 | 3  | The new course is introduced because it more relevant to the new technologies used in this area. It is offered by most renowned institutions offering this programme.                                           |
| 5                 |            |                                              |   | AEI.MC21   | Academic writing I         | 3  |                                                                                                                                                                                                                 |
| 6                 |            |                                              |   | AWII.MC22  | Academic writing II        | 3  |                                                                                                                                                                                                                 |
| 7                 |            |                                              |   | AWIII.MC31 | Academic writing III       | 3  |                                                                                                                                                                                                                 |
| 8                 |            |                                              |   | AWIV.MC32  | Academic writing IV        | 3  |                                                                                                                                                                                                                 |
| 9                 |            |                                              |   | EFC.MC31   | English for Communication  | 3  |                                                                                                                                                                                                                 |
| 10                |            |                                              |   | MBL.MC32   | Model Business letters     | 3  |                                                                                                                                                                                                                 |
| Electives Courses |            |                                              |   |            |                            |    |                                                                                                                                                                                                                 |
| 1                 | SLC.M3-B41 | Soilless Culture: Hydroponics and Aquaponics | 3 | HAA.EC32   | Hydroponics and Aquaponics | 3  | The new name may better represent and to align with current terminology and trends in the field.                                                                                                                |

|   |            |                                     |   |          |                                       |   |                                                                                                                                                                                         |
|---|------------|-------------------------------------|---|----------|---------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | SAA.M1-B12 | Sustainable Agriculture Application | 3 | PDM.EC32 | Introduction to Precision Agriculture | 3 | The new name may better represent the integration of advanced technologies such as GPS, sensors, drones, and data analytics in agriculture, which are central to precision agriculture. |
| 3 | PDM.M4-B41 | Project Development and Management  | 3 | GIS.EC21 | Project Development and Management    | 3 |                                                                                                                                                                                         |
|   | ASA.M4-B41 | Agroecosystem Analysis              | 3 |          |                                       |   | Course is omitted from the current curriculum. It is no longer relevant as raised by the external examiners.                                                                            |
| 4 |            |                                     |   | IPA.EC31 | Introduction to GIS                   | 3 | The new course is introduced because it more relevant to the new technologies used in this area. It is offered by most renowned institutions offering this programme.                   |

## Appendix B

### Mapping of Programme Learning Outcomes (PLOs) to CQF Learning Domains

| PLOs | MD1            | MD2                   | MD3                     | MD4                       |                     |                              |                                 | MD5                |                                               |                        |
|------|----------------|-----------------------|-------------------------|---------------------------|---------------------|------------------------------|---------------------------------|--------------------|-----------------------------------------------|------------------------|
|      | K              | K                     | S                       | A                         | A                   | A                            | A                               | K/S/A              | K/S/A                                         | K/S/A                  |
|      | LD1: Knowledge | LD2: Cognitive skills | LD3: Psychomotor skills | LD4: Interpersonal skills | LD5: Responsibility | LD6: Entrepreneurship skills | LD7: Ethics and Professionalism | LD8: Communication | LD9: Information technology or digital skills | LD10: Numerical skills |
| 1    | ✓              |                       |                         |                           | ✓                   |                              |                                 |                    |                                               |                        |
| 2    |                | ✓                     |                         |                           |                     |                              |                                 |                    |                                               |                        |
| 3    |                |                       | ✓                       | ✓                         |                     |                              |                                 |                    |                                               |                        |
| 4    |                |                       |                         | ✓                         |                     |                              |                                 | ✓                  |                                               |                        |
| 5    |                |                       |                         |                           | ✓                   |                              |                                 |                    |                                               |                        |
| 6    |                |                       |                         |                           |                     | ✓                            |                                 |                    |                                               |                        |
| 7    |                |                       |                         |                           |                     |                              | ✓                               |                    |                                               |                        |
| 8    |                |                       |                         |                           |                     |                              |                                 | ✓                  | ✓                                             |                        |
| 9    |                | ✓                     |                         |                           |                     |                              |                                 |                    | ✓                                             |                        |
| 10   | ✓              |                       |                         |                           |                     |                              |                                 |                    |                                               | ✓                      |

## Appendix C

### Mapping of Programme Learning Outcomes (PLOs) to Programme Educational Objectives (PEOs)

| PLOs   | Program Educational Objectives (PEOs) |       |       |
|--------|---------------------------------------|-------|-------|
|        | PEO 1                                 | PEO 2 | PEO 3 |
| PLO 1  | ✓                                     |       |       |
| PLO 2  | ✓                                     |       |       |
| PLO 3  | ✓                                     | ✓     |       |
| PLO 4  |                                       |       | ✓     |
| PLO 5  |                                       | ✓     |       |
| PLO 6  |                                       | ✓     |       |
| PLO 7  |                                       |       | ✓     |
| PLO 8  |                                       |       | ✓     |
| PLO 9  | ✓                                     |       |       |
| PLO 10 | ✓                                     | ✓     |       |

## Appendix D

Mapping of Courses to Programme Learning Outcomes (PLOs) (according to year of study)

| Year | Sem. | Course code | Course Name                               | Credit | Program Learning Outcomes (PLOs) |   |   |   |   |   |   |   |   |    |
|------|------|-------------|-------------------------------------------|--------|----------------------------------|---|---|---|---|---|---|---|---|----|
|      |      |             |                                           |        | 1                                | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1    | 1    | KLC.BM11    | Khmer Language for Communication          | 2      |                                  |   |   |   |   | P | M | F |   |    |
|      |      | HAC.BM11    | Humanity and Civilization                 | 1      |                                  |   |   | M |   |   | F | P |   |    |
|      |      | ITM.BH11    | Introduction to Microbiology              | 3      | M                                | F | P |   |   |   |   |   |   |    |
|      |      | EFS.MC11    | English for Science                       | 3      |                                  |   |   | M |   | F |   | P |   |    |
|      |      | GRI.MC11    | Grammar I                                 | 3      |                                  |   |   | M |   | F |   | P |   |    |
|      |      | AEN.CC11    | Applied Entomology                        | 3      | F                                | M |   |   |   |   | P |   |   |    |
|      | 2    | SRM.BH12    | Statistics Research Method                | 3      |                                  |   |   |   |   |   |   | P | M | F  |
|      |      | ASS.CC12    | Applied Soil Science                      | 3      | F                                | P | M |   |   |   |   |   |   |    |
|      |      | EFC.MC12    | English for Career                        | 3      |                                  |   |   | M |   | F |   | P |   |    |
|      |      | GRIL.MC12   | Grammar II                                | 3      |                                  |   |   | M |   | F |   | P |   |    |
|      |      | BTN.MC12    | Botany                                    | 3      | F                                | P | M |   |   |   |   |   |   |    |
| 2    | 1    | OPS.CC21    | Ornamental Plant Production Systems       | 3      | F                                | P |   |   |   | M |   |   |   |    |
|      |      | WMM.CC21    | Weed Management                           | 3      | F                                | M | P |   |   |   |   |   |   |    |
|      |      | PPN.CC21    | Plant Physiology and Nutrition            | 3      | M                                | F | P |   |   |   |   |   |   |    |
|      |      | GIS.EC21    | Introduction to GIS                       | 3      |                                  |   |   |   |   |   |   | P | F | M  |
|      |      | AEI.MC21    | Academic writing I                        | 3      |                                  |   |   | M |   | F |   | P |   |    |
|      | 2    | AAE.BM22    | Agribusiness and Entrepreneurship         | 3      |                                  |   |   | M | P | F |   |   |   |    |
|      |      | RME.CC22    | Research Methodology: Experimental Design | 3      | M                                |   | F |   |   |   |   |   |   | P  |
|      |      | LPD.EC22    | Landscape Planting Design                 | 3      | F                                | M |   |   |   | P |   |   |   |    |
|      |      | AWII.MC22   | Academic writing II                       | 3      |                                  |   |   | M |   | F |   | P |   |    |
|      |      | STP.CC22    | Small Fruit and Tree Fruit production     | 3      | F                                | P | M |   |   |   |   |   |   |    |

|              |   |            |                                               |     |                    |                   |                   |                    |                   |                    |                   |                    |                   |                   |
|--------------|---|------------|-----------------------------------------------|-----|--------------------|-------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|-------------------|
| 3            | 1 | PTC.CC31   | Plant Tissue Culture                          | 3   | F                  | M                 | P                 |                    |                   |                    |                   |                    |                   |                   |
|              |   | NGM.CC31   | Nursery and Greenhouse Management             | 3   | M                  | F                 | P                 |                    |                   |                    |                   |                    |                   |                   |
|              |   | PHC.CC31   | Plant Health and Crop Protection              | 3   | F                  | M                 |                   |                    |                   | P                  |                   |                    |                   |                   |
|              |   | AWIII.MC31 | Academic writing III                          | 3   |                    |                   |                   | M                  |                   | F                  |                   | P                  |                   |                   |
|              |   | EFC.MC31   | English for Communication                     | 3   |                    |                   |                   | M                  |                   | F                  |                   | P                  |                   |                   |
|              |   | IPA.EC31   | Introduction to Precision Agriculture         | 3   | M                  |                   |                   |                    |                   |                    |                   |                    | F                 | P                 |
|              | 2 | FCA.CC32   | Farm Management and Climate smart agriculture | 3   | F                  | M                 |                   |                    |                   |                    |                   |                    | P                 |                   |
|              |   | PDM.EC32   | Project Development and Management            | 3   |                    |                   |                   | M                  |                   | F                  |                   | P                  |                   |                   |
|              |   | HAA.EC32   | Hydroponics and Aquaponics                    | 3   |                    |                   | P                 | F                  | M                 |                    |                   |                    |                   |                   |
|              |   | AWIV.MC32  | Academic writing IV                           | 3   |                    |                   |                   | M                  |                   | F                  |                   | P                  |                   |                   |
|              |   | MBL.MC32   | Model Business letters                        | 3   |                    |                   |                   | M                  |                   | F                  |                   | P                  |                   |                   |
|              |   | SWC.BH32   | Scientific writing and communication skills   | 3   |                    |                   | M                 |                    |                   |                    |                   | P                  |                   | F                 |
| 4            | 1 | INT.CC41   | Internship                                    | 6   |                    |                   | P                 |                    |                   |                    | M                 | F                  |                   |                   |
|              |   | FDW.CC41   | Field Work                                    | 3   |                    |                   | P                 |                    | F                 |                    |                   | M                  |                   |                   |
|              |   | SEM.CC41   | Seminar                                       | 3   |                    |                   |                   | F                  | M                 |                    |                   | P                  |                   |                   |
|              | 2 | THS.CC42   | Thesis                                        | 12  |                    |                   |                   |                    | P                 |                    |                   | M                  | F                 |                   |
| <b>Total</b> |   |            | <b>37 courses</b>                             | 144 | F=10<br>P=0<br>M=5 | F=3<br>P=4<br>M=6 | F=1<br>P=8<br>M=4 | F=2<br>P=0<br>M=13 | F=1<br>P=2<br>M=2 | F=12<br>P=3<br>M=1 | F=1<br>P=1<br>M=2 | F=2<br>P=16<br>M=2 | F=3<br>P=1<br>M=1 | F=2<br>P=2<br>M=1 |

## Appendix E

Mapping of Courses to Learning Taxonomies (Cognitive-Affective-Psychomotor (CAP)) (based on course categories – Basic, Core, Electives)

| No                    | Course Code | Course Name                                 | Credits | Cognitive Domain |    |    |    |    |    | Psychomotor Domain |    |    |    |    |    |    | Affective Domain |    |    |    |    |
|-----------------------|-------------|---------------------------------------------|---------|------------------|----|----|----|----|----|--------------------|----|----|----|----|----|----|------------------|----|----|----|----|
|                       |             |                                             |         | C1               | C2 | C3 | C4 | C5 | C6 | P1                 | P2 | P3 | P4 | P5 | P6 | P7 | A1               | A2 | A3 | A4 | A5 |
| Basic Courses (MoEYS) |             |                                             |         |                  |    |    |    |    |    |                    |    |    |    |    |    |    |                  |    |    |    |    |
| 1                     | KLC.BM11    | Khmer Language for Communication            | 2       |                  |    |    | 1  |    |    | 1                  |    |    |    |    |    |    |                  |    | 1  |    |    |
| 2                     | HAC.BM11    | Humanity and Civilization                   | 1       |                  |    | 1  |    |    |    |                    | 1  |    |    |    |    |    |                  |    |    | 1  |    |
| 3                     | AAE.BM22    | Agribusiness and Entrepreneurship           | 3       |                  |    |    | 1  |    |    |                    |    |    |    |    | 1  |    |                  |    |    | 1  |    |
| Basic Courses (HEI)   |             |                                             |         |                  |    |    |    |    |    |                    |    |    |    |    |    |    |                  |    |    |    |    |
| 1                     | ITM.BH11    | Introduction to Microbiology                | 3       |                  |    |    | 1  |    |    |                    | 1  |    |    |    |    |    |                  |    |    |    | 1  |
| 2                     | SRM.BH12    | Statistics for Research Methodology         | 3       |                  |    |    |    | 1  |    |                    |    |    | 1  |    |    |    |                  |    | 1  |    |    |
| 3                     | SWC.BH32    | Scientific writing and communication skills | 3       |                  |    |    | 1  |    |    |                    |    |    | 1  |    |    |    |                  |    |    |    | 1  |
| Major Core Course     |             |                                             |         |                  |    |    |    |    |    |                    |    |    |    |    |    |    |                  |    |    |    |    |
| 1                     | BTN.MC12    | Botany                                      | 3       |                  |    |    |    | 1  |    |                    |    | 1  |    |    |    |    |                  |    |    | 1  |    |
| 2                     | ASS.CC12    | Applied Soil Science                        | 3       |                  |    |    | 1  |    |    |                    |    |    | 1  |    |    |    |                  |    | 1  |    |    |
| 3                     | RME.CC22    | Research Methodology: Experimental Design   | 3       |                  |    |    |    | 1  |    |                    |    |    |    | 1  |    |    |                  |    | 1  |    |    |
| 4                     | PPN.CC21    | Plant Physiology and Nutrition              | 3       |                  |    |    |    | 1  |    |                    |    | 1  |    |    |    |    |                  |    |    | 1  |    |
| 5                     | AEN.CC11    | Applied Entomology                          | 3       |                  |    |    | 1  |    |    |                    |    |    | 1  |    |    |    |                  |    | 1  |    |    |
| 6                     | OPS.CC21    | Ornamental Plant Production Systems         | 3       |                  |    |    |    | 1  |    |                    |    |    |    | 1  |    |    |                  |    |    | 1  |    |

|                          |            |                                               |    |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |
|--------------------------|------------|-----------------------------------------------|----|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|---|---|
| 7                        | LPD.EC22   | Landscape Planting Design                     | 3  |  |  |  | 1 |   |   |   |   |   | 1 |   |   |   |  |  | 1 |   |
| 8                        | NGM.CC31   | Nursery and Greenhouse Management             | 3  |  |  |  |   | 1 |   |   |   |   |   | 1 |   |   |  |  | 1 |   |
| 9                        | PTC.CC31   | Plant Tissue Culture                          | 3  |  |  |  | 1 |   |   |   |   |   | 1 |   |   |   |  |  | 1 |   |
| 10                       | FCA.CC32   | Farm Management and Climate smart agriculture | 3  |  |  |  |   | 1 |   |   |   |   |   | 1 |   |   |  |  |   | 1 |
| 11                       | WMM.CC21   | Weed Management                               | 3  |  |  |  | 1 |   |   |   |   |   | 1 |   |   |   |  |  | 1 |   |
| 12                       | PHC.CC31   | Plant Health and Crop Protection              | 3  |  |  |  |   | 1 |   |   |   |   |   | 1 |   |   |  |  |   | 1 |
| 13                       | STP.CC22   | Small Fruit and Tree Fruit Production         | 3  |  |  |  | 1 |   |   |   |   |   | 1 |   |   |   |  |  | 1 |   |
| 14                       | SEM.CC41   | Seminar                                       | 3  |  |  |  |   | 1 |   |   |   | 1 |   |   |   |   |  |  |   | 1 |
| 15                       | INT.CC41   | Internship                                    | 6  |  |  |  | 1 |   |   |   |   |   |   |   | 1 |   |  |  |   | 1 |
| 16                       | FDW.CC41   | Field Work                                    | 3  |  |  |  | 1 |   |   |   |   |   |   |   | 1 |   |  |  |   | 1 |
| 17                       | THS.CC42   | Thesis                                        | 12 |  |  |  |   |   | 1 |   |   |   |   |   |   | 1 |  |  |   | 1 |
| <b>Minor Core Course</b> |            |                                               |    |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |
| 1                        | EFC.MC12   | English for Career                            | 3  |  |  |  | 1 |   |   | 1 |   |   |   |   |   |   |  |  | 1 |   |
| 2                        | EFS.MC11   | English for Science                           | 3  |  |  |  |   | 1 |   |   | 1 |   |   |   |   |   |  |  | 1 |   |
| 3                        | GRI.MC11   | Grammar I                                     | 3  |  |  |  | 1 |   |   | 1 |   |   |   |   |   |   |  |  | 1 |   |
| 4                        | GRIL.MC12  | Grammar II                                    | 3  |  |  |  | 1 |   |   |   | 1 |   |   |   |   |   |  |  | 1 |   |
| 5                        | AEI.MC21   | Academic Writing I                            | 3  |  |  |  |   | 1 |   |   |   | 1 |   |   |   |   |  |  | 1 |   |
| 6                        | AWII.MC22  | Academic Writing II                           | 3  |  |  |  |   | 1 |   |   |   |   | 1 |   |   |   |  |  | 1 |   |
| 7                        | AWIIL.MC31 | Academic Writing III                          | 3  |  |  |  |   | 1 |   |   |   | 1 |   |   |   |   |  |  | 1 |   |
| 8                        | AWIV.MC32  | Academic Writing IV                           | 3  |  |  |  |   | 1 |   |   |   | 1 |   |   |   |   |  |  | 1 |   |
| 9                        | EFC.MC31   | English for Communication                     | 3  |  |  |  | 1 |   |   | 1 |   |   |   |   |   |   |  |  | 1 |   |

|                                                            |          |                                       |   |       |   |   |    |    |   |       |   |   |    |   |   |       |   |   |    |    |   |
|------------------------------------------------------------|----------|---------------------------------------|---|-------|---|---|----|----|---|-------|---|---|----|---|---|-------|---|---|----|----|---|
| 10                                                         | MBL.MC32 | Model Business letters                | 3 |       |   |   | 1  |    |   |       | 1 |   |    |   |   |       |   |   | 1  |    |   |
| Elective Courses                                           |          |                                       |   |       |   |   |    |    |   |       |   |   |    |   |   |       |   |   |    |    |   |
| 1                                                          | HAA.EC32 | Hydroponics and Aquaponics            | 3 |       |   |   | 1  |    |   |       |   |   |    | 1 |   |       |   |   | 1  |    |   |
| 2                                                          | PDM.EC32 | Project Development and Management    | 3 |       |   |   |    | 1  |   |       |   |   | 1  |   |   |       |   |   |    | 1  |   |
| 3                                                          | GIS.EC21 | Introduction to GIS                   | 3 |       |   |   | 1  |    |   |       |   | 1 |    |   |   |       |   |   | 1  |    |   |
| 4                                                          | IPA.EC31 | Introduction to Precision Agriculture | 3 |       |   |   | 1  |    |   |       |   |   | 1  |   |   |       |   |   |    | 1  |   |
| Number of courses that reach highest level within a domain |          |                                       |   | 0     | 0 | 1 | 20 | 15 | 1 | 4     | 5 | 7 | 11 | 6 | 3 | 1     | 0 | 0 | 12 | 21 | 4 |
| % of courses contributing to the domain*                   |          |                                       |   | 67.69 |   |   |    |    |   | 82.84 |   |   |    |   |   | 79.29 |   |   |    |    |   |
| Average target for each domain                             |          |                                       |   | 54.66 |   |   |    |    |   | 44.66 |   |   |    |   |   | 46.66 |   |   |    |    |   |

See Section 3.3.2: As a recommendation, a newly developed or revised undergraduate programme should set the levels of the PLOs for the cognitive, affective and psychomotor domains to an **average of C4 (analysing), A4 (organising), and P4 (mechanism)** to ensure that the educational programme will produce graduates that fit the defined outcomes of the FEF. For this case, the programme owner needs to add more courses that can contribute to higher levels for the affective domain.

\* See Section 3.3.3: As a recommendation to the curriculum developer and course principal lecturer, **each course should include three to four CLOs and must have a combination of Cognitive – Affective – Psychomotor (C-A-P) or C-A or C-P**, clearly specifying the levels for each CLO. Hence, most likely all courses contribute to the cognitive domain ie. 100%. However, contribution of courses in a programme to the affective and psychomotor domains should not be lower than 33%.

## Appendix F

Student Learning Time (SLT) for the programme

| No.                          | Course Code | Course Name                                   | Credit Hours (L-TP-O) | SLT |
|------------------------------|-------------|-----------------------------------------------|-----------------------|-----|
| <b>Basic Courses (MoEYS)</b> |             |                                               |                       |     |
| 1                            | KLC.BM11    | Khmer Language for Communication              | 2 (2-0-0)             | 80  |
| 2                            | HAC.BM11    | Humanity and Civilization                     | 1 (1-0-0)             | 40  |
| 3                            | AAE.BM22    | Agribusiness and Entrepreneurship             | 3 (1-2-0)             | 120 |
| <b>Basic Courses (HEI)</b>   |             |                                               |                       |     |
| 1                            | ITM.BH11    | Introduction to Microbiology                  | 3(2-1-0)              | 120 |
| 2                            | SRM.BH12    | Statistics for Research Methodology           | 3(2-1-0)              | 120 |
| 3                            | SWC.BH32    | Scientific writing and communication skills   | 3 (3-0-0)             | 120 |
| <b>Major Core Courses</b>    |             |                                               |                       |     |
| 1                            | BTN.MC12    | Botany                                        | 3(2-1-0)              | 120 |
| 2                            | ASS.CC12    | Applied Soil Science                          | 3(2-1-0)              | 120 |
| 3                            | RME.CC22    | Research Methodology: Experimental Design     | 3 (3-0-0)             | 120 |
| 4                            | PPN.CC21    | Plant Physiology and Nutrition                | 3(2-1-0)              | 120 |
| 5                            | AEN.CC11    | Applied Entomology                            | 3(2-1-0)              | 120 |
| 6                            | OPS.CC21    | Ornamental Plant Production Systems           | 3(2-1-0)              | 120 |
| 7                            | LPD.EC22    | Landscape Planting Design                     | 3(2-1-0)              | 120 |
| 8                            | NGM.CC31    | Nursery and Greenhouse Management             | 3(2-1-0)              | 120 |
| 9                            | PTC.CC31    | Plant Tissue Culture                          | 3(2-1-0)              | 120 |
| 10                           | FCA.CC32    | Farm Management and Climate smart agriculture | 3(2-1-0)              | 120 |
| 11                           | WMM.CC21    | Weed Management                               | 3(2-1-0)              | 120 |
| 12                           | PHC.CC31    | Plant Health and Crop Protection              | 3(2-1-0)              | 120 |
| 13                           | STP.CC22    | Small Fruit and Tree Fruit Production         | 3(2-1-0)              | 120 |
| 14                           | SEM.CC41    | Seminar                                       | 3 (1-0-2)             | 120 |
| 15                           | INT.CC41    | Internship                                    | 6 (0-0-6)             | 240 |
| 16                           | FDW.CC41    | Field Work                                    | 3 (0-0-3)             | 120 |

|                          |            |                                       |             |     |
|--------------------------|------------|---------------------------------------|-------------|-----|
| 17                       | THS.CC42   | Thesis                                | 12 (0-0-12) | 480 |
| <b>Minor Core Course</b> |            |                                       |             |     |
| 1                        | EFC.MC12   | English for Career                    | 3 (3-0-0)   | 120 |
| 2                        | EFS.MC11   | English for Science                   | 3 (3-0-0)   | 120 |
| 3                        | GRI.MC11   | Grammar I                             | 3 (3-0-0)   | 120 |
| 4                        | GRIL.MC12  | Grammar II                            | 3 (3-0-0)   | 120 |
| 5                        | AEI.MC21   | Academic writing I                    | 3 (3-0-0)   | 120 |
| 6                        | AWIL.MC22  | Academic writing II                   | 3 (3-0-0)   | 120 |
| 7                        | AWIIL.MC31 | Academic writing III                  | 3 (3-0-0)   | 120 |
| 8                        | AWIV.MC32  | Academic writing IV                   | 3 (3-0-0)   | 120 |
| 9                        | EFC.MC31   | English for Communication             | 3 (3-0-0)   | 120 |
| 10                       | MBL.MC32   | Model Business letters                | 3 (3-0-0)   | 120 |
| <b>Elective Courses</b>  |            |                                       |             |     |
| 1                        | HAA.EC32   | Hydroponics and Aquaponics            | 3 (2-1-0)   | 120 |
| 2                        | PDM.EC32   | Project Development and Management    | 3 (3-0-0)   | 120 |
| 3                        | GIS.EC21   | Introduction to GIS                   | 3 (2-1-0)   | 120 |
| 4                        | IPA.EC31   | Introduction to Precision Agriculture | 3 (2-1-0)   | 120 |
| Total SLT= 4,800         |            |                                       |             |     |
| Total SLT/40 = 120       |            |                                       |             |     |

Note: Total SLT/40 should be about 120 for a Bachelor programme.

**Appendix G**  
Study Scheme

| YEAR 1             |                                     |        |         |           |            |                    |                                           |        |         |           |            |
|--------------------|-------------------------------------|--------|---------|-----------|------------|--------------------|-------------------------------------------|--------|---------|-----------|------------|
| Semester 1         |                                     |        |         |           |            | Semester 2         |                                           |        |         |           |            |
| Course Code        | Course Name                         | Credit | Lecture | Practical | Field Work | Course Code        | Course Name                               | Credit | Lecture | Practical | Field Work |
| KLC.BM11           | Khmer Language for Communication    | 2      | 2       | 0         | 0          | SRM.BH12           | Statistics Research Method                | 3      | 2       | 1         | 0          |
| HAC.BM11           | Humanity and Civilization           | 1      | 1       | 0         | 0          | ASS.CC12           | Applied Soil Science                      | 3      | 2       | 1         | 0          |
| ITM.BH11           | Introduction to Microbiology        | 3      | 2       | 1         | 0          | EFC.MC12           | English for Career                        | 3      | 3       | 0         | 0          |
| EFS.MC11           | English for Science                 | 3      | 3       | 0         | 0          | GRIL.MC12          | Grammar II                                | 3      | 3       | 0         | 0          |
| GRI.MC11           | Grammar I                           | 3      | 3       | 0         | 0          | BTN.MC12           | Botany                                    | 3      | 2       | 1         | 0          |
| AEN.CC11           | Applied Entomology                  | 3      | 2       | 1         | 0          |                    |                                           |        |         |           |            |
| Total Credits = 15 |                                     |        |         |           |            | Total Credits = 15 |                                           |        |         |           |            |
| YEAR 2             |                                     |        |         |           |            |                    |                                           |        |         |           |            |
| Semester 1         |                                     |        |         |           |            | Semester 2         |                                           |        |         |           |            |
| Course Code        | Course Name                         | Credit | Lecture | Practical | Field Work | Course Code        | Course Name                               | Credit | Lecture | Practical | Field Work |
| OPS.CC21           | Ornamental Plant Production Systems | 3      | 2       | 1         | 0          | AAE.BM22           | Agribusiness and Entrepreneurship         | 3      | 1       | 2         | 0          |
| WMM.CC21           | Weed Management                     | 3      | 2       | 1         | 0          | RME.CC22           | Research Methodology: Experimental Design | 3      | 3       | 0         | 0          |
| PPN.CC21           | Plant Physiology and Nutrition      | 3      | 2       | 1         | 0          | LPD.EC22           | Landscape Planting Design                 | 3      | 2       | 1         | 0          |
| GIS.EC21           | Introduction to GIS                 | 3      | 2       | 1         | 0          | AWIL.MC22          | Academic writing II                       | 3      | 3       | 0         | 0          |
| AEL.MC21           | Academic writing I                  | 3      | 3       | 0         | 0          | STP.CC22           | Small Fruit and Tree Fruit production     | 3      | 2       | 1         | 0          |

|                    |                                       |        |         |           |            |                    |                                               |        |         |           |            |
|--------------------|---------------------------------------|--------|---------|-----------|------------|--------------------|-----------------------------------------------|--------|---------|-----------|------------|
| Total Credits = 15 |                                       |        |         |           |            | Total Credits = 15 |                                               |        |         |           |            |
| YEAR 3             |                                       |        |         |           |            |                    |                                               |        |         |           |            |
| Semester 1         |                                       |        |         |           |            | Semester 2         |                                               |        |         |           |            |
| Course Code        | Course Name                           | Credit | Lecture | Practical | Field Work | Course Code        | Course Name                                   | Credit | Lecture | Practical | Field Work |
| PTC.CC31           | Plant Tissue Culture                  | 3      | 2       | 1         | 0          | FCA.CC32           | Farm Management and Climate smart agriculture | 3      | 2       | 1         | 0          |
| NGM.CC31           | Nursery and Greenhouse Management     | 3      | 2       | 1         | 0          | PDM.EC32           | Project Development and Management            | 3      | 3       | 0         | 0          |
| PHC.CC31           | Plant Health and Crop Protection      | 3      | 2       | 1         | 0          | HAA.EC32           | Hydroponics and Aquaponics                    | 3      | 2       | 1         | 0          |
| AWIII.MC31         | Academic writing III                  | 3      | 3       | 0         | 0          | AWIV.MC32          | Academic writing IV                           | 3      | 3       | 0         | 0          |
| EFC.MC31           | English for Communication             | 3      | 3       | 0         | 0          | MBL.MC32           | Model Business letters                        | 3      | 3       | 0         | 0          |
| IPA.EC31           | Introduction to Precision Agriculture | 3      | 2       | 1         | 0          | SWC.BH32           | Scientific writing and communication skills   | 3      | 3       | 0         | 0          |
| Total Credits = 18 |                                       |        |         |           |            | Total Credits = 18 |                                               |        |         |           |            |
| YEAR 4             |                                       |        |         |           |            |                    |                                               |        |         |           |            |
| Semester 1         |                                       |        |         |           |            | Semester 2         |                                               |        |         |           |            |
| Course Code        | Course Name                           | Credit | Lecture | Practical | Field Work | Course Code        | Course Name                                   | Credit | Lecture | Practical | Field Work |
| INT.CC41           | Internship                            | 6      | 0       | 0         | 6          | THS.CC42           | Thesis                                        | 12     | 0       | 0         | 12         |
| FDW.CC41           | Field Work                            | 3      | 0       | 0         | 3          |                    |                                               |        |         |           |            |
| SEM.CC41           | Seminar                               | 3      | 1       | 0         | 2          |                    |                                               |        |         |           |            |
| Total Credits = 12 |                                       |        |         |           |            | Total Credits = 12 |                                               |        |         |           |            |

Note: The practical and field work can be changed according to the university's practices eg. lecture – tutorial – practical.

## Appendix H

### Experiential Learning Immersion in Programme

| Year/Semester | Industry-driven | Community-Resilience                        | Research-infused                                    | Personalised | Remark |
|---------------|-----------------|---------------------------------------------|-----------------------------------------------------|--------------|--------|
| Y1/S1         |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
| Y1/S2         |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
| Y2/S1         |                 | GIS.EC21-Introduction to GIS                |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
| Y2/S2         |                 | AAE.BM22-Agribusiness and Entrepreneurship  |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
| Y3/S1         |                 | NGM.CC31-Nursery and Greenhouse Management  |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |
| Y3/S2         |                 | PDM.EC32-Project Development and Management | SWC.BH32-Scientific writing and communication skill |              |        |
|               |                 |                                             | SRM.BH12-Statistics Research Methodology            |              |        |
|               |                 |                                             | RME.CC22-Research Methodology: Experimental Design  |              |        |
| Y4/S1         |                 | INT.CC41-Internship                         |                                                     |              |        |
|               |                 | FDW.CC41-Field work                         |                                                     |              |        |
|               |                 | SEM.CC41-Seminar                            |                                                     |              |        |
| Y4/S2         |                 |                                             | THS-CC42-Thesis                                     |              |        |
|               |                 |                                             |                                                     |              |        |
|               |                 |                                             |                                                     |              |        |

## **12.4. Course Specifications**

Course specifications are a detailed document on the course offered within a study programme. It informs stakeholders of the CLO, CLO-PLO mapping, assessment, student learning time and expectations. It is used as a reference for course design, delivery and assessment. It serves as a formal document that outlines the essential elements and requirements of the course, typically for administrative purposes and for accreditation or curriculum development processes. On the other hand, a course syllabus is a document distributed to students at the beginning of a course. It provides detailed information that guides students through the course and sets expectations. While it includes some of the same information as the course specification, it is more focused on the practical and logistical aspects of the course. The information to be included in the course specifications include the following (but not limited to):

1. Course title,
2. Course requirements such as prerequisites, credits, etc,
3. Expected learning outcomes of the course,
4. Course description,
5. Course outline,
6. Core textbook and references,
7. Teaching, learning, and assessment methods that enable the expected learning outcomes to be achieved,
8. Course policy,
9. Student responsibility,
10. Details matrix of student assessment and instructional method that ensure constructive alignment,
11. Rubric and rating scale,
12. Date on which the course specification was written or revised.

The curriculum must be designed to ensure that teaching methods, learning activities, and student assessments are all aligned to help students achieve the desired learning outcomes. Biggs (2003) refers to this process as constructive alignment. Constructive refers to the concept that students construct meaning through relevant learning activities. Alignment refers to the situation when teaching and learning activities and student assessment are aligned to achieve the expected learning outcomes. Constructive alignment in any course of study involves:

1. Defining expected learning outcomes that are measurable,
2. Selecting teaching and learning methods that are likely to ensure that the expected learning outcomes are achieved,
3. Assessing how well the students have achieved the expected learning outcomes as intended.

The following are two examples of course specifications.

### EXAMPLE 1: COURSE SPECIFICATIONS

#### AGRIBUSINESS AND ENTREPRENEURSHIP COURSE

|                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------|
| <b>1. Programme Title</b>                                                                                                                                                                                                                                    | Bachelor of Science in Horticulture                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |               |
| <b>2. Course Title</b>                                                                                                                                                                                                                                       | Agribusiness and Entrepreneurship                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |               |
| <b>3. Course Code</b>                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>4. No. of Credits</b> | 3 (3-0-0)     |
| <b>5. Pre-requisites (If any)</b>                                                                                                                                                                                                                            | Entrepreneurship and Innovation                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |               |
| <b>6. Course Instructor</b>                                                                                                                                                                                                                                  | Sreyngat LO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>7. Qualification</b>  | Master Degree |
| <b>8. Email</b>                                                                                                                                                                                                                                              | lo.sreyngat@nubb.edu.kh                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>9. Telephone No.</b>  | 069 474 725   |
| <b>10. Other Course Teacher(s)/Lecturer(s) (If any)</b>                                                                                                                                                                                                      | Prof. Peter BREUNIG, PhD (Guest Speakers)                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |               |
| <b>11. Course Type</b>                                                                                                                                                                                                                                       | Basic <input checked="" type="checkbox"/> Major <input type="checkbox"/> Core <input type="checkbox"/> Minor <input type="checkbox"/> Elective <input type="checkbox"/> Specialization <input type="checkbox"/>                                                                                                                                                                                                                                                                                       |                          |               |
| <b>12. Course Availability</b>                                                                                                                                                                                                                               | 1 <sup>st</sup> Semester <input type="checkbox"/> 2 <sup>nd</sup> Semester <input checked="" type="checkbox"/> or Term                                                                                                                                                                                                                                                                                                                                                                                |                          |               |
| <b>13. Course description/ Synopsis</b>                                                                                                                                                                                                                      | Creating business idea and business model by applying design thinking methodologies. Students will delve into the dynamic field of agriculture and learn how to identify opportunities, develop innovative solutions, and create sustainable business models in the agribusiness sector. Through a combination of lectures, case studies, interactive workshops, and hands-on projects, participants will gain practical knowledge and skills essential for success in agricultural entrepreneurship. |                          |               |
| <b>14. Course Learning Outcomes</b><br><i>[Write at least 3-5 CLOs using active/accessible verbs from Bloom's taxonomy which show what the student will be able to do after completing the course. (State the cognitive, affective, psychomotor levels)]</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |               |

| Course learning Outcomes - CLO<br>At the end of the course, students are able to: |                                                                                      | CQF<br>Major<br>Domain | Learning<br>Domain | Level in Learning Domain<br>Knowledge (Cognitive-C),<br>Attitudes (Affective-A),<br>Skills (Psychomotor-P) |   |   |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|--------------------|------------------------------------------------------------------------------------------------------------|---|---|
|                                                                                   |                                                                                      |                        |                    | C                                                                                                          | A | P |
| CLO 1                                                                             | Characterize the concept of agribusiness and entrepreneurship.                       | MD1                    | LD1                | 4                                                                                                          |   |   |
| CLO 2                                                                             | Identify the impact of planning, decision making and risk taking on a farm business. | MD1                    | LD1                | 4                                                                                                          |   |   |
| CLO 3                                                                             | Adapt design thinking using CANVAS to develop business plan                          | MD2<br>MD4<br>MD4      | LD2<br>LD6<br>LD9  |                                                                                                            |   | 6 |
| CLO 4                                                                             | Explain business ideas for business plan in horticulture                             | MD4                    | LD6                |                                                                                                            | 4 |   |

### 15. Mapping of the course learning outcomes to the Programme Learning Outcome, Teaching Methods and Assessment Techniques

| Course<br>Learning<br>Outcome | Programme Learning Outcome |      |      |      |      |      |      |      |      |       | Teaching Method                         | Assessment<br>methods                 |
|-------------------------------|----------------------------|------|------|------|------|------|------|------|------|-------|-----------------------------------------|---------------------------------------|
|                               | PLO1                       | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |                                         |                                       |
| CLO1                          | ✓                          |      |      |      |      |      |      |      |      |       | - Lecture                               | - Quizzes<br>- Mid-term test          |
| CLO2                          | ✓                          |      |      |      |      |      |      |      |      |       | - Lecture                               | - Project work                        |
| CLO3                          |                            | ✓    |      |      |      | ✓    |      |      | ✓    |       | - Lecture<br>- Projects<br>- Group work | - Project work<br>- Report<br>- Pitch |
| CLO4                          |                            | ✓    |      |      |      | ✓    |      |      |      |       | - Lecture<br>- Projects                 | - Project work                        |

**16. Distribution of Student Learning Time (SLT)**

| Course content outline and sub-topics |                                             | CLO | Learning and Teaching Activities |   |   |                                            |   |   | Total SLT |                              |
|---------------------------------------|---------------------------------------------|-----|----------------------------------|---|---|--------------------------------------------|---|---|-----------|------------------------------|
|                                       |                                             |     | Face to Face (F2F)               |   |   |                                            |   |   |           | Non F2F Independent Learning |
|                                       |                                             |     | Physical Class                   |   |   | Online/Technology mediated (if applicable) |   |   |           |                              |
|                                       |                                             |     | L                                | T | P | L                                          | T | P |           |                              |
| 1                                     | Lecture 1: Introduction to Agribusiness     | 1   | 3                                |   |   |                                            |   |   | 3         | 6                            |
| 2                                     | Lecture 2: The future of Farming Technology | 1   | 3                                |   |   |                                            |   |   | 3         | 6                            |
| 3                                     | Lecture 3: Introduction to Entrepreneurship | 2   | 3                                |   |   |                                            |   |   | 3         | 6                            |
| 4                                     | Lecture 4: Introduction to innovation       | 2   | 3                                |   |   |                                            |   |   | 3         | 6                            |
| 5                                     | Lecture 5: Introduction to design thinking  | 3   | 3                                |   |   |                                            |   |   | 3         | 6                            |
| 6                                     | Project Work: Define design challenge       | 3,4 | 1                                |   | 2 |                                            |   |   | 3         | 6                            |
| 7                                     | Project Work: Understand                    | 3,4 | 1                                |   | 2 |                                            |   |   | 3         | 6                            |

|                       |                                                             |     |                |  |                    |  |                              |  |           |   |
|-----------------------|-------------------------------------------------------------|-----|----------------|--|--------------------|--|------------------------------|--|-----------|---|
| 8                     | Project Work: Observe                                       | 3,4 | 1              |  | 2                  |  |                              |  | 3         | 6 |
| 9                     | Project Work: Define point of view                          | 3,4 | 1              |  | 2                  |  |                              |  | 3         | 6 |
| 10                    | Project Work: Create ideas                                  | 3,4 | 1              |  | 2                  |  |                              |  | 3         | 6 |
| 11                    | Project Work: Create prototypes                             | 3,4 | 1              |  | 2                  |  |                              |  | 4         | 7 |
| 12                    | Project Work: Test prototypes                               | 3,4 | 1              |  | 2                  |  |                              |  | 4         | 7 |
| 13                    | Project Work: Reflect and adjust                            | 3,4 | 1              |  | 2                  |  |                              |  | 4         | 7 |
| 14                    | Project Work: Create final presentation and Present results | 3,4 | 1              |  | 2                  |  |                              |  | 6         | 9 |
| Sub-Total SLT         |                                                             |     |                |  |                    |  |                              |  | 90        |   |
| Continuous Assessment |                                                             |     | Percentage (%) |  | Face to Face (F2F) |  | Non F2F Independent learning |  | Total SLT |   |
| 1                     | Quizzes                                                     |     | 20             |  | 1                  |  | 2                            |  | 3         |   |
| 2                     | Mid-term test                                               |     | 20             |  | 1.5                |  | 4.5                          |  | 6         |   |
| Sub-Total SLT         |                                                             |     |                |  |                    |  |                              |  | 9         |   |

| Final Assessment         |                                        | Percentage (%) | Face to Face (F2F) | NF2F Independent learning | Total SLT |
|--------------------------|----------------------------------------|----------------|--------------------|---------------------------|-----------|
| 1                        | Performance-Based evaluation (Project) | 60             | 1                  | 20                        | 21        |
| Sub-Total SLT            |                                        |                |                    |                           | 21        |
| Total SLT for Assessment |                                        |                |                    |                           | 30        |
| Grand Total SLT          |                                        |                |                    |                           | 120       |
| Total SLT/40             |                                        |                |                    |                           | 3.00      |

\*Note: L =Lecture, T= Tutorial/Seminar, P= Practical, F2F= Face to Face

Please check (✓) if this course is Industrial/Clinical Placement/ Practicum using 50% of effective Learning Time (ELT)

### 17. Course Assessment Plan

Course: Agribusiness and Entrepreneurship, Year 1, Semester 2

| CLOs | CLOs statement                                                                       | PLO  | Assessment Techniques                  | Weightage (%) | T&L Methods | C/A/P* level | Topics |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    | SL T (h) |
|------|--------------------------------------------------------------------------------------|------|----------------------------------------|---------------|-------------|--------------|--------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----------|
|      |                                                                                      |      |                                        |               |             |              | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |          |
| CLO1 | Characterize the concept of agribusiness and entrepreneurship                        | PLO1 | Quizzes(10marks)<br>Mid-term test (10) | 20            | Lecture     | C4           | ✓      | ✓ |   |   | ✓ |   |   |   |   |    |    |    |    |    |    |    | 21       |
| CLO2 | Identify the impact of planning, decision making, and risk taking on a farm business | PLO1 | Project Work (10)                      | 10            | -Lecture    | C4           |        |   |   | ✓ | ✓ |   |   |   |   |    |    |    |    |    |    | ✓  | 14       |



|   |       |               |                                                                                                                                                                                                 |                                                |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                              |                                                                                                                                                                |                                                                                                                                                                            |
|---|-------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | 3/0/0 | 1, 2          | <ul style="list-style-type: none"> <li>- Review current challenges in agriculture</li> <li>- Explain how agriculture 4.0 can help to solve these challenges</li> </ul>                          | Lecture 2:<br>The future of Farming Technology | <ul style="list-style-type: none"> <li>- Check and revise the students' review on the current challenges in agriculture</li> <li>- Lecture on how agriculture 4.0 can solve the challenges</li> <li>- Q&amp;A sessions</li> <li>- Assign the task</li> </ul> | <ul style="list-style-type: none"> <li>- Review the current challenges in agriculture</li> <li>- Pay attention the the revision from lecturer</li> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> <li>- Join a group discussion</li> </ul> | <ul style="list-style-type: none"> <li>- Group work: Explore how agriculture 4.0 is able to solve the current challenge in the field of agriculture</li> </ul> | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Completed document of the Future of Farming Technology</li> <li>- Task using education ICT applications</li> </ul> |
| 3 | 3/0/0 | 1, 2          | <ul style="list-style-type: none"> <li>- Summarize success factors and requirements for starting your own business</li> <li>- Develop content of a presentation for pitching an idea</li> </ul> | Lecture 3:<br>Introduction to Entrepreneurship | <ul style="list-style-type: none"> <li>- Lecture on the success factors and requirements for starting own self business</li> <li>- Q&amp;A sessions</li> <li>- Assign group work</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> <li>- Join a group to complete the assigned task</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>- Group work: Develop a content of a presentation for pitching an idea</li> </ul>                                       | <ul style="list-style-type: none"> <li>-PPT</li> <li>-Completed document of the introduction to Entrepreneurship</li> <li>-Educational ICT applications</li> </ul>         |
| 4 | 3/0/0 | 1,2,3         | <ul style="list-style-type: none"> <li>- Summarize main activities in innovation management</li> <li>- Provide an overview of modern innovation methods</li> </ul>                              | Lecture 4:<br>Introduction to innovation       | <ul style="list-style-type: none"> <li>- Lecture on the Introduction to Innovation</li> <li>- Lecture on the Innovation Management</li> <li>- Q&amp;A sessions</li> <li>- Assign the group work to complete a task</li> </ul>                                | <ul style="list-style-type: none"> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> <li>- Join a group work</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>- Group work: Provide an overview of modern innovation methods</li> </ul>                                               | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Completed document of innovation management</li> <li>- Educational ICT applications</li> </ul>                     |
| 5 | 1.5   | Mid-term test |                                                                                                                                                                                                 |                                                |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                              |                                                                                                                                                                | Midterm doc.                                                                                                                                                               |

|   |       |     |                                                                                                                                               |                                            |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                         |                                                          |                                                                                                                                                                                       |
|---|-------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | 3/0/0 | 2,3 | <ul style="list-style-type: none"> <li>- List the phases of design thinking</li> <li>- Describe different tools in design thinking</li> </ul> | Lecture 5: Introduction to design thinking | <ul style="list-style-type: none"> <li>- Lecture on the design thinking</li> <li>- Lecture on the different tools in design thinking</li> <li>- Lecture on the meaningful design challenge</li> <li>- Q&amp;A sessions</li> <li>- Assign the project work: Define the design challenge</li> </ul> | <ul style="list-style-type: none"> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> <li>- Join a project work</li> </ul>                                | Complete a project work: Define design challenge         | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Lab</li> <li>- Completed document of Design Thinking</li> <li>- Educational ICT applications</li> </ul>                       |
| 7 | 3/0/0 | 3,4 | Define a meaningful design challenge                                                                                                          | Project Work: Define design challenge      | <ul style="list-style-type: none"> <li>- Lecture on the meaningful design challenge</li> <li>- Q&amp;A sessions</li> <li>- Assign the project work</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> <li>- Join a project work</li> <li>- Prepare a pitch</li> </ul>     | Complete a project work: Define design challenge         | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Lab</li> <li>- Completed document of Design Challenge</li> <li>- Educational ICT applications</li> </ul>                      |
| 8 | 3/0/0 | 3,4 | Use tools to better understand design challenge                                                                                               | Project Work: Understand design challenge  | <ul style="list-style-type: none"> <li>- Lecture on the understanding of the design challenge</li> <li>- Q&amp;A sessions</li> <li>- Assign the project work</li> </ul>                                                                                                                           | <ul style="list-style-type: none"> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> <li>- Complete a project work</li> <li>- Develop a pitch</li> </ul> | Complete a project work: Understand the design challenge | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Lab</li> <li>- Completed document of understanding of the design challenge</li> <li>- Educational ICT applications</li> </ul> |
| 9 | 3/0/0 | 3,4 | Identify customer needs through                                                                                                               | Project Work: Observe                      | <ul style="list-style-type: none"> <li>- Lecture on the Customer's Needs through Personas and Other Tools</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>- Pay attention to the lecture presentation</li> <li>- Q&amp;A sessions</li> </ul>                                                               | Complete a project work: Observe the Needs of customers  | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Lab</li> <li>- Completed document of</li> </ul>                                                                               |

|    |       |     |                                                                     |                                    |                                                                                                                      |                                                                                                                   |                                                                                     |                                                                                                                                          |
|----|-------|-----|---------------------------------------------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|    |       |     | Personas and other tools                                            |                                    | - Assign the project work                                                                                            | - Complete a project work<br>- Develop a pitch                                                                    | through Personas and Other Tools                                                    | the needs of customers through Personas and Other Tools<br>- Educational ICT applications                                                |
| 10 | 3/0/0 | 3,4 | Construct a meaningful point of view that summarizes customer needs | Project Work: Define point of view | Explain and assign the project work in order to construct a meaningful point of view that summarize customers' needs | - Pay attention to the lecturer's explanation<br>- Q&A sessions<br>- Complete a project work<br>- Develop a pitch | Complete a project work: Define point of view that summarize customer's needs       | - PPT<br>- Lab<br>- Completed document of the meaningful point of view that summarize customers' needs<br>- Educational ICT applications |
| 11 | 3/0/0 | 3,4 | Generate ideas for customer needs using relevant tools              | Project Work: Create ideas         | Explain and assign the project work in order to generate idea for customers' needs using relevant tools              | - Pay attention to the lecturer's explanation<br>- Q&A sessions<br>- Complete a project work<br>- Develop a pitch | Complete the project work: generate ideas for customers' needs using relevant tools | -PPT<br>-Lab<br>-Completed document of the creating ideas for customers' needs using relevant tools<br>-Educational ICT applications     |

|    |       |     |                                                                   |                                                             |                                                                                                                   |                                                                                                                                                                                           |                                                                                             |                                                                                                                                                                |
|----|-------|-----|-------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | 3/0/0 | 3,4 | Generate prototypes with low resource requirements based on ideas | Project Work: Create prototypes                             | Explain and assign the project work in order to generate prototypes with low resource requirements based on ideas | <ul style="list-style-type: none"> <li>- Pay attention to the lecturer's explanation</li> <li>- Q&amp;A sessions</li> <li>- Complete a project work</li> <li>- Develop a pitch</li> </ul> | -Complete a project work: Generate prototypes with low resource requirements based on ideas | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Lab</li> <li>- Completed document of the creating prototypes - Educational ICT applications</li> </ul> |
| 13 | 3/0/0 | 3,4 | Test prototypes with target customers                             | Project Work: Test prototypes                               | Explain and assign the project work in order to test prototypes with targets customers                            | <ul style="list-style-type: none"> <li>- Pay attention to the lecturer's explanation</li> <li>- Q&amp;A sessions</li> <li>- Complete a project work</li> <li>- Develop a pitch</li> </ul> | - Complete a project work: Test prototypes with target customers                            | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Lab</li> <li>- Completed document of the Test Prototypes - Educational ICT applications</li> </ul>     |
| 14 | 3/0/0 | 3,4 | Reflect and adjust ideas based on customer feedback               | Project Work: Reflect and adjust                            | Explain and assign the project work in order to reflect and adjust ideas based on customers' feedback             | <ul style="list-style-type: none"> <li>- Pay attention to the lecturer's explanation</li> <li>- Q&amp;A sessions</li> <li>- Complete a project work</li> <li>- Develop a pitch</li> </ul> | Complete a project work: reflect and adjust                                                 | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Completed document of the reflection and adjustment</li> <li>- Educational ICT applications</li> </ul> |
| 15 | 3/0/0 | 3,4 | - Develop presentation to pitch idea/prototype to target audience | Project Work: Create final presentation and Present results | Explain and assign the project work in order to create a final presentation and result                            | <ul style="list-style-type: none"> <li>- Develop a presentation</li> <li>- Present the project work to target audience</li> </ul>                                                         | Final Presentation                                                                          | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Completed document of the result and presentation</li> </ul>                                           |

|                                                                                                                                      |     |                                                     |                                                                                               |                                       |  |      |  |                                |
|--------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------|--|------|--|--------------------------------|
|                                                                                                                                      |     |                                                     | - Present idea/prototype to target audience and assess your readiness for starting a business |                                       |  |      |  | - Educational ICT applications |
| 16                                                                                                                                   | 1.5 | Performance-Based evaluation (Project)              |                                                                                               |                                       |  |      |  | Final doc.                     |
| 19. Require resources to deliver the course (E.g: Pix4D mapper, Green seeker, Weather Station, Computer lab, etc.)<br>- Computer Lab |     |                                                     |                                                                                               |                                       |  |      |  |                                |
| 20. Required References/Textbooks and Other Teaching and Learning materials                                                          |     |                                                     |                                                                                               |                                       |  |      |  |                                |
| Required references/Textbooks                                                                                                        |     |                                                     |                                                                                               |                                       |  |      |  |                                |
| Title                                                                                                                                |     | Author (s)                                          |                                                                                               | Publisher                             |  | Year |  | ISBN                           |
| Agribusiness: Principles of Management                                                                                               |     | David Van Fleet, Ella Van Fleet, George J. Seperich |                                                                                               | Cengage Learning                      |  | 2013 |  | 9781285947839                  |
| The Design Thinking Playbook                                                                                                         |     | Michael Lewrick, Patrick Link, Larry Leifer         |                                                                                               | John Wiley & Sons, Inc.               |  | 2018 |  | 978-1119-46747-2               |
| Art of the Start 2.0 The Time-Tested, Battle-Hardened Guide for Anyone Starting Anything                                             |     | Guy Kawasaki                                        |                                                                                               | Penguin                               |  | 2015 |  | 978-0241187265                 |
| Recommended Textbooks/ Readings                                                                                                      |     |                                                     |                                                                                               |                                       |  |      |  |                                |
| Title                                                                                                                                |     | Author(s)                                           |                                                                                               | Publisher                             |  | Year |  | ISBN                           |
| Smart Business Plan                                                                                                                  |     | Master Steve                                        |                                                                                               | Silk Road Publishing (Toronto,Canada) |  | 2021 |  | 978-1-990236-13-6              |

| Agriculture 4.0: The Future of Farming Technology                                                                                                                                                                                                                                                                                                        | Matthieu De Clercq, Anshu Vats, Alvaro Biel                                               | The World Government Summit                                         | 2018                                                               |                                                                       |                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------|
| <b>Other Teaching and learning materials (E.g: YouTube clips, Movie, etc.)</b>                                                                                                                                                                                                                                                                           |                                                                                           |                                                                     |                                                                    |                                                                       |                                                   |
| <b>21. Student responsibility:</b> <ul style="list-style-type: none"> <li>- Attending classes on time and regularly</li> <li>- Completing their assignments, projects</li> <li>- Organising their time well.</li> <li>- Respecting themselves and others</li> <li>- Contributing to discussion and group activities</li> <li>- Helping others</li> </ul> |                                                                                           |                                                                     |                                                                    |                                                                       |                                                   |
| <b>- Rubric and Rating scale</b> <ul style="list-style-type: none"> <li>- Rubric to assess the project work measuring CLO2, CLO3, and CLO4</li> </ul>                                                                                                                                                                                                    |                                                                                           |                                                                     |                                                                    |                                                                       |                                                   |
| Criteria                                                                                                                                                                                                                                                                                                                                                 | Excellent (5)                                                                             | Good (4)                                                            | Satisfactory (3)                                                   | Needs Improvement (2)                                                 | Unsatisfactory (1)                                |
| <b>Understanding of Concepts</b>                                                                                                                                                                                                                                                                                                                         | Demonstrates a comprehensive understanding of agribusiness and entrepreneurship concepts. | Demonstrates a good understanding with minor gaps in comprehension. | Demonstrates an adequate understanding with some significant gaps. | Demonstrates a limited understanding with many gaps in comprehension. | Shows little to no understanding of key concepts. |
| <b>Innovation and Creativity</b>                                                                                                                                                                                                                                                                                                                         | Highly innovative and creative approach to solving problems.                              | Good level of innovation and creativity.                            | Some innovation and creativity displayed.                          | Minimal innovation and creativity.                                    | Lacks innovation and creativity.                  |
| <b>Research and Data Analysis</b>                                                                                                                                                                                                                                                                                                                        | Extensive and thorough research with detailed data analysis.                              | Good research with solid data analysis.                             | Adequate research and data analysis.                               | Limited research and weak data analysis.                              | Little to no research or data analysis.           |
| <b>Practical Application</b>                                                                                                                                                                                                                                                                                                                             | Excellent application of theoretical concepts to practical scenarios.                     | Good application with minor improvements needed.                    | Adequate application with several areas needing improvement.       | Limited application with many areas needing improvement.              | Poor application of theoretical concepts.         |

|                                                                 |                                                                                 |                                                               |                                                                     |                                                                           |                                             |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------|
| <b>Business Plan Development</b>                                | Detailed and realistic business plan with clear goals and strategies.           | Good business plan with minor issues in goals and strategies. | Adequate business plan with several areas needing clarification.    | Incomplete business plan with significant issues in goals and strategies. | Lacks a coherent business plan.             |
| <b>Financial Planning and Analysis</b>                          | Comprehensive financial planning with detailed analysis and projections.        | Good financial planning with minor issues.                    | Adequate financial planning with several areas needing improvement. | Limited financial planning with significant issues.                       | Poor financial planning and analysis.       |
| <b>Implementation Strategy</b>                                  | Clear, realistic, and well-structured implementation strategy.                  | Good implementation strategy with minor adjustments needed.   | Adequate implementation strategy with several gaps.                 | Limited implementation strategy with significant gaps.                    | No clear implementation strategy.           |
| <b>Market Analysis</b>                                          | In-depth market analysis with detailed insights and trends.                     | Good market analysis with minor gaps.                         | Adequate market analysis with several areas needing improvement.    | Limited market analysis with significant gaps.                            | Poor market analysis.                       |
| <b>Presentation and Communication</b>                           | Highly effective presentation with clear, concise, and engaging communication.  | Good presentation with clear communication.                   | Adequate presentation with some communication issues.               | Poor presentation with unclear communication.                             | Ineffective presentation and communication. |
| <b>Teamwork and Collaboration</b>                               | Excellent teamwork with strong collaboration and contribution from all members. | Good teamwork with effective collaboration.                   | Adequate teamwork with some issues in collaboration.                | Limited teamwork with significant collaboration issues.                   | Poor teamwork and lack of collaboration.    |
| - Rubric to access the Pitch by CANVAS measuring CLO3, and CLO4 |                                                                                 |                                                               |                                                                     |                                                                           |                                             |
| <b>Criteria</b>                                                 | <b>Excellent (4 points)</b>                                                     | <b>Good (3 points)</b>                                        | <b>Fair (2 points)</b>                                              | <b>Poor (1 point)</b>                                                     |                                             |

|                                       |                                                                                           |                                                                               |                                                                               |                                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>Problem</b>                        | Clearly articulates a significant, well-researched problem with strong supporting data.   | Identifies a relevant problem with some supporting data.                      | Mentions a problem but lacks clarity or sufficient supporting data.           | Vaguely identifies a problem without supporting data.                 |
| <b>Solution</b>                       | Provides a clear, innovative solution directly addressing the problem with detailed plan. | Offers a solution that addresses the problem with a general plan.             | Presents a solution but lacks innovation or detailed plan.                    | Solution is unclear, vague, or does not directly address the problem. |
| <b>Unique Value Proposition (UVP)</b> | UVP is compelling, well-defined, and clearly differentiates from competitors.             | UVP is clear and shows some differentiation from competitors.                 | UVP is somewhat clear but lacks strong differentiation.                       | UVP is unclear or does not differentiate from competitors.            |
| <b>Target Market</b>                  | Thoroughly defines a specific, sizable target market with strong rationale.               | Defines a target market with some rationale.                                  | Identifies a broad or poorly defined target market with limited rationale.    | Target market is unclear or unsupported.                              |
| <b>Market Opportunity</b>             | Demonstrates a deep understanding of market size, growth, and potential with solid data.  | Shows good understanding of market size and potential with some data.         | Provides basic market opportunity information with limited data.              | Market opportunity is unclear or lacks supporting data.               |
| <b>Business Model</b>                 | Clearly outlines a scalable and sustainable business model with revenue streams.          | Describes a business model with potential for scalability and sustainability. | Mentions a business model but lacks detail on scalability and sustainability. | Business model is unclear or not viable.                              |
| <b>Go-to-Market Strategy</b>          | Presents a detailed, actionable plan for market entry and growth.                         | Provides a general plan for market entry and growth.                          | Mentions a go-to-market strategy but lacks detail.                            | Go-to-market strategy is unclear or not feasible.                     |
| <b>Competitive Landscape</b>          | Thoroughly analyzes competitors and demonstrates strong differentiation and strategy.     | Analyzes competitors and shows some differentiation and strategy.             | Mentions competitors but lacks detailed analysis or differentiation.          | Competitive landscape is unclear or not addressed.                    |

|                   |                                                                              |                                                                         |                                                                     |                                                          |
|-------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------|
| <b>Traction</b>   | Shows significant progress, milestones, or user/customer adoption with data. | Demonstrates some progress or user/customer interest with some data.    | Indicates limited progress or user/customer interest.               | No traction or progress demonstrated.                    |
| <b>Team</b>       | Presents a highly skilled and relevant team with clear roles and experience. | Presents a competent team with relevant skills and some experience.     | Team is mentioned but lacks relevant skills or clear roles.         | Team is unclear or lacks relevant skills and experience. |
| <b>Financials</b> | Provides detailed, realistic financial projections and funding requirements. | Offers financial projections and funding requirements with some detail. | Presents basic financial projections with limited detail.           | Financials are unclear or unrealistic.                   |
| <b>Ask</b>        | Clearly states a specific, justified ask with a clear plan for use of funds. | States an ask with some justification and general plan for funds.       | Mentions an ask but lacks justification or detailed plan for funds. | Ask is unclear or unjustified.                           |

**- Rating Scale for Project work and Pitch presentation**

| <b>Criteria</b>                      | <b>Excellent (5)</b> | <b>Very Good (4)</b> | <b>Good (3)</b> | <b>Fair (2)</b> | <b>Poor (1)</b> |
|--------------------------------------|----------------------|----------------------|-----------------|-----------------|-----------------|
| <b>Project Work</b>                  |                      |                      |                 |                 |                 |
| Innovation and Originality           |                      |                      |                 |                 |                 |
| Feasibility and Viability            |                      |                      |                 |                 |                 |
| Market Research and Analysis         |                      |                      |                 |                 |                 |
| Business Plan Quality                |                      |                      |                 |                 |                 |
| Execution and Implementation         |                      |                      |                 |                 |                 |
| <b>Pitch Presentation</b>            |                      |                      |                 |                 |                 |
| Clarity and Organization             |                      |                      |                 |                 |                 |
| Communication Skills                 |                      |                      |                 |                 |                 |
| Engagement and Persuasiveness        |                      |                      |                 |                 |                 |
| Confidence and Professionalism       |                      |                      |                 |                 |                 |
| Visual Aids and Presentation Quality |                      |                      |                 |                 |                 |
| <b>Overall Impact</b>                |                      |                      |                 |                 |                 |

In this rubric:

- **Excellent (5)** indicates exceptional performance, demonstrating mastery and exceeding expectations.
- **Very Good (4)** indicates strong performance with minor areas for improvement.
- **Good (3)** indicates satisfactory performance meeting expectations adequately.
- **Fair (2)** indicates performance that meets some of the expectations but with notable deficiencies.
- **Poor (1)** indicates performance that falls significantly below expectations with substantial room for improvement

**22. Course policy:**

- Students will be given every opportunity to make-up work, provided valid reasons are given for absence.
- Students will be given one day for each day missed to turn in class assignments/projects for full credit. It is the students' responsibility to find out if any work was missed during absence.

**23. Date:**

**February 2025**

## EXAMPLE 2: COURSE SPECIFICATIONS

### POWER ELECTRONICS COURSE

| 1. <b>Programme Title</b>                                                                                                     | Engineering Degree in Electronics and Automation Systems                                                                                                                                                                                                                                                                                                                                        |                          |                           |      |      |      |      |         |      |       |                 |                             |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|------|------|------|------|---------|------|-------|-----------------|-----------------------------|
| 2. <b>Course Title</b>                                                                                                        | Power Electronics                                                                                                                                                                                                                                                                                                                                                                               |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 3. <b>Course Code</b>                                                                                                         | GEEI41PEL                                                                                                                                                                                                                                                                                                                                                                                       | 4. <b>No. of Credits</b> | 4 (2+1+1), Format (L,T,P) |      |      |      |      |         |      |       |                 |                             |
| 5. <b>Pre-requisites (If any)</b>                                                                                             | Digital Electronics, Analog Electronics, Electrical Circuit                                                                                                                                                                                                                                                                                                                                     |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 6. <b>Course Instructor</b>                                                                                                   | Dr. AM Sokchea (PI)                                                                                                                                                                                                                                                                                                                                                                             | 7. <b>Qualification</b>  | Doctoral Degree           |      |      |      |      |         |      |       |                 |                             |
| 8. <b>Email</b>                                                                                                               | Sokchea_am@itc.edu.kh                                                                                                                                                                                                                                                                                                                                                                           | 9. <b>Telephone No.</b>  | 096 34 55 449             |      |      |      |      |         |      |       |                 |                             |
| 10. <b>Other Course Teacher(s)/Lecturer(s) (If any)</b>                                                                       | Mr. Seng Theara (Co-PI), Master Degree                                                                                                                                                                                                                                                                                                                                                          |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 11. <b>Course Type</b>                                                                                                        | Major Electronics <input checked="" type="checkbox"/> Major Automation <input type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Specialization <input type="checkbox"/>                                                                                                                                                                                         |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 12. <b>Course Availability</b>                                                                                                | 1 <sup>st</sup> Semester <input checked="" type="checkbox"/> 2 <sup>nd</sup> Semester <input type="checkbox"/> or Term <input type="checkbox"/>                                                                                                                                                                                                                                                 |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 13. <b>Course Description/ Synopsis</b>                                                                                       | This subject is to provide the concept of a power electronics system that can convert from AC/DC voltage to another AC/DC voltage level. A detailed description of power electronics devices is also provided for forming the power converter. One main part of the lecture focuses on how to design a power converter for a suitable application with the association of their control design. |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 14. <b>Course Learning Outcomes</b><br>Here are the three CLOs of this course.                                                |                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                           |      |      |      |      |         |      |       |                 |                             |
| Description of the course learning outcomes – CLOs<br>At the end of the course, students are able to:                         |                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                           |      |      |      |      |         |      |       |                 |                             |
| CLO1 (K)                                                                                                                      | Select the power electronics components and structures for suitable purposes. (MD1 – LD1, C4)                                                                                                                                                                                                                                                                                                   |                          |                           |      |      |      |      |         |      |       |                 |                             |
| CLO2 (S)                                                                                                                      | Design a suitable and economical power electronics converter for requirement specification. (MD2 – LD2, C6; MD3 – LD3, P6)                                                                                                                                                                                                                                                                      |                          |                           |      |      |      |      |         |      |       |                 |                             |
| CLO3 (A)                                                                                                                      | Develop effective communication skills for power electronics in scientific communities. (MD5 – LD8, A4)                                                                                                                                                                                                                                                                                         |                          |                           |      |      |      |      |         |      |       |                 |                             |
| 15. <b>Mapping of the course learning outcomes to the programme Learning Outcome, Teaching Methods and Assessment methods</b> |                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                           |      |      |      |      |         |      |       |                 |                             |
| CLO                                                                                                                           | Programme Learning Outcome                                                                                                                                                                                                                                                                                                                                                                      |                          |                           |      |      |      |      |         |      |       | Teaching Method | Assessment methods          |
|                                                                                                                               | PLO1                                                                                                                                                                                                                                                                                                                                                                                            | PLO2                     | PLO3                      | PLO4 | PLO5 | PLO6 | PLO7 | PLO8    | PLO9 | PLO10 |                 |                             |
| CLO1                                                                                                                          | F (50%)                                                                                                                                                                                                                                                                                                                                                                                         |                          |                           |      |      |      |      |         |      |       |                 | Quiz, Mid-term, Final exams |
| CLO2                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                 | P (10%)                  | P (15%)                   |      |      |      |      |         |      |       | K-W-L           | Lab. Practice, PCB design   |
| CLO3                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                           |      |      |      |      | P (25%) |      |       | Peer teaching   | Presentation & report       |
| 16. <b>Distribution of Student Learning Time (SLT)</b>                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                           |      |      |      |      |         |      |       |                 |                             |

| Course Content Outline and Subtopics |                                                                            |                  | CLO* | Learning and Teaching Activities** |   |   |     |                                                          |   |   |     | NF2F Independent Learning                | Total SLT |
|--------------------------------------|----------------------------------------------------------------------------|------------------|------|------------------------------------|---|---|-----|----------------------------------------------------------|---|---|-----|------------------------------------------|-----------|
|                                      |                                                                            |                  |      | Face-to-Face (F2F)                 |   |   |     |                                                          |   |   |     |                                          |           |
|                                      |                                                                            |                  |      | Physical Class                     |   |   |     | Online/Technology-mediated (Synchronous) (if applicable) |   |   |     |                                          |           |
|                                      |                                                                            |                  |      | L                                  | T | P | O   | L                                                        | T | P | O   |                                          |           |
| 1                                    | Lec. 1: Introduction to Power Electronics (1 week)                         | CLO1             | 2    | 2                                  | 2 |   |     |                                                          |   |   | 2   | 12                                       |           |
| 2                                    | Lec. 2: Design Half-wave Rectifier (2 weeks)                               | CLO1, CLO2, CLO3 | 4    | 4                                  | 4 |   |     |                                                          |   |   | 8   | 20                                       |           |
| 3                                    | Lec. 3: Design Full-wave Rectifier (2 weeks)                               | CLO1, CLO2, CLO3 | 4    | 4                                  | 4 |   |     |                                                          |   |   | 8   | 20                                       |           |
| 4                                    | Lec. 4: Design Three-phase Rectifier (2 week)                              | CLO1, CLO2, CLO3 | 4    | 4                                  | 4 |   |     |                                                          |   |   | 8   | 20                                       |           |
| 5                                    | Lec. 5: Design DC Converter Part 1 (Buck, Boost, Cuk, Sepic) (3 weeks)     | CLO1, CLO2, CLO3 | 6    | 6                                  | 6 |   |     |                                                          |   |   | 6   | 24                                       |           |
|                                      | Lec. 6: Design DC Converter Part 2 (Flyback, Forward, Push-pull) (4 weeks) | CLO1, CLO2, CLO3 | 8    | 8                                  | 8 |   |     |                                                          |   |   | 8   | 32                                       |           |
| Sub Total SLT:                       |                                                                            |                  |      |                                    |   |   |     |                                                          |   |   |     | 128                                      |           |
| Continuous Assessment                |                                                                            |                  | %    | Face-to-Face (F2F)                 |   |   |     |                                                          |   |   |     | NF2F Independent Learning for Assessment |           |
|                                      |                                                                            |                  |      | Physical Class                     |   |   |     | Online/Technology-mediated (Synchronous) (if applicable) |   |   |     |                                          |           |
| 1                                    | Quiz 1                                                                     | 5                |      |                                    |   |   | 0.5 |                                                          |   |   | 0.5 | 1                                        |           |
| 2                                    | Quiz 2                                                                     | 5                |      |                                    |   |   | 0.5 |                                                          |   |   | 0.5 | 1                                        |           |
| 3                                    | Presentation                                                               | 25               | 0.5  |                                    |   |   |     |                                                          |   |   | 3.5 | 4                                        |           |
| 4                                    | Lab. Prototype & report                                                    | 25               |      |                                    |   |   |     |                                                          |   |   | 10  | 10                                       |           |
| 5                                    | Mid-term exam                                                              | 20               | 2    |                                    |   |   |     |                                                          |   |   | 6   | 8                                        |           |
| Sub Total SLT:                       |                                                                            |                  |      |                                    |   |   |     |                                                          |   |   |     | 24                                       |           |
| Final Assessment                     |                                                                            |                  | %    | Face-to-Face (F2F)                 |   |   |     |                                                          |   |   |     | NF2F Independent Learning for Assessment |           |
|                                      |                                                                            |                  |      | Physical Class                     |   |   |     | Online/Technology-mediated (Synchronous) (if applicable) |   |   |     |                                          |           |
| 1                                    | Final Exam                                                                 | 20               | 2    |                                    |   |   |     |                                                          |   |   | 6   | 8                                        |           |
| Sub Total SLT:                       |                                                                            |                  |      |                                    |   |   |     |                                                          |   |   |     | 8                                        |           |
| Grand Total SLT:                     |                                                                            |                  |      |                                    |   |   |     |                                                          |   |   |     | 160                                      |           |

Please check (✓) if this course is Industrial/Clinical Placement/ Practicum using 50% of effective Learning Time (ELT)

### 17. Course Assessment Plan

| CLOs | CLOs statement                                                                                                             | PLOs | Assess. Methods                          | Weightage (%) | T&L* Technique       | Level of Learning (C/A/P*) | Topics   |        |          | SLT** (h) |
|------|----------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------|---------------|----------------------|----------------------------|----------|--------|----------|-----------|
|      |                                                                                                                            |      |                                          |               |                      |                            | Lec. 2-4 | Lec. 5 | All lec. |           |
| 1    | Select the power electronics components and structures for suitable purposes. (MD1 – LD1, C4).                             | PLO1 | Class Test 1                             | 5%            | Flipped Class, K-W-L | C4                         | ✓        |        |          | 80        |
|      |                                                                                                                            |      | Class Test 2                             | 5%            |                      |                            |          | ✓      |          |           |
|      |                                                                                                                            |      | Midterm Exam                             | 20%           |                      |                            | ✓        | ✓      |          |           |
|      |                                                                                                                            |      | Final Exam                               | 20%           |                      |                            | ✓        | ✓      | ✓        |           |
| 2    | Design a suitable and economical power electronics converter for requirement specification. (MD2 – LD2, C6; MD3 – LD3, P6) | PLO2 | Oral Test                                | 10%           | K-W-L                | C6                         | ✓        | ✓      |          | 40        |
|      |                                                                                                                            | PLO3 | Lab Practical and report                 | 15%           |                      | P6                         | ✓        | ✓      |          |           |
| 3    | Develop effective communication skills for power electronics in scientific communities. (MD5 – LD8, A4)                    | PLO8 | Presentation                             | 15%           | Peer teaching        | A4                         | ✓        | ✓      | ✓        | 40        |
|      |                                                                                                                            |      | Report on provided problems of each lec. | 10%           |                      |                            |          |        |          |           |

\*T&L: Teaching and Learning

\*\*SLT: Student Learning Time

### 18. Course Outline/detailed lesson plan

| Weeks | Contact hours (L/T/P) | CLOs | Lesson Learning Outcomes (LLOs)                                                                                                                                                                                                                                                                                                  | Lecture                                                                                  | Teaching Method/activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Learning Method/activity: Active Learning Methodology ( <i>peer teaching</i> method)                                                                                                                                                                                                                                           | Assessment | T&L Resources                                                                                                                                                                                      |
|-------|-----------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | 2h/2h/2h              | CLO1 | <ul style="list-style-type: none"> <li>- Ability to distinguish different PE devices, especially power semiconductors.</li> <li>- Ability to select appropriate semiconductor devices for specific specifications of the converter.</li> <li>- Ability to select power electronics systems for suitable applications.</li> </ul> | Lecture 1: Introduction to Power Electronics System: Devices, Structure, and Application | <ul style="list-style-type: none"> <li>- Lecture on the passive device: the relationship between voltage and current (definition)</li> <li>- Lecture on the active device: switch ON/OFF characteristics and state-of-the-art industrial products</li> <li>- Lecture on conversion types of power electronics systems</li> <li>- Lecture on the example of power converter for suitable applications: research trend, challenges, and issues</li> <li>- Develop class activity by forming a pair as a group for working on active device classification and selection.</li> </ul> | <ul style="list-style-type: none"> <li>- Review provided learning material before class (Flip-Classroom)</li> <li>- Review state-of-art of semiconductor devices: Material usage, advantages/disadvantages, limitations, package (size/shape), operation range, etc.</li> <li>- Review Lab. The topic before class.</li> </ul> | --         | <ul style="list-style-type: none"> <li>- PPT</li> <li>- Completed document on active devices</li> <li>- Lab. #1: Topic and support document</li> <li>- Safety guidelines for Lab. Class</li> </ul> |

|     |          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                              |
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|     |          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                | - Demonstrate how to perform Lab. #1: Classification of semiconductor devices, ON/OFF Diode/MOSFETs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                              |
| 2-3 | 4h/4h/4h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"> <li>- Ability to compute the half-wave rectifier with one diode (for uncontrol output) and with one thyristor (for control output)</li> <li>- Ability to <b>analyze</b> the half-wave rectifier operation for different load types and selection of devices.</li> <li>- Ability to simulate the half-wave rectifier with a case study.</li> <li>- Ability to <b>build</b> a single-phase half-wave rectifier with one diode.</li> </ul> | Lecture 2: Operation and device sizing for Half-Wave Rectifier | <ul style="list-style-type: none"> <li>- Lecture on a single-phase half-wave rectifier with R load, RL load, RL with Vdc (DC motor),</li> <li>- Lecture on device selection for a case study problem,</li> <li>- Demonstrate how to use software (LTSpice) for simulation on one case study rectifier,</li> <li>- <b>Provide 12-15 problems to students,</b></li> <li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li> <li>- Show the format of the report and the deadline to submit the report.</li> <li>- Monitor and follow up on Lab. #1</li> <li>- Demonstrate how to perform Lab. #2: Half-wave rectifier for 10W</li> <li>- Demonstration on using KidCad software for PCB design of 10W half-wave rectifier</li> </ul> | <ul style="list-style-type: none"> <li>- Review provided learning material before class (Flip-Classroom)</li> <li>- Review how to use software (LTSpice and Kicad) in the rectifier system.</li> <li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li> <li>- <b>Prepare PTT for teaching others in the class about the group findings (only for assigned students): Peer teaching method</b></li> <li>- Submit a synthesis report of the case study.</li> <li>- Review Lab. #2 before class</li> </ul> | <ul style="list-style-type: none"> <li>- <b>Assessment of presentation skills</b> (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li> <li>- <b>Assessment of practical knowledge on 10W half-wave rectifier</b> (Lab – session: PoBL): Rubric (converter operation, device selection and specification, system design, measurement results)</li> </ul> | <ul style="list-style-type: none"> <li>- Lecture slides</li> <li>- Completed document of Half-wave rectifier</li> <li>- 12 to 15 problem studies of half-wave rectifier</li> <li>- Topic of Lab. #2</li> <li>- Software: LTSpice and KiCad</li> </ul>        |
| 4-5 | 4h/4h/4h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"> <li>- Ability to compute the full-wave rectifier with 4 Diodes (for uncontrol output) and with Thyristor (for control output)</li> <li>- Ability to analyze the full-wave rectifier operation for different load types and devices selection.</li> <li>- Ability to simulate the full-wave rectifier with a case study.</li> <li>- Ability to build a single-phase full-wave rectifier with 4 diodes.</li> </ul>                        | Lecture 3: Operation and device sizing for Full-Wave Rectifier | <ul style="list-style-type: none"> <li>- Lecture on a single-phase full-wave rectifier with R load, RL load, RL with Vdc (DC motor),</li> <li>- Provide 12-15 problems (case study) to students,</li> <li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li> <li>- Monitor and follow up on Lab. #2</li> <li>- Demonstrate how to perform Lab. #3: Full-wave rectifier for 10W</li> <li>- <b>Demonstration on using KidCad software for PCB design of 10W full-wave rectifier</b></li> </ul>                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>- Review provided learning material before class (Flip-Classroom)</li> <li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li> <li>- Prepare PTT for teaching others in the class about the group findings (only for assigned students): Peer teaching method</li> <li>- Submit a synthesis report of the case study.</li> <li>- Review Lab. #3 before class</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>- Assessment of presentation skills (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li> <li>- Assessment of practical knowledge on 10W full-wave rectifier (Lab – session: K-W-L activity): Rubric (converter operation, device selection and specification, system design, measurement results)</li> </ul>     | <ul style="list-style-type: none"> <li>- Lecture slides</li> <li>- Completed document of full-wave rectifier</li> <li>- 12 to 15 problem studies of full-wave rectifier</li> <li>- Topic of Lab. #3</li> <li>- <b>Software: LTSpice and KiCad</b></li> </ul> |

|       |          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                    |                     |
|-------|----------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 6     | 2h/2h/2h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"> <li>- Ability to compute the three-phase rectifier with six diodes (for uncontrol output) and with six thyristors (for control output)</li> <li>- Ability to analyze the three-phase rectifier operation for different load types and device selection.</li> <li>- Ability to simulate the three-phase rectifier with a case study.</li> <li>- Ability to build a three-phase rectifier with six diodes.</li> </ul> | Lecture 4: 3-Operation and device sizing for 3-phase rectifier                 | <ul style="list-style-type: none"> <li>- Lecture on a three-phase rectifier with R load, RL load, RL with Vdc (DC motor),</li> <li>- Provide 12-15 problems to students,</li> <li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li> <li>- Monitor and follow up on Lab. #3</li> <li>- <b>Prepare problems (Quiz #1): Rectifier 1-p, and 3-p.</b></li> </ul> | <ul style="list-style-type: none"> <li>- Review provided learning material before class (Flip-Classroom)</li> <li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li> <li>- Prepare PTT for teaching others in the class about the group findings (<i>only for assigned students</i>): Peer teaching method</li> <li>- Submit a synthesis report of the case study.</li> <li>- Continuous working on Lab. #3</li> </ul> | <ul style="list-style-type: none"> <li>- Assessment of presentation skills (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li> <li>- Assessment of practical knowledge on 10W full-wave rectifier (Lab – session: K-W-L activity): Rubric (converter operation, device selection and specification, system design, measurement results)</li> <li>- <b>Class Test #1 (Quiz): using Google Form (10 minutes with 10 questions)</b></li> </ul> | <ul style="list-style-type: none"> <li>- Lecture slides</li> <li>- Completed document of three-phase rectifier</li> <li>- 12 to 15 problem studies of full-wave rectifier</li> <li>- Topic of Lab. #3</li> <li>- Software: LTSpice and KiCad</li> <li>- Link to Google Form for Quiz #1</li> </ul> |                     |
| 7     | 2h       | CLO1                 | Mid-term exam: <ul style="list-style-type: none"> <li>• Content validity: <b>from single-phase to three-phase rectifier</b></li> <li>• Fairness: <b>closed book exam and approved by department committee</b></li> </ul>                                                                                                                                                                                                                               |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                    | Mid-term exam paper |
| 8-9   | 4h/4h/4h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"> <li>- Ability to compute the Buck Converter, Boost Converter</li> <li>- Ability to analyze the Buck Converter operation.</li> <li>- Ability to analyze the Boost Converter operation.</li> <li>- Ability to simulate the Buck Converter and Boost Converter with a case study.</li> <li>- Ability to build Buck Converter or Boost Converter.</li> </ul>                                                            | Lecture 5: Operation and device sizing for DC-DC Non-isolated Converter Part 1 | <ul style="list-style-type: none"> <li>- Lecture on a Buck Converter and a Boost Converter</li> <li>- Provide 12-15 problems to students,</li> <li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li> <li>- Demonstrate how to perform Lab. #4: Buck Converter and Boost Converter for 25W</li> </ul>                                                        | <ul style="list-style-type: none"> <li>- Review provided learning material before class (Flip-Classroom)</li> <li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li> <li>- Prepare PTT for teaching others in the class about the group findings (<i>only for assigned students</i>): Peer teaching method</li> <li>- Review Lab. #4 before class</li> </ul>                                                           | <ul style="list-style-type: none"> <li>- Assessment of presentation skills (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li> <li>- Assessment of practical knowledge on 25W Buck and Boost converter (Lab – session: K-W-L activity): Rubric (converter operation, device selection and specification, system design, measurement results)</li> </ul>                                                                                     | <ul style="list-style-type: none"> <li>- Lecture slides</li> <li>- Completed document of Buck and Boost converter</li> <li>- 12 to 15 problem studies of Buck and Boost converter</li> <li>- Topic of Lab. #4</li> <li>- Software: LTSpice and KiCad</li> </ul>                                    |                     |
| 11-12 | 4h/4h/4h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"> <li>- Ability to compute the Buck-Boost Converter, Cuk Converter, and SEPIC Converter</li> <li>- Ability to analyze the Buck-Boost, Cuk, and SEPIC operations.</li> <li>- Ability to simulate the Buck-Boost/Cuk/SEPIC Converter with a case study.</li> <li>- Ability to build Buck-Boost.</li> </ul>                                                                                                              | Lecture 6: Operation and device sizing for DC-DC Non-isolated Converter Part 2 | <ul style="list-style-type: none"> <li>- Lecture on a Buck-Boost Converter, a cuk converter, and sepic converter</li> <li>- Provide 12-15 problems to students,</li> <li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li> <li>- Monitor and follow-up on Lab. #4: Buck Converter and Boost Converter for 25W</li> </ul>                                    | <ul style="list-style-type: none"> <li>- Review provided learning material before class (Flip-Classroom)</li> <li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li> <li>- Prepare PTT for teaching others in the class about the group</li> </ul>                                                                                                                                                                     | <ul style="list-style-type: none"> <li>- Assessment of presentation skills (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li> <li>- Assessment of practical knowledge on 25W Buck and Boost converter (Lab – session: K-W-L activity):</li> </ul>                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>- Lecture slides</li> <li>- Completed document of buck-boost converter, cuk converter, sepic converter</li> <li>- 12 to 15 problem studies of buck-</li> </ul>                                                                                              |                     |

|                                                                                                                                                                                         |          |                      |                                                                                                                                                                                                                                                                                                                          |                                   |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                      |                  |
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|                                                                                                                                                                                         |          |                      |                                                                                                                                                                                                                                                                                                                          |                                   | <ul style="list-style-type: none"><li>- Prepare problems (Quiz #2)</li></ul>                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>findings (<i>only for assigned students</i>): Peer teaching method</li><li>- Continuous working on Lab. #4 before class</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Rubric (converter operation, device selection and specification, system design, measurement results)</li><li>- Class Test #2 (Quiz): using Google Form (10 minutes with 10 questions)</li></ul>                                                                                                                                                                                                | <ul style="list-style-type: none"><li>boost, cuk, sepic converters</li><li>- Software: LTSpice and KiCad</li><li>- Link to Google Form for Quiz #2</li></ul>                                                                                                         |                  |
| 13-14                                                                                                                                                                                   | 4h/4h/4h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"><li>- Ability to compute the Flyback Converter, Forward Converter</li><li>- Ability to analyze the Flyback/Forward converter operations.</li><li>- Ability to simulate the Flyback/Forward Converter with a case study.</li><li>- Ability to build Flyback.</li></ul>                  | Lecture 7: DC-Power Supply Part 1 | <ul style="list-style-type: none"><li>- Lecture on a Flyback Converter, a Forward converter</li><li>- Provide 12-15 problems to students,</li><li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li><li>- Lab. #5: Flyback Converter for 25W</li></ul> | <ul style="list-style-type: none"><li>- Review provided learning material before class (Flip-Classroom)</li><li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li><li>- Prepare PTT for teaching others in the class about the group findings (<i>only for assigned students</i>): Peer teaching method</li><li>- Review on Lab. #5</li></ul> | <ul style="list-style-type: none"><li>- Assessment of presentation skills (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li><li>- Assessment of practical knowledge on 25W Flyback converter (Lab – session: K-W-L activity): Rubric (converter operation, device selection and specification, system design, measurement results)</li></ul> | <ul style="list-style-type: none"><li>- Lecture slides</li><li>- Completed document of Flyback, Forward converter</li><li>- 12 to 15 problem studies of Flyback, Forward converter</li><li>- Topic of Lab. #5</li><li>- Software: LTSpice and KiCad</li></ul>        |                  |
| 15-16                                                                                                                                                                                   | 4h/4h/4h | CLO1<br>CLO2<br>CLO3 | <ul style="list-style-type: none"><li>- Ability to compute the Push-Pull Converter, Half-Bridge, and Full-Bridge Converter</li><li>- Ability to analyze the push-pull, half/full bridge converter operations.</li><li>- Ability to simulate the push-pull/half-bridge/full-bridge Converter with a case study.</li></ul> | Lecture 8: DC-Power Supply Part 2 | <ul style="list-style-type: none"><li>- Lecture on a Push-pull converter, Half-bridge converter, full-bridge converter</li><li>- Provide 12-15 problems to students,</li><li>- Assign a pair of students as a group responsible for the oral presentation of only one case study during the next tutorial class,</li></ul>                   | <ul style="list-style-type: none"><li>- Review provided learning material before class (Flip-Classroom)</li><li>- Working as a group of two students on the provided topic: do calculations and simulation with given software,</li><li>- Prepare PTT for teaching others in the class about the group findings (<i>only for assigned students</i>): Peer teaching method</li></ul>                             | <ul style="list-style-type: none"><li>- Assessment of presentation skills (from peer teaching activity) and report writing skills: Rubric (quality of slide presentation and report, speaking skills, teamwork)</li><li>- Assessment of practical knowledge on 25W Flyback converter (Lab – session: K-W-L activity): Rubric (converter operation, device selection and</li></ul>                                                    | <ul style="list-style-type: none"><li>- Lecture slides</li><li>- Completed document of push-pull/full-bridge/half-bridge converter</li><li>- 12 to 15 problem studies of push-pull/full-bridge/half-bridge converter</li><li>- Software: LTSpice and KiCad</li></ul> |                  |
| 17                                                                                                                                                                                      | 2h       | CLO1                 | Mid-term exam: <ul style="list-style-type: none"><li>• Content validity: from buck converter to push-pull converter</li><li>• Fairness: closed book exam and approved by department committee</li></ul>                                                                                                                  |                                   |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                      | Final test paper |
| <b>19. Require resources to deliver the course (E.g: Pix4D mapper, Greenseeker, Weather Station, Computer lab, etc.)</b> <ul style="list-style-type: none"><li>- Computer Lab</li></ul> |          |                      |                                                                                                                                                                                                                                                                                                                          |                                   |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                      |                  |

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| <b>20. Required References/Textbooks and Other Teaching and Learning materials</b>                                                                                                                                           |                               |                                                     |             |             |
| <b>Required references/Textbooks</b>                                                                                                                                                                                         |                               |                                                     |             |             |
| <b>Title</b>                                                                                                                                                                                                                 | <b>Author (s)</b>             | <b>Publisher</b>                                    | <b>Year</b> | <b>ISBN</b> |
| Power Electronics                                                                                                                                                                                                            | D. W. Hart                    | McGraw-Hill                                         | 2011        |             |
| <b>Recommended Textbooks/ Readings</b>                                                                                                                                                                                       |                               |                                                     |             |             |
| <b>Title</b>                                                                                                                                                                                                                 | <b>Author(s)</b>              | <b>Publisher</b>                                    | <b>Year</b> | <b>ISBN</b> |
| Power Electronics and Motor Drive Systems                                                                                                                                                                                    | S. N. Manias                  | Elsevier Inc.                                       | 2017        |             |
| Fundamentals of Power Electronics                                                                                                                                                                                            | R. W. Erickson, D. Maksimovic | 2 <sup>nd</sup> Edition, Kluwer Academic Publishers | 2004        |             |
| <b>21. Student responsibility</b> <ul style="list-style-type: none"> <li>- Participate activity in the classes</li> <li>- Complete all requirements/assignment</li> <li>- Submit all works on time</li> <li>- ...</li> </ul> |                               |                                                     |             |             |
| <b>22. Rubric and Rating scale</b><br>In appendix assessment folder                                                                                                                                                          |                               |                                                     |             |             |
| <b>23. Course policy</b> <ul style="list-style-type: none"> <li>- Student, who obtain overall score below 30% of 100, have to re-sit for exam.</li> </ul>                                                                    |                               |                                                     |             |             |
| <b>24. Date</b><br>03 June 2024                                                                                                                                                                                              |                               |                                                     |             |             |



**ព្រះរាជាណាចក្រកម្ពុជា**  
**ជាតិ សាសនា ព្រះមហាក្សត្រ**

**ក្រសួងអប់រំ យុវជន និងកីឡា**  
**លេខ: ៥២៦៤ អយក. ១៩៩**

**លិខិតឧត្តេសនាម**

យោង៖ - Inception Report របស់អ្នកជំនាញការអន្តរជាតិផ្នែកការរៀបចំក្របខ័ណ្ឌអភិវឌ្ឍកម្មវិធីសិក្សាតាមបែបការអប់រំ  
ផ្នែកលើលទ្ធផល  
- កំណត់ហេតុប្រជុំស្តីពីការរៀបចំក្របខ័ណ្ឌអភិវឌ្ឍកម្មវិធីសិក្សាតាមបែបការអប់រំផ្នែកលើលទ្ធផលចុះថ្ងៃ  
ទី២១ ខែធ្នូ ឆ្នាំ២០២៣។

ថ្នាក់ដឹកនាំ និងបុគ្គលិកអប់រំនៃក្រសួងអប់រំ យុវជន និងកីឡា ដូចមានរាយនាមខាងក្រោម ត្រូវបានចាត់តាំងជា  
គណៈកម្មការដឹកនាំ គណៈកម្មការបច្ចេកទេស និងក្រុមការងារលេខាធិការដ្ឋាន ដើម្បីរៀបចំ ក្របខ័ណ្ឌអប់រំ អនាគតផល  
សម្រាប់ការអប់រំផ្នែកលើលទ្ធផលនៅឧត្តមសិក្សាកម្ពុជា និង គោលការណ៍ណែនាំស្តីពី កម្មវិធីសិក្សាបរិវត្តន៍ គោលការណ៍  
ណែនាំស្តីពី គម្រោងសិក្សាវិទ្យាស្ថាន និង គោលការណ៍ណែនាំស្តីពី សមាសភាគប្រែប្រួលលទ្ធផលសិក្សា។

**ក. គណៈកម្មការដឹកនាំ**

|     |               |             |                                             |                      |
|-----|---------------|-------------|---------------------------------------------|----------------------|
| ១.  | ឯកឧត្តមបណ្ឌិត | សាន វឌ្ឍនា  | រដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា      | ប្រធាន               |
| ២.  | ឯកឧត្តមបណ្ឌិត | សោម រតនា    | អនុរដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា   | អនុប្រធាន            |
| ៣.  | ឯកឧត្តម       | ម៉ក់ ឈ      | អគ្គនាយក អគ្គនាយកដ្ឋានឧត្តមសិក្សា           | អនុប្រធានអចិន្ត្រៃយ៍ |
| ៤.  | ឯកឧត្តមបណ្ឌិត | ប៉ូ គឹមថុ   | នាយកវិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា          | សមាជិក               |
| ៥.  | ឯកឧត្តមបណ្ឌិត | ជេត ជាលី    | សាកលវិទ្យាធិការ សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ | សមាជិក               |
| ៦.  | ឯកឧត្តមបណ្ឌិត | ង៉ា ប៊ុនថាន | សាកលវិទ្យាធិការ សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម | សមាជិក               |
| ៧.  | ឯកឧត្តម       | សុខ យន      | សាកលវិទ្យាធិការ សាកលវិទ្យាល័យជាតិបាត់ដំបង   | សមាជិក               |
| ៨.  | ឯកឧត្តម       | ទុំ សារាជ   | សាកលវិទ្យាធិការ សាកលវិទ្យាល័យស្វាយរៀង       | សមាជិក               |
| ១០. | លោកបណ្ឌិត     | និត ប៊ុនឡែ  | អគ្គនាយករង អគ្គនាយកដ្ឋានឧត្តមសិក្សា         | សមាជិក               |
| ១១. | លោក           | យូ វ៉ៃ      | អគ្គនាយករង អគ្គនាយកដ្ឋានឧត្តមសិក្សា         | សមាជិក               |
| ១២. | លោក           | គង់ ភូមីកា  | ប្រធាននាយកដ្ឋានគ្រប់គ្រងឧត្តមសិក្សា         | សមាជិក               |
| ១៣. | លោកបណ្ឌិត     | ហេង គ្រេង   | ប្រធាននាយកដ្ឋានស្រាវជ្រាវនិងនវានុវត្តន៍     | សមាជិក               |

គណៈកម្មការដឹកនាំ មានតួនាទី និងភារកិច្ច ដូចខាងក្រោម ៖

- ដឹកនាំ និងគ្រប់គ្រងដំណើរការរៀបចំក្របខ័ណ្ឌអប់រំអនាគតផល និងគោលការណ៍ណែនាំ
- ពិនិត្យ និងផ្តល់យោបល់លើការរៀបចំក្របខ័ណ្ឌអប់រំអនាគតផល និងគោលការណ៍ណែនាំ

- ផ្តល់ការគាំទ្រដល់គ្រឹះស្ថានឧត្តមសិក្សាសម្រាប់ធ្វើទំនើបកម្មកម្មវិធីអប់រំស្របតាមក្របខណ្ឌអប់រំអនាគតផលសម្រាប់ការអប់រំផ្នែកលើលទ្ធផលនៅឧត្តមសិក្សាកម្ពុជា
- សមាជិក សមាជិកា ចូលរួមប្រជុំតាមការអញ្ជើញរបស់ឯកឧត្តមប្រធាន។

**ខ. គណៈកម្មការបច្ចេកទេស**

|    |               |      |                  |                                           |            |
|----|---------------|------|------------------|-------------------------------------------|------------|
| ១. | ឯកឧត្តម       | ម៉ក់ | ងយ               | អគ្គនាយកនៃអគ្គនាយកដ្ឋានឧត្តមសិក្សា        | ប្រធាន     |
| ២. | លោកបណ្ឌិត     | កៅ   | សុវណ្ណសុផល       | ប្រធានការិ. នា.គ្រប់គ្រងឧត្តមសិក្សា       | អនុប្រធាន  |
| ៣. | លោកបណ្ឌិត     | ហេង  | គ្រុង            | ប្រធាននាយកដ្ឋានស្រាវជ្រាវនិងនវានុវត្តន៍   | សមាជិក     |
| ៤. | លោកបណ្ឌិត     | ជ័យ  | ចាន់អឿន          | ព្រឹទ្ធបុរសរង សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ | សមាជិក     |
| ៥. | លោកបណ្ឌិត     | អោម  | សុខជា            | ប្រធានដេប៉ាតឺម៉ង់ វិ.បច្ចេកវិទ្យាកម្ពុជា  | សមាជិក     |
| ៦. | លោកស្រីបណ្ឌិត | ច័ម  | មួយលីន           | មន្ត្រី សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម       | សមាជិក     |
| ៧. | លោកបណ្ឌិត     | សុក  | សាយ              | ទីប្រឹក្សាបច្ចេកទេសគម្រោងHEIP             | ទីប្រឹក្សា |
| ៨. | Prof. Dr.     | Aida | Suraya Md. Yunus | អ្នកជំនាញការអន្តរជាតិផ្នែកOBE             | ទីប្រឹក្សា |
| ៩. | Prof. Dr.     | Wan  | Zuhainis Saad    | អ្នកជំនាញការអន្តរជាតិផ្នែកOBE             | ទីប្រឹក្សា |

គណៈកម្មការបច្ចេកទេស មានអនុគណៈកម្មការបួនគឺ៖ អនុគណៈកម្មការរៀបចំក្របខ័ណ្ឌអប់រំអនាគតផលសម្រាប់ការអប់រំផ្នែកលើលទ្ធផលនៅឧត្តមសិក្សាកម្ពុជា (FutureFit Educational Framework for Outcome-Based Education in Cambodian Higher Education) អនុគណៈកម្មការរៀបចំគោលការណ៍ណែនាំស្តីពីកម្មវិធីសិក្សាបរិក្ខេប (Guideline on Transformative Curriculum) អនុគណៈកម្មការរៀបចំគោលការណ៍ណែនាំស្តីពីគោលការណ៍ស្រាវជ្រាវនិងនវានុវត្តន៍ (Guideline on Innovative Pedagogy) និង អនុគណៈកម្មការរៀបចំគោលការណ៍ណែនាំស្តីពីសមាមាត្រផ្នែកវិនិច្ឆ័យសិក្សា (Guideline on Holistic Assessment)។

**ខ.១. អនុគណៈកម្មការរៀបចំក្របខ័ណ្ឌអប់រំអនាគតផលសម្រាប់ការអប់រំផ្នែកលើលទ្ធផល**

|    |               |      |            |                                       |          |
|----|---------------|------|------------|---------------------------------------|----------|
| ១. | លោកបណ្ឌិត     | កៅ   | សុវណ្ណសុផល | ប្រធានការិ. នា.គ្រប់គ្រងឧត្តមសិក្សា   | ប្រធាន   |
| ២. | លោក           | សូយ  | ទី         | នាយករង វិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា | សហប្រធាន |
| ៣. | លោក           | បាល់ | ផែស        | សាកលវិទ្យាធិការរង សា.ភូមិន្ទភ្នំពេញ   | សមាជិក   |
| ៤. | លោកស្រីបណ្ឌិត | សេង  | ម៉ុ        | សាកលវិទ្យាធិការរង សា.ភូមិន្ទកសិកម្ម   | សមាជិក   |
| ៥. | លោក           | ឡឹក  | រ៉ៃ        | សាកលវិទ្យាធិការរង សា.ស្វាយរៀង         | សមាជិក   |
| ៦. | លោក           | ទេព  | នាវា       | សាកលវិទ្យាធិការរងសា.ជាតិបាត់ដំបង      | សមាជិក   |

**ខ.២. អនុគណៈកម្មការរៀបចំគោលការណ៍ណែនាំស្តីពីកម្មវិធីសិក្សាបរិក្ខេប**

|    |           |      |            |                                          |          |
|----|-----------|------|------------|------------------------------------------|----------|
| ១. | លោក       | ជូរ  | ចាន់ណាវិទូ | មន្ត្រីនាយកដ្ឋានគ្រប់គ្រងឧត្តមសិក្សា     | ប្រធាន   |
| ២. | លោកបណ្ឌិត | អោម  | សុខជា      | ប្រធានដេប៉ាតឺម៉ង់ វិ.បច្ចេកវិទ្យាកម្ពុជា | សហប្រធាន |
| ៣. | លោកបណ្ឌិត | យុន  | គឹមលាង     | ប្រធានដេប៉ាតឺម៉ង់ សា.ភូមិន្ទភ្នំពេញ      | សមាជិក   |
| ៤. | លោក       | រៀន  | រដ្ឋា      | អនុប្រធានដេប៉ាតឺម៉ង់ សា.ជាតិបាត់ដំបង     | សមាជិក   |
| ៥. | កញ្ញា     | ហ៊ាន | និមល       | មន្ត្រីនាយកដ្ឋានគ្រប់គ្រងឧត្តមសិក្សា     | សមាជិក   |

|    |               |     |         |                                     |        |
|----|---------------|-----|---------|-------------------------------------|--------|
| ៦. | លោកស្រីបណ្ឌិត | ចែម | មួយលីន  | មន្ត្រី សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម | សមាជិក |
| ៧. | លោក           | ប៉ម | ឧត្តរ   | គ្រូបង្រៀនសាកលវិទ្យាល័យស្វាយរៀង     | សមាជិក |
| ៨. | កញ្ញា         | ឡូ  | ស្រីឆែត | មន្ត្រី សាកលវិទ្យាល័យជាតិបាត់ដំបង   | សមាជិក |
| ៩. | កញ្ញាបណ្ឌិត   | អោម | សុខា    | ជំនួយការបច្ចេកទេសគម្រោងHEIP         | សមាជិក |

**ខ.៣. អនុគណៈកម្មការរៀបចំគោលការណ៍ណែនាំស្តីពីកម្មភាពសង្ស័យច្បាប់**

|     |               |        |         |                                              |          |
|-----|---------------|--------|---------|----------------------------------------------|----------|
| ១.  | លោកស្រី       | ហុយ    | សុច័ន្ទ | អនុប្រធានការិ.នា.គ្រប់គ្រងឧត្តមសិក្សា        | ប្រធាន   |
| ២.  | លោកបណ្ឌិត     | ស្រីន  | ពៅ      | ព្រឹទ្ធបុរស សាកលវិទ្យាល័យជាតិបាត់ដំបង        | សហប្រធាន |
| ៣.  | លោក           | គង់    | ចុង     | ព្រឹទ្ធបុរស សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម      | សមាជិក   |
| ៤.  | លោកស្រីបណ្ឌិត | ប៊ុច   | សុភាព   | ព្រឹទ្ធបុរសរង វិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា | សមាជិក   |
| ៥.  | លោកបណ្ឌិត     | ជា     | ស៊ីណាត  | អនុប្រធានការិ. នា.ស្រាវជ្រាវនិងនវានុវត្តន៍   | សមាជិក   |
| ៦.  | លោក           | ជូ     | កុសល្យ  | សាស្ត្រាចារ្យ វិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា | សមាជិក   |
| ៧.  | លោកបណ្ឌិត     | ស្រីវី | ថាវិទូ  | គ្រូបង្រៀនសាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ        | សមាជិក   |
| ៨.  | លោកបណ្ឌិត     | ខឹមកុន | ស៊ុនលី  | គ្រូបង្រៀន សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ       | សមាជិក   |
| ៩.  | លោក           | ជួន    | កក្កី   | គ្រូបង្រៀន សាកលវិទ្យាល័យស្វាយរៀង             | សមាជិក   |
| ១០. | លោក           | ជូ     | ម៉ានិត  | គ្រូបង្រៀន សាកលវិទ្យាល័យស្វាយរៀង             | សមាជិក   |
| ១១. | លោក           | ឌឹម    | កាណាន់  | គ្រូបង្រៀន សា.ភូមិន្ទកសិកម្ម                 | សមាជិក   |
| ១២. | កញ្ញា         | ឡុង    | ស្រីពៅ  | គ្រូបង្រៀន សា.ភូមិន្ទកសិកម្ម                 | សមាជិក   |

**ខ.៤. អនុគណៈកម្មការរៀបចំគោលការណ៍ណែនាំស្តីពីសមាគមន៍កម្មវិធីសិក្សា**

|    |             |        |          |                                           |          |
|----|-------------|--------|----------|-------------------------------------------|----------|
| ១. | កញ្ញា       | ប៊ុនរី | វិនណា    | ប្រធានការិ. នា.គ្រប់គ្រងឧត្តមសិក្សា       | ប្រធាន   |
| ២. | លោកបណ្ឌិត   | ជ័យ    | ចាន់អឿន  | ព្រឹទ្ធបុរសរង សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ | សហប្រធាន |
| ៣. | លោកបណ្ឌិត   | ជ្រិន  | ផុក      | ប្រធានដេប៉ាតឺម៉ង់ វិ.បច្ចេកវិទ្យាកម្ពុជា  | សមាជិក   |
| ៤. | លោក         | ហែម    | សុនធីន្ទ | ប្រធានដេប៉ាតឺម៉ង់ សា.ស្វាយរៀង             | សមាជិក   |
| ៥. | កញ្ញា       | ហ៊ុន   | ស៊ីយ៉ា   | ប្រធានដេប៉ាតឺម៉ង់ សា.ជាតិបាត់ដំបង         | សមាជិក   |
| ៦. | លោក         | លឹម    | ពីង      | គ្រូបង្រៀនវិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា  | សមាជិក   |
| ៧. | លោកស្រី     | លី     | ផាន់ណា   | មន្ត្រី សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម       | សមាជិក   |
| ៨. | កញ្ញាបណ្ឌិត | ហោ     | វិច្ឆណា  | មន្ត្រី សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម       | សមាជិក   |

គណៈកម្មការបច្ចេកទេសមានតួនាទី និងភារកិច្ចដូចខាងក្រោម៖

- រៀបចំសេចក្តីព្រាងក្របខ័ណ្ឌអប់រំអនាគតផល និងគោលការណ៍ណែនាំដាក់ជូនគណៈកម្មការដឹកនាំពិនិត្យ និងផ្តល់យោបល់ដើម្បីគោរពស្នើសុំ ឯកឧត្តមបណ្ឌិតសភាចារ្យឧបនាយករដ្ឋមន្ត្រី រដ្ឋមន្ត្រីក្រសួងអប់រំ យុវជន និងកីឡា ពិនិត្យ និងសម្រេច
- ផ្តល់ការគាំទ្របច្ចេកទេសដល់គ្រឹះស្ថានឧត្តមសិក្សាដើម្បីធ្វើទំនើបកម្មកម្មវិធីអប់រំឱ្យស្របតាមក្របខ័ណ្ឌអប់រំអនាគតផលសម្រាប់ការអប់រំផ្នែកលើលទ្ធផលសម្រាប់ឧត្តមសិក្សាកម្ពុជា

- សមាជិក សមាជិកា ចូលរួមប្រជុំតាមការអញ្ជើញរបស់ក្រុមប្រធាន។

**គ. ក្រុមការងារលេខាធិការដ្ឋាន**

|    |           |        |             |                                            |           |
|----|-----------|--------|-------------|--------------------------------------------|-----------|
| ១. | លោកបណ្ឌិត | កៅ     | សុវណ្ណសុផល  | ប្រធានការិ. នា.គ្រប់គ្រងឧត្តមសិក្សា        | ប្រធាន    |
| ២. | លោកបណ្ឌិត | ជា     | ស៊ីណាត      | អនុប្រធានការិ. នា.ស្រាវជ្រាវនិងនវានុវត្តន៍ | អនុប្រធាន |
| ៣. | កញ្ញា     | ប៊ុនរី | វិនណា       | ប្រធានការិ. ន.គ្រប់គ្រងឧត្តមសិក្សា         | សមាជិក    |
| ៤. | លោកស្រី   | ហួយ    | សុច័ន្ទ     | អនុប្រធានការិ. នា.គ្រប់គ្រងឧត្តមសិក្សា     | សមាជិក    |
| ៥. | លោក       | ជួរ    | ចាន់ណារិទ្ធ | មន្ត្រី នា.គ្រប់គ្រងឧត្តមសិក្សា            | សមាជិក    |
| ៦. | លោក       | កក្កី  | ចាន់រតនៈ    | មន្ត្រី នា.គ្រប់គ្រងឧត្តមសិក្សា            | លេខាធិការ |
| ៧. | លោក       |        | សាមៀនកិត្យា | មន្ត្រី នា.គ្រប់គ្រងឧត្តមសិក្សា            | លេខាធិការ |
| ៨. | លោក       |        | គឹម ឌឿន     | មន្ត្រី នា.គ្រប់គ្រងឧត្តមសិក្សា            | លេខាធិការ |

ក្រុមការងារលេខាធិការដ្ឋានមានតួនាទី និងភារកិច្ចដូចខាងក្រោម៖

- រៀបចំសេចក្តីព្រាងក្របខ័ណ្ឌការងារ និងឯកសារគាំទ្រ
- រៀបចំ និងសម្របសម្រួលកិច្ចប្រជុំគណៈកម្មការបច្ចេកទេស និងគណៈកម្មការដឹកនាំ
- រៀបចំសិក្ខាសាលាដើម្បីប្រមូលធាតុចូលសម្រាប់សរសេរក្របខ័ណ្ឌអប់រំអនាគតផល និងគោលការណ៍ណែនាំ
- ផ្តល់ការគាំទ្ររដ្ឋបាលសម្រាប់ដំណើរការរៀបចំក្របខ័ណ្ឌអប់រំអនាគតផល និងគោលការណ៍ណែនាំ
- សមាជិក សមាជិកា ចូលរួមប្រជុំតាមការអញ្ជើញរបស់ក្រុមប្រធាន។

សមាសភាពគណៈកម្មការដឹកនាំ គណៈកម្មការបច្ចេកទេស និង ក្រុមការងារលេខាធិការដ្ឋាន ដូចមានរាយនាមខាងលើត្រូវអនុវត្តការងារតាមការចាត់តាំងខាងលើឱ្យមានប្រសិទ្ធភាពខ្ពស់។ ២/

ថ្ងៃ ព្រហស្បតិ៍ ខែតុលា ឆ្នាំរោង ឆស័ក ព.ស.២៥៦៨  
រាជធានីភ្នំពេញ ថ្ងៃទី ០៦ ខែតុលា ឆ្នាំ២០២៤



**ឧបនាយករដ្ឋមន្ត្រី**  
**រដ្ឋមន្ត្រីក្រសួងអប់រំ យុវជន និងកីឡា**

*(Signature)*

**បណ្ឌិតសភាចារ្យ ហង់ ជួន ណារ៉ុន**

**បម្រុងជូន៖**

- អគ្គលេខាធិការដ្ឋាន
- អគ្គនាយកដ្ឋានឧត្តមសិក្សា
- ឧទ្ទកាល័យឯកឧត្តមបណ្ឌិតសភាចារ្យឧបនាយករដ្ឋមន្ត្រី
- គ្រឹះស្ថានឧត្តមសិក្សាគោលដៅ  
“ដើម្បីជូនជ្រាបជាព័ត៌មាន”
- សាមីជន “ដើម្បីអនុវត្ត”
- កាលប្បវត្តិ
- ឯកសារ នាយកដ្ឋានគ្រប់គ្រងឧត្តមសិក្សា

## References

- ASEAN University Network (2020). *Guide to AUN-QA Assessment at Program Level*, Version 4.0. Bangkok: ASEAN University Network.
- Biggs, J. B. (2003) Aligning Teaching for Constructing Learning. *The Higher Education Academy*. Accessed on May 5, 2024 from [\(PDF\) Aligning Teaching for Constructing Learning \(researchgate.net\)](#)
- Deming, W. E. (1982). *Out of the Crisis*, Center for Advanced Engineering Study, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- Malaysian Qualifications Agency. (2019). *Guidelines on Nomenclature of Malaysian Higher Education Programme*. Kuala Lumpur, Malaysia: Malaysian Qualifications Agency.
- Malaysian Qualifications Agency. (2020). *Summary of Course Information Template*, Table 4 v2.0 June 2020.
- Malaysian Qualifications Agency. (2023). *Guidelines to Good Practices: Programme Development and Delivery* (p. 96). Kuala Lumpur, Malaysia: Malaysian Qualifications Agency.
- Ministry of Higher Education (2021). *Experiential Learning and Competency-based Education Landscape (EXCEL): Resilient and Change-Ready Talent*. Malaysia: Department of Higher Education.
- Royal Government of Cambodia (2012), *National Qualification Framework*. Phnom Penh: Royal Government of Cambodia.
- Universiti Putra Malaysia. (2022). *Panduan Penyediaan Dokumen Program Pengajian (Guideline in Preparing Academic Programme Documentations)*. Serdang, Malaysia: Universiti Putra Mala
- UNESCO (2017). *Competency-Based Curriculum: Framework for Implementation*.

**Directorate General of Higher Education**

ISBN 978-99950-2-504-5



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