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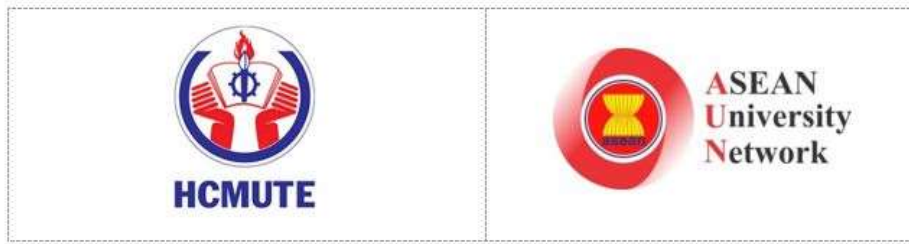
HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY AND EDUCATION
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING

HCMUTE

BACHELOR OF ENGINEERING

IN ELECTRONICS COMMUNICATION ENGINEERING TECHNOLOGY

AUN-QA
A Touch of Quality

The XY[th] AUN Quality Assessment at Programme Level
November 07 - 09, 2017

AUN-QA SELF-ASSESSMENT REPORT

of the Bachelor of Engineering in

ELECTRONICS COMMUNICATION ENGINEERING TECHNOLOGY

We hereby confirm to approve this AUN-QA Self-Assessment Report of the Bachelor of Engineering in Electronics Communication Engineering Technology programme for assessment according to AUN-QA Criteria (V3.0).

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Dean

Faculty of Electrical and Electronics Engineering

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LIST OF ABBREVIATIONS

No.	ABBR	Explanations
1	AAO	Academic Affairs Office
2	ASAO	Admission and Student Affairs
3	ASU	Arizona State University
4	AUN	ASEAN University Network
5	CDIO	Conceive - Design - Implement - Operate
6	DM	Dormitory Management
7	DLC	Digital Learning Center
8	ECET	Electrical and Communication Engineering Technology
9	ELOs	Expected Learning Outcomes
10	EMO	Equipment and Maintenance Office
11	ERO	Enterprise Relation Office
12	EXH	Exhibition
13	FCE	Faculty of Civil Engineering
14	FEEE	Faculty of Electrical and Electronic Engineering
15	FME	Faculty of Mechanical Engineering
16	FTE	Full Time Employees
17	FVEE	Faculty of Vehicle and Energy Engineering
18	FMO	Facility Management Office
19	GPA	Grade Point Average
20	HEEAP	Higher Engineering Education Alliance Program - www.heeap.org
21	HCMUTE	Ho Chi Minh City University of Technology and Education
22	HCO	Health Care Office
23	HRMO	Human Resource Management Office
24	HCMUT	Ho Chi Minh University of Technology
25	ITC	Information and Technology Center
26	ITEC	Indian Technical and Economic Cooperation
27	ISO	International Organization for Standardization
28	IU	International University, VNU-HCMC, Vietnam
29	IQ	Intelligence Quotient

30	KPI	Key Performance Indicator
31	LMS	Learning Management System
32	MOET	Ministry of Education and Training
33	PEO	Programme Education Objectives
34	PC	Personal Computer
35	PLC	Programmable Logic Controller
36	PDCA	Plan-Do-Check-Act
37	PMO	Press and Media Office
38	PTIT	Posts and Telecommunications Institute of Technology
39	QAO	Quality Assurance Office
40	SAO	Student Affairs Office
41	SHTP	Saigon Hi-Tech Park
42	SSC	Student Services Center
43	STO	Science and Technology Office
44	SAC	Scientific and Academic Committee
45	SAR	Self-Assessment Report
46	TPP	Trans-Pacific Partnership
47	UTE-TV	University of Technology and Education-Television
48	YUSA	Youth Union and Students Association

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PART I: INTRODUCTION

1.1 Ho Chi Minh City University of Technology and Education

Ho Chi Minh City University of Technology and Education (HCMUTE) is located in Ho Chi Minh City, Viet Nam. It was the first university to be established to offer the Technical Education Programmes when it was founded in October 1962. Since that time, it has grown to be one of the leading universities in training and supplying high quality human resources in the Vietnam. The university currently has about 19,000 full-time undergraduate students and more than 700 academic staff, of which more than 100 are full time faculty members with doctorate degrees. It offers academic programmes in undergraduate, post-graduate, and doctoral studies in variety of fields at high quality which is recognized locally and regionally. The university believes in the core values of lifelong learning: each learner needs to self- construct and enrich knowledge and skills by discovering, inquiring and learning by doing to improve creativeness potential to fulfill his/her own aspirations and to serve the community *[http://en.hcmute.edu.vn/]*.

HCMUTE has the quality assurance system for monitoring the quality improvement of teaching, learning and scientific research in order to provide learners with the best conditions for comprehensive development of the capacity to meet development needs and international integration. In particular, it consists of quality assurance activities; preparation, organization of non-level evaluation of training programmes and educational institutions. The QAO deploys the activities such as Internal examination and evaluation of quality objectives for each semester and academic year; Quality assurance handbook; Survey stakeholders; Archives and evidence management; organization of courses for training on quality assurance; Preparation for external assessment of training programmes and the educational university.

1.1.1 Vision and mission of HCMUTE

The academic activities are aligned with the vision and mission of the HCMUTE which are published in HCMUTE website *[http://en.hcmute.edu.vn/]*. The HCMUTE vision and mission statements are as follows:

A. Vision

The HCMC University of Technology and Education will become a top center of training, research, creativity, innovation and entrepreneurship in Vietnam, on a par with regional and worldwide prestigious universities.

B. Mission

The mission of HCMUTE is to be a leading institution in training, scientific research and technology transfer in Vietnam, continuously innovate to provide human resources and scientific products with high quality in the fields of technical and vocational education, science and technology to meet the demands of the economic-social development of the country and the region.

1.1.2 Schools and departments

HCMUTE has the president board, 15 academic faculties, 20 offices and 16 centers and is organized as shown in **Figure 0.1**. In the academic faculties, all deans of the faculties and heads of academic departments have the PhD/Assoc. Prof. degree. The president board consists of the president and three vice-presidents, in which each vice-president is assigned one typical role such as scientific research-International Relations; Academic Affairs; Finance-Facility. All these vice-presidents are responsible to support the president to monitor functional offices and centers.
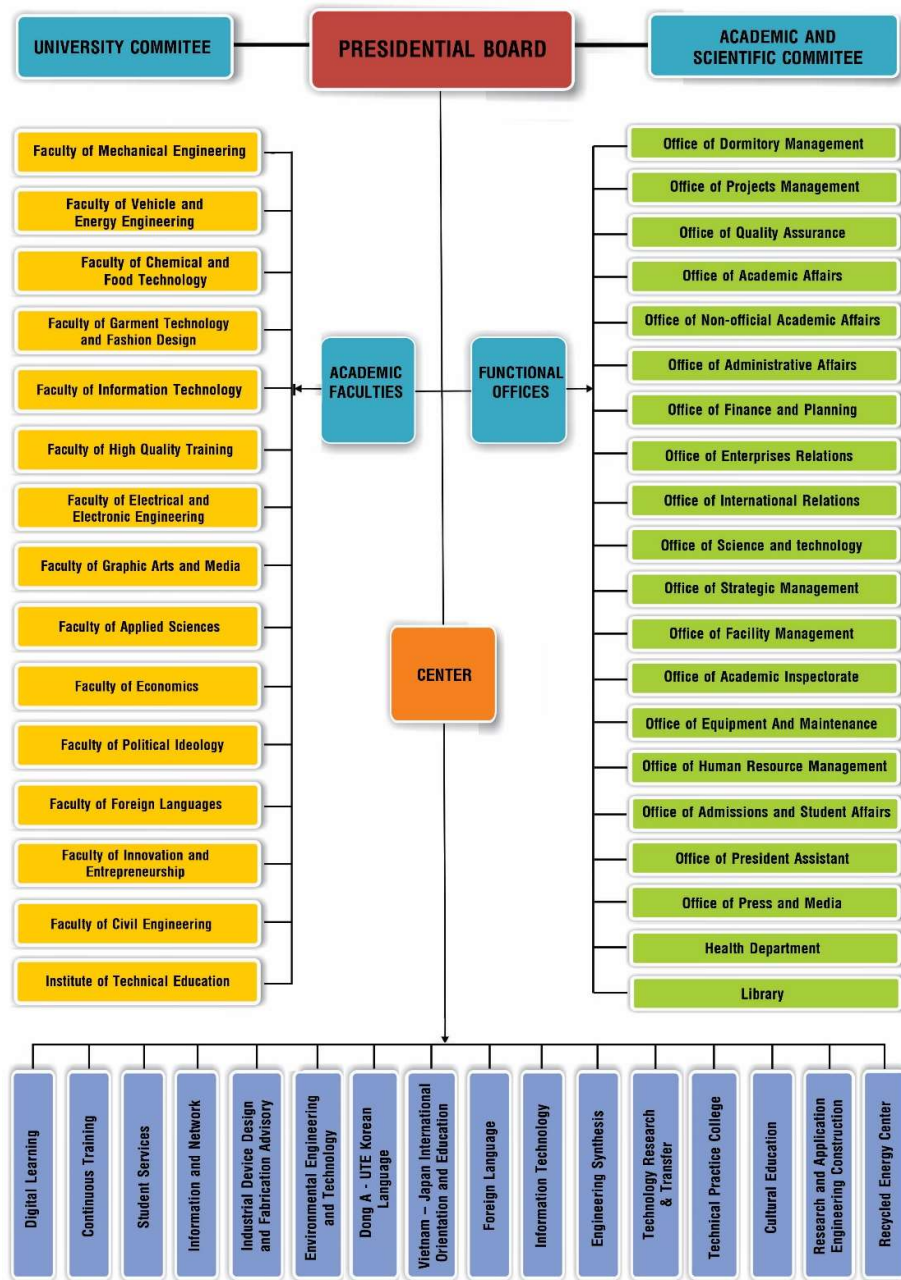
UNIVERSITY COMMITEE — **PRESIDENTIAL BOARD** — **ACADEMIC AND SCIENTIFIC COMMITEE**

ACADEMIC FACULTIES

- Faculty of Mechanical Engineering
- Faculty of Vehicle and Energy Engineering
- Faculty of Chemical and Food Technology
- Faculty of Garment Technology and Fashion Design
- Faculty of Information Technology
- Faculty of High Quality Training
- Faculty of Electrical and Electronic Engineering
- Faculty of Graphic Arts and Media
- Faculty of Applied Sciences
- Faculty of Economics
- Faculty of Political Ideology
- Faculty of Foreign Languages
- Faculty of Innovation and Entrepreneurship
- Faculty of Civil Engineering
- Institute of Technical Education

FUNCTIONAL OFFICES

- Office of Dormitory Management
- Office of Projects Management
- Office of Quality Assurance
- Office of Academic Affairs
- Office of Non-official Academic Affairs
- Office of Administrative Affairs
- Office of Finance and Planning
- Office of Enterprises Relations
- Office of International Relations
- Office of Science and technology
- Office of Strategic Management
- Office of Facility Management
- Office of Academic Inspectorate
- Office of Equipment And Maintenance
- Office of Human Resource Management
- Office of Admissions and Student Affairs
- Office of President Assistant
- Office of Press and Media
- Health Department
- Library

CENTER

- Digital Learning
- Continuous Training
- Student Services
- Information and Network
- Industrial Device Design and Fabrication Advisory
- Environmental Engineering and Technology
- Dong A - UTE Korean Language
- Vietnam – Japan International Orientation and Education
- Foreign Language
- Information Technology
- Engineering Synthesis
- Technology Research & Transfer
- Technical Practice College
- Cultural Education
- Research and Application Engineering Construction
- Recycled Energy Center

Fig. 0.1. Description of the organization structure of HCMUTE

1.1.3 Quality assurance system of HCMUTE

The quality Policy of HCMUTE is based on the following premise: Continuously upgrade quality of teaching, learning and scientific research to provide students with the best conditions to develop comprehensively their professional skills in order to satisfy the demands of society and international integration. QAO was established in 2008 according to MOET regulation in order to enhance the educational. QAO is responsible for developing internal quality assurance system and implementing the quality assessment as well as responsible for supporting the program accreditation process at institutional level and programme level in accordance with national, regional and international standards. QAO has 6 staffs who regularly attend the QA training courses annually to continue improving our internal quality assurance system based on AUN-QA model. Currently, HCMUTE has been assessed and accredited by MOET and ASEAN University Network for Quality Assurance (AUN/QA) for programme and institution levels as shown in Table 0.1.

Table 0. 1: Report on the Assessment and Accreditation of HCMUTE

Year	Assessment/ Accreditation	Assessed/Accredited by
2005	Quality Accreditation at Institutional level	MOET
2011	External Assessment of Technical and Vocational Education and Training (TVET) in Electrical and Electronics Engineering	MOET
Mar. 2016	**AUN-QA Assessment at Programme level:** - Automotive Engineering Technology - Electrical and Electronics Engineering Technology - Mechatronics Engineering Technology	AUN/QA
Nov. 2016	Quality Accreditation at Institutional level	MOET
Dec. 2016	**AUN-QA Assessment at Programme level:** - Construction Engineering Technology	AUA/QA

1.2 Faculty of Electrical and Electronics Engineering

1.2.1 Faculty Overview

Founded in 1964, Faculty of Electrical and Electronics Engineering (FEEE) is nationally recognized as one of the best undergraduate electrical and electronics engineering faculties in the country. FEEE has been continuously improving and developing in terms of facilities as well as education and research activities in order to meet the various demands of electrical and electronics engineering fields *[http://feee.hcmute.edu.vn]*. FEEE has been, and remains, to provide high quality education to its students both theoretically and practically oriented. FEEE provides an inclusive and active learning environment and encourages students to engage in collaborative and creative work. There are about 100 faculty members serving on the faculty, and about 4000 undergraduates (sophomores through seniors) and 200 graduate students are enrolled as full-time students, making HCMUTE among the largest Electrical and Electronics Engineering faculties in the nation. The faculty's areas of expertise include:

- ➢ Industrial Electrical Engineering Technology
- ➢ Industrial Electronics Engineering Technology
- ➢ Automation and Control Engineering Technology
- ➢ Semiconductor and Communications Engineering Technology
- ➢ Computer Engineering Technology
- ➢ Biomedical Engineering

The faculty offers state-of-the-art teaching and research facilities, including 33 teaching and research laboratories. Moreover, the faculty is located just a few km from the Saigon Hi-Tech Park (SHTP), so the students have abundant opportunities for internships, co-ops, and employment with leading technology companies.

The FEEE offers programmes of study leading to Bachelors of Science, Masters of Science, and Doctor of Philosophy degrees in Electrical, Electronics, Communications and Computer Engineering Technology. By attracting a large and diverse student population of some of the best and brightest young minds in the engineering and technology, the faculty has demonstrated excellence and commitment to the fields of academics, student support, and community. In the 2015-2016 academic year, 400 Bachelor's, 30 Master's were awarded. In this report, only the programme of Bachelor of Electronics and Communications Engineering Technology (ECET) will be described.

1.2.2 Vision and mission

A. Vision

FEEE targets to be recognized among the university of technology and education in Vietnam as an excellent faculty in education, scientific research and technology transfer in the fields of Electrical and Electronic Engineering Technology, Electronics and Telecommunications Engineering Technology, Control and Automation Engineering Technology, and Computer Engineering Technology, and step by step reach to the regional and international levels.

B. Mission

The mission of FEEE is to create the best learning environment for students to solve problems in the field of Electrical and Electronics Engineering Technology, Electronics and Telecommunications Technology, Control and Automation Technology, and Computer Engineering, and at the same time associating teaching and learning with real-life problems, scientific research and technology transfer in order to provide high-quality human resources serving the industrialization and modernization of the country and international integration.

1.3 Electronics and Communications Engineering Technology Programme

The Electronics and Communications Engineering Technology Programme curricula are generally designed to provide the fundamental principles of mathematics, natural sciences engineering technology, and general education essential to the continuing professional development of engineers. The programme objectives listed below are also published in the catalog on-line at *[http://feee.hcmute.edu.vn/]*.

> ➢ Our graduates will demonstrate the ability to use appropriate fundamental mathematical, scientific, and engineering technology principles in formulating and solving electronics and communication engineering problems to excel in their engineering careers and/or postgraduate education
> ➢ Our graduates will be able to communicate and work effectively in multidisciplinary teams and understand their professional and ethical responsibilities
> ➢ Our graduates will actively engage in life-long learning and/or continue into graduate programmes.
> ➢ Our graduates will demonstrate the ability to design, development, and manufacturing in their practice of electronics and communication engineering technology.

The programme objectives were well defined to align with the framework of the mission of HCMUTE and the mission of the FEEE. The programme objectives are designed to provide students a solid background in mathematical principles and the fundamental concepts of electronics, communications engineering technology, and skills to be able to continue professional development throughout their careers. Moreover, in order to enter a new era of rapidly increasing economic globalization the programme objectives also include providing interdisciplinary teaming and communication skills for students to prepare graduates to function effectively and responsibly in diverse environment.

1.4 Executive summary of the SAR

In June 2016 the HCMUTE Board of Rectors selected the ECET programme to be assessed by AUN according to the decision No. 1048/QĐ-ĐHSPKT *[http://qao.hcmute.edu.vn/]*. The FEEE AUN/QA Committee was then established to complete the tasks of preparing documents, writing SAR and other related activities regarding the assessment at the FEEE. The Committee has twelve members including four members of the FEEE Dean's Board, two department chairs and six faculty members in the involved the departments, divided in 3 working groups according to related criteria of AUN-QA. Afterwards, a support team including secretaries and other faculty members was also formed to collect data for evidences. Each Committee member is responsible for attending all meetings and writing their assigned criteria. The Chairperson was then to finalize the SAR after several discussions and meeting minutes and sent it to all faculty members and QAO for reviewing and evaluating. All

questions and comments from the first round of reviewing were handled carefully to finish the second revision which was sent to external experts to do the second round of reviewing and evaluating in June 2017. The final revision was completed in August 2017 and ready to submit for AUN-QA assessment.

This SAR is an evidential document describing the quantitative and qualitative assessment of the strengths and limitations of the Electronics and Communications Engineering Technology, Faculty of Electrical and Electronics Engineering, Ho Chi Minh City University of Technology and Education for AUN accreditation. All the members of the faculty in the both departments relating to ECET including Department of Computer and Communications Engineering and Department of Biomedical and Industrial Electronics Engineering participated in preparing this document. For further information on this document or other related materials please contact:

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PART II: AUN-QA CRITERIA

Criterion 1: Expected Learning Outcomes

1.1. The expected learning outcomes have been clearly formulated and aligned with the vision and mission of the university

Based on the goals of the university-level education of the MOET for training students, the ECET programme with ELOs is designed to consist of comprehensive knowledge, firmly grasp of the principles of nature and society, practical skills, ability to work independently and creatively, and solving problems in the industry. In addition, combining with the visions and missions of HCMUTE and FEEE is not only to train students with the manpower in research, technology transfer, and vocational education science, but also to provide the high educational quality for meeting all social needs *[Exh.1.1: The vision and mission of UTE and FEEE]*.

The ECET programme is fully translated into eleven Expected Learning Outcomes (ELOs) that are to give students a solid science and engineering foundation with emphasis on scientific research ability, practical skills, and a multidisciplinary approach. The ELOs have been stated and published in the academic curriculum and formulated based on the analysis of the national education standards; all requirements of the MOET regulations; collection and analysis of feedbacks from the stakeholders including employers, lecturers, alumni, and students in terms of knowledge, skills and attitude, stakeholders' expectation of the graduates as described in **Table 1.1**. In addition, lecturers are joined to this investigation via meetings of the department. All feedbacks will be discussed in the meeting and then select the reasonable feedbacks for improving the programme. Besides, the vision of the ECET programme has been built to be alignment with that of FEEE and HCMUTE, in which the programme will meet training students being creative, working at domestic and international enterprises, at research institutes, studying overseas *[Exh.1.2: Meeting Minutes and feedbacks]*.

Table 1.1. Alignment between the programme PEOs with FEEE and HCMUTE's missions, and the MOET's regulations *[Appendix A4. Programme Specification]*.

MOET's regulations	HCMUTE's mission	FEEE's mission	ECET's PEOs
Have general and specialized knowledge	Be a leading institution in training, research, creativity, innovation and entrepreneurship in Vietnam	Associate teaching and learning with real-life problems, scientific research	PEO1: To excel in engineering careers and/or postgraduate education by utilizing the fundamental mathematical, scientific, and engineering technology principles in formulating and solving electronics and communication engineering problems.
Adapt to working environment; Be able to work independently or in groups	Provide human resources with high quality in many fields for economic-social development	Create the best learning environment for students to solve problems in the field of EET, ECET, Control and Automation Technology, and Computer Engineering.	PEO2: To communicate and work effectively in multidisciplinary teams and continue career-long professional development through engagement in lifelong learning.
Have basically practical skill;	Provide human resources with high	Associate technology transfer in order to	PEO3: To fulfill the needs of society in solving technical

have morality and professional responsibilities	quality to meet the demands of the economic-social development of the country and the region	provide high-quality human resources serving the industrialization and modernization of the country and international integration.	problems using engineering principles, tools and practices, in an ethical and professional manner
Be able to create and solve problems related to trained career	Be a leading institution in training, research, creativity, innovation and entrepreneurship in Vietnam	Apply scientific research and technology transfer in serving the industrialization and modernization of the country.	PEO4: To make technical contributions to design, development, and manufacturing in practice of ECET

Based on referring and benchmarking with the related programmes such as HCMUT, PTIT, Rutgers, Auckland, Birghamton, Arizona State University and Chulalongkorn University, the ECET programme is designed to be more flexible. The ELOs of the programme, which are listed in **Table 1.1**, are correlated with the general and technological knowledge, generic and professional skills, and attitude and awareness as shown in **Table 1.2**. *[Exh.1.3: Benchmarking results of the ECET and other programmes]*.

Table 1.2. Mapping of the ELOs with knowledge, skills and attitudes, and professional ethics.

Contents	ELOs-after completing the programme-graduates
General knowledge	▪ ELO-01: An ability to apply knowledge of mathematics, science, computer fundamentals, and engineering.
Technological knowledge	▪ ELO-02: An ability to identify, formulate and solve engineering problems and to design a system, component, or process to meet desired needs. ▪ ELO-03: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
Generic skills	▪ ELO-04: An ability to apply written, oral, and graphical communication in both technical and non-technical environments. ▪ ELO-05: An ability to communicate in English. ▪ ELO-06: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting. ▪ ELO-07: A recognition of the need for continuous learning, and an ability to engage in life-long learning.
Attitude and awareness	▪ ELO-08: An ability to understand the tenants of professional codes of ethics and to apply ethical considerations to realistic problems. ▪ ELO-09: Recognize the importance of the global, economic, environmental and societal context in engineering practice.
Technical area	▪ ELO-10: An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments related to electronics and communication engineering technology. ▪ ELO-11: Demonstrate the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering technology standards to the building, testing, operation, and maintenance of electronics/ communication systems.

The contents of all courses are logically designed to meet all ELOs of the programme. Moreover,

these ELOs are distributed in all courses to legally spread from the basic knowledge to the advanced knowledge and Labs mixed in each semester. The teaching plan of lecturers are composed of many positive activities to encourage that the ELOs meet stakeholders' needs and the relationship between the ELOs and the PEOs of the programme as shown in **Table 1.3**.

Table 1.3. The relationship between the PEOs and ELOs.

POs	ELOs										
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
PO1	✓	✓	✓								
PO2				✓	✓	✓	✓				
PO3								✓	✓		
PO4										✓	✓

The contents of the ECET programme are translated into all ELOs which are explicitly introduced to the related boards including the MOET, students, academic staff, and employers. In addition, information are posted on the university/FEEE/department websites and located in front of the FEEE. In addition to this, students are introduced in the subject of Introduction to ECET *[Exh.1.4: Website of the departments and leaflets]*.

1.2. The expected learning outcomes cover both subject specific and generic (i.e. transferable) learning outcomes

The ELOs are designed to map on generic and technological knowledge, skills, attitude-awareness and technical area of the ECET programme as shown in **Table 1.2**. The technological knowledge is transferred into the programme by teaching activities in core courses with corresponding ELOs, for example, Labs, design of models, internship. In particular, before doing exiting thesis, all students take internship, in which the students are studied both generic knowledge and practical skills to complete their reports and oral representation. The generic knowledge consists of basic courses, in which the course of "Introduction to ECET", is designed to provide an overview of the ECET for students of the first year, for example introducing ECET programme, studying soft skills, how to write a report and designing slides of PowerPoint etc. In this course, the students are required to join this course including many activities such as reports, visiting the lab rooms and factories. In addition, the social activities are mentioned during studying process of students such as blood donation, "Green Summer" campaign, and visiting orphans and the Heroes' Vietnamese Mothers as described in **Table 1.4**. This table shows contribution of some courses and social activities for ELOs, with ELOs having levels of low (L), medium (M), and high (H) *[Exh.1.5: ELOs matrix and syllabi related to activities]*.

Table 1.4. Matrix between the extra cultural and social activities and programme ELOs

Activities	ELOs										
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**
Introduction to ECET	M	H	L				H		H	M	L
Visiting factories				L	L	M	M				
Social activities						M	L	M	M		L
Internship			H	M	M	H	H	H	H		M

1.3. The expected learning outcomes clearly reflect the requirements of the stakeholders

The construction and revision of programme is clearly designed to follow by the ISO procedure, in

which by the ISO procedure with 40 small procedures was built by the HCMUTE science and academic committee including faculties and units to perform training process of programmes as shown in **Figure 1.1**. Thus, the construction of the ECET programme is designed by the following main steps:

➢ Based on stakeholders' needs to design a revision plan by the department.
➢ Collection of the necessary information and evidences related to the programme revision for adjusting contents by the department and the FEEE Scientific and Academic Committee (SAC).
➢ The evaluation of the programme performance through the university SAC.
➢ Announcement of the programme revision to stakeholder
➢ Implementing and improvement of the programme by the department *[Exh.1.6: Curriculum procedures for revising and designing]*.
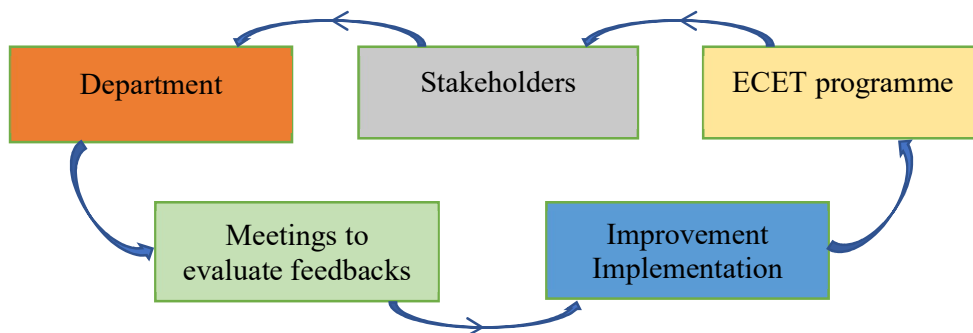

Fig. 1.1. Block diagram of process

For improvement of the quality, ELOs of the programme are periodically reviewed with the four-year period. Moreover, feedbacks from stakeholders are annually collected so that the department can consider for adjusting from 5 percent to 7 percent of the total credits and lecturers can update problems related to ELOs in the "Lecture Portfolio" *[Exh.1.7: Stakeholders' feedbacks for the ECET]*.

In particular, the programme is always updated based on requirements from labor market through channels such as surveys and the lecturers' relations, in which these requirements consist of the basically technical knowledge, foreign language, attitude and soft skill as described in Table 1.5. Most of foreign companies have the requirement for enhancing English skills for students. Therefore, the FEEE often combines with the employers to organize many extra courses to enhance these skills for students, in which the English requirement is the important part in the ECET programme. In order to increase the skills for students, some social activities are organized by HCMUTE *[Exh.1.8: Co-operations of departments and companies]*.

Table 1.5. Some specific requirements of the labor market.

Specific requirements	Labor market	FEEE solutions
Knowledge	Professional knowledge is good. Students can response an immediate work in factories or be trained in a short time. Some programming skills are requested.	Make the contents of the courses more practical. Changing the teaching methods to bring the lectures to the students more realistic and attractive *[Exh.1.9: The syllabi of the content-updated courses]*.
English	Students are encouraged to improve English to be able to write a team report and to have a conversation with the internal or external partners of companies in	Improve the English skills for students in the courses. Students use the English textbooks and are required to have an English report. Some courses are assessed by the final bilingual examination with the insertion of

	English.	some English problems *[Exh.1.10: The final tests of the courses]*. Organize a discussion meeting of how to use English effectively to the students. Opening the English clubs at the faculty levels and many typical English contests.
Team working	Having ability of team working, making independent decisions.	Students are requested to work in groups/teams, reports on the results. The duty is divided clearly *[Exh.1.11: Rubrics of internship, courses and theses]*.

The programme are designed to be able to adjust courses to meet the requirements of the labor market. In particular, the programme of 2012 was more flexible than that of from 2008 to 2011, in which many courses were constructed with the flexible contents to be able to update the requirements of companies such as "Research in Modern Industry Electronics" and "Advanced topics in communications". In addition, some teaching methods are used in courses to bring the learning effects for students *[Exh.1.12: List of the courses, emphasis on the related course]*.

In the ECET programme of 2012, the course of "Introduction to ECET" is added and students are learned in the beginning of the first semester. This course introduces students an overview of the ECET programme, including soft skills in more subjects, technical workshops, English skills, use of English materials and textbooks, English clubs. Besides, assessment types are shown, in which rubric tables are applied for courses of projects and exiting thesis to measure the desired outcomes with reliability and fairness *[Exh.1.13: Thesis procedures, the syllabus of the course "Intro. to ECET"]*.

To be able to have the good achievement and the reliable measurement, the ELOs are clearly stated using action words of Bloom's Taxonomy. These measurements are achieved through assessing many courses spreading from the basic courses to advanced courses. In particular, the assessment of the course is divided into the weighted formative assessment of 50 percent and the summative assessment of the remaining marks. In practice, the ELOs are quite achievable and well-constructed novels with the balances of the difficulties, in which contents, teaching methods, and relevant assessments of the courses are periodically reviewed for improving the highest efficiency to meet the ELOs' requirements. Moreover, in order to achieve the ELOs, strong supports for students such as good facilities, Labs and library, teaching assistants, and the LMS play the important roles *[Exh.1.14: Information on the LMS page and target lists]*.

It is obvious that the job profile is well-defined and posted on the website of the department. This job profile shows problems practical skills, soft skills and knowledge related to ELOs of the ECET programme so that students and enterprises understand. Besides the training and research information are posted on the department website, information of job opportunity are updates so that students and enterprises can contact for co-operation together *[Exh.1.15: Information of job profiles on website of department]*.

Criterion 2: Programme Specification

2.1. The information in the programme specification is comprehensive and up-to-date

The ECET programme is designed based on the regulations of the MOET and HCMUTE, as well as stakeholder's needs. It is obvious that all ELOs in the programme with many levels and skills are spread from the basic subjects to the advanced ones. There are three contributed levels suggested to all subjects, in which the low and medium levels are often applied for courses of the basic knowledge and the advanced courses provide the higher contribution for the ELOs. Projects, internships, and theses especially contribute many levels and skills related to the ELOs of the programme. In addition, the detailed translation of the ELOs into the programme is formally asked for all syllabi *[Exh.2.1.*

Mapping with ELOs and syllabi].

The programme specification with contents and structures coherently followed by the MOET consists of the following information:

➢ Awarding institution: HoChiMinh City University of Technology and Education.
➢ Teaching institution: Faculty of Electrical and Electronics Engineering, Ho Chi Minh City University of Technology and Education.
➢ Details of the accreditation by a professional or statutory body: recognized in 2010 by the MOET.
➢ The name of the final award: Bachelor of Engineering in Electronics and Communications Engineering Technology.
➢ Programme title: Electronics and Communications Engineering Technology.
➢ Expected learning outcomes of the programme.
➢ Admission criteria or requirements to the programme: based on the result of national graduation examination of the high school and the required minimum score of the MOET.
➢ Based on the relevant subject benchmark statements and other external and internal reference points from the stakeholders for the former programme, the ECET programme of 2012 was modified to enhance studying skills of students. In 2015, the credits of English courses of the ECET programme were added to enhance the communicative skills for students based on the feedbacks of employers *[Exh.2.2. Meeting minutes]*.
➢ The structure and requirements of the ECET programme are divided into courses with many different contributed levels to the ELOs including the basic and advanced courses. The programme is constructed with 150 credits, in which there are 56 credits for the fundamental knowledge and 94 credits for the professional knowledge. Courses in each semester are designed to have some relevant credits. The curriculum map, which is the arranging flowchart of courses, is divided into eight semesters with columns and arrows so that students are easy to know how to reasonably register courses for each semester *[Exh.2.3. Curriculum mapping]*.
➢ Date is written on the programme specification revised/modified.

In addition, the up-to-date revision of the programme is done as the commonly required procedure of the university. This procedure is followed by the following four sequential steps: Plan-Do-Check-Act (PDCA). At the first step, the plan of the programme is completed based on needs of stakeholders and ELOs of the programme are composed of clearly and coherently making to meet the needs. The second step is that the relevant department organizes meetings with all lecturers to coherently discuss about subjects which are necessary for the ELOs of the programme. Thus, the syllabi of all required subjects are designed by academic lecturers. In the third step, the programme specification is sent to stakeholders for reviewing. The final one is that the programme and ELOs are modified based on the feedbacks from the stakeholders *[Exh.2.4. Curriculum procedure for revising]*.

For enhancement of studying, the programme is allowed to annually change from 5 to 7 percent of the total credits following the ISO management procedure. This change can be based on feedbacks of lecturers and students for modifying teaching methods or updating the course contents. The curriculum is periodically adjusted with the period of two years. Therefore, the ECET programme of 2012 was remarkably adjusted to enhance soft skills for students. In 2015, the programme was modified with the CDIO-based assessments and the communicative skills in English are interesting *[Exh.2.5. Student Handbook and meeting minutes]*.

2.2. The information in the course specification is comprehensive and up-to-date

In the uniform design, all syllabi in the programme are standardized. The course goal is divided into many detailed requirements to contribute to ELOs of the programme. In the overall correlation matrix between the programme and the ELOs, a map is structured to show contributions of courses in the programme. Moreover, the syllabus contents are designed by a lecturer group who is in charge of the

typical course. Therefore, the syllabi are explicitly assessed by academic lecturers through the department meeting *[Exh.2.6. Minutes of the department meeting for revision]*. Information in the course specification is represented as follows:

- ➢ The course title is used both English and Vietnamese.
- ➢ Course requirements are consisted of the number of credits, time distribution of the study at class and at home, the prerequisite of the course.
- ➢ Names of lecturers are in charge of teaching the same course.
- ➢ Brief description of the course is to talk about main contents of the course.
- ➢ The course goal describes the course contribution to ELOs, including knowledge, skills, and attitudes of the students.
- ➢ The course learning outcomes are the detailed information of the course specified using the Bloom scale.
- ➢ Textbooks or references of the course are noted.
- ➢ The course assessments, including 50 percent of the total grade for the formative assessment and the remaining 50 percent for the summative assessment are shown.
- ➢ Content of the course is described in syllabus, including teaching methods, homework, self-study and assessment methods. Depending on the typical course, the assessment methods such as online quizzes, paper examination in class, topic for teamwork are applied. Moreover, students are introduced the LMS for searching materials, video clips and others.
- ➢ Dates of writing, modification or revision are noted.

All courses are suggested to use a few methods for the formative assessment at least three times during course for each semester. The summative assessment, which is scheduled by AAO, is organized in the end of the semester. Lecturers can apply many kinds of different examinations such as oral, paper examination in-class, oral representation, homework and teamwork to be able to assess exactly the ability and skills of students. In addition, all kinds of the examinations are announced to students in the first week of the semester and posted on the LMS. Soft skills can be tested through the oral method, doing teamwork and presentation on topics *[Exh.2.7. Sample syllabi]*.

To ensure the up-to-date contents, the revision of the course specifications is frequently performed after each semester. Before beginning each semester, AAO sends the schedule of the programme courses to the department for assigning the relevant lecturers for the courses and the department has the academic meeting with all lectures to discuss about contents, teaching and assessment methods and more advanced lecture notes. During teaching time, feedbacks of students are collected and then lecturers write down their "Lecturer Portfolio" to send to the department in the end of the semester. Based on these portfolios, the department organizes the meeting in the end of the semester to revise the course specifications for improvement. Reviewing the course specifications is frequently carried out in the department meeting among lecturers. From the student feedbacks during the course and the department meeting after each semester, lecturers adjust their "Lecture Portfolio", in which contents of the course can be suggested to modify and then they are applied to the next course *[Exh.2.8. Lecturer portfolio and student feedbacks]*.

2.3. The programme and course specification are communicated, and made available to the stakeholders

The programme specifications are explicitly published on many ways such as the websites of AAO, faculty, and department. ELOs of the programme are introduced to all students using posters in front of the faculty or through student surveys. Students can view the course specifications via the online systems are introduced in the first week of the course *[Exh.2.9. Teaching plans and programme specification on websites]*. The programme specifications are designed to meet needs of stakeholders as follows:

- ➢ The university assigns AAO to make plan of the academic semester, including timetable of courses and teaching and studying activities for lecturers and students.

- ➢ Faculty/Department allocates the relevant lecturers to all courses and prepares equipment and materials for the courses.
- ➢ Lecturers use the course specifications to the relevant lectures and get feedbacks from students for submitting the portfolios after each completed semester.
- ➢ Students have references to the programme and the course specifications to register the studying plan.
- ➢ Regulations are correctly described in the programme specifications for teaching and learning activities.
- ➢ Employers refer to the programme specifications to do the recruitments and reference to the pupils' choices for studying plans.
- ➢ There is reference information for internal and external assessment teams.

Criteria-3: Programme Structure and Content

3.1 The curriculum is designed based on constructive alignment with the expected learning outcomes

The ECET programme was designed based on the programme outcomes, the feedbacks of the stakeholders, and references of the similar education programmes of national and international universities. These universities are listed as Ho Chi Minh City University of Technology (HCMUT), Posts and Telecommunications Institute of Technology (PTIT), Rutgers university, Auckland university, Binghamton university, Arizona State University, Chulalongkorn University…Highlights can be showed from ECET Curriculum Comparisons as shown in **Table 3.1**. Firstly, name and content of courses are almost identical, especially intermediate and specialized courses. Secondly, total credits are very different but are set in range 123-150 credits, in according with 4-year and 4.5-year training programme, and HCMUTE owns more practices and experiment credits (19 credits) in advantages. Thirdly, the percent of basic courses is very important, more than 1/3 of total credits. Fourthly, intermediate knowledge is rarely taught in the PTIT (33/148 credits), while specialized knowledge is very high proportion (60/148 credits) to direct students to technology field. Advantages of the PTIT curriculum are to train the students with practical knowledge to adapt quickly works after graduating. Finally, most of programmes, especially in HCMUTE, HCMUT, PTIT, have compulsory basic courses about cultural, human and country.

Table 3.1. ECET Curriculum Comparisons

No.	University	No. Years	Total Credits	Basic Knowledge	Intermediate Knowledge	Specialized Knowledge
1	HCMUTE	4	150	56	56	38
2	HCMUT	4	142	53	58	31
3	PTIT	4.5	148	55	33	60
4	Rutgers	4	123	55	38	30
5	Auckland	4	128	40	52	36
6	Binghamton	4	128	58	37	33
7	Arizona State University	4	128	53	44	31
8	Chulalongkorn University	4	132	51	54	27

The Programme Education Objectives (PEOs) *[Appendix A4. Programme Specification]* of the ECET are shifted into outcomes of each course in which courses are specifically presented by the syllabuses with main contents and corresponding ELOs. By this way, each course is designed to achieve several ELOs, and thus all courses in 04 years (8 official semesters) will cover all ELOs of the programme. For example, the syllabi of the cources advanced topics in communications, digital signal processing,

data communication lab, microwave engineering and others are constructed to achieve 5 ELOs, 4 ELOs, 8 ELOs and 3 ELOs, respectively *[Exh.3.1: Correlation description and syllabus]*.

Teaching and learning methods presented in **Table 3.2** of the ECET programme are designed to match ELOs. A combination of all teaching and learning methods make a big contribution to finish all ELOs. In addition, assessments are diversified and are adopted corresponding with the teaching and learning methods. Details about assessment methods will be presented in the criterion 5.

Table 3.2. Teaching and learning methods versus ELOs

No.	Teaching and learning methods	ELOs										
		01	02	03	04	05	06	07	08	09	10	11
1	Lecture	H	H	L	L	L	L	M	L	L	L	L
2	Seminar	H	M	M	L	L	L	M	L	L	L	M
3	Discussion	H	H	H	H	H	H	H	H	H	H	H
4	Instructions in serving as model	M	M	H	M	M	H	L	M	L	H	M
5	Conservation	M	M	H	L	M	H	M	L	L	H	M
6	Practices (student)	H	M	H	L	L	L	M	L	L	L	L
7	Instructions for homework	H	H	L	L	M	L	H	L	L	L	L

- Legend: **H**- High contribution; **M**- Medium Contribution; **L**- Low contribution

Furthermore, the ECET curriculum is designed flexibly in which students can select career directions suitably. At the end of the 3rd semester, students must select one of two directions: (1) IC and Communication, and (2) Industry Electronics. Typically, the student will finish the ECET programme in 4 years (extent 4 years), maximum is 8 years, and can study in the shorter duration (less than 4 years). During permitted time (8 years), students can study equivalent courses to replace the recommended courses. Some students are sent to other universities to perform their capstone projects such as Rajamangala university, Thailand *[Exh.3.2: ECET curriculum and course features]*.

3.2 The contribution made by each course to achieve the expected learning outcomes is clear

The ECET programme is constructed by combining of courses according to a logical sequence, in which each course contributes some ELOs clearly. Skill matrix table presents contributions of each course to ELOs of the ECET curriculum. In this table, the least contribution is the courses Signals and Systems, Electronic Communication and Data communication with 03 ELOs in the intermediate and specialized knowledge group whereas the exiting thesis course conduces to all high level ELOs. The free electives have the same ELOs to make balance between students with different directions (IC and Communication, and Industry Electronics). Based on this table, all courses will contribute all ELOs, and thus, graduated students of the ECET programme with different directions will achieve all ELOs. In addition, contributions of courses with increment difficulty are represented by semesters where the content of lecture has application of previous courses and assessments are increased by essay and projected-based evaluations at the last semesters *[Appendix A3.2: Skill matrix of courses]*.

3.3 The curriculum is logically structured, sequenced, integrated and up-to-date

Figure 3.1 shows a proper balance of courses: basic courses (56 credits), intermediate courses (37 credits), specialized courses (28 credits), practices and experiments (19 credits), and thesis (10 credits). In 19 credits of the practices and experiments, 13 credits are trained to support the intermediate courses, 04 credits are supplemented for the specialized courses and remaining 02 credits are the internship course. Students in the ECET curriculum are required 150 credits to graduate in which required courses have 135 credits and remaining credits are elective (15 credits). Elective

credits consist of (i) 06 credits of humanities and social sciences and (ii) 9 credits of specialized courses. The detail information about courses including semester, code, name, number of credits, and type (required and elective) are listed in *[Exh.3.3: List of courses]*.

Percentage of course distribution

- Thesis, 6.67%
- Practices and experiments, 12.67%
- Basic courses, 37.33%
- Specialized courses, 18.67%
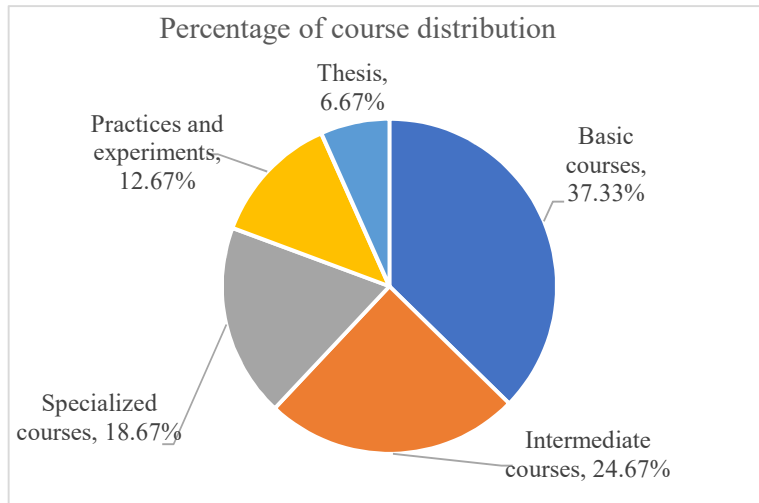- Intermediate courses, 24.67%

Fig. 3.1 Distribution of courses in the ECET curriculum (100%=150 Credits)

The courses and corresponding number of credits of the ECET programme are organized logically in 04 years (08 main semesters), and balanced between knowledge blocks basic, intermediate, specialized, practices and experiments, and thesis. Courses have rich content with core and advanced knowledge, and are spitted into required and elective groups, and are taught at logic semesters. Each knowledge block has specific objectives as follows. Firstly, the basic block which has high percent in the ECET curriculum (56 credits/150 credits) is to provide background knowledge about math, physics, and programming language which are very essential for electronic and communication areas and for industries as well as academia in the future. In addition, the basic block also provides social and political knowledge that educate students to become a good citizen. Secondly, the intermediate block uses knowledge of the basic block such as math mentality, physics theories and programming language, and is designed to train students with basic knowledge and skills for subject matters: IC and Communication and Industry Electronics. Thirdly, the specialized block is combination and development from the basic and intermediate blocks, and is obtained to afford students career orientations. The specialized block is updated continually according to engineering tendency. Fourthly, the practices and experiments is to improve theoretical knowledge in the intermediate and specialized blocks by instructing of practices and internship. Through the practices and experiments, students will be equipped essential skills in their directions and also to motivate them in carrier orientations. The internship is a required course in which students will attend technology companies to take opportunities to learn and practice in professional labor environments. Finally, the thesis is to use all knowledge studied in the previous courses to solve a specific problem in students' direction and the final result of thesis will cover all ELOs. Hence, by organizing into the knowledge blocks in which courses have coherent and seamless relationship between function blocks, the structure of the ECET programme can be viewed as a whole *[Appendix A3.2: Skill matrix of courses]*.

The content of the ECET curriculum provides breadth knowledge (basic courses, intermediate courses) and depth knowledge (specialized courses, practices and experiments and thesis). In addition, the intermediate and specialized courses are divided into required and elective courses which help students in creating their knowledge proactively. The required and elective courses use the knowledge in the basic courses and are consolidated by practices and experiments. Efficiencies of the required courses are related to knowledge and skills about career directions, whereas the elective courses are to help students in approaching update and expected problems. In each semester, students are oriented to register the required and elective courses based on the broadcasted schedules in which students must complete at least 15 credits of the elective courses. Thesis, a required course

in the ECET curriculum, is to create a career direction product at the last semester in which students are instructed directly by their lecturer. The evaluation of the thesis is performed by reviewers and defense committee members. Hence, by the classification using knowledge groups and specific courses (required and elective courses), the ECET curriculum clearly shows the logical relation between basic courses, intermediate courses, specialized courses, practices and experiments, and thesis *[Exh.3.4: Proposed schedule]*.

Curriculum diagram presents curriculums diagrams of course sequences versus semester of directions: IC and Communication, and Industry Electronics. In these curriculums diagrams, courses are arranged based on more complex and difficult characteristics in which previous courses are considered as prerequisite conditions to study later courses. The order of the courses is designed from the basic courses, to the intermediate courses and end at the specialized courses. The duration and sequence of each course is obtained logically to help students in orienting career and distributing study time *[Appendix A5: Recommended ECET curriculum flow chart]*.

In 2012, number of credits of the ECET curriculum was reduced from 189 (2008-2011) to 150, in order to strengthen self-study of students, integrate similar or same courses, eliminate courses that little involve in specialty, complement new courses trending towards modern technology (such as courses introduction to ECET, …), and add soft skills to lesson *[Exh.3.5: The ECET curriculum of 2008-2011]*. Integrating courses is implemented usually after every semester, based on practical situation and compatibility with top universities (example about identity content and English course name). Specifically, to integrate and decrease number of credits of political courses, eliminate Visual Basic programming course, etc. Moreover, the ECET curriculum has been improved many times through main years: 2008-2011, 2012-2016 with descended credits, integrating knowledge and courses to avoid coincidence. In **Table 3.3**, knowledge blocks are edited reasonably to create balance and efficiency of training. Besides, HCMUTE has compulsory setting up and revising curriculum procedure (14th ISO procedure) *[http://qao.hcmute.edu.vn/]*. In update task, curriculum efficiency is evaluated with 1-year cycle, and curriculum content can be changed (adjusted/updated) about 5 percent to 7 percent by faculty and department. In addition, at the end of each semester, the ECET curriculum is always changed/updated a little in according to technology trends. Updated contents are detailed in the updated content table used for classes from 2012 to 2016 and before the 2012 class in which some courses of intermediate and specialized knowledge blocks have been decreased number of credits to integrate knowledge, to avoid duplication and to increase self-study of students *[Exh.3.6: ECET curriculums of 2008-2011 and 2012-2016]*. Moreover, new courses are added to elective course groups and some courses are updated new contents (such as wireless communication with knowledge about advanced wireless technology …) to enhance integration for ECET engineers *[Exh.3.7: Revising curriculum procedures, meeting minutes and updated content table]*.

Table 3.3 Comparison of the ECET curriculums 2008-2011 and 2012-2016

ECET Curriculum	No. Years	Total Credits	Basic courses	Intermediate Courses	Practices and experiments	Specialized courses	Thesis
2008-2011	4	186	66	53	27	33	7
2012-2016	4	150	56	37	19	28	10

Criterion 4: Teaching and Learning Approach

4.1 The educational philosophy is well articulated and communicated to all stakeholders

The ECET programme is designed based on the educational philosophy of HCMUTE to be "Humanity, Creation, Integration-HCI" and FEEE to be "Ensuring Enhanced Education-EEE," *[http://feee.hcmute.edu.vn/]*. It means that the programme is always improved to meet the community of managers, lecturers, students, and stakeholders, who is involved in the educational process,

inspiration and empowerment for each student to become a competent, conscientious and responsible individual; embracement in students' minds is the importance of new skills, global citizenship skills, entrepreneurial skills and other core skills. Moreover, with this programme, each student is given opportunity for comprehensive development of abilities about awareness; society; behavior and technical specialization with ensuring enhanced education *[Appendix A6: Figures of student research activities and FEEE education philosophy]*.

The ECET programme not only provides students with an excellent education background, but also encourages students to be creative and help them see their accomplishments through the diversity of teaching and learning activities:

 ➢ Lecturers and students can discuss in class and students do group discussion
 ➢ Students are assigned work such as teamwork, assignments, projects, course topics, Lab courses
 ➢ Students study professional practices such as internships and factory visiting trips
 ➢ E-learning is applied in courses so that students can self-study and do online quizzes for developing the interaction between student-student and student-lecturer.

In addition, students' reflective learning is stimulated and fostered in courses such as lab experiments, practicum, course projects and theses. It is obvious that this learning method help students can deploy practical applications based on the background of studied knowledge in the ECET programme. *[Exh.4.1: ECET curriculum]*.

4.2 Teaching and learning activities are constructively aligned to the achievement of the expected learning outcomes

The teaching and learning activities are reasonably organized to have a constructive alignment for the achievement of all the ELOs. The student-centered teaching approach is used to make students more active in their study. Lecturers can use many different teaching methods to transfer contents of the course for students as designed in each syllabus. For high performance, students need to have more effective activities in class, as well as self-study. Credits in each semester designed to allow students choose the best oriented learning strategy through a consultant system. In practice, the traditional and modern methods are combined to transfer contents of courses to students, in which the presentation method shows contents with concepts and definitions which require students to focus on for understanding. In many situations, students are required to work in groups with selected topics to cover knowledge of the lessons. In addition, lecturers can have interactions directly in class and indirectly on the LMS page, in which many edited video clips related to the lessons are posted so that students can study any time. Students can make questions to discuss with lecturers and classmates in forums such as the LMS and Facebook. For supporting lecturers during studying courses, HCMUTE policy allows lecturers with many courses in one semester using teaching assistant (TA), in which one TA can work with students, prepare materials, answer homework questions and related score lists *[Exh.4.2: Teaching and assessment activities, the LMS and list of teaching assistant]*.

Scientific research activities play an important role for students to be able to achieve ELOs of the programme. From the fifth semester of the programme, students study project courses, in which students are assigned topics to study how to design a small system, write reports, represent with PowerPoint slides. In particular, each topic is assigned from 2-3 students to work together and each group has a leader who combines members of the group and reports the group work for lecturer based on the installed timetable. In the last semester, students receive exiting these and they can use Lab rooms equipped with many measuring devices, oscilloscopes, programmers for microcontrollers to complete their projects. For support of teaching and learning, LCDs are installed in classrooms and Lab rooms so that students and lecturers can be easy to connect Laptops. Besides, many areas in HCMUTE are equipped the wifi free systems so that students can exchange, study together and finish online tests. The library is not only invested a lot of digital reference resources, but also the learning spaces to enhance the studying and research performance of students. In order to encourage scientific

research students, FEEE periodically organize many academic competitions such as LED Circuit Design, Robots Maze Challenge. In addition, many domestic and international contests such as ROBOCON, "Cactus SPKT", "WEPICS - Women Stem 2017" are held *[Exh.4.3: Creative contests, Labs for self-study, list of scientific research students, self-study areas and specialized rooms]*

Associated with the learning and teaching activities, many exchange programmes of lecturers and students between the HCMUTE and foreign universities are aimed to gain the diversity of learning environment. The HEEAP programme is the cooperation of Intel Company, ASU and HCMUTE, in which many lecturers have joined to study many skills related to teaching and assessment methods in USA. In addition, the ITECH programme of the Indian Government is held to study technical courses in India and many lecturers have attended in recent years. For increasing English skills, lecturers have registered to attend training courses in Philippines. Besides, HCMUTE has co-operations with overseas universities in Laos and Thailand to exchange students in training and performing exiting these *[Exh.4.4: Exchange collaborations]*.

Beside the academic activities, the physical and social activities are very important to students in achieving learning results. In the ECET programme, courses related to physical, soft-skill and working skills are distributed in semesters. With the community activities, HCMUTE and FEEE often organize many social activities *[Appendix A6: Figures of social activities]* that are aimed to raise community awareness for students, for example the campaign of "Green Summer" with many practical works such as cleaning roads, teaching countryside children, and repairing broken houses in rural areas; blood donation, visiting the Heroes' Mothers and orphan children, etc. Moreover, students are visited companies/factories and attend fairs for career/extracurricular activities and to be counselors. They can join clubs such as life skill, sport, English for life experience. *[Exh.4.5: Social activities and plans]*.

In order to have a long-time efficiency of the teaching and learning approach, HCMUTE and FEEE often work out the revision based on the PDCA process as follows:

> ➢ **Plan**: Design of ELOs, teaching methods and assessments.
> ➢ **Do**: Implementation of the approved syllabi.
> ➢ **Check**: Activities such as teaching, assessment methods, scientific research projects, teaching portfolio.
> ➢ **Act**: At the end of each semester, curriculum adjustments based on feedbacks from stakeholders and applying for next semester *[Exh.4.6: Meeting Minutes]*.

4.3 Teaching and learning activities enhance life-long learning

The core values of life-long learning are believed that what each learner needs to self-construct, enrich knowledge and skills by discovering, inquiring and learning to improve creative ability to fulfill own aspirations and to serve the community. Therefore, the foreign language is one of skills which students needs to develop for their life-long learning. Students are encouraged to enhance English and to attend English clubs which organized at HCMUTE. In order to enhance learning, the entrance students are tested English for arranging reasonable classes. Based on the tested English results, AAO will design compatible classes and specialized courses for students. During the studying process, students are studied many courses with materials, lectures and assessments in English. Moreover, there are many English clubs for students to join for improving their English skills *[Exh.4.7: English clubs, testing announcement, input English testing lists]*.

Some skills of life-long learning are introduced to students in the course of Introduction to ECET in the first semester. Many contents of this course show the positive activities such as learning experience, careers in the future, how to write a report, how to use a correct reference material, representation skills, design of PowerPoint slides and orientation of the further study as shown in **Figure 4.1**.

According to the ECET programme, courses for long-life learning, which are designed to teach

students from semesters, are Lab courses and projects. In the courses. The students are guided step-by-step in selecting topics, identifying objectives, identifying contents, writing outlines, how to write reports, how to search and identify reasonable materials and how to use references in the reports. In addition, the students are taught about the ability to use English materials, develop presentation skills, skills for discussion, teamwork and critical thinking. Students are encouraged to conduct scientific research for developing critical thinking, creative thinking and research capacity. Moreover, for the orientation of studying in the future, students need to basically understand the initiative and entrepreneurship through some courses and are guided to visit some factories and internships so that students have a look more practical. These activities will be the strong motivations for students to upgrade their knowledge frequently and they can use them in long-life after graduation *[Exh.4.8: SIE - School of Innovation and Entrepreneurship, visiting lists, syllabus of Introduction to ECET, timetable samples, rubrics of projects with specific instruction]*.
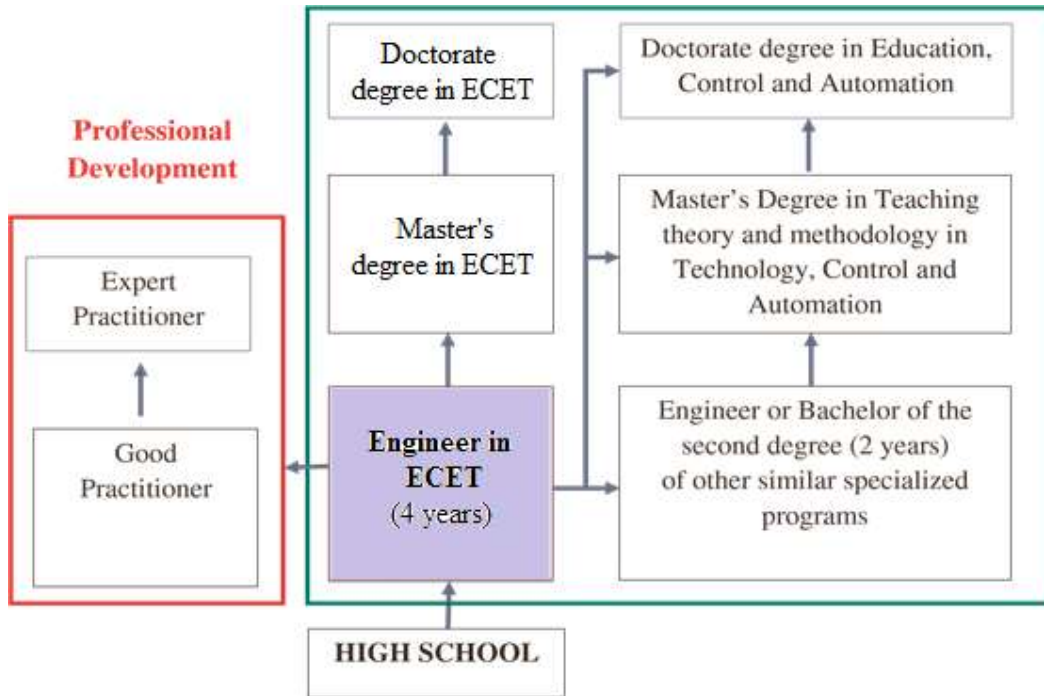

Fig. 4.1. Flowchart for orientation of the ECET programme

Increasingly, the awareness and attitude are important to the life-long learning of students, in which they need to understand laws and social and community activities. They are always encouraged to participate actions of the Youth Union/Student Association to have the active awareness and attitude to be a good civil. Besides, many annual events such as reminding Fallen Heros, visiting to Heroes' Vietnamese Mothers and supporting gifts and orphaned children, holding events for children in Moon Day, and meals for unlucky people are organized so that students have the life experience *[Refer Exh.4.5]*.

Criterion 5: Student Assessment

5.1. The student assessment is constructively aligned to the achievement of the expected learning outcomes

With the ISO procedure including 40 small procedures, the student assessments are continuously performed from the entrance to graduation in order to help students adjust their learning approaches for obtaining the better results. In particular, lecturers write down answer-papers\report or give them advice during oral representation\class hours. In addition, use of rubrics is one of good method due to showing content details related to ELOs which students need to achieve. There are many assessment methods, which are applied to ensure the 11 ELOs of the ECET programme, such as

entrance examination, formative assessment, summative assessment and exiting thesis, in which the entrance exam is organized for the high school students by MOET. *[Exh.5.1. Assessment methods such as answer-paper, report, rubrics, exam questions, ISO procedure, ELO mapping]*

At the beginning of the first semester, new students attend the English test for arranging the suitable courses. Students, who have the good English results, are arranged to study English classes with higher levels (levels-1,2,3), inversely they must start to study intensive English. Besides, to the graduate students, they need to meet the English requirement of the programme and the English ability is also to meet needs of the society *[Exh.5.2. Regulations and English testing information]*.

In addition, during the studying process of each semester, lecturers introduce students about assessment methods via contents of course. To ensure ELOs of the ECET programme for student process, lecturers are always encouraged to update contents of syllabi and assessment methods such as paper examination in class, online quizzes, essay reports, oral presentations, projects with modelling, and simulation, homework. The ELO mapping of the ECET programme is designed to describe courses with the suggested assessments methods and the specific courses related to ELOs as shown in **Table 5.1**. In particular, ELO-03 requires "An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice", in which courses such as Basic Electronics, Digital Systems, Microprocessor, HDL and others are organized to assess using methods of doing teamwork and practical skills, writing report. All activities of studying and teaching are monitored by QAO following the ISO procedure of HCMUTE *[Refer Exh.5.1].*

Table 5.1. Assessment methods versus ELOs

No.	Assessment methods	ELOs										
		01	02	03	04	05	06	07	08	09	10	11
1	Online quiz	H	H	L	L	M	L	H	L	L	L	H
2	Project (teamwork, oral representation, writing report, real model/simulation)	H	H	H	H	M	M	H	L	M	H	M
3	Internship	H	M	M	H	M	H	H	L	L	H	H
4	Homework	H	H	H	L	M	H	H	L	H	L	H
5	Individual paper assessment in class	H	H	H	L	M	H	H	L	L	H	H
6	Thesis (teamwork, oral representation, writing report, real model/simulation)	H	H	H	H	H	H	H	H	H	H	H

Legend: **H**- High contribution; **M**- Medium Contribution; **L**- Low contribution

In the ECET programme, the internship course plays an important role. Students are introduced to work at companies at least three weeks for gaining practice work or research related experience. The department sends students' profiles including personal and requirements of ELOs to the companies. Based on the supplied requirements, the companies arrange the appropriate positions for students during internship. The performance of internship is assessed based on their reports and assessment rubrics from the companies *[Exh.5.3. Assessments of internship and report]*.

Finally, all students are carried out their exiting theses in the last semester, in which they can suggest good topics and advisors to the department. Thus, the department considers the topics related to working skills to meet ELOs for approving. All students, who are approved to perform theses, must satisfy the requirement of FEEE and students, who have not yet satisfied this requirement, need to improve in order to perform theses for next semester. Moreover, students can suggest topics which they co-operate with companies to the department and the department can invite on behavior of the companies to attend the thesis defence committee. During doing theses, students work with the assigned advisors following the student time line and also send the formative reports to the department for evaluation. For fairness and reliable assessments, rubrics are applied to assess results of the theses,

in which rubric assessment samples of advisors, reviewers and the thesis committee members and all information related to the theses are posted on the department website *[http://feee.hcmute.edu.vn/]* so that students can know what they need to complete *[Exh.5.4. Thesis rubrics and requirement to perform thesis, report]*.

5.2. The student assessments including timelines, methods, regulations, weight distribution, rubrics and grading are explicit and communicated to students

For the assessment effectiveness, syllabi of the ECET programme are designed to show all types of assessments such as the timelines, methods, regulations, weight distribution, rubrics, and grading and these assessments are communicated to all students through websites of FEEE and department. In addition, it is depending on types of courses which lecturers can apply the different student assessments and also show students about content details in course syllabus. In particular, there are 15 teaching weeks, one extra week for teaching complement and enhancement, and four weeks for examination in each semester. All information of teaching and examining are announced to students in the first week of each semester and the schedule of teaching and examining are planned by AAO following the ISO procedure *[Exh.5.5. Schedule for course assessments and grading policy]*.

Related to the course ELOs, lecturers can select types of assessments which are suitable course knowledge for the formative and summative assessments. The types of the assessments designed in the ECET programme are online questions, paper examination in class, teamwork with reports, oral representation and modelling, and simulation. The student assessment in a course is weighted based on the regulation of HCMUTE, in which there are the 50 percent for the formative assessment and the remaining 50 percent for the summative assessment. The formative assessment can be divided into at least three times of examination for a course and one summative assessment is organized by AAO except some courses with doing projects and topics. In some practical courses such as Labs, projects and thesis, the assessments are applied rubrics with detailed contents so that students are easy for carrying out their studying. **Table 5.2** shows the rank of grading for the studying evaluation of students based on the overall GPA *[Refer Exh.5.4]*.

Table 5.2. Grading policy

Cumulative GPA	Classifications
From 8.50 to 10	Good
From 7.00 to 8.49	Fair
From 5.50 to 6.99	Average
From 4.00 to 5.49	Average - Poor
Below 4.0	Very poor

Based on the general regulations of MOET and HCMUTE, in which conditions of graduation, stopping learning, teaching assistant, grading, and other issues are explicit and communicated through the student handbook. In addition, all assessments for teaching and studying accurate and objective and they are monitored by AIO *[Exh.5.6. Regulations and TA lists]*.

5.3. Methods including assessment rubrics and marking schemes are used to ensure validity, reliability and fairness of student assessment

Methods of the student assessment are always ensured to be valid, reliable and fair during one semester. In practice, HCMUTE has the ISO management procedure of teaching and assessing students which all lecturers are required to perform. In particular, the ECET programme is designed to include syllabi which show contents of courses, course learning outcomes and student assessment methods. In the formative assessment, most of lecturers often apply the following types such as online quizzes, paper examination in class, topics with oral presentations, homework and while teamwork projects with reports and oral, paper examination in class are applied for the summative assessments

as follows:

- ➢ **Online quizzes:** Task like Multi-choice with about 20 questions is often chosen to test many the basic knowledge of one course and takes about 10-20 percent of the formative assessment.
- ➢ **Paper examination in class:** This task is often to test students about ability of explaining, calculating and designing small parts in some lectures/chapters. It can be 1-2 exam(s) in the formative assessment and take 20-40 percent of the formative assessment.
- ➢ **Homework:** Students can do this task at home and return to lecturer after some weeks. This one takes about 5-10 percent.
- ➢ **Teamwork projects and oral presentations:** Students are assigned course topics for doing groups and finished them within 4-6 weeks and then submit reports and members of groups represent their understandings with PowerPoint slides for evaluation. This criterion takes about 10-20 percent of the formative assessment.

In the types of the assessments, the student assessment using paper examination in class or homework, lecturers can write down notices points on paper tasks of students and the minimum point scale is from 0.25-0.5 depending on the examination task of course. With courses such as teamwork projects and oral presentation, lecturers can directly show comments, directly note on reports and use rubrics with point details. In addition, in recent semesters, rubrics have employed for courses such as Labs, teamwork projects and exiting theses, in which each type of rubrics is designed to be suitable for each course. The rubric method is designed to show main contents with assigned grades and students are easy to understand what they need to complete for desired grades. It is obvious that this method is fair and reliable. All methods for the student assessments show the weak and strong points of students, in which the rubric tables let students know contents corresponding to points during course so that the students can try to complete their results with the corresponding learning outcomes *[Exh.5.7. Rubric types, assessment results using rubrics]*.

For the subjectivity and consistency during the student assessment, lecturers can deploy different assessments following the ISO procedure. The different assessments may help lecturers assess knowledge ability and skills of students for each course to achieve ELOs of the ECET programme with reliability and fairness. In the summative assessment, all students spend about four weeks for the common examination held by AAO and FEEE and this examination is monitored by ASO following the ISO procedure about confidentiality of questions, photocopy, delivering-receiving; point scales; and examination organization. Students are assessed using papers examination in class and each examination room has two supervisors. The courses of Labs, projects, thesis and subjects deployed to do teamwork using rubrics and interviews. Answers of examination tasks are posted on website of department after one course examination time about one week. After each semester, all lecturers have to finish their "Lecturer Portfolio", including syllabus, updated assessment methods, student feedbacks and others and the "Lecturer Portfolio" and sample assessment results are monitored by QAO. Especially, in each the examination task, each question is assigned the corresponding ELOs noted in each syllabus *[Exh.5.8: ISO procedure for course assessment and confidentiality of examination tasks, "Lecturer Portfolio", and sample assessment results]*.

In addition to assessment of specialized knowledge, the regulation to evaluate training results of students at HCMUTE is related to attitude-moral-civic education. In particular, students need to join clubs to share difficulty; to exchange life experience; and to live in accordance with the HCMUTE regulation and the Vietnam law. In addition, they attend social activities to understand life values and have contribution for society, as well as orientations for their future.

For improvement of assessment methods, department academic meeting is often held on the end of each semester so that all lecturers can show feedbacks related to teaching, assessments and contents of courses. Besides, some lecturers can do surveys from once or twice a semester during their courses so that feedback collection from students for timely adjusting and this is a good method to achieve the effectiveness of the course outcomes. In particular, lecturers send brief surveys related to teaching speed, contents, student requirements and others through Google form and also discuss with students using Facebook and the LMS page. It is obvious that with this assessment procedure discussed above

parts, the student assessment gains the fairness, validity, reliability and objectivity *[Exh.5.9. Department meetings, lecturer feedbacks for building and improving rubrics, surveys of courses]*.

5.4. Feedback of student assessment is timely and helps to improve learning

For improvement of learning, lecturer feedbacks for students play a very important role and need to be timely performed during studying course each semester following the ISO procedure. In particular, lecturers prepare online/paper homework and send quick feedbacks written on examination papers to students so that they know strong and weak points for improvement of next exam during the course. In addition, the lecturers send surveys to get feedbacks from their students to adapt contents and teaching methods during courses for timely improving teaching and assessment methods. Therefore, based on feedbacks from assessment times, students may timely improve their studying and examination results. After assessment results, students may make decision to continue one course or to withdraw it to respond their workload following the ISO procedure *[Exh.5.10: Lecturer feedbacks or students, student feedbacks for lecturer, assessment results]*.

The ECET programme has different courses such as theory, Lab, projects and exiting thesis and each type of the courses has different assessment types to send feedbacks to students. The theoretical courses are often divided into two parts for assessments, called the formative and summative assessments and each part is 50 percent of the total point. For the formative assessment, lecturers often organize to assess some tomes per semester and send score and feedbacks to students after each test soon. In particular, assessments using online quizzes give results and feedbacks immediately after submitting their tasks. In assessments of papers examination in class, students will receive feedbacks on examination sheets after 1-2 week(s) and then discuss with lecturer about problems related to the assessment tasks. In addition, with representation of projects or thesis, lecturers give immediately comments to students during their oral presentation to help them as well as the next groups avoid the similar mistakes. In case of Lab courses, lecturers often review pre-Labs, which are required to prepare before, to point out common mistakes and then feedback immediately after each lesson. For exiting thesis, the implementing plan is discussed between advisor and student and divided into weeks to perform using the department template. Advisors can directly give feedbacks when discussing with students during thesis process for improvement. Finally, lecturers will review student thesis report and give them feedbacks and thesis committee including from 3-5 lecturers assesses theses using rubrics *[Exh.5.11: Assessment results using rubrics, student feedbacks for using rubrics]*.

5.5. Students have ready access to appeal procedure

All students are informed the procedures related to teaching, assessing and studying plans by ASAO through the HCMUTE website and the student handbook. With the formative assessment, students are introduced time and types of the assessments in the first week of course by lecturer through the first lecture and the LMS page. Moreover, during semester, students are reminded about examining time and assessment methods by the course lecturers. Relate to the summative results, students have one week after the announced examination results to check grading results and then they are allowed to apply requirements to be verified their examination results for satisfaction. In particular, students send their requirement petition directed by FEEE secretary to faculty and the faculty delivers this petition to department so that the department considers and assigns two lecturers having specialization of the course field to truly verify. If the verified result is higher than the first result, the faculty and the verified lecturers will sign to determine this result change, inversely it is kept and then announce again to student *[Exh.5.12. Verified results and procedure for planning and organizing examination and verification]*.

Criterion 6: Academic Staff Quality

6.1. Academic staff planning (considering succession, promotion, re-deployment, termination, and retirement) is carried out to fulfil the needs for education, research and service

In the long-term development plan of HCMUTE in the five-year period based on the visions and missions of HCMUTE *[http://en.hcmute.edu.vn/]*, the quality of academic staff plays a main role. For academic staff recruitment, faculties annually send plans for academic staff recruitment to HRMO. In particular, heads of departments send lists of the staff needs to FEEE and the faculty will synthesize to deliver to HRMO. For improvement of lecturer quality, HCMUTE always encourages master lecturers to study PhD degrees and PhD lecturers to apply documents for Prof. certificates. For support of studying, the university introduces many scholarships from many different resources, including PhD and master programmes from national/international programmes. Moreover, HCMUTE supports the document procedure and makes the best conditions for candidates so that they can feel peace of mind during studying and then come back to continue contribution. The reputation of the university has been risen dramatically in recent years due to its correct development strategy and it has attracted many academic staff with the quality Master/PhD/Assoc. Prof./Prof. degrees *[Exh.6.1: Scholarship information, decisions for studying PhD]*.

In recent years, HCMUTE has attracted PhD lecturers by supporting them policies such as good salary, free laptop, tuition fee and promotion. The HCMUTE president organizes to elect deans of faculties and heads of units through votes of confidence of all staff. Positions of deans, vice deans and heads of departments are usually required the high and suitable qualifications such as PhD/Assoc. Prof./Prof. following the MOET regulation. In appointment of positions, the department heads with PhD degree at least are usually introduced to hold. These heads not only manage academic staff but also design the programmes and deploy them *[Exh.6.2: Appointment information of positions]*.

The future developments of Human Resource (HR) policy for academic staff are planned by HRMO, particularly, HRMO requires faculties and units to deliver lists for recruitment every year. FEEE always performs this based on the entrance students and the HR going to retire and studying. All lecturers, who are retired, receive the complete welfare following the government regulation. The lecturers, who are retired, receive the support according to the decrees of the government. The retirement ages are limited to be 60 years old for males and 55 years old for females. Especially, the retired lecturers with PhD/Assoc./Prof., Prof. certificates are signed the extended contracts with five/seven/ten years for academic works. Therefore, there is the shortage of academic staff due to studying PhD degrees and retirement. In order to meet academic staff enough for training each semester, the department often plans to invite visiting lecturers from universities around HCMUTE such as Saigon University, College of Industry and Trading, College of Technology, and the IU *[Exh.6.3: Support list and visiting lecturers; Decisions for HR policy (extending contracts, retired)]*.

From the HCMUTE long-term plan, based on the FEEE visions and missions *[http://feee.hcmute.edu.vn/]*, the HR requirements of faculties are planned. Therefore, FEEE has calculation of academic staff for the long-term development strategy, particularly the number of academic staff will be recruited to replace academic staff studying aboard and going to be retired. In the general development plan. FEEE is one large faculty of HCMUTE, so academic staff including PhD, Prof./Assoc. Prof., and Master are always planned to recruit for inheritance of personnel retired and studying as listed in **Table 6.1** *[Exh.6.4: HR development plan]*.

Table 6.1. The plan of human resource development of FEEE

Years	Academic Staff	Master Lecturer	PhD Lecturer	Prof./Assoc Prof.	Retirement	Studying	Leaving job
2014	97	70	10	3	0	14	0
2015	98	64	12	4	1	17	0
2016	99	61	13	5	1	16	3
2017	98	61	14	5	2	15	1
2018	100	57	16	7	2	18	0
2019	104	57	17	9	1	19	1

| 2020 | 107 | 51 | 20 | 12 | 2 | 20 | 2 |

6.2. Staff-to-student ratio and workload are measured and monitored to improve the quality of education, research and service

FEEE has 97 staff, including 2 secretaries and 95 academic lecturers, in which there are 5 Assoc. Professors, 14 PhD lecturers, 15 PhD students (studying in Canada, German, Australia, American, Korean, Taiwan), 56 master lecturers and 5 Lab lecturers. Besides the lecturers with the correct major degrees, all academic lecturers are required educational certificates following the MOET regulation. In **Table 6.2**, the column of Full-Time Employees (FTEs) describes the number of employees participating full-time teaching in the programme, in which (41x0.35)=14.35 is the number of the FTEs; 0.35 denotes the coefficient of the FEEE lecturer (non-ECET); 0.7 describes the visiting professors/lecturers coefficient.

Table 6.2. Number of Academic staff and their FTEs

Title	Male	Female	Total		Percentage of PhDs
			Headcounts	FTEs	
Associate professors	3	2	5	5x1=5	100
Full time lecturers (ECET)	28	1	29	29x1=29	17.2
Full time lecturers (Non-ECET)	22	19	41	(41x0.35)=14.35	22
Visiting professors/lecturers	14	0	14	(14x0.7)=9.8	50
Total	**67**	**22**	**89**	**58.15**	

Table 6.3 shows the ratio between lectures and students in five years, in which the number of students increasingly enrolls to study on the ECTE. In this table, the staff-to-student ratio meets requirements for training and the MOET regulation.

Table 6.3. Description of academic staff to student ratio

Academic year	Total FTEs of Academic Staff	Total FTEs of Students	Staff-to-student Ratio
2016-2017	58.15	1164	1/(20.02)
2015-2016	58.15	1148	1/(19.75)
2014-2015	58.15	1189	1/(20.45)
2013-2014	58.15	1219	1/(20.97)
2012-2013	58.15	1171	1/(20.14)

HCMUTE has the monitoring system, called dashboard, which allows us know student information and results during semesters. Besides, lecturers to know teaching periods, credits, courses, the number of students for a course and others each semester through the LMS. The number of scientific research hours are annually summarized by STO. In particular, the scientific research hours are calculated by published publications, completed projects and other scientific contributions. HCMUTE has invested the KPIs system which allows staff know their contributions every academic year. Academic lecturers know workloads including teaching, scientific research and other academic supports following the HCMUTE and MOET regulations as described in **Table 6.4** *[Exh.6.5: HCMUTE and MOET regulations about workload]*.

Table 6.4. Representation of standard hours for academic staff.

No	Title	Standard hours for academic staff	Total

		Teaching	Research	Support	
1	Senior lecturers, Professors	900	800	60	1760
2	Lecturers, Assoc. professors	900	700	160	1760
3	Lecturers, PhD	900	650	230	1760
3	Senior lecturers, Master	900	590	270	1760
4	Lecturers, Master	900	250	610	1760
5	Probationary lecturers	900	250	610	1760
6	Physical lecturers	900		860	1760

All lecturers need to finish workloads, including teaching, research and academic supports following the educational regulations. In addition, the lecturers may complete other academic supports such as leading students to visit factories and companies, supervising students to do scientific research and to attend creative competitions held by FEEE or HCMUTE. All policies related to the teaching loads applied by FEEE or the university have to be satisfied by all staff. If there are any dissatisfaction in these policies during implementation, they are updated to meet all requirements *[Exh.6.6: Workload information and working environment surveys]*

6.3. Recruitment and selection criteria including ethics and academic freedom for appointment, deployment and promotion are determined and communicated

The University has the criteria of recruitment and promotion for academic staff based on the ISO procedure. In order to meet academic staff for teaching, scientific research and academic supports, the recruitment policy of HCMUTE was changed in 2014, in which candidates with master degrees graduated from overseas or PhD degrees will be considered documents for recruitment and English skills of the candidates are also examined depending on different positions. In addition, according to the policy, HCMUTE has attracted the recruited PhD lecturers by supporting 10,000,000 VND, PhD students, who are academic lecturers of HCMUTE, studying overseas are supported the transportation fees once, the lecturers, who completed the PhD course in time, are rewarded the amount of money up to 20,000,000 VND and up to 150 percent of that amount if they can graduate before the course periods. Moreover, the university pays scientific research fees for all lecturers through projects, publications and attending to the scientific conferences *[Exh.6.7: Recruitment policy for lecturers including supporting transportation-research-conference fees, money support decision]*

The policy for academic staff recruitment is flexible and it is depending on teaching and scientific research experiment years. In particular, new lecturers need to the probationary period and they only get the salary of 85 percent. While lecturers with several experience years in teach and scientific research are directly signed without the probationary period. All lecturers need to meet certificates such as the B certificate of information technology, the educational skills, the philosophy and English. In addition, HCMUTE has the special policy for recruitment of professors and associate professors; PhD lecturers with teaching and scientific research experience and they can be promoted to management suitable positions such as head/deputy head of department, dean/deputy dean of faculties *[Exh.6.8: Lecturer promotion policy]*

For lecturer recruitment of the ECET programme, the department will send the requirement information to FEEE for synthesizing to deliver to HRMO every year. HRMO will synthesize all lists of faculties and then transfer to the HCMUTE president for approving of recruitment. All documents of candidates have to satisfy the requirements of different positions depending on each faculty. The documents with PhD or master degrees finished overseas are prior for consideration. The second round is that heads of departments and the faculty board will interview problems related to teaching and scientific research experience and salary levels. After the second round, the candidates will attend a test including English skills and the IQ index. After the third round, they will quickly talk to the

president board before signing labor contracts *[Exh.6.9: Lecturer recruitment policy]*

According to the HCMUTE policy to a faculty, a high-quality candidate has to satisfy the first condition of the PhD degree/Assoc. Prof./Prof. and also has the experience in teaching, scientific research and the good professional ethic. This candidate can be appointed a dean of faculty who can control all activities of the faculty including quality of training and scientific research, development of staff and facility and departments. Besides the dean of the faculty, FEEE has three vice deans, who are in charge of academic affairs, scientific research, facilities and enterprise relation, in which the deputy deans will support the dean so that the faculty can perform and complete the activities. Positions of department heads/deputy heads are encouraged to elect lecturers with PhD degrees due to their good ability in scientific research and training related to design and implement of academic programmes. The FEEE secretaries are responsible to work under control of the dean and support students and lecturers *[Exh.6.10: MOET regulation, decisions for positions in the FEEE, lecturer information attending conference and committee boards]*.

Moreover, academic lecturers with higher qualifications are assigned to teach theoretical courses and Lab courses are prioritized to assign for lecturers with various practical experiences. FEEE has some academic lecturers who are members of the Youth Union often organizing activities related to scientific research and teamwork such as Design of LEDs, Robot to Maze Path and others. Assoc. Professors and academic doctors with scientific research experience can be in charge of scientific research projects supported by HCMUTE, MOET, STO, enterprises and others Academic staff of the departments are responsible for teaching, scientific research and academic supports and they need to finish workloads assigned each academic year following the HCMUTE regulation. For the scientific research development, HCMUTE has the policy to support fees for projects, academic papers and attendance of the conferences held overseas and in Vietnam *[Appendix A6: Figures of conference activities, July, 2017], [Exh.6.11: Lecturer responsibility and authority, lecturer information attending conference and committee boards, Support policy of research, project and conference]*

All academic lecturers are responsible to the quality of courses in the training programme, including syllabi, assessments, teaching methods, in which the lectures, video clips, teaching and assessment plans are posted on the personal page of lecturer *[https://lms.hcmute.edu.vn/]*. In addition, In the scientific research, the lecturers can apply projects under high competition from different sponsor organizations and also collaborate with researchers and institutions inside/outside HCMUTE. HCMUTE often introduces and combines academic staff with enterprises and sponsor organizations on scientific projects. All activities of academic staff are through the HCMUTE regulation and laws such as technology transfer, intellectual property, copyright and etc. It is important that research and training activities are responsible of a lecturer and they need to achieve each academic year. HCMUTE has the KPIs system to monitor lecturer's workload and other activities and this system allows to evaluate achievement of lecturer's research, training and other activities. Besides, satisfaction's feedbacks the important part in lecturer's evaluation *[Exh.6.12: MOU with organizations and project contracts and decisions, lists of attending programme building, scientific research, KPIs information, student satisfaction's feedbacks]*.

According to the HCMUTE and MOET regulations, all academic staff are signed contracts through the HRMO. The academic staff are responsible in completing standard hours of teaching, research and academic supports and benefited salary and other additional policies. Lecturers, who excellently completes academic year activities, are promoted early salary increase, managing positions, awards from the HCMUTE president/MOET *[Exh.6.13: Decisions of promotion, early salary increase]*

6.4. Competences of academic staff are identified and evaluated

According to the HCMUTE regulation, academic staff are responsible for teaching, scientific research and academic supports. In order to work out this, the academic staff have to meet competences such as master/PhD/Assoc. Prof./Prof. degrees, English levels and educational certificates. Moreover, they are required to finished the minimum scientific research hours, as well as encouraged to increasingly do scientific research with projects and publications. The lecturers are encouraged to attend the short-

term courses for improvement of skills related to technology, education, English and education quality assessment to achieve ELOs of the programme *[Exh.6.14: Projects and workloads]*

All academic staff are responsible for finishing three tasks such teaching, scientific research and academic activities. The academic staff not only teach courses, but also contribute designing syllabi, sending comments to adjust assessment methods and courses contents. In addition, they can update teaching and assessment methods trained from the short-term training courses to enhance teaching and studying performance, in which there are teaching methods combined with reasonable equipment such as PowerPoint slides with animations, posting multi-materials on LMS, using projectors/LCD displays, Lab modules. The lecturers have a look student feedbacks and grading lists in the end of each semester for looking back teaching for improvement. Besides, the lecturers are required to do scientific research related to teaching following orientation of the ECET programme and the faculty development, in which projects are performed to develop teaching and studying models, technological models for applying companies and publications to achieve ELOs of the programme *[Exh.6.15: Syllabus and projects]*

The programme has ELOs and syllabi has goals followed by ELOs of the programme. Therefore, lecturers prepare for their teaching tasks based on the syllabi, in which the syllabi consist of contents, assessment types and grading policy. One subject has many classes in one semester, lecturers need to unify contents, how to exam and the same examinations. In some subjects, types of the formative assessment can be online quizzes, papers examination in class, topics with teamwork and the type of the summative one is paper examination in class with the same test. All lecturers hold their schedules before each semester from two to three weeks for preparation. During the courses, lecturers need to post materials related to their teaching courses on their LMS and to have interactions between them and students. Moreover, HCMUTE has deployed Dashboard *[http://it.hcmute.edu.vn/btvdt/manager]* to show statistics and student information such as student progress, performance, the student rate of the programme completion in the planned time and etc. *[Exh.6.16: LMS information]*

After having the theoretical and Lab schedules for the next semester from AAO, the department will discuss with all lecturers for assigning courses. After assigning the courses, the lecturers have to responsibly perform workloads. During the semester, teaching and studying are monitored about the class time, how to assess, absent reports and others by AIO. If there are any problem during the courses, head of the department and the faculty board need to report reasons and show solutions for improvement. In the end of each semester, surveys are sent to students for satisfaction's evaluations and feedbacks are sent to lecturers through the private LMS page. If there is any big problem to any lecturer, the dean of the faculty and head of the department will have a meeting with that lecturer for considering reason and showing how to improve for next semester. Feedbacks of students can send to the faculty board and department through face to face, counselling emails so that the faculty and department can consider and improve. For supervision and assessment, the university are conducting the assessment using the KPI software *[http://kpis.hcmute.edu.vn]* which allow to assess lecturer's workloads as well as their working quality *[Exh.6.17: KPI system and student surveys]*.

6.5. Training and developmental needs of academic staff are identified and activities are implemented to fulfil them

Table 6.5. The training fees in five years.

No.	Years	Training fees	Unit
1	2012	703.451.500	VND
2	2013	1.844.402.000	VND
3	2014	926.236.638	VND
4	2015	1.077.318.400	VND
5	2016	1.004.588.438	VND

In the development strategy, the university always encourages academic staff to attending the short-term and long-term courses to improve skills related to their works and fees for training are supported by HCMUTE as shown in **Table 6.5**. In addition, the process of the HR development is perform by HRMO as described in **Figure 6.1** *[Exh.6.18: Staff training fees].*
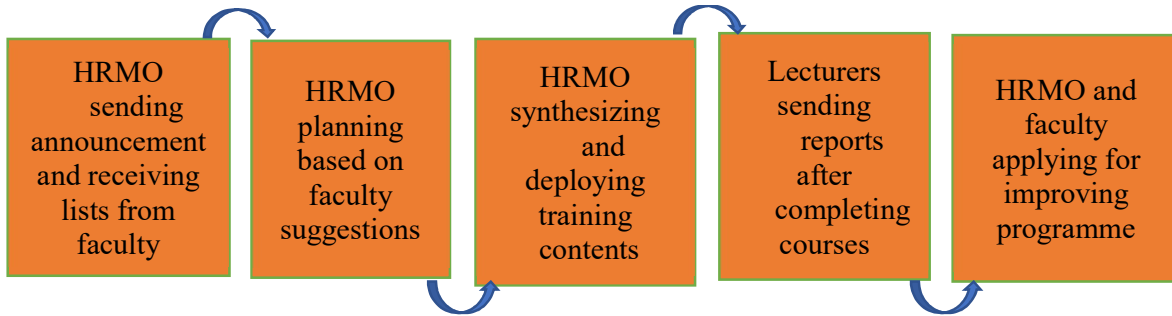
HRMO sending announcement and receiving lists from faculty	HRMO planning based on faculty suggestions	HRMO synthesizing and deploying training contents	Lecturers sending reports after completing courses	HRMO and faculty applying for improving programme

Fig. 6.1. Schematic of training and development needs of academic staff

➢ HRMO annually sends announcement to faculty so that academic staff can register the short-term courses related to education, English, training quality assessment and others and receives lecturer lists from the faculty for arranging courses.

➢ HRMO is based on course registrations of lecturers and the evaluation of the training processes. Therefore, HRMO plans to organize the short-term and long-term courses such as teaching methods and English skills, educational quality, how to use LMS, KPIs and workshops with new and modern technologies by enterprises. Besides, HRMO has the long-term plan so that young lecturers can study PhD degrees and PhD lecturers can promote to be Assoc. Prof/Prof. lecturers.

➢ HRMO synthesizes and cooperates to AAO, ERO, QAO, IRO to deploy training courses. The courses, which can be taught by experts from overseas or Vietnam, include main contents related to education, technology, English and scientific research problems.

➢ Academic lecturers are responsible for attending training courses and sending reports to FEEE and HRMO after completing the courses.

➢ In design of the development strategy and plan, the university always orients the training and development plan so that it can reflect the university and faculty mission and vision. In particular, HRMO organizes the short-term and long-term training courses so that academic lecturers attend and improve their understandings and knowledge for improving teaching, scientific research and training quality of the programme *[Exh.6.19: Process of HR development]*

For long-term training courses, academic staff can register to study PhD degrees at the national/international universities and institutes such as HCMUT, HCMUTE, and UT-HCMC; the IU and institutes in Korean, Taiwan, Japan, Australia, Spain and etc. In addition, there are some short-term training courses such as the Learning Management System, the educational skill training, the quality assurance programmes (HEEAP/VULII), the Fullbright learners (AQ-ABET, student leadership), the intellectual property, how to write scientific papers, SEAMEO conference and others held at HCMUTE, VNU_HCMC and other places. After the completion of the training courses, all lecturers have to send their reports for HRMO following the ISO procedure. Lecturers, who have the good training results from courses, can be promoted by increasing the salary soon *[Exh.6.20: Training reports]*

6.6. Performance management including rewards and recognition is implemented to motivate and support education, research and service

HCMUTE has 15 faculties, in which FEEE is organized to staff management structure including the FEEE board, 6 departments and 2 boards for alternative activities as described in **Figure 6.2**. Each department has academic lecturers who are the common major group and they are responsible for teaching subjects of that common group.
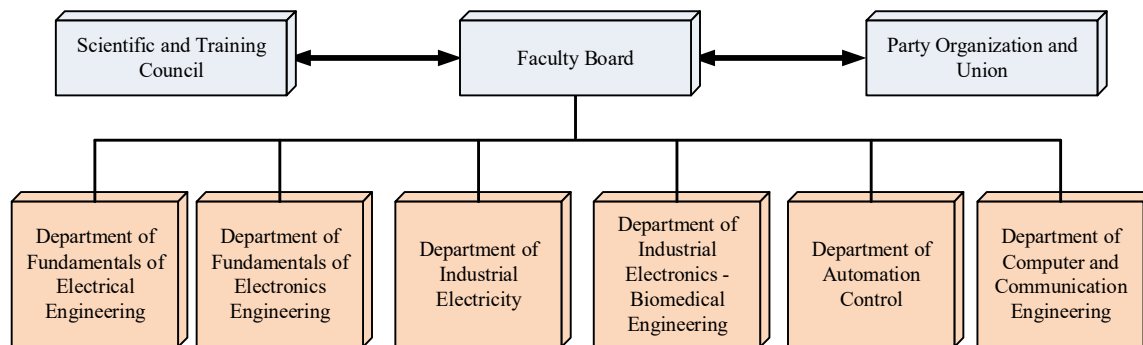
Fig. 6.2. Organization of FEEE

According to HCMUTE regulation, each academic lecturer is assigned workloads of teaching, scientific research and academic support every year. Each semester, all lecturers will send their reports to the head of the department for consideration and comments before having the department meeting so that the lecturers discuss together. Besides the workloads, teaching activities such as lecture preparation, assessment participation, class control and others are monitored by AIO. The lecturers and the head will analyze the workloads and the teaching activities for complete evaluation and the department will vote for arranging levels A, B and C. The levels of A, B, C are depending on their contributions and arranged from high to low. The voted results are to the faculty are estimated before transferring to HRMO *[Exh.6.21: Department and faculty meeting minutes]*.

HCMUTE has deployed the KPIs system to manage workloads of all academic staff. This system allows the staff register their workloads and shows their contribution results through many problems such as workload completion, satisfaction evaluation in teaching and other activities. Based on the KPIs system, leaders of the president, faculties and units are easy to get result information of all staff for arranging levels for honors with rewards. Academic staff have not yet completed their workloads, receive active feedbacks for improvement *[Exh.6.22: HCMUTE regulation for KPIs]*

The university always has the supporting policies for promotion of staff. In particular, lecturers contribute a lot of scientific research, master lecturers have completed PhD degrees, PhD lecturers are promoted to be Assoc. Prof., Assoc. Prof. lecturers become full Prof., they will be reward and increased salary levels. In addition, lecturers. who pass through the probationary period to become the official lecturers, are increased salary levels following the HCMUTE regulation. Besides the HCMUTE prizes, academic lecturers with the excellent contributions can be suggested to MOET or the Vietnam government to be awarded certificates of merits *[Exh.6.23: Decisions for rewards and honors]*.

6.7. The types and quantity of research activities by academic staff are established, monitored and benchmarked for improvement

According to HCMUTE and MOET regulations, academic lecturers are responsible for three main tasks such as teaching, academic supports, and scientific research. Academic lecturers with different qualifications assigned with different workloads. HCMUTE always encourages lecturers to do scientific research by supporting fees for projects. STO annually plans to send all academic lecturers to register projects, as well as the deadline for reviewing and reporting results of the projects. In addition, STO send information of research directions of neighborhood organizations and enterprises so that lecturers can register suitable projects.

Types of scientific research activities which academic staff can carry out during the academic year are editing textbooks, writing proposals of projects, attending scientific conference and workshops, published papers and building syllabi and training programmes. Each type of the activities is converted into research hours and all activities of one lecturer are calculated by STO according to the ISO procedure. The scientific research activity is one of activities considered to evaluate the completion of workload of one academic lecturer *[Exh.6.24: ISO procedure]*.

HCMUTE always encourages academic staff who register proposals and publications with high indexes (ISI or Scopus database) being suitable to the vision and mission of the university. Types of the proposals registered by young lecturers with good potential and lecturers with high qualifications such as PhD/Assoc. Prof/Prof. are often supported by HCMUTE. These supports not only help lecturers to develop scientific research but also the scientific research orientation of HCMUTE has increased in recent years. In addition, the scientific research development creates collaboration between HCMUTE and enterprises *[Exh.6.25: Scientific research policy]*

From the supported projects, academic lecturers with the high qualifications can supervised PhD students to work with them. Besides finishing the projects, the number of research papers increase and there are many papers published on different journals such national, international and regional. The papers published on the different journals depending on product requirements of projects and the research ability of each lecturer. FEEE is one of the largest faculties of HCMUTE having many publications for the last five years as shown in **Table 6.6**, in which SCI/SCIE have increased in recent five years *[Exh.6.26: Paper information]*.

Table 6.6. Types and number of research publications

Academic Year	Types of Publications		Total	No. of Publications per academic staff
	National	International		
2011-2012	5	11	16	0.5
2012-2013	14	25	39	1
2013-2014	24	34	58	1.3
2014-2015	26	49	75	1.6
2015-2016	22	42	64	1.4
2016-2017	26	55	81	1.6

With the mission and vision of HCMUTE and FEEE, the university with the main development strategy is research and technology. Therefore, many lab rooms in the buildings have been invested modules and equipment with modern technologies and this is the good environment for development of scientific research. In practice, there are many different grants such as HCMUTE, Nafosted, MOET, departments of science and technology of cities and provinces connected with HCMUTE and lecturers are easy to register proposals. STO always supports lecturers in informing project information and transferring proposal documents for review. In recent years, many lecturers got many projects and contributed on the scientific research development of HCMUTE *[Exh.6.27: Project information and MOU]*.

Criterion 7: Support Staff Quality

7.1. Support staff planning (at the library, laboratory, IT facility and student services) is carried out to fulfil the needs for education, research and service

HCMUTE periodically builds the medium-term developing strategy for every five years and the development of HCMUTE will be based on plans and targets built in this strategy. In order to perform this, HCMUTE has the personnel planning composing of 15 faculties,20 offices and 16 centers related to the workload requirements so that it always ensures that the development is good in progress. The number of staff are relatively enough for the university to develop and to satisfy the current requirements as shown in **Table 7.1**. However, Human Resource (HR) can be changed due to staff can studied overseas, or be retired every year. Therefore, HRMO always receives requirements from faculties and units and then plans for recruiting HR every year. In case of Lab staff, FEEE can temporarily invite visiting lecturers during waiting for new staff recruitment *[Exh.7.1: Schematic of units and centers and plan for human resources]*.

Table 7.1. The number of support staff (Reference date: 30.07.2017)

STT	Support staff	Highest Educational Attainment					Total
		High School	Bachelor	Master	Doctoral	Assoc. Prof.	
1	Quality Assurance Personnel		2	4			6
2	Finance and Planning Personnel	1	11	2			14
3	International Affairs Personnel		1	1	2		4
4	Science and Technology Personnel		3	2		2	7
5	Facility management Personnel	2	4	2			8
6	Academic inspectorate Personnel		3	3			6
7	Equipment and maintenance Personnel	5	5	2	1		13
8	Human Resource Management Personnel		6	2		1	9
9	Admissions and Student affair's Personnel		7	3	1		11
10	Health Care Personnel	2	1				3
11	Library Personnel	2	9	2			13
12	Digital Learning Personnel		1	2			3
13	Student Services Personnel		3	2			5
14	Laboratory Personnel		1	16	1		18
15	Faculty Advisory Group		1	5	7	3	16
16	Youth and Student Associations	12			1		13
17	Public Relations Personnel		5	1			6
18	Guard team's Personnel	21					21
19	IT Personnel	3	2	2			7
20	Academic personnel		8	3	1	1	13
21	Administrative personnel	2	4	2			8
	Total	**50**	**77**	**56**	**14**	**7**	**199**

For the support of things related to teaching and learning, FEEE has two secretaries who basically have the skills in managing and arranging student and lecturer documents, sets of student lists. In addition, they assist dean of FEEE to edit letters, to arrange agenda for faculty meetings, to advise students related to registering re-study and other activities. In FEEE, many Labs are always opened so that students come to study with the fixed schedules. Therefore, each Lab has a head who is not only help students finish Lab tasks, but also directly fix error modules, prepare modules and materials

, report the effectiveness of using equipment, Lab management and hygiene and labor safety *[Exh.7.2: List of laboratory heads of the ECET]*.

The quality and quantity of staffs are always required to improve every year. Staff can suggest deans or heads of units for attending short-term courses to enhance their contribution and support to students and lecturers. From suggestions, HRMO will make a list of attendees to send to the president board for approving. In addition, HCMUTE always encourages staffs to attend courses for employees. The courses such as English enhancement, Computer improvement, country management and technologies in the internationalizing situation, Library professional work, Quality assurance in education, Official culture training, Document preparation, Full quality assurance and others can be organized at HCMUTE or at another place. After finishing the courses, the employees have to send their reports to the relative faculties or units for effective assessment *[Exh.7.3: Lists of training courses of English, visiting courses in India, Taiwan, Korea and others]*.

7.2. Recruitment and selection criteria for appointment, deployment and promotion are determined and communicated

For the quality assurance of HCMUTE, the university organizes the process of recruitment and selection of support staffs according to the ISO procedure. It means that information related to the recruitment of staffs are widely announced on the HCMUTE website and newspapers (Labor, Youth, Educations and Times), in which requirements and positions are obviously showed. According to the development plan of the five-year term, HRMO is responsible to plan for recruitment every year *[Exh.7.4: ISO procedure for recruitment and selection in 5 years, announcements of staff recruitment on HCMUTE website and newspapers]*.

According to the ISO procedure, after finishing the deadline of applying applicant's documents, the university works with the related units and faculties to organize interview days, IQ and English test, and computer skill for applicants. Therefore, applicants, who overcome the tests, are required to sign contracts following the HCMUTE regulation, including duties, rights, and salaries *[Exh.7.5: Recruitment results and plan s of support staff]*.

In the development plan of HCMUTE, recruitment and promotion criteria of support staff are always established in fair and transparent. It means that the promotion progress of support staff depends on the professional skills, personal experiences, and individual achievements and professional ethics during their working years. They can be promoted the reasonable positions to replace the retired staffs or staffs with the weak contribution. The promoted staff are encouraged to contribute their ability for satisfying requirements of students and lecturers. Related to the promotion of support staffs, HCMUTE has the plan for job evaluation in the end of year by arranging types of contributions. The achievement results of staffs are based on contributions such as statistics from surveys of students and lecturers, working ethics and colleague relationship. From these results, the staff will be voted for arranging contribution types and this is one of criteria so that they can be promoted the better positions.

After signing the contracts, the new staff become the probationary officers and they begin their works. After finishing the probationary time, they are officially signed the long-term contracts. According to the labor law, after the working period of three years, the staff salary will be increased according to the fixed levels. In the special case, if any staff has the excellent contribution through evaluation of all members and heads, their salary will be increased sooner than one year *[Exh.7.6: Promotion and recruitment policy, promotion decisions (early salary increase, head/vice-head of departments, excellent lecturers]*.

7.3. Competences of support staff are identified and evaluated

In the development strategy of HCMUTE, the quality of services plays an important role, in which contributions of support staffs need to be identified and evaluated through support for students and lecturers. In addition to the quality recruitment and promotion process, HCMUTE usually evaluates

the quality of the services every academic year, particularly surveys are sent to feedbacks from students and lecturers and all feedbacks are collected for satisfaction's evaluation. Thus, the university council will consider the reasonable feedbacks in order to send to the support staffs for improvement. The organization of HCMUTE consists of 16 faculties, 20 offices and 16 centers as described on the HCMUTE website *[http://en.hcmute.edu.vn/]*. Basically, it can be divided into seven main groups of consultants and guides for students such as education and scientific research, the student affairs and policies, and the field of school psychology, health, and life of students as described in **Table 7.2**.

Table 7.2. Description of consultants and guides of units for students

No.	Activities	Supporting units	Services
1	Academic	Academic Affairs	To consult students about learning course registration, timetable adjustment and corresponding courses
			To guide students to be able to implement the MOET and HCMUTE regulations of educational and academic affairs
			To consult with students how to withdraw a course, select a suitable course, open a restudying course and do grade complaint by using hardcopies or online pages
			To guide students to work out problems such as graduation, in-debt credit, certificates and qualifications.
			To consult international students about problems above
		Faculty	To guide students to know learning planning scheme, to use handbook and to find information on websites of departments and FEEE; LMS pages; advisory email group
			To consult students about choosing and registering courses each semester.
			To consult students about learning methods, solving difficult problems and scholarships during learning process
			To consult and to guiding students about science research and attending scientific competitions
2	Social	Admissions and Students Affairs	To organize activities related to educational and training regulations for the first-year students.
			To guide students to implement regulations of student activities and social work programmes, processes of training assessments.
			To consult and support faculties in the HCMUTE entrance exams
			To consult students about the HCMUTE youth union and social activity organizations.
			To consult students about problems related to stopping learning temporarily, re-entrancing, dropping out of one university and then transferring to another university
			To consult students about rewards and disciplines

		Students Service Center	To support facilities, learning environments, social extra working activities.
			To organize students to attend skill clubs and another clubs to increase experience skills.
3	Physical	Health and Medical Service	To consult students about health, anti-disease and health insurance fees, as well as protection of learning environment
4	Psychology	Students Service Center	To consult students about solving difficult life problem, family problems, sexual problems.
			To consult students about educational and social psychology and student life.
5	Career	Enterprise Relations	To seek a job or part-time jobs at HCMUTE or companies How to find scholarships To contact with companies or enterprises to gain experience for students. To organize seminars to train soft skills for students and visits of companies or enterprises
		Students Service Center	To consult students about jobs and to introduce part-time jobs
			To train students short-term courses such as techniques, , soft-skills and English skills.
6	Finance	Admissions and Students Affairs	To consult students about living allowance, school fees, social working allowance, how to reduce tuition document.
			To consult students about tuition fees, how to get scholarships
			To consult students about difficult situations related to borrowing tuition supported by government.
7	Others	Students Service Center	To meet students daily to connect students with faculty consultants.
			To organize international student festival friendship services and international student exchanges
		Library	To introduce students about information of the HCMUTE library and how to access the library.
			To guide students to find and to use documentation, e-books and related services
		Dormitory	To support students to register dormitory, internship regulations.

The HCMUTE library is composed of 13 librarians and a lot of national and international materials *[http://thuvien.hcmute.edu.vn]*. All librarians with professional degrees are conscientious and enthusiastic to support students and lecturers in using the materials, particularly they will guide how to search, borrow and return books and to use self-studying spaces which are set up around the library. Moreover, they are encouraged to attend the short-term courses for enhancement of the library managing and supporting skills *[Exh.7.7: Courses for library staff]*.

Information and Network system, which plays an important role in the development strategy, has been invested strongly in recent years, including the fiber-optic cable system installed with modem equipment throughout the campus under supervised closely by the experienced IT team of ITC. In addition, this system meets access to students and staff to process works such as online examination, course registration, announcement, information related to studying and teaching and other activities. In order to have the good support quality, all officers of ITC are recruited with high and suitable skills for network administrations, network engineering, and hardware problems. They are steady to maintain the computer systems in Labs, to repair the network system to obtain the quality in teaching and studying.

FEEE has six departments with about 97 lecturers (17 heads of Labs), 2 secretaries, and the Student-Lecturer ratio of around 1/20 for the ECET programme *[http://feee.hcmute.edu.vn/]*. This is one of the largest faculties in HCMUTE and it is always the faculty with the large recruited students. Two secretaries with many experience can solve the large amount of works in FEEE to satisfy students and lecturers. In FEEE, Labs invested to modern technology equipment are organized to teach for students. Heads of the Labs not only teach Lab courses but also are responsible for maintaining them each semester, managing Labs (equipment, hygiene and labor safety). Moreover, they instruct students how to measure and use equipment and safety in use. In these Labs, there are some specialized Labs which allow senior students to work out their theses or research topics at additional time according to the timetable. FEEE also has an advisory team, including lecturers, heads of departments, secretary and dean of FEEE for supporting students about study, answering all questions related to the programme, scholarships, scientific research problems, health. Students can choose to one of methods to be advised, such as face to face, sending emails, discussion using Facebooks of FEEE and department, especially students can send their requirements to the FEEE email group box and will quickly receive responses *[http://it.hcmute.edu.vn/btvdt/]* *[Exh.7.8. The laboratory diary, advisory member lists, advisory results]*.

In order to evaluate the quality of student support, QAO conducts the online surveys so that students can answer questions and write down suggestions related to services. Feedbacks will be collected to evaluate the quality of supporting students and lecturers every semester. All units will receive feedbacks and unit meetings will consider and evaluate the support quality of their units for improvement and investigation. Thus, support staffs have opportunities to look back their works for satisfaction of students and lecturers in HCMUTE *[Exh.7.9. Meetings between leaders and students and satisfaction feedbacks of students]*.

The quality of the ECET programme is depending on the quality of services, in which support staff play an important role in the HCMUTE quality. Therefore, all support staff recruited are required the high qualifications and the good professional skills for suitable working positions in units and faculties and they receive the HCMUTE policy such as medical insurance, increasing salary, bonus depending on the working effectiveness, and other rights. In addition, during the working time, they are encouraged to attend courses such as English, management in education, managing software for enhancement of supporting students and lecturers. Moreover, support staffs are annually evaluated works through the satisfaction of students and lecturers. From feedbacks, the support staff can be estimate by colleagues and heads at supporting levels for improvement and promotion every academic year *[Exh.7.10. Short-term courses and supporting feedbacks]*.

7.4. Training and developmental needs of support staff are identified and activities are implemented to fulfil them

HCMUTE always performs development of the quality following the strategy planed for the five-year term, in which training and development needs of support staffs are identified to improve. From needs of faculties and units, lists of requirements for activities of training and development of support staffs are delivered to HRMO. According to the ISO procedure, HRMO is responsible to synthesizes and classify types of knowledge and skills which need to be invested for support staffs and then suggest the HCMUTE president board for approving. Therefore, HRMO can organize courses at

HCMUTE or support staffs can be supported to register courses outside of HCMUTE *[Exh.7.11. Course lists]*.

According to the HCMUTE regulations and the development strategy, HRMO annually has the plans of developing human resources to advise the president board. From practical needs of faculties and units, HRMO is assigned to work out technical competencies every year and this problem is a part in the ISO procedure to develop the quality of HCMUTE. Besides, groups for development and training of human resources are fixed annually, some groups are extended depending on development of faculties or units, meaning that requirements are related to the new developments. There are many courses such as Management capacity, Productive capacity, the local assessment according to the ISO Standards 9001:2008, local quality assurances and writing the personal report, English skills, AUN – QA Testing and evaluation and etc. planned to improve skills of the human resource, Design of Rubrics, Project-Based Learning Models, Program Accreditation Self-Study Template Implementation and others *[Exh.7.12: Course plans, decisions, results, certificates, course contents and suggestions]*.

In the policy of investigation for the HCMUTE development, fees for training and development of support staffs are calculated in the total investigation. HCMUTE always encourages support staffs to attend the short-term courses and pay for training activities every year as described in **Table 7.3** *[Exh.7.13: Financial report]*

Table 7.3. The payment for training activities of support staffs every year

No.	Years	Training fees	Unit
1	2012	703.451.500	VND
2	2013	1.844.402.000	VND
3	2014	926.236.638	VND
4	2015	1.077.318.400	VND
5	2016	1.004.588.438	VND

7.5. Performance management including rewards and recognition is implemented to motivate and support education, research and service

In the HCMUTE regulation, the policy of rewards and recognition is implemented to motivate all staff to achieve the working performance, in which the KPIs is applied to estimate the working quality. In particular, HRMO has the monthly statistics system about the working status of all staffs which are supervised by head of department, units and deans of faculties, in which the working performance of staff are estimated by levels of A, B, and C and this shows the ability of contribution of every staff. Therefore, these estimated results are the basic of arranging the monthly salary levels and also affect to increase the salary level. In the end of each academic year, all staff have to send the evaluation information themselves and FEEE organizes the conference of Cadres and Civil servants in order to evaluate their working results. In this conference, feedbacks from students and staff are sent to everyone for looking back, in which advantages and disadvantages are analyzed for developing more strong points and improving weak points *[Exh.7.14: Rewards of HCMUTE president, MOET, other organizations and lists of levels A, B]*.

HCMUTE organizes the conference of summarizing all problems achieved and needed to improve for the next year. From this conference, staff, who have the excellent contributions, are awarded rewards and recognized by the president board. In addition, reasonable feedbacks related to the working environment from the HCMUTE staff are considered for improvement. In addition, HCMUTE has the summer conference with key leaders of units, faculties and the president board to evaluate the deployed plans such as training quality, scientific research development, recruitment activities, facility development and other activities and also to give the coming academic year *[Exh.7.15: Summer conference information and working environment surveys]*

Criterion 8: Student Quality and Support

8.1. The student intake policy and admission criteria are defined, communicated, published, and up-to-date

In recent years, HCMUTE shows different intake policies for recruiting high-school students from many places based on the rules of MOET and HCMUTE. One of the policies is that the ECET programme is allowed to recruit students with four types of the subject groups (A00, A01, D01, D90) as described in **Table 8.1**. Moreover, HCMUTE has the important policy to encourage candidates with the high overall score of the high-school years, particularly these candidates will receive prizes from HCMUTE *[http://tuyensinh.hcmute.edu.vn]*. In addition, students, who have the good prizes from the national/international competitions of subjects such as Math, Physical, English and Literature, are encouraged to directly enroll to the ECET without the national examination, as well as the high school documents. One humanity policy in the recruitment is that students from areas with ethnic minority are added some points to the input benchmark.

Table 8.1. Groups for the entrance recruitment of the ECET programme

No.	Group of subjects	Subject 1	Subject 2	Subject 3
1	A00	Mathematics	Physics	Chemistry
2	A01	Mathematics	Physics	English
3	D01	Mathematics	Literature	English
4	D90	Mathematics	English	Natural science

In practice, HCMUTE has two options for the recruitment of the ECET programme. The first option is based on GPA of the national high school graduation examination, in which students, who has the suitable GPA for the ECET, will be recruited and the amount of students for this programme will be issued every year. The second option is that students are recruited based on the high school profile, in which the scores of three subjects of the A00, A01, D01, D90 group are considered for recruitment *[Exh.8.1: Recruitment decisions and announcement]*.

During months for the student recruitment, HCMUTE uses many channels to disseminate a lot of information such as the ECET programme, the student intake policy, recruitment conditions, and relative questions. The HCMUTE president board can visit some neighborhood cities and provinces for advising at coffee shops called "*advisory-coffee*" and advise students and their parents through the online channels such as video clips on Youtube by the Press and Media Office (PMO), UTE-TV *[http://utetv.hcmute.edu.vn/]*, advisory days with press, the HCMUTE website and facebook. In addition to these channels, HCMUTE often organizes for advising at HCMUTE, called open-day once a year for high school students. The students visit the department Labs, workshops and then they are consulted by academic lecturers and answered all questions related to the ECET *[Exh.8.2: Advisory for recruitment]*.

For the recruitment consultants, HCMUTE has invested to develop different channels such as Discussion-coffee, the HCMUTE website, Video clips on Youtube, Publishing information on educational magazines, Facebooks of HCMUTE and alumni, Hotphone for recruitment. Especially, in the weekly Thursday nights, Dean and heads of the programme are assigned to present at the Digital Communication Room to livingly consult through hotline calls, as well as liveshows for collecting video clips for posting on Youtube page.

8.2. The methods and criteria for the selection of students are determined and evaluated

The amount of the entrance students is issued by MOET and HCMUTE is allowed to recruit about 5,000 students for all programmes, in which the ECET programme is issued to recruit about around 260 students each year as described in **Table 8.2**. The amount of the ECET students can be changed

each year depending on the entrance student quality and other problems. There are recruitment methods such as based on high school documents, national examination results, students having prizes from prizes competitions of related subjects as shown in **Table 8.1**. In the recruitment criteria for selection of students, HCMUTE encourages students with the overall score of the high-school level greater than around 25 or national examination results announced on the HCMUTE website *[http://tuyensinh.hcmute.edu.vn]* before students enrolling their documents. In addition, students, who have the good prizes from the national/international competitions of subjects such as Math, Physical, English, Chemistry, Natural science and Literature, are encouraged to directly enroll to the ECET without other conditions. One humanity policy in the recruitment criteria is that students from areas with ethnic minority are added maximum of 2 points to the input benchmark of MOET. For the recruitment procedure, candidates can send their documents through the post office, HCMUTE website, or directly applying documents at HCMUTE. **Table 8.3** shows the number of students and its total number each academic year in a five-years period. It is obvious that the total number of students is not much change. It means that improvement needs to be continuously worked out to stably meet social needs *[Exh.8.3: The input benchmark decisions of MOET and HCMUTE for recruitment, recruitment policy, the input benchmark lists]*.

Table 8.2. Summary of the intake of first year students

Academic year	Applicants		
	No. Applied	No. Offered	No. Admitted/Enrolled
2016-2017	1155	221	146
2015-2016	1198	244	219
2014-2015	1277	346	289
2013-2014	2339	449	349
2012-2013	1312	542	307

Table 8.3. Summary of the total number of students enrolled in the ECET programme.

Academic year	Students					Total
	1st Year	2nd Year	3rd Year	4th Year	>4th Year	
2016-2017	146	220	264	311	223	1164
2015-2016	219	268	310	234	117	1148
2014-2015	289	331	247	237	85	1189
2013-2014	349	266	253	211	140	1219
2012-2013	307	271	222	202	169	1171

The quality of graduate students is relative to the quality of the entrance recruitment. It is obvious that the student intake policy, the consultant system and the programme dissemination are very important for the selection of students. For collecting the quality students, HCMUTE often performs evaluation and improvement of the programme and also invest Labs with modern technologies to train the graduate students with the desire quality for satisfaction of enterprises. This is one of the important points during the recruitment consultants *[Exh.8.4: Policy decision and the ECET]*. In addition, members of the recruitment board are the dean of FEEE and heads of the ECET department who have a lot of knowledge and experience to answer all questions related to the ECET programme, in which there are questions related to jobs after graduation. This is easy to convince the large amount of the quality entrance students. During recruitment time, the recruitment board can visit some high schools or invite candidates to visit FEEE and the university and show the policy, the programme quality and the engineering field orientations for the candidates. Some small competitions such as the

solar cars and the engineering models designed by academic lecturers and the FEEE students so that the candidates understand more clearly the training programme.

Especially, HCMUTE has the special scholarships and supports for candidates who meet the recruitment policy. In particular, candidates, who can be directly recruited to entrance the university without the national examination, have the distinction GPA of the high school years or the national or international prizes about the subjects of the recruitment groups in **Table 8.4**. Besides, HCMUTE can add points for candidates living at areas with ethnic minority or support these candidates the scholarships *[http://tuyensinh.hcmute.edu.vn]* .

Table. 8.4. Admission score of the ECET programme for the past five years, compared to the programmes of different institutes

Institutes	Years				
	2012	**2013**	**2014**	**2015**	**2016**
	Admission scores				
HCMUTE	14	17.5	18.5	22	21.75
HCMUT	19	22.5	21.25	24.75	24.25
HUTECH	13	13	18	15	16
TDTU	13	14	16	16.25	18
CTU	9.5	16.5	20	18.75	17.5

With the recruitment methods, the ECET programme of HCMUTE has obtained the recruited results as shown in Table 8.4. In particular, the entrance average point of the ECET students in the five year is 18.75 which is estimated to be high, compared to that of different institutes, except HCMUT and its entrance point is also stable and lightly increasing. Moreover, the entrance students of the ECET can lightly reduce due to the distributed policy of HCMUTE for all fields. However, the recruitment of the quality students is prior to HCMUTE and particularly the high entrance points of the ECET programme in the past five years.

8.3. There is an adequate monitoring system for student progress, academic performance, and workload

All lecturers are issued the personal online pages in LMS for timely updating of information related to studying and learning. The lecturers are required to use their online pages to post materials, video clips, formative-summative mark lists, announcements and others. It is obvious that students can easily access to read information or download materials without going to their class. Moreover, each student has the personal page for registering courses, monitoring test schedule, and other notifications. From the online page, students easily update their formative and summative marks, as well as GPA and the statistics of courses each semester. From theses early information, students can look back to develop their strengths and improve weaknesses. Moreover, dashboard *[http://it.hcmute.edu.vn/btvdt/], [https://online.hcmute.edu.vn/]* is applied to indicate student progress and performance, including student GPAs, class ranking, average graduation time of students and the percentage of graduates of the programme in the planned time. *[Exh.8.5: Online learning-teaching information and dashboard]*.

In addition to the activity of the online pages, students, who have problems related to studying results, the receive warnings from ASAO. Therefore, these students can be supported by FEEE and department counselors for improving their studying. Moreover, these students with studying warnings are assisted from Youth Union and Student Association (YUSA) and other offices for improving problems such as soft skills, team works, and social activities *[Exh.8.6: Studying warnings]*.

According to the regulation of MOET, students must participate social activities and this is the

required condition for graduation. In particular, students can participate Green Summers, blood donation days held at HCMUTE. Moreover, student groups are encouraged to perform social activities such as collecting things from students and community to send to flood-prone areas, poor country-sides. These activities not only bring the community spirit to people, but also obtain points for finishing their programme *[http://sao.hcmute.edu.vn] [Exh.8.7: Social activity information]*.

The ECET programme was designed to reduce from 189 to 150 credits which are distributed for 4 years corresponding to eight semesters. Each semester is from 18 to 22 credits per semester, in which the number of credits in each semester depends on courses of theory and Labs. In the last semester, the thesis with 10 credits is designed and students are encouraged to perform projects with the real systems using a lot of knowledge studied in previous courses. In addition, the completed thesis with good quality is required many skills such as oral representation, writing report, the real model/system, PowerPoint slides *[Exh.8.8: The ECET programme]*.

In each semester, students are informed points of all courses, both of the formative and summative assessments, in which students with the high GPA are considered to supply scholarships for next semester. While students with the low GPA are supported by the department and FEEE, particularly the students are consulted to reduce the number of credits in the next semester.

However, with different reasons, the amount of students can not complete the ECET programme on time. It means that some students have difficult family situations, difficulty to catch up the curriculum with the university level in the first semesters, wrong orientations to follow this programme and other reasons. In all of these cases, the students often complete their all courses with some semesters later than eight semesters of the designed ECET. To complete this as soon as possible, the FEEE/University always consider case by case to advise and support them the best to overcome.

8.4. Academic advice, co-curricular activities, student competition, and other student support services are available to improve learning and employ ability

From 2014, in addition to counselors with face-to-face, HCMUTE enhances counseling using the email group. In particular, these counselors, who are heads of department or experience lecturers, responds all questions related to the ECET curriculum through emails. Besides, other counseling activities are performed at the departments, faculty and centers including online advisors, social media system, emails and phone calls as described in **Table 8.5**.

Table 8.5. Representation of contents and units for students

No.	Contents consulted	Consultant units
1	School psychology and student life	HCO, ERO, SSC
2	Students affairs and policy	ASAO
3	ECET programme, course registration, certificates	AAO
4	Learning problems/academic	FEEE

For the new students enrolling the ECET programme for feeling a friendly environment and the first impression, FEEE associates with the Youth Union and Students Association (YUSA) to hold a welcome ceremony to introduce useful activities of the ECET programme, department and faculty. In particular, FEEE board and heads of departments have the friendly talks to the new students and answer all their questions. The departments show activities such as food stalls, exhibitions of scientific research products of students and lecturers, in which lecturers with experience discuss with the new students about problems related to the programme, Labs, designing projects and studying skills. With the aim of promotion for searching materials for self-study and knowing regulations to participate courses at HCMUTE, new students must attend courses for training how to use library resources, reading rooms, group studying rooms, public rooms, online documentation resources and others. *[Exh.8.9: Showing activities and training courses for new students]*.

In addition, the new students are arranged for the entrance assessment of English for arranging classes. Therefore, students, who are not enough standard of English, need to study the intensive English classes *[Exh.8.10: English testing list]*. For the good preparation of studying, the new students are studied the important course of Introduction to ECET, in which this course shows skills related to the post courses. The enhanced skills in this course include job ethics and passion of job, long-life, how to write report, solving problems, logical thinking, critical thinking and others. All these useful activities will help the new students overcome crestfallen problems. Studying progress of students is informed in the beginning of each semester by a studying plan designed in the ECET curriculum. In addition, each student receives an online subject registration schedule of each semester by one week before each new semester *[http://online.hcmute.edu.vn]*. Students can monitor the accumulated subjects during their studying progress by going to their online individual account pages which are issued by ITC.

The orientation days such as golden weeks are organized each semester at HCMUTE by ERO so that students have opportunities approached and discussed with enterprises for finding jobs and for orienting the future jobs. In these days, many enterprises can directly interview students and receive their documents for jobs. Moreover, ERO and FEEE combine to organize visiting trips to companies/enterprises and it will be the motivation for the students in striving learning to be able to get the good opportunity to work in the future. In addition to these activities, students of the ECET programme are sent to companies and factories such as Renesas Vietnam, Bosch, Jabil, Intel and others for graduation internship courses. This is the good chance for students not only to study the practical problems, but also to illustrate their capacity for finding a job. Students with the excellent or good GPA can be introduced and have good opportunities to work at the large companies and enterprises with good salaries *[Exh.8.11: Job orientation and visiting trips].*

FEEE has some scientific research groups such as electronics club and IS-LAB which always welcome academic lecturers and students searching collaborations with scientific research. Therefore, these students have good opportunities to works with academic lecturers of FEEE on scientific research projects. They are often assigned a part of work in the large project and this work can be developed in their final theses. It is obvious that these works can help students with deep studying and they can improve many skills such as self-studying, how to write academic reports and oral representation. In addition to the research groups, workshops are held regularly for the goal of timely trends, as well as technology market for students. In particular, in each semester, tours are organized for students to visit some factories, enterprises and companies such as ON Semiconductor at Bien Hoa Industrial Zone, Vietnam Beer Factory, Vietnam Hyosung and others by ERO and FEEE. Another activity is that students are always supported in seeking jobs, part-time works, particularly information are often posted on student Facebook, websites of FEEE, department and ERO *[Exh.8.12: FEEE activities]*.

In order to enhance the systematical knowledge, long-life and soft skills, students perform their theses which are designed to work out in the final semester. Before students perform their theses, an academic lecturer with research experience will instruct them how to choose topics, to write reports and to carry out it. Students can recommend supervisions to the department and topics discussed between the supervisors and students are registered to the department. The completed theses have to work out following forms posted on the department website, meeting ELOs designed in the ECET curriculum, including knowledge, long-life, soft skills and others. The excellent topics can be proposed to introduce on open days or a few enterprises so that they can consider to develop them *[Exh.8.13: Thesis models]*.

8.5. The physical, social and psychological environment is conductive for education and research as well as personal well-being

HCMUTE has two campuses, in which the main campus is located on the large with many green trees bordered Buildings A, B, C and D. In addition, the university has a library with high quality and many materials, a large dormitory and some places around have large reading rooms, teamworks, public

rooms to help students in group works and self-study. The benchs are located outside of the Buildings to meet the needs of learning, exchange, team works and the rest of students, in which the shared space, which has been located at the basement of the central building for some months, is to share difficulty among students and students-staff in HCMUTE such as introducing part-time jobs, supplying scholarships, instructing materials for reading more, and answering questions related to studying through emails or face to face. The YUSA of HCMUTE and FEEE often organize the sport competitions such as: football, volleyball, badminton, fell running for students every year. This is obvious that it is very useful for improving student's physicals and mental after studying hours with large workloads. In addition, many clubs such as social work, skills of English, Karate, modern dance and Ben dancer are developed to support and to welcome student's participation. *[Exh.8.14: Club activities]*.

Social and cultural activities such as fashion show, singing Festival are organized annually for all students and especially, FEEE has the traditional show of 3E-style. In addition, the propaganda activities and contests about laws of citizen traffic safety of Socialist Republic of Viet Nam are organized every year. Students are attracted by donation activities such as blood donation, tribute to martyrs, visiting Heroic Vietnamese Mother due to their humanities held by the YUSA *[Exh.8.15: Social activities]*.

Students are supported by HCMUTE to apply healthy insurance and accident insurance through clinics. From the insurance, students are issued free medication and counseled problems related to their health at HCMUTE health care center. Another problem often supported by HCMUTE is the clean environment by spraying mosquito and insect poison for protectting health of students and staff. Moreover, activities related to the health of students are that signs of warnings about gender, HIV/AIDS are appeared around studying spaces such as library rooms, public rooms, research Labs and others. *[Exh.8.16: Healthy information and warning pictures]*.

Criterion 9: Facilities and Infrastructure

9.1 The teaching and learning facilities and equipment (lecture halls, classrooms, project rooms, etc.) are adequate and updated to support education and research

In HCMUTE, there are two campuses, in which the main campus is on No. 01 Vo Van Ngan Street, Thu Duc District and another one on 484 Le Van Viet Street, District 9, Ho Chi Minh City, and the total area is more than 21 hectares. In addition, HCMUTE has the construction area about 122,243 m^2 with the average area is about 3.95 m^2/student, in which four buildings were constructed from 2007, consisting of the Center Building, the High-Tech Building, Multifunction Building and the second domitory in the second campus with the total area of 54.000 m^2. For FEEE faculty, it has one D102 room for seminar and the faculty library; another one for advisory, lecturer and research rooms at Building-D, the Intelligent System lab equipped with the wifi system at Building-C, measurement instruments, and sample models is for research students and lecturers. Besides, Many Labs to serve the ECET programme can be used for research and working lecturers *[Exh.9.1: Equipment and maintenance information, lecturer and research rooms, Lab rooms, campus information]*.

HCMUTE has the good infrastructure and learning facilities for learning and teaching, consisting of 183 classrooms, 58 Labs, 98 practice rooms and 16 computer rooms. Moreover, HCMUTE often plans to increase the number of classrooms to meet needs for research and learning spaces of students and lecturers. For the long-term plan, the new equipment and modern multimedia devices are invested for improvement of teaching and research quality following the annual plan. With the approved budget for the annual construction with about six billion VND, HCMUTE requires faculties to send plans for investment of new equipment and instruments. In order to meet needs of the international educational development, the internet infrastructure in HCMUTE was invested around 22 billion VND in 2013 to upgrade the system with high quality lines. This has improved many problems the service quality to meet needs for studying, teaching and research and the quality of teaching and learning using E-Learning and Mobile learning *[Exh.9.2: Internet infrastructure of ITC, investment*

information, Lab and computers rooms, learning spaces].

HCMUTE has the development strategy plans to invest the facilities and infrastructure as well as to maintain them, in which the short-term is from 2013 to 2018 and the long-term one is from 2018-2025. In particular, HCMUTE has invested to build a new building with classrooms and Labs and renewed Building-D and Building-C in 2016. For each semester, FMO and EMO sends announcement to faculties for planning to buy electronic and electrical devices for Labs and FMO and EMO synthesizes to transfer to the president board for approving. The facilities and infrastructure are periodically maintained following the ISO procedure, in which facilities of classrooms and Labs are tested for replacing the broken ones before each semester. In order to enhance support equipment quality, the FEEE Labs, FMO, EMO and library receive student and lecturer feedbacks through the google forms each academic year. Based on these feedbacks, FEEE sends suggestions to the university for supports *[Exh.9.3: Plan and strategy for facility investment, facility information and student and lecturer feedbacks]*.

9.2 The library and its resources are adequate and updated to support education and research

The library located at the center of HCMUTE inside Building-A with the area of 1.430 m^2. The library has the large amount of the national and international material resources, including hardcopy and softcopy books and magazines. In particular, there are about 1714 (Vietnamese) and 575 (English) reference books. In addition, to enhance material information for readers, the library has the cooperation and exchange the resources with organizations such as Vietnam Library Association, Library Association of universities, colleges Southern South (2007 - 2012), the Union library technical schools STE block. For enhancement of scientific research, HCMUTE bought 20 accounts from the National Center of Information and Technology so that research lecturers are easy to find national/international materials and publications. In addition to this library, HCMUTE has invested the high quality library with nice and convenient space and many materials at the base level of the central Building. Moreover, FEEE has the small library located at Building-D where students and lecturers of FEEE are easy to find specialized materials, research posters, thesis reports. To ensure that the material resource is uptodated, the library has plan to cooperate to FEEE for investment and enhancement of new textbooks and reference books every year *[Exh.9.4: Resource information, FEEE book plans, high quality space, account list, FEEE library and My OPAC data, book lists]*.

The library always creates the best condition for using material resources. The working time of the library for borrowing and returning materials is from 7:30 to 16:30 and the additional time for learning at self-study spaces is from 16:30 to 21:00. The self-study spaces for students and the teamwork room were invested inside the library and around it. The library staff are divided into two groups: service and profession, in which the service includes rooms of general reading, finding materials and borrowing materials, community reading, storage, guiding learning; business department, executive officer, reading activities, E-Learning Resources. Moreover, the library was invested the digital library in 2012 to provide the online information and e-material resources *[Exh.9.5: Resource lists and library actions]*.

The library resources are easy to access and look for through the personal computers equipped in seft-study rooms. Furthermore, the library has the cooperation with the national libraries for the solution of increasing the material resources. The library has the modern management software which allows students and lecturers search materials using their accounts to access mobile phones and remote computers. In addition, there are the annual activities such as exchanging books and book fairs, seminars with the famous visitors to bring readers the library materials and recieving feedbacks form readers for improving the service quality through the online surveys *[Exh 9.6: Lecture and student accounts for e-library, satisfactions' feedbacks and library collaborations with universities, exchanging books, famous visitor information]*.

9.3 The laboratories and equipment are adequate and updated to support education and

research

For improvement of studying quality, FEEE is supplied the amount of the annual budge (about from 0.5 to 1 billion VND) for improvement of Lab equipment. Heads of Labs assigned to be lecturers, who have the practice experience, manage equipment and devices in Labs, send FEEE for supports. In addition, they can repair or test fault devices during courses and make reports to send FEEE about equipment conditions each semester. After each semester, the heads test the status of devices, equipments and components in the end of each semester before next semester. The resiponsibility is that they plan to suggest to department and faculty with lists of electronics and electical devices to prepare for next semester *[Exh 9.7: Annual budget lists for FEEE investment, Lab budget for each semester, plans for large Lab investment]*.

FEEE has many Labs for six department, in which there are 21 Labs to serve for the ECET programme as described in Table 9.1. The Labs are located at Building-D and Building-C and these two buildings with many classrooms are mainly used to teach students of FEEE. Some Labs for major courses of the ECET programme were largely invested with equipment and devices of expensive grants such as Panasonic, Rockwell, Siemens for PLC course; and Kit DSP DSP TMDSVDP6437, Texas Instruments, for digital signal processing course; Exchange PABX system, Panasonic for telecommunication system, Kit the economical Cyclone III FPGA for IC design course.

Table 9.1. List of Labs for the ECET programme

Name	Quantity	Subjects	Head of lab
Basic Electrical Engineering Lab	2	Electronic practice	Bui Thi Tuyet Dan
Microprocessor Lab	2	Microprocessor practice	Truong Ngoc Anh
Advanced Microprocessor Lab	1	Microprocessor practice	Phan Van Hoan
IC Design Lab	1	Digital Systems Design with HDLs Practice	Nguyen Tan Nhu
Digital Systems Lab	2	Digital system practice	Nguyen Truong Duy
Electronic Devices-Circuits Lab	2	Electronic practice	Phu Thi Ngoc Hieu
Rockwell Automation Lab	1	PLC practice	Truong Dinh Nhon
Siemens Automation Lab	1	PLC practice	Ta Van Phuong
Panasonic Automation Lab	1	PLC practice	Nguyen Tan Doi
ABB Automation Lab	1	PLC practice	Ta Van Phuong
Power Electronics Lab	1	Power electronic Practice	Hoang Ngoc Van
Advanced Power Electronics Lab	1	Power electronic Practice	Do Duc Tri
Embedded Systems Lab	1	Embedded system practice	Huynh Hoang Ha
PC Networks Lab	1	Network practice	Le Minh
VLSI/ASIC Design Lab	1	VLSI design practice	Hoang Xuan Bach
Communication Systems Lab	1	Communication systems practice	Dang Phuoc Hai Trang
Signal and Image Processing Lab	1	Digital signal processing practice	Le Minh Thanh

In addition, FEEE has the co-operation with companies, industrial groups to organize seminars at least twice one semester about the modern technology applied in industry. On the other hand, students

are often supported to have internships and company tours.

9.4 The IT facilities including e-learning infrastructure are adequate and updated to support education and research

HCMUTE has invested the large amount of the IT facilities, in which it consists of about 1.512 (Personal Computers) PCs for all Labs and offices of faculties and units and about 258 projectors and LCD displays for many classrooms. The majority of PCs are connnected to the internet system for learning, teaching, research and working. In addition, the PCs in Labs of FEEE were installed with the specialized software with student licences such as Cadance Orcad, National instrument Multisim, Matlab, HFSS, ModelSim, Visual Studio for studying and teaching. One special case is that HCMUTE has invested around 22 billion VND for the Internet network system and infractracture which allows students and lecturers apply mobile learning and e-learning with the high speed lines. Moreover, the wifi system was covered for all buildings and students and lecturers are easy to access information for studying, teaching and research. It is obvious that HCMUTE invested trending with the HCMUTE mission and vision *[https://lms.hcmute.edu.vn] [Exh.9.8: PC statistics, PC investment plan, investment plan for internet system, software investment]*.

For use of the PCs and the support software, students and staff have private accounts with *[@hcmute.edu.vn]* domain to log in for managing their personal information. In particular, the students can access to their page for viewing grades, time tables, exam schedules, tuition fees and others. The academic staff can access their page to know teaching schedules and post materials. The support staff have the private accounts for solving their works. In addition, all department, faculties and units have the private websites to introduce about the mission, staff and to update information. Furthermore, the FEEE's website is *[http://feee.hcmute.edu.vn/],* where information of the programmes, annoucements, job requirements, activitites, technology information and lecturer information and other things.

The Digital Learning Center (DLC) with the most modern technology in Vietnam was invested about US 300,000 USD, in which there were the co-investment of HCMUTE and the HEEAP Alliance partners such as the ASU, Intel and Pearson. Moreover, this room can contain about 50 students arranged in 7 workstations and each one equipped with tools supporting virtual collaboration. To ensure that the quality of teaching, learning and updating teaching methods, HCMUTE has the speacial policy to encourage academic lecturers using digital learning, Blendded learning, E/M learning and att this time, there are more than 1000 online courses on the digital learning sytem *[Exh.9.9. MOU-collaboration information, training courses for lecturers, student course timetables]*.

9.5 The standards for environment, health and safety; and access for people with special needs are defined and implemented

The HCMUTE always invests to built the green and clean environment and it is the part of the training quality improvement. All lecturers and staff have health and accident insurances, in which they are introduced to go to the hospital for generally testing their health once a year. In addition, during the working time if they have any trouble with their healths, they can come to the HCC or be introduced to the hospital for diagnosis and treatment. With the new students, they are required to test health in the admission day and supported health insurances. Moreover, during studying, HCMUTE supports to advice on psychology, health, disease prevention and treatment through face to face, email, announcement on the HCMUTE website *[Exh.9.10: Health care and disease prevention lists for students and lecturers]*.

Another activity is that HCMUTE has got the regulation of banning smoking around buildings and classrooms through announcement and warnings signs since 2000. In additional, the activity to prevent the epidemic disease from insects, mosquitos and mice are periodically worked out by spraying chemical around HCMUTE. In the Labs and worshops, warning signs such as the Lab regulation, labor safety, dangerous warnings, medicine cabinets and fire fighting equipment are installed around working and studying places for purposes of safety and emergency. In practice, there

ais the guard team of 22 persons who are responsible to ensure the safety in HCMUTE with 24/24. For the high safety, the guard team often attends the professional training courses following the planned schedule every year and this team will instruct staff and students to understand the regulation and use of the firing devices for emergency. For the emergency situations, Cacbon dioxide fire-extinguisher and the hotline 08.37.201.269 are installed with classrooms, labs and workshops *[Exh.9.11: HCMUTE hotline and security, regulation, labor safety, dangerous warnings, medicine cabinets and fire fighting equipment information]*.

Criterion 10: Quality Enhancement

10.1. Stakeholders' needs and feedback serve as input to curriculum design and development

The ECET programme was built based on guidelines and decision of MOET; orientations of the professional organizations; mission and vision of HCMUTE; feedbacks of enterprises, alumni, lecturers and students through surveys, academic meetings, the annual job fair and scientific seminars. The academic curriculum of the ECET was developed to be 150 credits in 2012, in which this curriculum was designed to meet the requirements, needs and comments of stakeholders. With the department lecturer's feedbacks, in the end of each semester, the department has the meeting to share information related to courses in the semester and then the department selects the lecturer's feedbacks for improvement. In particular, in the department meeting, lecturers often discuss about courses which they can contribute and give feedbacks related to assessments, contents, ELOs and courses integration. Student's feedbacks are collected through methods such as student's comments on the personal dashboard of lecturer or the group Facebook for each subject; paper surveys and meetings face to face between students and leaders of departments and faculty. Surveys are sent to alumni and enterprises to collect feedbacks related to curriculum. From these feedbacks, in the end of each academic year, the department can recognize and plan to enhance the curriculum following the ISO procedure with 40 small procedures *[Exh.10.1: Stakehoders' needs, meeting minutes, student feedbacks and regulations]*.

For the curriculum innovations, the collection of comments and feedbacks from the stakeholders plays an important role. Therefore, the department is assigned to work out the innovations by collecting feedbacks from the stakeholders through direct/indirect surveys, meetings and workshops as shown in **Table.10.1**. In addition, requirements/suggestions from employers\alumni\lecturers\students are written down based on feedbacks related to statistic 11 ELOs. All feedbacks will be considered at department and FEEE meetings for adjustment.

Table 10.1. Suggestions of stakeholders for adjustments of the programme *[Exh.10.2: Decisions on TA and social activities; Syllabi and curricula; Feedbacks from stakeholders]*

Academic year	Requirements/ Suggestions	Stakeholders	Fulfillments	Evidence
2012	Improve newly graduated students' ability in Communication in English for job profile:(ELO-05) selected from good to excellent - Employer:(over 65%) - Alumni: (47,5%)	Alumni, Employers	Improve the quality of English courses and English criterion for graduation	*Curriculum-2012*
	Orientation to ECET for students to do projects, write reports, standard tests and measurements, and to	Students	Add the course: "Introduction to ECET"	

	conduct, analyze, and interpret experiments and soft skills: ELOs selected from good to excellent: (ELO-04: 63,8%; ELO-04: 66,3%)			
	Enhance the ability of designing in projects :(ELO-11) selected from good to excellent - Employer: (72,3%) - Alumni: (60,4%)	Alumni, Employers	Increase credits for the capstone project	
	Reduce credits of the programme; Inherited knowledge among related courses; Create the continuous knowledge (department meetings)	Lecturers	Integrate the content of Audio-Video Engineering, Electronic circuit and others (Table 10.3)	
2012-2013	Propose teaching assistance scheme (department meetings)	Lecturers	Design regulations on teaching assistance	*Decision on TA*
2013	Students have to spend days for social activities during the programme	University	Set community service and social work as a requirement for graduation	*Decision on Social activities*
2014-2015	Improve assessments (department meetings)	Students, lecturers, university	Change formative assessments (quizzes, paper examination in class, teamwork, oral representation)	*Syllabus 2015, grade lists*
	Enhance English in teaching and learning :(ELO-05) selected from good to excellent - Employer: (over 90%) - Alumni: (63,7%)	Alumni, Employers	Use lecture notes and PowerPoint slides in English	
2016-2017	Enhance assessment (department meetings)	Students, lecturers	- Use rubrics for projects, thesis and Labs - Online tests	*Syllabus 2016-2017, grade lists*

For enhancement of the ECET programme, HCMUTE has two ISO management procedures with specific guidelines, including planning - survey - statistics – recommendation for improvement. Related to the ISO management, AAO is responsible to advice, as well as to report the HCMUTE president board about the action of the curriculum. One vice President is assigned to monitor its action through AAO, including the procedures for evaluating stakeholder's satisfaction. In particular, QAO and department annually sends surveys to students having finished their courses; graduate students; enterprises; lecturers and then feedbacks are transferred to the department for improvement *[Exh.10.3: ISO management procedure with specific guidelines]*.

Fig. 10.1 shows the schematic of the curriculum design and development, in which surveys are delivered to stakeholders for collecting needs. Thus, the programme is designed based on the stakeholder's needs. The department has meeting with lecturers to consider the most reasonable feedbacks for designing and adjusting the programme. After selecting the reasonable feedbacks for improving the curriculum, it is validated by SAC by the end of semester. Therefore, the validated curriculum will be implemented for next semester and this process is periodically carried out *[Refer Exh.10.1 and Exh.10.2]*.
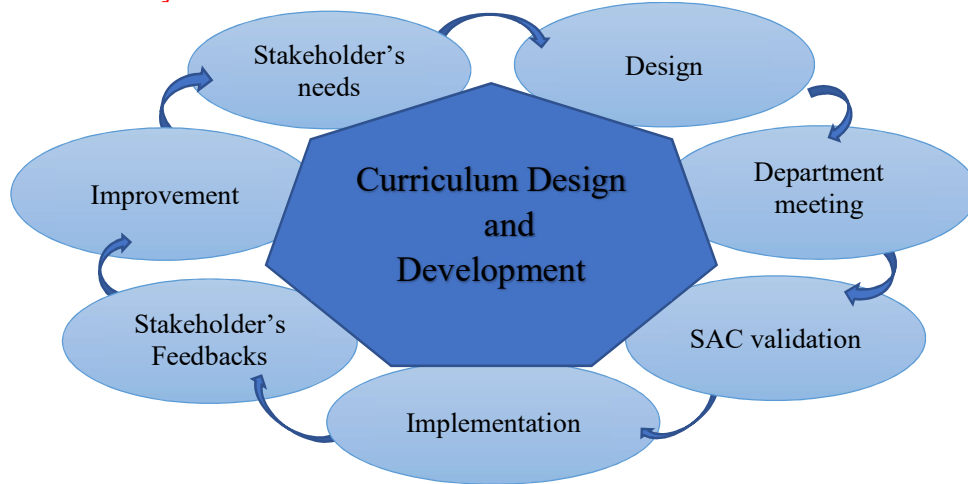

Fig. 10.1. Schematic of the ECET curriculum design and development

10.2. The curriculum design and development process is established and subjected to evaluation and enhancement

HCMUTE made the decision for adjusting all curricula based on the ISO procedure, in which its procedure is that the curriculums are evaluated for enhancement once every two years. Besides lecturers' feedbacks through the department meeting and student feedbacks, the department sends the curriculum to enterprises and alumni for feedbacks as shown in **Figure 10.1**. The adjusted curriculum is posted website of AAO, FEEE and department for announcement and stakeholders are easy to search information and contents for feedbacks. Moreover, the annual curriculums are allowed to adjust from 5-7 percent of the total curriculum credits on specialized modules. Based on this procedure, the department has deployed to perform many activities for curriculum improvement based on feedbacks from stakeholders. Therefore, the curriculum is validated by and SAC to make decision for adjusting the curriculum, including courses, syllabi or assessment types *[Exh.10.4: ISO procedure for adjusting the annual curriculum, meeting minutes and curriculum information on websites]*.

HCMUTE has actions for improvement of curriculums, particularly, the curriculums with 189 credits designed from 2008 to 2011 were adjusted to be 150 credits from 2012. Moreover, this 150-credit curriculum was developed to increase soft skills for purpose of enhancing the self-study methods through courses such as Introduction to ECET, projects and thesis. These courses require students to design PowerPoint slides to represent reports, to write reports, etc. For self-study, students can go to LMS to collect more materials (videos, textbooks and announcements related to assessments and learning, doing quizzes, rubrics). The ECET programme is periodically adjusted and updated based on feedbacks and comments from stakeholders and this adjustment is to meet the social needs as shown in **Table 10.2**.

Table 10.2. Comparison between programme structures of 189- and 150- credits

Clusters	189 credits (applied from 2008 to 2011)	150 credits (applied 2012)	150 credits (applied from 2013 to 2017)

57

General courses	66	56	56
Introduction to CET	0	3	3
Mathematics and natural sciences	30	23	23
English	15	9	9
Information technology	5	3	3
Human sciences	5	6	6
Political education and General laws	11	12	12
Fundamental courses	58	40	39
Theory	55	38	37
Course projects	1	0	0
Experiment, Practice	2	2	2
Specialized courses	58	44	45
Theory	32	25	26
Course projects	1	2	2
Experimental, Practice	22	15	15
Internship	3	2	2
Capstone project	7	10	10
Total	**189**	**150**	**150**

Some subjects were adjusted by integrating, replacing and changing their credits from 2008 to 2017, in which some courses of the curriculum have strengthed English, soft skills, team-works, reduce credits and eliminate some courses as shown in **Table 10.3**. In particular, the ECET curriculum was evaluated by the end of the year 2015 for performance under CDIO by QAO. In practice, the curriculum is reviewed and evaluated so that its adjustment must guaranteed following the logic process, suitability and adherence to the programme outcomes. In addition, plans for adjusting the curriculum are performed to meet the integration of Vietnam and international organizations such as AEC, TPP and others *[Exh.10.5: ECET curricula]*.

Table 10.3. Description of the adjustment in the ECET programme applied since 2012

No.	189-credit curriculum (applied from 2008 to2011)	Credits	150-credit curriculum (applied from 2012 to now)	Credits	Notes
1.	Lab of Electronic Communication	2	Lab of Communication System	2	Integrated
2.	Lab of Communication 1	2			
3.	Lab of Communication 2	2	Lab of Wireless	2	Integrated

4.	Lab of Further Communication System	2	Communication System		
5.	Electric Circuits 1	3	Electric Circuits	4	Integrated
6.	Electric Circuits 2	3			
7.	Basic Electronics 1	3	Basic Electronics	4	Integrated
8.	Basic Electronics 2	3			
9.	Programmable Logic Controller	4	Programmable Logic Controller	3	Reduced
10.	Advanced Microprocessor	3	Advanced Microprocessor	2	Reduced
11.	Microprocessor and computer interface	4	Microprocessor	3	Reduced
12.	English for Special Purpose	3	English for Special Purpose	0	Eliminated
13.	Computer Architecture	2	Computer Architecture	0	Eliminated

For enhancement, the department often has meetings in the end of semester to discuss about student's comments, grading results related to assessments, feedbacks from lecturers, alumni and enterprises. From this meeting, the department synthesizes the reasonable feedbacks for improvement. Lecturers, who commonly participate on the same subject, regularly have the meeting together to discuss about student's feedbacks and summative and formative assessment results and then show suggestions for adjusting course contents and assessments.

When designing and adjusting the curriculum, the department benchmarks it with national and abroad curricula which are very close to the designing curriculum. It means that the ECET programme was designed based on the similar education programmes of the national and international universities such as HCMC University of Technology (HCMUT), Posts and Telecommunications Institute of Technology (PTIT), Rurgers university, Auckland university, Suny Binghamton university, Arizona State University, Cholopunkon University. However, the ECET programme must mainly meet social needs and the vision and mission of FEEE and HCMUTE.

FEEE has got collaboration with Rajamangala University of Technology (RMUT) in Thailand for exchanging students for short-time training and research in recent years. In particular, HCMUTE students can study at RMUT from six months to one year and reversely, RMUT students can come to HCMUTE to study. Therefore, the students can choose the interesting topics to work with academic lecturers. Another collaboration is that there have been Laos students studying this programme in recent years *[Exh.10.6: Bachelor programmes and international collaboration]*.

10.3. The teaching and learning processes and student assessment are continuously reviewed and evaluated to ensure their relevance and alignment

HCMUTE deployed the ISO procedure *[Refer Exh.10.3]* to ensure the quality of all programmes and this procedure was revised in 2015. All academic units must plan to follow this procedure under the supervisor of AIO and under the review and evaluation of QAO for quality assurance. From 2015, QAO and FEEE have combined to supervise the procedure of the ECET programme every semester, in which the department and lecturers work out problems related to the quality of learning and teaching such as process of examination questions and answers, exam security, replication of written exams, delivery of exams and scores between lecturers, submission of formative-summative tests, improved contents, updated lecturer portfolios, improved assessment methods, etc. *[Exh.10.7: Assessment types and recommendations from the QAO]*.

The programme and its courses are always improved and adjusted to meet access needs. In particular, credits of the curriculum were reduced from 189 to 150 in 2012. Lecturers are always encouraged to suggest for adjusting contents and assessments of courses every semester and this adjustment is to well meet needs of ELOs of the programme. Therefore, some lecturers have worked out grading statistics of subjects in the end of every semester for adjustment in recent semesters, for example, in the subject of Digital Systems, contents and assessments in its syllabus are adjusted to enhance the effectiveness of ELOs. In addition, a few lecturers have performed the short surveys for their courses after a few weeks for timely adjusting teaching and assessment. It is obvious that this help lecturers more strongly enhance the teaching effectiveness of their courses *[Exh.10.8: Subject feedbacks from students; grading statistic lists]*.

The department often has the academic meeting in the beginning and end of every semester so that lecturers discuss together and show their contributions related to the past courses. From this meeting, the significant feedbacks are considered for improvement of the curriculum to enhance learning outcomes. For example, the content of Digital Systems was too long, in which many problems, which students can self-study based on online materials and supports from tutors, need to reduce theory and increase exercises in class. In addition, lecturers can adjust how to assess by choosing reasonable assessment kinds for their courses. Another example is that Digital System Lab shows students in beginning of semester about its assessment having three parts: pre-lab, formative examination and summative examination to produce the final column. For improvement, semesters of 2016-2017, Lab courses have shown assessments using rubrics, as well improved some rubrics to enhance reliability *[Exh.10.9: Department meeting minutes and rubrics]*.

Improvements in teaching and studying activities to ensure that it may help students achieve the learning outcomes of the curriculum are important. In the ECET programme, all lecturers are encouraged to apply a variety of positive teaching methods such as presentation combined with group discussion in class; English PowerPoint lectures; bilingual lectures (Vietnamese-English), using the LMS from 2013 until now. Moreover, in some courses, students are required to do topics or projects by a group with a few students so that they can learn how to work together, working responsibility and member contribution. The topics not only require theory, but also show results of the real products or simulation results. In some cases, students with deep learning capacity can work with lecturers through projects. All teaching plans of lecturers for each beginning of the semester are discussed among lecturers through department meeting before performing. In the end of each semester, the department meeting is organized to discuss the last problems such as teaching and methods, feedbacks of students and lecturers related to teaching and studying for adjustment and enhancement of next semester *[Exh.10.10: Information on LMS, working results of students, department meetings]*.

In each syllabus, student assessment activities are planned and introduced to students in the beginning of each course for purpose of helping students achieve the learning outcomes. These assessment activities are divided into two parts: Formative assessment for 50 percent of the total grading and summative assessment for 50 percent of the remaining grading. In the formative assessment, some courses are performed several times with different tests such as online quizzes, individual paper examination in class, topics for teamwork with oral representations and reports. With the summative assessment, AAO organizes the common examination for all courses lasting about four weeks. Moreover, for enhancement of timely improving, some courses projects, oral representations, laboratories, working models, enterprise internships, theses apply assessments using rubrics *[Exh.10.11: Assessment procedure and result rubrics]*.

For ensuring relevance and alignment in improvement of the curriculum, teaching portfolio and assessment processes of lecturers related to preparation, implementation and true procedure are monitored by AIO and reviewed and evaluated by QAO in the end of each semester for quality assurance according to the ISO procedure. All feedbacks collected from students through dashboard, online surveys, AIO, QAO are sent to the department for improvements and then apply for next semester. In the improvement procedure, the department plan for participating lecturers' classes between lecturers are registered in beginning of each semester and then recommendations are sent to

lecturers for improvement of assessments, subject contents, suitable rubrics for subjects of Labs and theories, etc. *[Exh.10.12: Plans for participating classes and teaching and lecturer portfolio; Results including grading lists; class participating lists; QAO recommendation; meeting minutes]*.

10.4. Research output is used to enhance teaching and learning

Research results play an important role for improvement of learning and teaching to the programme. In the HCMUTE regulation workload for lecturers, scientific research hours per year are required, therefore most of lecturers must do research. However, a quarter of the FEEE lecturers has projects and publications with high quality. Thus, these research projects and publications can help them to adjust textbooks or to add exercises, experimental or simulation models. In addition, a small amount of students with deep studying have the good chances to work with academic lecturers for improvement of experience and research skills *[Appendix A6: Figures of student group attending international competition under lecturer instruction]*. For example, when teaching course of Image Processing, results related to problems of image processing are showed through video clips which are products of research projects supported by some organizations. Therefore, students may associate their course with real research and applications. Moreover, if one lecturer has a lot of research projects related to his/her courses, his/her lectures can show real results from the projects to illustrate theory. It means that this not only enhances student understanding, but also instruct students how to transfer theoretical study into application research *[Exh.10.13. Projects' decisions and titles; Project assessment results, lecturer publication lists, student scientific research list]*.

From lecturer's projects and research results, students can study how to apply theoretical knowledge into real projects under instruction of academic lecturers with research experience. HCMUTE encourages students to register research projects under help of academic lecturers to develop their application skills. In addition, the projects can help students more understanding real problems related to theory courses which have been studied. Thus, students learn skills and experience for design of real models and simulation results from lecturers. Students of the ECET programme are encouraged to participate in competitions at different levels. In practice, there have got competitive programs such as Holeim prize, Eureka, Mechanics for scientific research students, Led Matrix Design, Robots Moving on Maze Map, YSEALI: Young Southeast Asian Leaders Initiative *[Appendix A6: Figures of research activities]*. From studying theory to doing real system models, student groups may successfully perform real systems for exiting theses with studied knowledge and skills built in the programme *[Exh.10.14: Student's prizes, research topics, real models]*.

10.5. Quality of support services and facilities (at the library, laboratory, IT facility and student services) is subjected to evaluation and enhancement

In recent years, HCMUTE has invested facilities for improvements of teaching and studying after receiving feedbacks from students and lecturers through the annual surveys of units. Based on the invested facilities, all relative units work out enhancing the service quality to meet ELOs of the programme. Many classrooms have been equipped with the large LCD televisions instead of old projectors at Buildings A, B and C. The LCD televisions allow to connect to electronics devices for the support of teaching and studying. Moreover, the university annually plans to renew facilities in each classroom, in which EMO is responsible to synthesize and perform this problem *[Exh.10.15. Equipment calibration, and student and lecturer feedbacks, plans for facility improvement]*.

For enhancement of teaching and studying, a Digital Learning room has been enhanced to support lecturers in teaching on LMS. In particular, the lecturers can post materials, video clips, information, online tests and others on their private website. Students can easily read and download materials and information on this website for self-studying, as well as perform the formative online tests at any time. In addition, HCMUTE has invested to build the Building-F1 eight floors with classrooms and Labs in 2017. In increasing more public space, HCMUTE has invested the studying space at the 5th floor – the Central Building and completed it in October, 2016 *[Appendix A6: Figures of sefl-study activities]*. This is obvious that the university always has plans to improve facilities to meet needs of

teaching and studying for development of the technological university. In addition to investment of classrooms, the facilities of Laboratories, Library, Dormitory, Student service, Information technology, Health service and Hygiene environment have been improved *[Exh10.16. Studying spaces]*

Laboratories: The department has plans for repairing experiment modules and suggesting to invest Lab equipment every semester/year. In particular, heads of laboratories may carry out measuring, testing repairing the modules, then they send statistic reports to FEEE and department for next semester preparation. If the equipment\modules are broken, they will send requirement for replacing or upgrading. Moreover, the department suggests the university to invest the equipment with modern technology or receives donations from companies related to the ECET field. After each semester, the department sends surveys to students for satisfaction's evaluation of Lab rooms and some suitable feedbacks related to studying modules and equipment in next semester are timely processed. In addition, FEEE sends plans to improve and develop Lab facilities at Labs every year to the HCMUTE board for investment to meet training plan of the ECET programme *[Refer Exh.10.15] [Exh.10.17: Investment plans, invested lists, donated module lists]*.

Library: The library was built the portal system to provide online information and electronic documents for readers in 2012. In order to a lot of online information, the library bought 20 accounts from the Information Center of National Science and Technology and collaborates with other university libraries to serve the key research groups of HCMUTE and students. All students have the personal accounts to access the digital library to view and update online information. Moreover, the library creates the comfortable environment with reading rooms and spaces around it. The library has suggested HCMUTE to invest the center of digital studying materials with sufficient modern facilities, called high quality library, to meet reading needs of all studnets in 2017. In order to improve service and material quality, the library always receives feedbacks from readers *[Exh.10.18: Account lists, collaboration information, high quality library area, plans for material investigation, reader feedbacks]*.

Dormitory: The dormitory always efforts to improve service quality to serve students and particularly it was awarded the title of "Cultural Dormitory" in 2015. In the development strategy of 2016-2020, HCMUTE will plan to build one more dormitory with the comfortable environment to meet needs of students, in which there are necessary activities such as the living and learning conditions, entertainment, wifi system and sport areas *[Exh.10.19: Prizes, dormitory investigation plan, dormitory facility]*.

Student service: Student Service Center (SSC) was founded in 2013 to support students in learning, part-time work, and entertainments and sports, physical activity, life skills and psychology counseling, life sharing and other activities *[http://ssc.hcmute.edu.vn/]*. In addition, SSC receives information from the social network, from students about problems related to study, living for direct consultation or contactting the expert or responsible units to solve students. The center is also responsible to build and manage the Student Advisory Group (SAG) and this helps students reduce their difficulties and enhances studying efficiency of students. Finally, there are many activities deploying to serve and to share with all students during studying years at HCMUTE *[Exh.10.20: Student service information]*.

Information Technology (IT) Facility: the IT center has been invested to develop the stronger wifi system for the whole university from 2012, including classrooms, centers of teaching and studying, library, dormitory, public rooms and others. Moreover, all Labs and offices of faculties and units are invested about 1,512 PCs. IT team always tests and repairs\repaces error PCs during studying hours. In addition, these PCs are tested for their normal operation in the end of each semester to prepare for next semester. For improvement, the IT center will evaluate quality of these PCs for maitaining and replacing. Moreover, HCMUTE has planned to invested a quality room with many PCs for online examination from the begining of 2017 *[Exh.10.21: IT facility information, investigation plan]*.

Health service: HCMUTE has the medical center to support for students and staff. For all students,

the mandatory health insurance is required. All staff and lecturers are supported and introduced the large hospitals of HCM city for the annual health testing. In addition, HCMUTE collaborates with the local Health Care Station to spray chemicals for preventing epidemic disease from mice, mosquito, insects and others. The medical cabinets first aids are consulted and required to install in Labs *[Exh.10.22: Healthy support and environment]*.

Hygiene and Environment: The University hires sanitation workers from the department of Hygiene and Environment to assure safe hygiene in all areas. Besides, school yards and classrooms are always cleaned daily *[Exh.10.23: Hygiene and environment at Buildings for students]*.

For enhancement of service and facilities, all units supporting services and facilities perform satisfaction's evaluations of students and lecturers and surveys are sent to them by QAO every semester. Therefore, feedbacks are synthesized by the units to enhance service quality and to suggest for facility improvement. Therefore, plans for repairing and upgrading equipment are transferred to the university leader *[Exh.10.24: Library, dormitory, Health Care surveys]*.

10.6. The stakeholders' feedback mechanisms are systematic and subjected to evaluation and enhancement

The ECET curriculum is evaluated to satisfy stakeholders such as enterprises, students, lecturers, alumni using the ISO management procedure. The feedbacks and comments from stakeholders, which are reflected the quality of the curriculum, are annually collected to improve the programme and gain their satisfaction as described in **Table 10.**4. In practice, there are many types of feedbacks from stakeholders held every semester or year, in which surveys such as online survey, paper survey, direct dialogue and meetings are designed to collect feedbacks *[Exh.10.25: Feedback's mechanisms]*.

Table 10.4. Catalogues of surveys

No	Survey's name	Objects	Times/ Year	Time	Method
1	Teaching quality survey	All students	2	The end of each semester	- Online (PSC) - online.hcmute.edu.vn
2	Newly graduate survey	Graduates after 3 months	2	1st: May; 2nd: November	- Online (PSC) - online.hcmute.edu.vn
3	Alumni survey	Graduates after 1 year	2	October	- Online-Google form - paper forms
4	Student's satisfaction survey on service quality at HCMUTE	All students	1	January	- Online (PSC) danhgia.hcmute.edu.vn
5	Workplace satisfaction of HCMUTE's staff survey	All current staffs at HCMUTE	1	October	Online-Google form
6	Employers' survey	Companies	1	October	- Online-Google form - Paper form
7	Student's satisfaction survey on studying course	Lecturers	1-2	During course	- Online-Google form - Paper form

For enhancement of the curriculum, improvement activities are worked out by applying the Plan-Do-Check-Act (PDCA) process. The department receives feedbacks from stakeholders and then perform the improvement following the process.

Plan: Different survey forms are designed by the department to deliver them to stakeholders and feedbacks about the ECET programme with ELOs are received through emails, post or other online channels. Therefore, the department synthesizes and analyzes feedbacks for improvement.

Do: The ECET curriculum is deployed every semester and plans for monitoring are employed by QAO. The surveys are sent to stakeholders and then feedbacks are collected.

Check: QAO monitors and analyzes training actions for correction and prevention, and internal audits. The collected survey results are sent to the department for quality improvement. The department has meeting with lecturers to analyze weaknesses and strengths and compare to the proposed plans to show solutions for improvement.

Act: After validated by Scientific and Academic Committee (SAC), the improved curriculum will be applied for next semester. In order to receive reasonable feedbacks from stakeholders such as lecturers, enterprises, alumni, students, the content selection of survey forms is very important. Moreover, survey time and feedback processing for innovative activities are always mentioned. All problems related to surveys are designed and deployed by QAO and FEEE.

Surveys for enterprises are sent through emails, online-Google form and paper forms in order to get specific feedbacks on information of graduate students related to the curriculum by ERO and the department. There are about two-third of feedbacks and they are synthesized and then transferred to the department for analysis of weaknesses and strengths for improvement of the curriculum *[Refer Exh.10.25]*.

Feedbacks of lecturers often contribute their opinions and experience through the department meetings which are usually held at least two times per semester. Moreover, feedbacks are collected through the congress of the workers and officials and the training summary of the academic year. All feedbacks are considered for improvement.

Student surveys are sent all students focused on the quality of teaching and they are periodically carried out two times a year from the midterm and the end of each semester through online (PSC), *[danhgia.hcmute.edu.vn]* and paper form. Feedback information are delivered to lecturers so that they can timely improve their teaching. In addition, Lecturers can do surveys themselves around 2 times per one semester for timely adjustment of teaching. In addition, feedbacks are worked out through the dialogue meetings between the FEEE leaders and students, as well as the HCMUTE president board and students at the Main Hall periodically held by ASAO *[Exh.10.26: Feedbacks information]*.

Surveys for graduate students after 3 months are periodically performed two times per year at the time of graduation using online survey forms or paper forms by QAO. Contents of the surveys are focused on problems related to job, filed, salary, using English and others. Feedback information are sent to the department for improvement *[Exh.10.27: Graduation feedback information]*.

Alumni surveys for feedbacks, which are sent to alumni, have two kinds: paper form and online form. The paper form can be delivered to their companies or directly sent them through the annual alumni meeting at the university. In some special cases, the department can directly receive feedbacks from large alumni at academic workshops. From 2015, online surveys can be performed by QAO for graduate students. In addition to these kinds, feedbacks can be received through talking between the HCMUTE leaders and students by face to face in the end week of every month or on the facebook group of the HCMUTE staff *[Exh.10.27: Alumni feedback information]*.

Programme improvement for enhancement of studying and teaching to meet needs plays an important role in the educational development. Therefore, the activity of surveys for feedbacks from stakeholders has performed in past years and particularly it is regularly worked out each semester or each academic year. Surveys are sent to receive feedbacks through Facebook, Google form, paper form, academic workshops and then these feedbacks are synthesized and suggested for improvement. In 2012, HCMUTE was advised by INC to invest the high-speed internet system for the online learning and teaching management software, so it is the good condition for performing online surveys

and support for other academic problems. After developing the online management system, HCMUTE has required all units to synchronously perform surveys related to studying, teaching and curriculum adjustment each semester and each academic year from 2012. From the surveys via "lecturer portfolio" in the end of semester, the department can consider for improvements of teaching and studying according to the process of "Plan-Do-Check-Act".

Criterion 11: Output

11.1. The pass rates and dropout rates are established, monitored and benchmarked for improvement

Pass rate and dropout rate are important metrics to evaluate the training programme. We recognize the importance of pass rate and dropout rate to quality of an education system; therefore, FEEE had monitored and established the ratio over years. From 2007, AAO acquires the number of graduated students, ASAO monitors the pass rate and dropout rate every year. This process costs much human labor and introduces some error during the collection process. Therefore, in 2014, we use an online system to acquire these data automatically. The system helps to monitor pass rate and dropout rate efficiently with a high accuracy as in **Table 11.1** *[Exh.11.1: Dashboard system].*

Table 11.1. Pass rates and dropout rates from 2008-2016

Academic Year	Cohort size	Percentage of completed first degree			Percentage of dropout during			
		<4 years	4 years	>4 years	1st year	2nd year	3rd year	>3 years
2016-2017	**146**	-	-	-	-	-	-	-
2015-2016	**219**	-	-	-	-	-	-	-
2014-2015	**289**	-	-	-	7.27	1.38	-	-
2013-2014	**349**	-	-	-	5.16	6.02	-	-
2012-2013	**307**	0	48.86	25.08	13.36	6.19	4.23	2.28
2011-2012	**291**	0	47.08	31.96	6.87	6.19	5.5	2.41
2010-2011	**241**	0	44.4	36.1	3.73	4.15	4.56	7.05
2009-2010	**231**	0	42.42	38.96	6.93	2.16	3.46	6.06
2008-2009	**247**	0	43.72	35.22	8.5	4.05	2.43	6.07

The results in **Table 11.1** point out that the dropout rate reduces significantly over years. In particular, for the first and second years, 12.55% (8.5+4.05) students had dropped in 2008 and this number reduces to 8.65% (7.27+1.38) students in 2014. From the third years, 8,5%(2.43+6.07) had dropped in 2008 and this number reduces to 6.51% (4.23+2.28) students in 2012. It means that if students work hard for two years and they will be familiar with university environment. Hence, students will have a high change to complete the degree within four years. In addition, the ECET programme allows students exchange between various programmes; therefore, if a student finds out a suitable training programme, the student could move to it. The flexible strategy leads to a phenomenon that the dropout rate in the first years is significant higher than others; because these students move to another programme. To reduce the drop rate given by the reason, Open day and consultant activity are held to support students to deeply understand about the ECET programme before they enroll to the university. Moreover, to reduce dropout rate in other years, SAO has a consultant team to advise students in their daily life and difficulty. With supporting activities, it is hopeful that more students can finish the ECET programme smoothly.

Based on the monitored dropout rate and pass rate from previous academic year, FEEE estimates the ratio between pass rate and dropout rate for the next semester as in **Table 11.2**. For each academic year, FEEE adjusts the pass rate not to be at least smaller than previous year. Moreover, if the actual value is smaller than the estimation, FEEE will find out solutions to improve the ratio in next semester. For instance, due to the report from monitoring system, many students, who have high score, cannot get the degree in the fourth year, because they fail in some courses such as Labs, projects, thesis and internship. Therefore, rubrics are designed for the courses for the reliable and fair evaluation. The rubrics are published on the department website *[http://feee.hcmute.edu.vn/]* and informed to all students early so that they can have a better prepare during their courses. By using this rubric method, the actual pass rate has been increase significantly in recent semesters. In addition, improvement of assessment method of one course has been applied, for example, one course can use many different assessment methods such as individual paper examination in class, online quiz, topic with teamwork. Moreover, for improvement of teaching and assessment, all lecturers often have group meetings of the same courses to evaluate the last results based on statistics of grading lists and feedbacks from students and lecturers to adjust for next semester *[Exh.11.2: Department meeting minutes, rubrics, assessment methods, group meetings and feedbacks]*.

Table 11.2. Estimated and actual students get the first degree within four years from 2009

Year	2015-2016	2014-2015	2013-2014	2012-2013	2011-2012	2010-2011	2009-2010
Estimation **(%)**	80	80	80	80	80	75	70
Actual **(%)**	-	-	-	73.95	79.04	80.5	81.39

To have an open view from the statistics of pass rate and dropout rate of students, the comparison is made between metrics of the ECET programme and others in **Table 11.3**. The average pass rate of faculties in the HCMUTE university is 77.58 percent *[Exh.11.3: Pass rate – dropout rate from Dashboard system]*.

Table 11.3. Pass rate and dropout rate comparison of students among faculties (2008-2011)

Faculty	FME	FEE	FEEE	FTE	FCE	Average
Pass rate (%)	89.11	79.96	87.41	79.55	85.4	84.24
Dropout rate (%)	10.34	20.03	10.17	20.4	14.6	15.10

11.2. The average time to graduate is established, monitored and benchmarked for improvement

The average graduate time is measured to be suitable between the training programme and students. Regularly, a minimum period for a student to complete undergraduate degree is 4 years and it could be extended up to 8 years. However, if students cannot pass all required courses within these estimated durations, they can extend the studying time. In particular, many solutions are described as in **Table 11.4**, in which the number of students, who gets undergraduate degrees on time, is increased and the average graduated time is reduced.

Table 11.4. Applied solutions to improve pass rate and to ensure average graduated time

No	Reason	Solution	Improvement
1	Students fail in final exam but work hard during a course	Many mini- tests for mind term evaluation	Students who work hard during a course will pass even they do not do well in final exam
2	Students do not know how to meet the requirement of a course	rubrics for thesis and practical courses	Students know how to prepare for a test

3	Students feel difficult to follow a course	tutor systems are designed	Tutors can help to explain points that students cannot follow
4	Students fail in a course	summer semesters for improving student's courses	Students can register summer courses to reduce the graduated time

A comparison between graduated rates within 4 years and more than 4 years is presented in the **Table 11.5** and the average graduated rate within 4 years of HCMUTE is around 48.7 percent *[Exh.11.4: Statistic of graduated time over faculty]*.

Table 11.5. Graduated average time comparison among faculties from 2008-2011

Faculty	AET	ECET	EEET	MET	CET	Average
Within 4 years (%)	61.85	44.40	45.90	57.1	60.5	53.9
More than 4 years (%)	27.26	35.56	41.51	22.4	24.8	24.8

11.3. Employability of graduates is established, monitored and benchmarked for improvement

Table 11.6. The time to get the first job

Year	2014	2015	2016
	Employed rate (%)		
Before graduate	23.95	28	28.85
1 month after graduate	17.95	20.95	22.1
3 months after graduate	14.05	7.85	7.8
Sum of students getting jobs	55.95	56.8	58.75

Employability is an important metric to measure quality of a training programme. Recognition of the importance of the metrics, QAO and department annually measure the metric using the online survey. Through the survey, the number of students, who has jobs increasing over years as presented in **Table 11.6**. In addition, the survey points out the ratio that a student gets job in the trained field increasing from 60 percent in 2014 to 87 percent in 2016. It reflects a situation that the ECET training programme is always improved to meet the requirement of labor market. *[Exh.11.5: Online survey about employability of graduates]*

Table 11.7. Looking for a job after one year (unit is %)

Faculty	Mar-14	Sep-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Average
FVEE	54.8	64.3	46.2	52.4	54.5	68.3	64.4	**57.84**
FME	70.6	63.5	54.6	65.5	60.3	72.4	74.6	**65.93**
FEEE	54.8	54.7	43.1	66.5	45.4	72.1	63	**57.09**
FCFT	60	35.8	11.1	37.7	22.2	67.5	100	**47.76**
FCE	71	57.8	39.6	66.6	55	66.7	65.6	**60.33**

Moreover, the HCMUTE often holds many business trips *[Exh.11.6: Business trip event]* and labor market event *[Exh.11.7: Labor market event]* to help students have opportunity for suitable jobs. In addition, the activity helps companies to not only hire potential candidates but also introduce practical environments to pre-graduated students. Some well-known companies that have close relationship to FEEE consists of SHTP, FPT, Intel, Renesas, Bosch and Sumsung. Therefore, with this activity, the

number of students, who get jobs, are significantly increased from 4.4 percent in 2014 to 11.2 percent in 2015 *[Refer Exh.11.5]*. Through the survey, a comparison of students looking for jos after one year is described in **Table 11.7** in which the result points out a bright side of the ECET training programme.

11.4. The types and quantity of research activities by students are established, monitored and benchmarked for improvement

The Mission and Vision of HCMUTE aims to be a programme built to meet needs of industrial companies/enterprises and labor market. Therefore, ELOs designed in the programme are to train students to gain abilities of designing Electronic-communication engineering systems. To achieve ELOs, students must pass several major projects such as Project 1, Project 2, thesis Project and others. The purpose of these projects can help students collect practical design skills. Moreover, to improve ability of students to satisfy practical requirements, the programme inputs research actions combined with teaching and studying. Students have two options to do research: First, they can apply to annual research funding in March every year*; Second, they can join research labs to work with lecturers having projects at open Labs of FEEE, such as 3D vision Lab and Intelligence System Lab which are well-known labs in the university. Supported by the suitable policy, the number of research projects are increasing for both students and lecturer sides as in **Table 11.8**. *[Exh.11.8: Guide to register and manage student research process, Open Lab in FEEE]*

Table 11.8. Research activity from 2010 to 2016

Research Activity	Years				
	2012	**2013**	**2014**	**2015**	**2016**
Students' research projects	10	27	13	45	28
Research projects - Institutional Level	30	24	31	31	26
Focused-Research Projects-Institutional Level	8	10	13	18	18

It focuses on not only the number of research projects, but also qualify of research activity. To improve research quality, exchange programmes can help students have opportunity to study oversea. Selected students can join to an exchange university to do their theses. The programme helps students recognize the difference in learning skill and research level. In advantage research, lecturers co-work within research Labs around the world to improve research qualify. Some lecturers work as visiting researchers in Korea, Taiwan, Thailand; whereas others are a co-adviser for Master student in oversea university**.** *[Exh.11.9: Exchange programme, student list]*

Table 11.9. Representation of projects from 2010 to 2016

Faculty	Number of research projects						Average
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	
FCE	10	8	11	12	12	4	10
FVEE	13	29	10	12	11	8	14
FME	19	40	20	10	25	11	21
FEEE	29	10	27	13	45	29	26

In addition, FEEE makes corporations with outside organization such as Saigon Hi-Tech Park (SHTP) to hold completions for students. The completion is not limited in the HCMUTE students and expanded to other universities. For instance, in 2016, HCMUTE held three completions about IoTs, led design, finding road robot completion. Moreover, HCMUTE invites many experts to introduce new technique to lecturers and students. In 2016, two workshops were help to talk about IoTs technique and 5G techniques, in which four experts in industrial filed were invited *[Appendix A6:*

Figures of IoTs workshops]. With support of active activities, the number of researches given by students are active at high level compared with other faculties in HCMUTE as shown in **Table 11.9** *[Exh.11.10: Technique workshop information].*

11.5. The satisfaction levels of stakeholders are established, monitored and benchmarked for improvement

To improve satisfaction's levels, HCMUTE always receives feedbacks from stakeholders including staff, student, alumni and enterprises. For improvement of satisfaction, QAO sends surveys to students and staff in the end of the second semester and feedbacks are transferred to leaders of units. FEEE and departments organize meetings to consider the feedbacks for improvement in next semester, in which all lecturers and staff will discuss to give better solutions for teaching and supporting. From 2015, QAO makes the online surveys to annually collect feedbacks and the online survey allows to recognize the weak and strong points for improvement of satisfaction's levels. Positive feedbacks will share to all staff to apply and weak feedbacks will send to everyone for improvement. More than 75 percent staff agree that teaching and research workload of each staff is fair and reasonable. In addition, HCMUTE has built the workload policy for academic staff with three options for selection and each lecturer can select one option to be suitable with his/her contribution. In particular, one lecturer can choose teaching workload more than research workload; another one can like a lot of research workload. This policy is flexible and suitable for different efficient contributions of all lecturers. *[Exh.11.11: FEEE meeting minutes, surveys for staff, workload policy].*

For student feedbacks, FEEE will hold "face to face" meetings to receive feedbacks from students and to answer all questions every semester. Through the meetings, department meetings with lecturers will discuss to adjust teaching and assessment methods. In addition, meetings between the president board and students are held to receive feedbacks related to other units in the end of each semester. Based on these feedbacks, the president will require the units to consider and improve service quality. The survey result points out that the satisfied level increases over years and is also active at a high level (over 85 percent). For alumni and enterprises, QAO will send surveys every year to receive feedbacks for adjusting the training programme, in which the main feedbacks for the programme to improve English skills, soft skills *[Exh.11.12: Communicated meeting with students, survey about satisfaction level from students, surveys for alumni and enterprises]*.

PART III: STRENGTHS AND WEAKNESS ANALYSIS

Criterion 1 - Expected Learning Outcomes

Strengths

1. The expected learning outcomes (ELOs) in the ECET programme are designed for the ECET degree following the ISO management of HCMUTE and the ECET programme is compared to programmes of national and international universities.

2. The ECET programme with the carefully established curriculum includes qualified academic lecturers whose expertise are in engineering, science, education, practical experience, better intake students, and professional support staff. Therefore, all of them make good translation of ELOs to meet stakeholders' needs.

3. Based on the appreciate short-term and long-term development plan and infrastructure, the programme is designed for students so that they develop strong ties among lecturers, peer advisors and students. Moreover, it helps the students commit themselves to life-long learning and daily learning practices.

4. The department has strongly developed relations with alumni and enterprises who continually give feedbacks on the curriculum and realistic advices to students and the department through both face-to-face meetings, google form and Facebook.

5. The ECET programme aims to focus on the hands-on experience, technology and research which meet to the social needs.

6. The dissemination process to promote the ECET is large and effective.

7. The ECET programme has established an appropriate critical mass and is toward enhancement to the next level.

Weakness

1. Because BME is new to the country and there is not yet any companies in Vietnam to manufacture medical devices, the interactions between the academic and the real world are limited. The labor market's feedbacks do not reflect the long-term and mass strength to allow us to picture more vividly our expected learning outcomes.

2. The relationships between university and companies are just at some companies and this is common of Vietnamese universities. Although the programme with the education and technology meets enterprises' needs, the enterprise component needs to improve to be better.

Opportunities

1. The ECET field is popularly known by the Vietnamese academic and non-academic sectors. In practice, the demand of human resource of this field for companies and factories is very large. Therefore, the programme can become a standard and have a large impact in the society.

2. FEEE is one of three large faculties strategically invested for the development at HCMUTE. The ECET programme has received strong supports from HCMUTE for many recent years.

3. HCMUTE is the university with the diversity of fields such as business, engineering and technology. It is obvious that collaboration among them will be beneficial to all parties and students and lecturers to develop more appropriate ELOs.

Threats

1. There are many Vietnamese universities with the same field. Therefore, the competition would be harmful if the supply of human resource can be more than that of demand.

2. The ECFT programme is in a weak position in the international competition to attract good lecturer members and international students.

Plans for improvement

1. Enhance the programme's academic lecturer work force by attracting young, ambitious and visionary lecturers with quality qualifications. At the same time, the programme continues to attract outstanding students and promote innovations.

2. Enlarge national and international connections with top-notch ECET programmes to put actions together.

3. Identify topics for development not only in engineering and technology but also in management and entrepreneurship to convince the industry of the importance of the collaborations with engineering academia.

4. Develop additional ELOs that help propel the impact of the ECET to the society based on the feedbacks from students, alumni, lecturers and other stakeholders and the evolvement of the society.

Criterion 2 - Programme Specification

Strengths

1. The ECET programme specification is divided into clusters to be convenient for the appreciation and management.

2. The programme specification is best communicated to stakeholders, in which ELOs are designed to be assessable. In addition, the input criteria are explicit and conditions are appropriate for learning.

3. The programme specification provides enough information for students through websites of the department, FEEE and AAO, student handbook, poster in front of FEEE.

4. Changes of the programme are always updated and quickly posted on websites for announcement to stakeholders.

5. The programme specification has reflected the vision and mission of HCMUTE and FEEE.

6. Courses in the programme are reasonably divided into semesters to increase students' learning effectiveness, in which elective courses not only provide deeper knowledge, but also create flexibility and specificity so that students have selections for new orientations. While core courses create the solid and common background.

7. Courses are designed to be coherent and give students theory, hands-on, soft-skill, how to think and ask questions, learning research methodologies to approach in selecting and executing projects and exiting thesis.

8. Support teams and support staff, including academic lecturers, practical experts, technical staff and administration staff are enough strong to help students have a good balance between theoretical and practical knowledge.

Weakness

1. The ECET is popular in many countries and Vietnam. However, economy and technology have quickly developed and require work force with high quality. Therefore, the programme is required to continuously improve to meet the social needs, in which ELOs related to soft-skill, the state-of-the-art technology, and the latest discoveries are updated to teach students. In order to do this, we need to attract top-notch instructors who have great visions and high expectations to be able to teaching students. This is difficult for us to attract them and can take us much time to find optimal solutions.

Opportunities

1. The needs in the ECET field are very great. If the programme is appropriately designed, students will have a lot of opportunities to work in both the academia and the private sectors.

2. Many Vietnamese diasporas and academic lecturers with quality qualifications desire collaboration and contribution to universities.

3. Support from the leadership of HCMUTE and MOET is vital to help expand the programme.

4. HCMUTE has PMO for the programme advertisement and other media channels help us to recruit both good students and good lecturers.

Threats

1. The lack of appropriate lecturer members with quality qualifications may delay our development intentions.

Plans for improvement

1. The Department works closely with enterprises to develop projects and to enhance Transfer of Technology.

2. The Department will work with the University to have good policies for recruiting good lecturers with quality qualifications.

3. The Department will continue to improve international collaborations and share with national universities in scientific research and training enhancement.

Criterion 3 - Programme Structure and Content

Strengths

1. The programme is built to be throughout Education, Research, Technology and Enterprise.

2. Content and structure of the programme applies the concept of interdisciplinarity to equip students with the necessary knowledge and skills so that they may work at the interface between electronic, communication, engineering and technology.

3. The programme is designed to allow students to have a solid and common background knowledge in the core courses and the elective courses provide they with deeper knowledge.

4. The project courses help students facilitate the implementation of the project-based learning process.

5. The curriculum roadmap showing the order and prerequisites of the courses help students choose the appropriate courses with their ability.

6. All major changes in the curriculum are noted in the programme based on satisfactions' feedbacks to follow up and to prevent stepping back.

7. The ECET programme responses to the needs of the country and allows students to become useful engineers of the society after their graduation. Therefore, they are ready to embrace opportunities to serve for the industrialization and modernization and international integration.

Weakness

1. Most master lecturers, although, are competent, enthusiastic and practical experience, lack of academic lecturers with higher qualifications.

Opportunities

1. The programme is a good platform for students and instructors to improve their capability.

2. The courses in the programme are built so that lecturers have the opportunities to interact with students in the first semester to introduce issues of the ECET and specialized knowledge and skills are gradually increased for next semesters.

3. The support of the leadership of HCMUTE and enterprises

Threats

1. The competition to the ECET programme from other universities has been developed for past many years.

Plans for improvement

1. Labs need to be invested with more modern equipment for students to get familiar with the most recent technology on the markets. In addition, we will enhance visiting trips of students to companies/enterprises and enhance collaboration with enterprises and universities.

2. Enhance English for students.

3. Improve and enhance the learning support group to help students and teaching support group to help lecturers.

Criterion 4 - Teaching and Learning Approach

Strengths

1. Most academic lecturers participate in both teaching and research activities with many experience years. Lecturers with the Ph.D. degrees abroad have been active in research and published widely in their fields of expertise and are enthusiastic and strive to realize the department strategies.

2. Lecturers and TAs are always available to students in and out of the classrooms.

3. The integration of scientific research and education combined with the requirements of high quality from society creates high expectations in our activities.

4. The collaborations among lecturers and between lecturers and other sectors of the department/FEEE are excellent.

5. Courses of Labs, projects and thesis are accompanied by individual efforts as well as team works and it is reflected their ability. In addition, homework and quizzes are regularly assigned besides exams and they take an important percentage in the total grade of the course.

6. Courses are designed to teach students about approaches how to find reasonable solutions to solve problems and to know how to link between the theory and the reality, in which it is focused on teaching students to know about self-learning, team working and life-long learning.

Weakness

1. Although many master lecturers with many teaching and research years have contributions, the programme is still lack of academic lecturers with high qualifications for high quality education and research.

Opportunities

1. HCMUTE has been developing in past decade and lecturers are offered with salary higher. Therefore, they can devote their entire time for teaching and research works.

2. HCMUTE is one of large and quality universities with wide area and it is a good condition for all lecturers and students to teach and study at the University. The reputation of ECET programme is steadily growing and lecturers with quality qualification are interested in us.

Plans for improvement

1. Encourage lecturers who desire to devote to teaching and research the opportunities to develop new teaching strategies and facility.

2. Faculty and department are going to adjust the ECET programme toward Internationalization more and more and to train students and develop academic staff toward sustainment in 2017-2018.

Criterion 5 - Student Assessment

Strengths

1. The student assessments are applied for courses based on the ISO management procedure at HCMUTE.

2. Some courses enhance student assessments for reliability and fairness using rubrics.

3. Many clubs of skills and social activities at HCMUTE are opened to help students

Opportunities

1. Students and lecturers are cooperative

Plans for improvement:

1. The Department will establish the Academic Standing Committee to follow up student progress more systematically

2. Improve more courses using rubrics in 2017-2018 and online assessments.

Criterion 6: Academic Staff Quality

Strengths

1. Most lecturers of the department have practical experience in teaching students at Labs and instructing them to execute practical models.

2. A majority of lecturers are young and enthusiastic and graduated from developed countries such as Japan, Australia, Korea, and Taiwan. They are passion in scientific research and have published publications on national and international journals.

3. Lecturers always update various active teaching methods to enhance teaching performance

4. Lecturers use the LMS page to post video clips of lectures, contents, grading policy online and other materials.

Weakness

1. Only five lecturers in the department holds the Assoc. Professor title.

2. One third lecturer members with master degree are lack research experience at high level.

Threats

1. The demands for collaborations from enterprises are limited by the department and it may run the risk of losing their interests.

Plans for improvement

2. Encourage younger lecturers to study overseas in the next two years.

3. Train the lecturers for leadership.

4. Encourage lecturers to work for Professorship promotion.

5. Attract appropriate enterprises and companies to get involved in the ECET programme.

6. Create opportunities for lecturers to work with professors of overseas universities.

7. Encourage lecturers attend international conferences.

Criterion 7 - Support Staff Quality

Strength

1. The relationship between department members is solid and offer mutual help to solve administrative issues.

2. The secretaries work hard and maintain the integration within FEEE and with students.

3. The support staff consists of Master's degree holders and are in charge of the labs. In addition they have outstanding design skills to be able to help students in Labs.

4. The support staff of HCMUTE is adequate for general issues.

5. Lecturers who have advanced specialized knowledge are assigned to monitor laboratories, to ensure that the labs are use reasonably and absolutely.

6. Student support units consist of many functional offices, which are in charge of different tasks to support students quickly and effectively.

Weakness

1. The English proficiency of the staff needs to be improved.

Opportunities

1. HCMUTE has the development strategy for supporting staff. Staff can join courses annually organized for the professional training and English studying. Staff members who obtain qualified English certification are awarded.

Plans for improvement

1. Give the staff more opportunities to improve their English proficiency, to update the training courses related to technology and for promotion

2. The number of support staff of FEEE and units should be increased.

Criterion 8 - Student Quality and Support

Strengths

1. Students are more motivated, ambitious, demanding and active in different aspects.

2. Students are trained in a friendly atmosphere by lecturers and staff.

3. Many social activities such as Sports Championship, Blood Donation, "heroes' Mother" and Green Summer are annually organized by the Youth Union and Student Association. These activities teach students social knowledge and help them form their humanity, know how to contribute to society and refresh themselves after hard time studying at school.

4. Scientific research activities such as LED Circuit Design Contest and Maze Robot Competition, Dancing Robot, Puppetry Robot, IoT Startup competition are annually organized by FEEE and STO.

5. SSC has clubs such as English, Experience, Sport and students can easily join these clubs to help them with the life and health problems, in which the English club may help them the language problems they may face when writing theses in English.

6. HCMUTE has electronic library accessible to FEEE and students. In addition, they are allowed to access the database of libraries in affiliated universities for their scientific literature search.

7. HCMUTE has put a lot of efforts to improve student's services such as investing the dormitory for students

8. Student enrollment for the ECET programme is implemented clearly, carefully, transparently, legally and scientifically.

9. HCMUTE deployed many plans and methods to attract students and ensure student input quality, such as using brochures and leaflets to provide information about the university, the programme; besides, the programme is introduced to learners and enterprises via the Student Handbook, website, Open Day, Job Fair, YouTube, Facebook, ... The announcements for student enrollment are highly effective.

10. The student admission is planned and implemented thoroughly by the university and the faculty with the HCMUTE regulations.

11. The input quality is ensured because only the most excellent students, who pass the nation examination, are qualified for the ECET programme.

12. All enrollment results, as well as admission procedures are published on the HCMUTE website.

13. The studying work load is designed reasonably and is conducted scientifically.

14. The programme is implemented effectively, applicable to capacity of students and satisfying to lecturers and students.

15. The academic advisors and administrative staff are able to takeover, handle and consult students and freshmen effectively.

16. Center of support and advisory for students is good

17. Press and Media to communicate university and student activities and

Weakness

1. Many students came from small towns, away from Ho Chi Minh city. Therefore, they have to be far away from their families when studying at HCMUTE. It takes time for some students to adapt to new living and learning environments.

Opportunities

1. The University offers quite scholarships to students who have the best GPA and the poor situations. It allows us to attract better students.

2. The reputation of the university and FEEE has improved year by year.

3. The field of ECET has become familiar and Its novelty and job many opportunities are attractive to students and their parents.

Threats

1. Other universities in Vietnam have the ECET field.

Plans for improvement

1. Enhance the student recruiting campaign by giving talks to students of topnotch high schools and improve the department and FFEE websites.

2. Increase collaborations with companies/enterprises for the organization of career orientation days for students and visiting trips so that they know more about the job and feel more confident for their choice of the ECET field.

3. Because the students of HCMUTE come from different provinces, their English competence is at different levels. It is realized that, the university has several methods to improve their English ability by regularly organizing further English courses.

Criterion 9 – Facilities and Infrastructure

Strengths

1. The laboratories for the ECET programme are appropriately equipped and always maintained each semester.

2. the modern facilities and infrastructure of the university, faculty and department with international/national standard levels meet for teaching, learning and research.

3. A few Labs are sponsored by companies/enterprise and they are always invested to update new technology.

Weakness

1. The FEEE laboratories need to increase the number of TAs.

Plans for improvement

1. There will be new coming equipment for from one to two Lab(s).

2. We need to enhance the cooperation among units and FEEE for being coherent in consultancy and supports to students.

3. The number of self-study and research Labs for lecturers and students will be enlarged.

Criterion 10 – Quality Enhancement

Strengths

1. The department collects feedbacks of the programme from stakeholders for enhancement of the training programme.

2. The university, faculty and department organize periodically to get feedbacks from alumni, lecturers and students.

3. With some courses, lecturers receive feedbacks from students about 1-3 times during the teaching course to timely adjust teaching and assessment methods.

4. The ECET programme is designed based on programmes of the International and national universities

5. With courses such as projects, thesis and Lab, lecturers have applied student assessment using rubrics for enhancement of reliability and fairness.

6. The ECET programme is designed and run based on the ISO management procedure.

7. Staff with professional qualifications are Enthusiastically supported for lecturers and students.

8. Lab equipment, self-study spaces, spaces for sharing, the high speed Wifi system, websites. Digital Learning Room have been appropriately invested in recent years.

9. Most units at HCMUTE deploy surveys so that lecturers and students assess their satisfaction evaluation for improvement each semester.

Weakness

1. There is lack of lecturers with high qualifications

Opportunities

1. Students will be studied the quality programme and the opportunity for the job is very high.

2. Lecturers will be approached the quality programme for development of their teaching and research.

Plans for improvement

1. The university, faculty and department will increase collaboration with enterprises in order to invite them to send feedbacks for timely improving the programme in 2017-2018.

2. Contents, processes, assessments with reliability and fairness and quality of activities will periodically review for the continuous improvements based on the ISO procedure.

3. Rubrics will be deployed to apply for many courses in 2017-2018 and adjusted after receiving feedbacks from lecturers and students.

Criterion 11 – Output

Strengths

1. The statistics regarding student's profiles have been carefully designed. It allows the department and FEEE to keep track of the effectiveness of the recruitment campaign and the impact of the ECET programme.

2. HCMUTE has the dashboard system for student's academic records monitored by OAA.

3. Graduates have had good jobs or have applied to graduate programmes in national/international universities.

4. The university has the ISO management procedure for monitoring teaching and learning process. This procedure especially supports the improvement of quality of students' studying process and helps adequate graduation rate of students on time; early graduation from requirements; reduction of late graduation and drop out.

5. Graduates' employment rate has been around 80 percent in recent years.

Weakness

1. The ECET programme has attracted just some foreign students.

2. The transfer of technology and entrepreneurial activities are still slow.

Opportunities

1. The students are cooperative.

2. The job market is ready for the ECET students.

Threats

1. The success of the output depends on the intake students, the reputation, quality and enthusiasm of staff.

Plans for improvements

1. The statistical system of the input-output students need to be improved by FEEE in next two years.

2. In 2017-2018, the department enhances student assessments of courses using rubrics.

3. In 2017-2018, the university, faculty and department will improve more and more training activities for soft skills.

4. Our plan has started getting positive results. We will continue the course of our activities

PART IV: APPENDICES

A1. Self-assessment of Electronic and Communication Engineering Technology Programme

	Criteria	1	2	3	4	5	6	7
1	**Expected Learning Outcomes**							
1.1	The expected learning outcomes have been clearly formulated and aligned with the vision and mission of the university [1,2]						X	
1.2	The expected learning outcomes cover both subject specific and generic (i.e. transferable) learning outcomes [3]						X	
1.3	The expected learning outcomes clearly reflect the requirements of the stakeholders [4]						X	
	Overall Opinion				**6.0**			
2	**Programme Specification**							
2.1	The information in the programme specification is comprehensive and up-to-date [1,2]						X	
2.2	The information in the course specification is comprehensive and up-to-date [1,2]						X	
2.3	The programme and course specification are communicated, and made available to the stakeholders [1,2]					X		
	Overall Opinion				**6.0**			
3	**3. Programme Structure and Content**							
3.1	The curriculum is designed based on constructive alignment with the expected learning outcomes [1].						X	
3.2	The contribution made by each course to achieve the expected learning outcomes is clear [2].						X	
3.3	The curriculum is logically structured, sequenced, integrated and up-to-date [3, 4, 5, 6].					X		
	Overall Opinion				**6.0**			
4	**4. Teaching and Learning Approach**							
4.1	The educational philosophy is well articulated and communicated to all stakeholders [1]						X	
4.2	Teaching and learning activities are constructively aligned to the achievement of the expected learning outcomes [2,3,4,5]						X	
4.3	Teaching and learning activities enhance life-long learning [6]						X	
	Overall Opinion				**6.0**			
5	**5. Student Assessment**							
5.1	The student assessment is constructively aligned to the achievement of the expected learning outcomes [1,2]						X	
5.2	The student assessments including timelines, methods, regulations, weight distribution, rubrics and grading are explicit and communicated to students [4,5]						X	

		1	2	3	4	5	6	7
5.3	Methods including assessment rubrics and marking schemes are used to ensure validity, reliability and fairness of student assessment [6,7]						X	
5.4	Feedback of student assessment is timely and helps to improve learning [3]					X		
5.5	Students have ready access to appeal procedure [8]						X	
	Overall Opinion				**6.0**			
6	**6. Academic Staff Quality**							
6.1	Academic staff planning (considering succession, promotion, re-deployment, termination, and retirement) is carried out to fulfil the needs for education, research and service [1].					X		
6.2	Staff-to-student ratio and workload are measured and monitored to improve the quality of education, research and service [2].					X		
6.3	Recruitment and selection criteria including ethics and academic freedom for appointment, deployment and promotion are determined and communicated [4,5,6,7].						X	
6.4	Competences of academic staff are identified and evaluated [3].					X		
6.5	Training and developmental needs of academic staff are identified and activities are implemented to fulfil them [8].						X	
6.6	Performance management including rewards and recognition is implemented to motivate and support education, research and service [9].				X			
6.7	The types and quantity of research activities by academic staff are established, monitored and benchmarked for improvement [10].					X		
	Overall Opinion				**5.0**			
7	**Support Staff Quality.**							
7.1	Support staff planning (at the library, laboratory, IT facility and student services) is carried out to fulfil the needs for education, research and service [1].					X		
7.2	Recruitment and selection criteria for appointment, deployment and promotion are determined and communicated [2]						X	
7.3	Competences of support staff are identified and evaluated [3]					X		
7.4	Training and developmental needs of support staff are identified and activities are implemented to fulfil them [4]					X		
7.5	Performance management including rewards and recognition is implemented to motivate and support education, research and service [5]					X		
	Overall Opinion				**5.0**			
8	**Student Quality and Support.**							
8.1	The student intake policy and admission criteria are defined, communicated, published, and up-to-date [1].						X	

No.	Criteria	1	2	3	4	5	6	7
8.2	The methods and criteria for the selection of students are determined and evaluated [2].						X	
8.3	There is an adequate monitoring system for student progress, academic performance, and workload [3].					X		
8.4	Academic advice, co-curricular activities, student competition, and other student support services are available to improve learning and employ ability [4]						X	
8.5	The physical, social and psychological environment is conductive for education and research as well as personal well-being [5]						X	
	Overall Opinion				**6.0**			
9	**9. Facilities and Infrastructure.**							
9.1	The teaching and learning facilities and equipment (lecture halls, classrooms, project rooms, etc.) are adequate and updated to support education and research [1]					X		
9.2	The library and its resources are adequate and updated to support education and research [3,4]					X		
9.3	The laboratories and equipment are adequate and updated to support education and research [1,2]					X		
9.4	The IT facilities including e-learning infrastructure are adequate and updated to support education and research [1,5,6]					X		
9.5	The standards for environment, health and safety; and access for people with special needs are defined and implemented [7]					X		
	Overall Opinion				**5.0**			
10	**Quality Enhancement.**							
10.1	Stakeholders' needs and feedback serve as input to curriculum design and development [1]						X	
10.2	The curriculum design and development process is established and subjected to evaluation and enhancement [2].					X		
10.3	The teaching and learning processes and student assessment are continuously reviewed and evaluated to ensure their relevance and alignment [3].						X	
10.4	Research output is used to enhance teaching and learning [4].					X		
10.5	Quality of support services and facilities (at the library, laboratory, IT facility and student services) is subjected to evaluation and enhancement [5].						X	
10.6	The stakeholders' feedback mechanisms are systematic and subjected to evaluation and enhancement [6].						X	
	Overall Opinion				**5.0**			
11	**11. Output.**							
11.1	The pass rates and dropout rates are established, monitored and benchmarked for improvement [1].					X		

No.	Criteria	1	2	3	4	5	6	7
11.2	The average time to graduate is established, monitored and benchmarked for improvement [1]						X	
11.3	Employability of graduates is established, monitored and benchmarked for improvement [1]						X	
11.4	The types and quantity of research activities by students are established, monitored and benchmarked for improvement [2].					X		
11.5	The satisfaction levels of stakeholders are established, monitored and benchmarked for improvement [3]						X	
	Overall Opinion			**6.0**				
	Final Opinion			**5.5**				

A2. List of evidences

No	Exh.	Title of Exhibition	Category
		Criteria 1: Expected Learning Outcomes	
1	1.1	The vision and mission of UTE and FEEE	
	1.1a	Vision and mission of the HCMUTE	Document
	1.1b	Vision and mission of the FEEE	Document
2	1.2	Meeting Minutes and feedbacks	
	1.2a	Decision on the issuance of CDIO-based undergraduate training programme outcomes	Document
	1.2b	Decision on the issuance of the undergraduate training programmes	Document
	1.2c	Plan of the evaluation and implementation of the CDIO-approach undergraduate programmes	Document
	1.2d	Meeting minutes of the department for ECET programme revision of 2012, 2014, and 2016	Document
	1.2e	Meeting minutes of the FEEE science board for the ECET programme revision in 2014 and 2016	Document
3	1.3	Benchmarking results of the ECET and other programmes	
	1.3a	HCMUT ECET Curriculum	Document
	1.3b	PTIT ECET Curriculum	Document
	1.3c	ASU ECET Curriculum	Document
	1.3d	Curriculums of the Chulalongkorn University	Document
	1.3e	Other universities	Document
4	1.4	Website of the departments and leaflets	
	1.4a	Department of Computer and Communication Engineering	Document
	1.4b	Department of Biomedical and Industrial Electronics Engineering	Document
	1.4c	Leaflets	Document
5	1.5	ELOs matrix and syllabi related to activities	
	1.5a	ELOs matrix	Document
	1.5b	Syllabus of Introduction to ECET	Document
	1.5c	Social activities	Document
	1.5d	Syllabus of internship	Document
6	1.6	Curriculum procedures for revising and designing	Document
7	1.7	Stakeholders' feedbacks for the ECET programme	
	1.7a	Enterprise feedbacks	Document
	1.7b	Alumni feedbacks	Document

No	Exh.	Title of Exhibition	Category
		Criteria 1: Expected Learning Outcomes	
	1.7c	Lecturer feedbacks	Document
	1.7d	Students feedbacks	Document
8	1.8	Co-operations of departments and companies	
	1.8a	Co-operations of the CCE department and the FPT	Document
	1.8b	Co-operations of the OMRON	Document
9	1.9	The syllabi of the content-updated courses	
	1.9a	The syllabus of "Research in Modern Industry Electronics"	Document
	1.9b	The syllabus of "Advanced topics in communications"	Document
10	1.10	The final tests of the courses	
	1.10a	The final test of the course "Digital Systems"	Document
	1.10b	The final test of the course "Image Processing"	Document
11	1.11	Rubrics of internship, courses and theses	
	1.11a	Rubric of internship	Document
	1.11b	Rubrics of theses	Document
12	1.12	List of the courses, emphasis on the related course	
	1.12a	The syllabus of "Research in Modern Industry Electronics"	Document
	1.12b	The syllabus of "Advanced topics in communications"	Document
13	1.13	Thesis procedures, the syllabus of the course "Introduction to ECET"	
	1.13a	Thesis procedures	Document
	1.13b	Related thesis forms	Document
	1.13c	Invitation letters	Document
	1.13d	The syllabus of the course "Introduction to ECET"	Document
14	1.14	Information on the LMS page and target lists	
	1.14a	LMS site of the course "Communication systems"	Document
	1.14b	LMS site of the course "Data communications"	Document
	1.14c	LMS site of the course "Image processing"	Document
15	1.15	Information of job profiles on website of department	Document

No	Exh.	Title of Exhibition	Category
		Criteria 2: Programme Specification	
1	2.1	Mapping with ELOs and syllabi	
	2.1a	Skill matrix of contribution of courses to the ELOs of ECET Programme	Document

No	Exh.	Title of Exhibition	Category
		Criteria 2: Programme Specification	
	2.1b	Contents of the ELOs of the ECET programme	Document
	2.1c	Syllabus of Digital Systems	Document
	2.1d	Syllabus of Image Processing	Document
	2.1e	Syllabus of Digital IC Design Lab Using HDL	Document
2	2.2	Meeting minutes	
	2.2a	HCMUTE's decisions on revision of the programme	Document
	2.2b	Meeting minutes of the department for ECET programme revision of 2012	Document
	2.2c	Meeting minutes of the department for ECET programme revision of 2014	Document
	2.2d	Meeting minutes of the department for ECET programme revision of 2015	Document
	2.2e	Meeting minutes of the department for ECET programme revision of 2016	Document
	2.2f	Meeting minutes of the FEEE science board for the ECET programme revision in 2014	Document
	2.2g	Meeting minutes of the FEEE science board for the ECET programme revision in 2016	Document
3	2.3	Curriculum mapping	
	2.3a	Mapping of ELOs to PEOs	Document
	2.3b	Skill matrix of contribution of courses to the ELOs of ECET Programme	Document
4	2.4	Curriculum procedure for revising	
	2.4a	Curriculum procedures for revising and designing	Document
	2.4b	Setting up and revising curriculum procedure	Document
5	2.5	Student handbook and meeting minutes	
	2.5a	Student handbook	Document
	2.5b	Meeting minute from the programme assessment, 2012	Document
	2.5c	Meeting minute from the programme assessment, 2015	Document
6	2.6	Minutes of the department meeting for revision	
	2.6a	Meeting minute, semester 1_2015-2016	Document
	2.6b	Meeting minute, semester 2_2015-2016	Document
	2.6c	Meeting minute, semester 1_2016-2017	Document
	2.6d	Meeting minute, semester 2_2016-2017	Document
7	2.7	Sample syllabi	
	2.7a	The syllabus of Digital Systems	Document

No	Exh.	Title of Exhibition	Category
		Criteria 2: Programme Specification	
	2.7b	The syllabus of Image Processing	Document
	2.7c	The syllabus of Digital IC Design Lab Using HDL	Document
8	2.8	Lecturer portfolio and student feedbacks	
	2.8a	Lecturer portfolio	Document
	2.8b	Student feedbacks	Document
9	2.9	Teaching plans and programme specification on websites	
	2.9a	AAO website	Picture
	2.9b	FEEE website	Picture
	2.9c	Department website	Picture

No	Exh.	Title of Exhibition	Category
		Criteria 3: Programme Structure and Content	
1	3.1	Correlation description and syllabus	
	3.1a	Correlation descriptions of ELOs with knowledge blocks	Document
	3.1b	Syllabus of the advanced topics in communications	Document
	3.1c	Syllabus of the Digital Signal Processing	Document
	3.1d	Syllabus of the Data Communication Lab	Document
	3.1e	Syllabus of the Microwave Engineering	Document
2	3.2	ECET curriculum and course features	
	3.2a	ECET curriculum	Document
	3.2b	Equivalent courses	Document
	3.2c	Cooperative capstone projects	Document
3	3.3	List of courses	Document
4	3.4	Proposed schedule	Document
5	3.5	The ECET curriculum of 2008	Document
6	3.6	ECET curriculums of 2008-2011 and 2012-2016	
	3.6a	Exh. 3.5 (The ECET curriculum of 2008)	Document
	3.6b	The ECET curriculum of 2012	Document
	3.6c	The ECET curriculum of 2014	Document
	3.6d	The ECET curriculum of 2015	Document
	3.6e	The ECET curriculum of 2016 (Exh. 3.2a)	Document
7	3.7	Revising curriculum procedures and meeting minutes	
	3.7a	Revising curriculum procedures	Document

No	Exh.	Title of Exhibition	Category
		Criteria 3: Programme Structure and Content	
	3.7b	Meeting minutes	Document
	3.7c	Updated content table	Document

No	Exh.	Title of Exhibition	Category
		Criteria 4 - Teaching and Learning Approach	
1	4.1	ECET curriculum	Document
2	4.2	Teaching and assessment activities, the LMS and list of teaching assistant	
	4.2a	Teaching and assessment activities	Document
	4.2b	The LMS	Picture
	4.2c	List of teaching assistant	Document
3	4.3	Creative contests, Labs for self-study, List of scientific research, Self-study areas and specialized rooms	Document
	4.3a	Creative contests	Document
	4.3b	Labs for self-study and List of scientific research students	Picture
	4.3c	Self-study areas	Picture
	4.3d	Specialized rooms	Picture
4	4.4	Exchange collaborations	
	4.4a	Collaboration for lecturer	Document
	4.4b	Collaboration for student	Document
5	4.5	Social activities and plans	Document
	4.5a	Activities	Picture
	4.5b	Plans for activities	Document
6	4.6	Meeting Minutes	
	4.6a	The meeting minute for rubrics assessment	Document
	4.6b	The meeting minute for assessment methods	Document
7	4.7	English clubs, testing announcement, input English testing list	
	4.7a	English clubs	Picture
	4.7b	Testing announcement	Document
	4.7c	Input testing lists and English class lists	Document
8	4.8	School of Innovation and Entrepreneurship and visiting lists, syllabus of Introduction to ECET, timetable samples, rubrics of projects with specific instruction	

No	Exh.	Title of Exhibition	Category
		Criteria 4 - Teaching and Learning Approach	
	4.8a	School of Innovation and Entrepreneurship	Picture
	4.8b	Factory visiting lists	Document
	4.8c	Syllabus of Introduction to ECET	Document
	4.8d	Timetable samples	Document
	4.8e	Rubrics of projects with specific instruction	Document

No	Exh.	Title of Exhibition	Category
		Criteria 5 - Student Assessment	
1	5.1	Assessment methods such as answer-paper, report, rubrics, exam questions, ISO procedure, ELO mapping	
	5.1a	Answer-paper	Document
	5.1b	Reports	Document
	5.1c	Rubrics	Document
	5.1d	Exam questions	Document
	5.1e	ISO procedure	Document
	5.1f	ELO mapping	Document
2	5.2	Regulations and English testing information	
	5.2a	English testing regulations	Document
	5.2b	English testing information	Document
3	5.3	Assessments of internship and report	Document
	5.3a	Assessment of internship	Document
	5.3b	Internship reports	Document
4	5.4	Thesis rubrics and requirement to perform thesis, report	
	5.4a	Requirement to perform thesis	Document
	5.4b	Thesis rubric table	Document
	5.4c	Thesis reports	Document
5	5.5	Schedule for course assessments and grading policy	
	5.5a	Course assessment and assessment types	Document
	5.5b	Formative and summative grading policy	Document
6	5.6	Regulations and TA lists	
	5.6a	Student handbook and stopping studying	Document
	5.6b	TA lists	Document
7	5.7	Rubrics types, assessment results using rubrics	

No	Exh.	Title of Exhibition	Category
		Criteria 5 - Student Assessment	
	5.7a	Rubric types	Document
	5.7b	Assessment results using rubrics	Document
8	5.8	ISO procedure for course assessment and confidentiality of examination tasks, "Lecturer Portfolio", and sample assessment results	
	5.8a	ISO procedure for course assessment and confidentiality of examination tasks	Document
	5.8b	Lecturer Porfolio	Document
	5.8c	Sample assessment results	Document
9	5.9	Department meeting minutes, lecturer feedbacks for building and improving rubrics, surveys of courses	
	5.9a	Department meetings	Document
	5.9b	Lecturer feedbacks for building and improving rubrics	Document
	5.9c	Surveys of courses	Document
10	5.10	Lecturer feedbacks for students, student feedback for lecturer, assessment results	
	5.10a	Lecturer feedbacks for students	Document
	5.10b	Student feedbacks for lecturers	Document
	5.10c	Assessment results	Document
11	5.11	Assessment results using rubrics, student feedbacks for using rubrics	
	5.11a	Assessment results using rubrics	Document
	5.11b	Student feedbacks for using rubrics	Document
12	5.12	Verified results and procedure for planning and organizing examination and verification	
	5.12a	Verified results	Document
	5.12b	Procedure for planning and organizing examination and verification	Document

No	Exh.	Title of Exhibition	Category
		Criteria 6: Academic Staff Quality	
1	6.1	Scholarship information, decisions for studying PhD	
	6.1a	Scholarship information	Document
	6.1b	Decisions for studying PhD	Document
2	6.2	Appointment information of positions	Document

No	Exh.	Title of Exhibition	Category
		Criteria 6: Academic Staff Quality	
	6.2a	The appointment information of positions in HCMUTE	Document
3	6.3	Support list and visiting lecturers; Decisions for HR policy (extending contracts, retired)	
	6.3a	Support list for lecturers	Document
	6.3b	Lists of visiting lecturers	Document
	6.3c	Decisions for HR policy (extending contracts, retired)	Document
4	6.4	HR development plan	
	6.4a	The human resource plans from 2013 to 2017	Document
5	6.5	HCMUTE and MOET regulations about workload	
	6.5a	HCMUTE and MOET workload regulation	Document
6	6.6	Workload information and working environment surveys	
	6.6a	Workload and working environment surveys	Document
7	6.7	Recruitment policy for lecturers including supporting transportation-research-conference fees, money support decision	
	6.7a	The recruitment policy for lecturers	Document
	6.7b	Supporting policy for transportations, researching, and conferences	Document
	6.7c	Money support decisions	Document
8	6.8	Lecturer promotion policy	
	6.8a	Lecturer promotion policy in HCMUTE	Document
9	6.9	Lecturer recruitment policy	
	6.9a	Lecturer recruitment policy in HCMUTE	Document
10	6.10	MOET regulation, decisions for positions in the FEEE, lecturer information attending conference and committee boards	
	6.10a	MOET regulation, decisions for positions in the FEEE	Document
	6.10b	Lecturer information attending conference and committee boards	Document
11	6.11	Lecturer responsibility and authority, lecturer information attending conference and committee boards, Support policy of research, project and conference	
	6.11a	Lecturer responsibility and authority	Document
	6.11b	Lecturer information attending conference and committee boards	Document
	6.11c	Support policy of research, project and conference	Document

No	Exh.	Title of Exhibition	Category
	Criteria 6: Academic Staff Quality		
12	6.12	MOU with organizations and project contracts and decisions, lists of attending programme building, scientific research, KPIs information, student satisfaction's feedbacks	
	6.12a	MOU with organizations and project contracts and decisions	Document
	6.12b	Lists of attending programme building, scientific researches	Document
	6.12c	KPIs information	Document
	6.12d	Student satisfaction's feedbacks	Document
13	6.13	Decisions of promotion, early salary increase	
	6.13a	Decisions of salary promotions in HCMUTE	Document
14	6.14	Projects and workloads	
	6.14a	Project and workload regulation in HCMUTE	Document
15	6.15	Syllabus and projects	
	6.15a	Syllabus information	Document
	6.15b	Project information	Document
16	6.16	LMS information	
	6.16a	LMS information in HCMUTE	Document
17	6.17	KPI system and student surveys	
	6.17a	KPI system	Document
	6.17b	Student surveys	Document
18	6.18	Staff training fees	
	6.18a	The financial reports in HCMUTE from 2012 to 2016	Document
19	6.19	Process of HR development	
	6.19a	The regulation of procedure of human resource development	Picture
20	6.20	Training reports	
	6.20a	The summarization of human resource training in 5 years, 2011-2015	Document
21	6.21	Department and faculty meeting minutes	
	6.21a	Department meeting minutes	Document
	6.21b	Faculty meeting minutes	Document
22	6.22	HCMUTE regulation for KPIs	
	6.22a	HCMUTE regulation for KPIs, 2014	Document
23	6.23	Decisions for rewards and honors	
	6.23a	The decisions for promotion in HCMUTE from 2013-2015	Document
24	6.24	ISO procedure	

No	Exh.	Title of Exhibition	Category
		Criteria 6: Academic Staff Quality	
	6.24a	The ISO procedure for conducting the scientific research	Document
25	6.25	Scientific research policy	
	6.25a	The information for scientific researching loads for lecturers, 2013	Document
26	6.26	Paper information	
	6.26a	The list of scientific paper from 2012-2014	Document
27	6.27	Project information and MOU	
	6.27a	The projects in HCMUTE from 2011 to 2015	Document

No	Exh.	Title of Exhibition	Category
		Criteria 7: Support staff quality	
1	7.1	Schematic of units and centers and plan for human resources	
	7.1a	Decision for functions, tasks, working ranges, and structures of HCMUTE	Document
	7.1b	The schematic of units and centers of HCMUTE	Document
	7.1c	The human resource development plan in 2017	Document
2	7.2	List of laboratory heads of the ECET	
	7.2a	The laboratory head contract information of the FEEE	Document
3	7.3	Lists of training courses of English, visiting courses in India, Taiwan, Korea and others	
	7.3a	The training course for English in Philippines, 2016	Document
	7.3b	The training courses for official staff, 2016	Document
	7.3c	The training courses for promoting to main lecturers and high level lecturers, 2016	Document
	7.3d	The training courses for updating to the new teaching certificate, 2016	Document
	7.3e	The training course for promoting to the specialist class officers, 2016	Document
	7.3f	The training course for improving deans and heads	Document
	7.3g	The training course for improving English skills of lecturers, 2017	Document
	7.3h	The training courses for improving skills of official staff, 2017	Document
4	7.4	ISO procedure for recruitment and selection in 5 years, announcements of staff recruitment on HCMUTE website and newspapers	
	7.4a	The ISO procedure for recruitment and selection	Document

No	Exh.	Title of Exhibition	Category
		Criteria 7: Support staff quality	
	7.4b	The recruitment plan in HCMUTE from 2013 to 2017	Document
	7.4c	The recruitment information from 2013 to 2017	Document
	7.4d	The recruitment results 2013 to 2017	Document
5	7.5	Recruitment results and plans of support staff	
	7.5a	The recruitment results from 2016 to 2017	Document
	7.5b	The recruitment plans from 2016 to 2017	Document
6	7.6	Promotion and recruitment policy, promotion decisions (early salary increase, head/vice-head of departments, excellent lecturers)	
	7.6a	Promotion policy	Document
	7.6b	Recruitment policy	Document
	7.6c	Promotion decisions	Document
7	7.7	Courses for library staff	
	7.7a	The course for searching document for researching and studying, 2016	Document
	7.7b	The course for digital library training, 2016	Document
	7.7c	The course for IoTs in libraries, 2016	Document
	7.7d	The course for the library software, 2016	Document
8	7.8	The laboratory diary, advisory member lists, advisory results	
	7.8a	The laboratory diary	Document
	7.8b	Advisory member lists and results	Document
9	7.9	Meetings between leaders and students and satisfaction feedbacks of students	
	7.9a	FEEE meetings	Document
	7.9b	HCMUTE meetings	Document
	7.9c	Satisfaction feedbacks of students	Document
10	7.10	Short-term courses and supporting feedbacks	
	7.10a	Short-term courses	Document
	7.10b	Supporting feedbacks	Document
11	7.11	Course lists	Document
	7.11a	The training plans from Personnel Office from 2015 to 2015	
12	7.12	Course plans, decisions, results, certificates, course contents and suggestions	
	7.12a	The short-term courses in HCMUTE	Document
13	7.13	Financial report	

No	Exh.	Title of Exhibition	Category
		Criteria 7: Support staff quality	
	7.13a	The financial reports in HCMUTE from 2012 to 2016	Document
14	7.14	Rewards of HCMUTE president, MOET, other organizations and lists of levels A, B	
	7.14a	Rewards	Document
	7.14b	Lists of levels A, B	Document
15	7.15	Summer conference information and working environment surveys	
	7.15a	Summer conference information	Document
	7.15b	working environment surveys	Document

No	Exh.	Title of Exhibition	Category
		Criteria 8: Student Quality and Support	
1	8.1	Recruitment decisions and announcement	Document
2	8.2	Advisory for recruitment	Picture
3	8.3	The input benchmark decisions of MOET and HCMUTE for recruitment, recruitment policy, the input benchmark lists	
	8.3a	The input benchmark decisions of MOET for recruitment	Document
	8.3b	The input benchmark decisions of HCMUTE for recruitment	Document
	8.3c	Recruitment policy	Document
	8.3d	The input benchmark lists	Document
4	8.4	Policy decision and the ECET	
	8.4a	Policy decision	Document
	8.4b	The ECET	Document
5	8.5	Online learning-teaching information and dashboard	
	8.5a	Online learning-teaching information	Document
	8.5b	Dashboard	Picture
6	8.6	Studying warnings	Picture
7	8.7	Social activity information	Picture
8	8.8	The ECET programme	
	8.8a	ECET programme	Document
	8.8b	Thesis report	Picture
	8.8c	Thesis rubrics	Document
9	8.9	Showing activities and training courses for new students	
	8.9a	Showing activities	Picture

No	Exh.	Title of Exhibition	Category
		Criteria 8: Student Quality and Support	
	8.9b	Training courses for new students	Document
10	8.10	English testing list	Document
11	8.11	Job orientation and visiting trips	
	8.11a	Job orientation	Document
	8.11b	Visiting trips	Picture
12	8.12	FEEE activities	Picture
13	8.13	Thesis models	Picture
14	8.14	Club activities	Picture
15	8.15	Social activities	Picture
16	8.16	Healthy information and warning pictures	
	8.16a	Healthy information	Document
	8.16b	Warning pictures	Picture

No	Exh.	Title of Exhibition	Category
		Criterion 9: Facilities and Infrastructure	
1	9.1	Equipment and maintenance information, lecturer and research rooms, Lab rooms, campus information	
	9.1a	Equipment lists	Document
	9.1b	Maintenance fees	Document
	9.1c	Lecturer and research rooms, Lab rooms	Picture
	9.1d	Campus information	Document
2	9.2	Internet infrastructure of ITC, investment information, Lab and computers rooms, learning spaces	
	9.2a	Internet infrastructure information	Document
	9.2b	Internet investment information	Document
	9.2c	Lab and computers rooms	
	9.2d	Learning spaces	
3	9.3	Plan and strategy for facility investment, facility information and student and lecturer feedbacks	
	9.3a	Plan and strategy for facility investment, facility information	Document
	9.3b	Student and lecturer feedbacks	Document
4	9.4	Resource information, FEEE book plans, high quality space, account list, FEEE library and My OPAC data, book lists	
	9.4a	Resource information	Document

No	Exh.	Title of Exhibition	Category
		Criterion 9: Facilities and Infrastructure	
	9.4b	FEEE book plans	Document
	9.4c	High quality space	Picture
	9.4d	FEEE library	Picture
	9.4e	My OPAC data	Document
5	9.5	Resource lists and library actions	
	9.5a	Resource lists	Document
	9.5b	Library actions	Document
6	9.6	Lecture and student accounts for e-library, satisfactions' feedbacks and library collaborations with universities, exchanging books, famous visitor information	
	9.6a	Lecture and student accounts for e-library	Document
	9.6b	Satisfactions' feedbacks	Document
	9.6c	Collaboration with universities	Document
	9.6d	Exchanging books	Document
	9.6e	Seminars with the famous visitor information	
7	9.7	Annual budget lists for FEEE invesment, Lab budget for each semester, plans for large Lab invesment	
	9.7a	Annual budget lists for FEEE invesment	Document
	9.7b	Lab budget for each semester	Document
	9.7c	Plans for large Lab invesment	Document
8	9.8	PC statistics, PC invesment plan, invesment plan for internet system, software invesment	
	9.8a	PC statistics	
	9.8b	PC invesment plan	
	9.8c	Invesment plan for internet system	
	9.8d	Software invesment	
9	9.9	MOU-collaboration information, training courses for lecturers, student course timetables	
	9.9a	Collaboration information	Document
	9.9b	Training courses for lecturers	Document
	9.9c	Student course timetables	Document
10	9.10	Health care and disease prevention lists for students and lecturers	
	9.10a	Health care lists	Document
	9.10b	Disease prevention	Picture

No	Exh.	Title of Exhibition	Category
		Criterion 9: Facilities and Infrastructure	
11	9.11	HCMUTE hotline and security, regulation, labor safety, dangerous warnings, medicine cabinets and fire fighting equipment information	
	9.11a	HCMUTE hotline information	Picture
	9.11b	Security labor safety, dangerous warnings, medicine cabinets and fire fighting equipment information	Picture

No	Exh.	Title of Exhibition	Category
		Criteria 10: Quality Enhancement	
1	10.1	Stakeholders' needs, meeting minutes, student feedbacks and regulations	
	10.1a	Enterprises' feedbacks	Document
	10.1b	Alumni's feedbacks	Document
	10.1c	Lecturers' feedbacks	Document
	10.1d	Students' feedbacks through surveys forms	Document
	10.1e	Students' feedbacks through talking to department and FEEE	Document
	10.1f	Students' feedbacks through talking to HCMUTE leaders	Document
	10.1g	Meeting minutes	Document
2	10.2	Decisions on TA and social activities; Syllabi and curricula; Feedbacks from stakeholders	
	10.2a	Decision on teaching assistant	Document
	10.2b	Decision on social activities	Document
	10.2c	Syllabi 2016-2017	Document
	10.2d	Feedbacks from stakeholders	Document
3	10.3	ISO management procedure with specific guidelines	Document
4	10.4	ISO procedure for adjusting the annual curriculum, meeting minutes and curriculum information on websites	
	10.4a	ISO procedure for adjusting the annual curriculum	Document
	10.4b	Department meeting minutes, 2016 and 2017	Document
	10.4c	FEEE ASC meeting minutes, 2016 and 2017	Document
	10.4d	Curriculum on websites of AAO, FEEE and department	Picture
5	10.5	ECET curricula	
	10.5a	Curriculum before 2012	Document
	10.5b	Curriculum in 2012, 2014, 2016	Document
6	10.6	Bachelor programmes and international collaboration	

No	Exh.	Title of Exhibition	Category
		Criteria 10: Quality Enhancement	
	10.6a	HCMUT curriculum	Document
	10.6b	PTIT curriculum	Document
	10.6c	Rurgers university curriculum	Document
	10.6d	Arizona State University curriculum	Document
	10.6e	Cholopunkon University curriculum	Document
	10.6f	Training collaboration between HCMUTE and RMUT	Document
7	10.7	Assessment types *and recommendations from the QAO*	
	10.7a	Online formative results	Document
	10.7b	Paper formative results in class	Document
	10.7c	Teamwork results	Document
	10.7d	Summative results	Document
	10.7e	Recommendations from the QAO	Document
8	10.8	Subject feedbacks from students; grading statistic lists	
	10.8a	Subject feedbacks from students	Document
	10.8b	Grading statistic lists	Document
9	10.9	Department meeting minutes and rubrics	
	10.9a	Department meeting minutes	
	10.9b	Rubrics	
10	10.10	Information on LMS and working results of students, department meetings	
	10.10a	LMS page	Picture
	10.10b	Working results of students	Document
	10.10c	Department meetings	Document
11	10.11	Assessment procedure and result rubrics	
	10.11a	Assessment procedure	Document
	10.11b	Result rubrics	Document
12	10.12	Plans for participating classes and teaching and lecturer portfolio; Results including grading lists; class participating lists; QAO recommendation; meeting minutes	
	10.12a	Class participating plan semester 1_2016-2017	Document
	10.12b	Class participating plan semester 2_2016-2017	Document
	10.12c	Teaching portfolio	Document
	10.12d	Results including grading lists	Document
	10.12e	QAO recommendation	Document

No	Exh.	Title of Exhibition	Category
		Criteria 10: Quality Enhancement	
	10.12f	Meeting minutes	Document
13	10.13	Projects' decisions and titles; Project assessment results, lecturer publication lists, student scientific research list	
	10.13a	Projects' decisions and titles	Document
	10.13b	Project assessment results, lecturer publication lists	Document
	10.13c	Student scientific research list	Document
14	10.14	Student's prizes and research topics, real models	
	10.14a	Student prize lists_2015-2016	Document
	10.14b	Topic lists_2015-2016	Document
	10.14c	Student prize lists_2016-2017	Document
	10.14d	Topic lists_2016-2017	Document
	10.14e	Real models	Document
15	10.15	Equipment calibration, and student and lecturer feedbacks, plans for facility improvement	
	10.15a	Equipment calibration	Document
	10.15b	Student and lecturer feedbacks	Document
	10.15c	Plans for facility improvement	Document
15	10.16	Studying spaces	
	10.16a	Building A, D	Picture
	10.16b	Library	Picture
	10.16c	Center Building at Level-5	Picture
16	10.17	Investment plans, invested lists, donated module lists	
	10.17a	Investment plans	Picture
	10.17b	Invested lists	Document
	10.17c	Donated module lists	Document
17	10.18	Account lists, material lists, collaboration information, high quality library areas, plans for material investigation, reader feedbacks	
	10.18a	Account list for accessing journals	Document
	10.18b	Material lists for the ECET programme	Document
	10.18c	Collaboration information	Document
	10.18d	High quality library areas	Picture
	10.18e	Plans for material investigation	Document
	10.18f	Reader feedbacks	Document
18	10.19	Prizes, dormitory investigation plan, dormitory facility	

No	Exh.	Title of Exhibition	Category
		Criteria 10: Quality Enhancement	
	10.19a	"Cultural dormitory" in 2015	Picture
	10.19b	Dormitory investigation plan	Document
	10.19c	Dormitory facility	Document
19	10.20	Student service information	
	10.20a	Information page	Picture
	10.20b	Student activities	Picture
20	10.21	IT facility information, investigation plan	
	10.21a	PCs in Labs	Picture
	10.21b	PCs in offices	Picture
	10.21c	Investigation plan	Document
21	10.22	Healthy support and environment	
	10.22a	Healthy support decisions	Document
	10.22b	Environmental processing	Picture
22	10.23	Hygiene and Environment at Buildings for Student	Picture
23	10.24	Library, dormitory, Health Care feedbacks	
	10.24a	Library feedbacks	Document
	10.24b	Dormitory feedbacks	Document
	10.24c	Health Care feedbacks	Document
24	10.25	Feedback's mechanisms	Document
25	10.26	Feedbacks information	
	10.26a	Feedback information on PSC	Document
	10.26b	Feedback through face to face	Document
26	10.27	Graduation feedback information	
	10.27a	Survey results after three months for graduate students, 2016	Document
	10.27b	Survey results after one year for graduate students, 2016	Document
27	10.28	Alumni feedback information	Document

No	Exh.	Title of Exhibition	Category
		Criteria 11: Output	
1	11.1	Dashboard system	
	11.1a	Website	Software
	11.1b	Instruction	Document

No	Exh.	Title of Exhibition	Category
		Criteria 11: Output	
2	11.2	Department meeting minutes, rubrics, assessment methods, group meetings and feedbacks	
	11.2a	Department meeting minutes	Document
	11.2b	Group meetings	Document
	11.2c	Rubrics, assessment methods	Document
	11.2d	Student feedbacks	Document
3	11.3	Pass rate- dropout rate from Dashboard system.	Document
4	11.4	Statistic of Graduated Time over faculty	Document
5	11.5	Online survey about employability of graduates	Document
6	11.6	Business trip event	
	11.6a	Decision/ invitation from company	Document
	11.6b	Picture	Picture
7	11.7	Labor market event	
	11.7a	Decision/invitation to company	Document
	11.7b	Picture	Picture
8	11.8	Guide to register and manage student research process and Open Lab in FEEE	
	11.8a	Guide to register and manage student research process	Document
	11.8b	IS-Lab Introduction	Document
	11.8c	Activity	Document
9	11.9	Exchange programme	
	11.9a	Notation	Document
	11.9b	Student list	Document
10	11.10	Technique Conference	Picture
11	11.11	FEEE meeting minutes, surveys for staff, workload policy	
	11.11a	FEEE meeting minutes,	Document
	11.11b	Survey for staff	Document
	11.11c	Workload policy	Document
12	11.12	Communicated meeting with students, survey about satisfaction level from students, surveys for alumni and enterprises	
	11.12a	Communicated meeting with students	Document
	11.12a	Survey about satisfy level from student	Document
	11.12c	Procedure for evaluating student's satisfaction in the course	Document

No	Exh.	Title of Exhibition	Category
	Criteria 11: Output		
	11.12d	Result for student survey	Document
	11.12e	Survey for aluminum and company	Document

A3. Mapping of courses to programme outcomes

A3.1: Mapping of ELOs to PEOs

PLOs \ ELOs		Student Expected Learning Outcomes										
		ELO-01	ELO-02	ELO-03	ELO-04	ELO-05	ELO-06	ELO-07	ELO-08	ELO-09	ELO-10	ELO-11
Programme Education Objectives	PEO-01	x	x	x								
	PEO-02				x	x	x	x				
	PEO-03								x	x		
	PEO-04										x	x

A3.2: Skill matrix of courses

Type	Course Prefix and Number	Course Title	Student Expected Learning Outcomes										
			1	2	3	4	5	6	7	8	9	10	11
General knowledge													
Compulsory Courses													
LEC	LLCT150105	Basic Principles of Marxist-									H		
LEC	LLCT120314	Ho Chi Minh's Theory									H		
LEC	LLCT230214	VN Communist Party									H		
LEC	GELA220405	General Law								H	H		
OTH	CPRL130064	C Programming Language	H	M	H				M				
LEC	ENGL130137	English 1					H						
LEC	ENGL230237	English 2					H						
LEC	ENGL330337	English 3					H						
LEC	MATH130101	Advanced Mathematics 1	H										
LEC	MATH130201	Advanced Mathematics 2	H										
LEC	MATH130301	Advanced Mathematics 3	H										
LEC	MATH130401	Applied Statistics	H										
LEC	PHYS130102	General Physics A1	H										
LEC	PHYS120202	General Physics A2	H										
LAB	PHYS110302	Physics Experiment	M									H	
LEC	MATH121201	Complex Variables and	H										
LEC	GCHE130103	General Chemistry A1	H										
Free electives													
LEC	GEEC220105	General Economics									H		
LEC	PLSK320605	Planning Skill							H				
LEC	INMA220305	Introduction to									H		
LEC	INSO321005	Introduction to Sociology									H		
LEC	IQMA220205	Introduction to Quality									H		
LEC	INLO220405	Introduction to Logic							H				
LEC	PRSK320705	Presentation Skills					H						
LEC	SYTH220505	Systems Thinking		H									
LEC	ULTE121105	University Learning							H				
LEC	IVNC320905	Vietnamese Culture									H		
LEC	TDTS320805	Technical Writing					H						

Electrical and Electronics Core													
OTH	INMA133164	Introduction to ECET	M	M	M	M		M	M			L	L
LEC	ELCI140144	Electric Circuit	H	H	L				H				
LEC	BAEL340662	Basic Electronics	H	H			M		H				
LEC	DIGI330163	Digital Systems	H	H			M		H				
LEC	EMIN330244	Electrical measurement and	H	M					M			M	
LEC	MICR330363	Microprocessor	H	H			M		H				
LEC	ELSA320245	Electrical Safety	H	M			L		H				
LAB	ELPR320762	Electronics Lab	H	H			M		H				
LAB	PMEM310844	Measurement Engineering	H		H		M		L				M
LAB	PRDI320263	Digital Systems Lab	H	H	H		M		L				H
LAB	PRMI320463	Microprocessor Lab	M	H	H		L		M				H
Electrical and Electronics Advanced Core													
LEC	SISY330164	Signals and Systems	H	M	L				M				
LEC	COEL330264	Communication Electronics	H	M					M				
LEC	DACO430662	Data communication	H	M					M				
LEC	DSPR431264	Digital Signal Processing	H	H	M				M				L
DES	DSIC330563	Digital Systems Design	H	M			M		M				
LEC	EMSY427764	Embedded Systems	H	M	H				M				M
LAB	LDAT411164	Data Communication Lab	M	M	H			H	M	H	L	H	M
LAB	PRDS320663	Digital System Design with	M	H	H		M		M				H
LAB	ESPR427064	Embedded Systems Lab	M	M	H			H	M	H	L	H	M
Integrated-Circuits and Communications Area													
Compulsory Courses													
LEC	ELFI220344	Electromagnetic Field	H						M				
LEC	MIEN330364	Microwave Engineering	H	M					M				
LEC	COSY330464	Communication Systems	H	M	L				M				
LEC	AWPR330964	Antennas and Propagation	H	M	L				M				M
LEC	WCSY431364	Wireless Communication	H	M	M				M				M
LEC	DICD436264	Digital Integrated Circuits	H	M	M				M			L	H
LAB	LDSP412564	Digital Signal Processing	M	M	H	M	M	H	M	H	L	H	M
LAB	COSL420764	Communication Systems	M	M	H	M	M	H	M	H	L	H	M
LAB	WCSL422664	Wireless Communication	M	M	H	M	M	H	M	H	L	H	M
OTH	PRTE411464	Project 1	H	H	H	H	M	H	H	H	M	H	H
OTH	PRTE411664	Project 2	H	H	H	H	M	H	H	H	H	H	H
Elective Courses													
LEC	MOCO431864	Mobile Communication	H	M	M				M			L	H
LEC	MICI431964	Microwave Circuits	H	M	M				M			L	H
LEC	FOCO432064	Optical Communication	H	M	M				M			L	H
LEC	INTH422164	Information Theory	H	M	H				M			L	H
LEC	DICO432264	Digital Communication	H	M	M				M			L	H
LEC	IMPR432463	Image Processing	H	M	M				M			L	H
LEC	AUVI321563	Audio and Video	H	M	M				M			L	H
LEC	TETM423164	Advanced Topics in Communication	H	M	M				M			L	H
LEC	ITFA436064	IoTs: Foundations and	H	M	M				M			L	H
LEC	AICD433164	Analog Integrated Circuit	H	M	M				M			L	H
DES	CONE337764	Computer and	H	M	M				M			L	H
Industrial Electronics Area Core													
Compulsory Courses													

Type	Code	Course											
LEC	POEL330262	Power Electronics	H	H			M		H				
LEC	ACSY330346	Automatic Control Systems	H	H			L		L				
LEC	ELEQ220944	Electrical Equipment	H	H			M		H				
LEC	PLCS330846	Programmable Logic	H	H			M	M	H				
LEC	ELPS330345	Electrical power supply	H	H			L		M				
LEC	IMPR432463	Image Processing	H	H			M	M	H				
LAB	ELPR210644	Electric Lab	H	H	H				M	L			
LAB	POEP320262	Power Electronics Lab	M	H	H		L						H
LAB	PPLC321346	Programmable Logic	M	H	H		M						H
OTH	ELPR310863	Project 1	H	H	H	H	M	H	H	H	M	H	H
OTH	ELPR310963	Project 2	H	H	H	H	M	H	H	H	H	H	H
Elective Courses													
LEC	RFID321363	RFID Technology	H	M	M				M			L	H
LEC	ADMI320763	Advanced Microprocessor	H	M	M				M			L	H
LEC	INCO321546	Intelligent control	H	M	M				M			L	H
LEC	SCDA420946	SCADA System	H	M				H	M				H
LEC	IDMA322245	Industry management	H	M	M				M			L	H
LEC	NANO321463	Nano Technology	H	M	M				M			L	H
LEC	PLCN422946	Industrial Communication	H	M	M				M			L	H
LEC	NETT321263	Research in Modern	H	M	M				M			L	H
LEC	ELDA323245	Electric Drive and	H	M	M				M			L	H
LEC	AUVI321563	Audio and Video	H	M	M				M			L	H
LEC	MALE331063	Machine Learning	H	M	M				M			L	H
LEC	BISI331863	Bio-Signal and -Image	H	M	M				M			L	H
LEC	SETE331963	Sensor Technology	H	M	M				M			L	H
Thesis													
OTH	GRPR423064	Internship (ICET)	M	L	H	H	H	H	H	H	H	H	L
OTH	GRPR403264	Thesis (ICET)	H	H	H	H	H	H	H	H	H	H	H
OTH	GRPR324463	Internship (IEET)	M	L	H	H	H	H	H	H	H	H	L
OTH	GRAD401663	Thesis (IEET)	H	H	H	H	H	H	H	H	H	H	H
Number of courses contributing strongly to each programme outcome			67	25	23	10	07	14	21	14	15	14	36

Legend	LEC -Lecture course	H- High contribution
	LAB - Laboratory course	M- Medium Contribution
	DES - Design course	L- Low contribution
	OTH - Other	

A4. Programme Specification

THE MINISTRY OF EDUCATION AND TRAINING

HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY AND EDUCATION

Faculty of electrical and electronics engineering

UNDERGRADUATE PROGRAMME

(Full-time Curriculum)

Programme: Electronics and Communication Engineering Technology

Level: Undergraduate

Major: Electronics and communication engineering technology

Programme duration: 4 years

(Decision No……date… on………)

1- **Enrollment, Grading System, Curriculum and Graduation Requirements**

- *Enrollment***:** High-school Graduates

- *Grading system*: 10

- *Curriculum and Graduation Requirements*: Based on regulations of Decision No 43/2007/BGDDT

2- **The Goals, Objectives, and Expected Learning Outcomes**

Goals:

The programme is designed to prepare graduates to assume engineering and technology positions in the electronics and communications industry. Graduates of Electronics and Communications Engineering Technology (ECET) program have an ability to demonstrate expertise and career advancement in Electronics and Communications field through the application of fundamental knowledge, skills, and engineering technology tools. They also have potential to contribute significantly to the achievement of their organization's goals as an effective member and an ability to take part in life-long learning by being engaged with civic institutions, educational organizations, and professional societies.

2.1. Objectives:

PEO-01	Excel in their engineering careers and/or postgraduate education by utilizing the fundamental mathematical, scientific, and engineering technology principles in formulating and solving electronics and communication engineering problems
PEO-02	Communicate and work effectively in multidisciplinary teams and continue career-long professional development through engagement in lifelong learning
PEO-03	Fulfill the needs of society in solving technical problems using engineering principles, tools and practices, in an ethical and professional manner

PEO-04	Make technical contributions to design, development, and manufacturing in their practice of electronics and communication engineering technology

2.2. Expected Learning Outcomes:

ELO-01	An ability to apply knowledge of mathematics, science, computer fundamentals, and engineering
ELO-02	An ability to identify, formulate and solve engineering problems and to design a system, component, or process to meet desired needs
ELO-03	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
ELO-04	An ability to apply written, oral, and graphical communication in both technical and non-technical environments
ELO-05	An ability to communicate in English
ELO-06	An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting
ELO-07	A recognition of the need for continuous learning, and an ability to engage in life-long learning
ELO-08	An ability to understand the tenants of professional codes of ethics and to apply ethical considerations to realistic problems
ELO-09	Recognize the importance of the global, economic, environmental and societal context in engineering practice
ELO-10	An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments related to electronics and communication engineering technology
ELO-11	Demonstrate the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering technology standards to the building, testing, operation, and maintenance of electronics/ communication systems

3- **Blocks of knowledge in the whole programme:** 150 credits (without Physical Education and National Defense Education knowledge)

3.1. Block of knowledge

Name	Credits		
	Total	Compulsion	Elective
General knowledge	**56**	**50**	**06**
Political Education	12	12	0
Social Science	06	0	06
English	09	09	0
Mathematics and Natural Sciences	23	23	0
Informatics	03	03	0
Introduction to ECET	03	03	0

Professional knowledge	94	85	09
Electrical and Electronics Core	26	26	0
Electrical and Electronics Advanced Core	23	23	0
Electronics And Communications Specialization	33	24	9
Graduation Thesis and Internship	12	12	0

3.2. Programme content

a. General knowledge: 56 Credits

No.	Course Prefix and Number	Course Title	Cr.	Note
A	**Political Education and General Laws**		**12**	
1	LLCT150105	Principles of Marxist-Leninism	5	
2	LLCT120314	Ho Chi Minh's Ideology	2	
3	LLCT230214	Vietnamese Communist Party Policy of Revolution	3	
4	GELA220405	General Laws	2	
B	**Introduction to ECET**		**3**	
1	IEET130145	Introduction to ECET	3	
C	**Informatics**		**3**	
1	CPRL130064	C Program Language	3	
D	**Foreign Language**		**9**	
1	ENGL130137	English 1	3	
2	ENGL230237	English2	3	
3	ENGL330337	English 3	3	
E	**Mathematics and Natural Sciences**		**23**	
1	MATH130101	Advanced Mathematics 1	3	
2	MATH130201	Advanced Mathematics 2	3	
3	MATH130301	Advanced Mathematics 3	3	
4	MATH130401	Applied Probability	3	
5	PHYS120102	General Physics A1	3	
6	PHYS120202	General PhysicsA2	2+1	
7	MATH121201	Complex Functions and Laplace Transforms	2	
8	GCHE130103	General Chemistry A1	3	
F	**Social Science (Select 03 free elective courses)**		**6**	
1	GEEC220105	General Economics	2	
2	PLSK320605	Planning Skill	2	
3	INMA220305	Introduction to Management	2	

| 4	INSO321005	Introduction to Sociology	2	
5	IQMA220205	Introduction to Quality Management	2	
6	INLO220405	Introduction to Logic	2	
7	PRSK320705	Presentation Skills	2	
8	SYTH220505	Systems Thinking	2	
9	ULTE121105	University Learning Method	2	
10	IVNC320905	Vietnamese Culture	2	
11	TDTS320805	Technical Writing	2	
G	**Physical Education**		**5**	
1	PHED110513	Physical Education 1	1	
2	PHED110613	Physical Education 2	1	
3	PHED130715	Physical Education 3 (Elective)	3	
H	**National Defense Education**		**11**	

b. Professional education knowledge: 94 credits

No.	Course Prefix and Number	Course Title	Cr.	Note
A	**Electrical and Electronics Core**		**26**	
1	ELCI140144	Electric Circuit	4	
2	BAEL340662	Basic Electronics	4	
3	DIGI330163	Digital Systems	3	
4	EMIN330244	Electrical Measurement and Instruments	3	
5	MICR330363	Microprocessor	3	
6	ELSA320245	Electrical Safety	2	
7	ELPR320762	Electronics Lab	2	
8	PMEM310844	Measurement Engineering Lab	1	
9	PRDI320263	Digital Systems Lab	2	
10	PRMI320463	Microprocessor Lab	2	
B	**Electrical and Electronics Advanced Core**		**23**	
1	SISY330164	Signals and Systems	3	
2	DACO430664	Data Communication	3	
3	DSPR431264	Digital Signal Processing	3	
4	COEL330264	Communication Electronics	3	
5	DSIC330563	Digital Systems Design with HDLs	3	

6	EMSY437764	Embedded Systems	3	
7	LDAT411164	Data Communication Lab	1	
8	PRDS320663	Digital Systems Design with HDLs Lab	2	
9	ESPR427064	Embedded Systems Lab	2	
C	**Electronics and Communications Specialization**		**33**	
C.1	*Integrated-Circuits and Communications Area*			
I	*Compulsory Courses*		*24*	
1	ELFI220344	Electromagnetic Field	*2*	
2	MIEN330364	Microwave Engineering	3	
3	COSY330464	Communication Systems	3	
4	AWPR330964	Antennas and Propagation	3	
5	WCSY431364	Wireless Communication Systems	3	
6	DICD436264	Digital Integrated Circuits Design	3	
7	LDSP412564	Digital Signal Processing Lab	1	
8	COSL420764	Communication Systems Lab	2	
9	WCSL422664	Wireless Communication Systems Lab	2	
10	PRTE411464	Project 1	1	
11	PRTE411664	Project 2	1	
II	*Elective courses*		*9*	
1	MOCO431864	Mobile Communication	3	
2	MICI431964	Microwave Circuits	3	
3	FOCO432064	Optical Communication	3	
4	INTH422164	Information Theory	2	
5	DICO432264	Digital Communication	3	
6	IMPR432463	Image Processing	3	
7	AUVI321563	Audio and Video Engineering	2	
8	TETM423164	Advanced Topics in Communication	2	
9	ITFA436064	Internet of Things: Foundations and Applications	3	
10	AICD433164	Analog Integrated Circuit Design	3	
11	CONE337764	Computer and Communication Networks	3	

C.2	*Industrial Electronics Area*			
I	*Compulsory Courses*		*24*	
1	POEL330262	Power Electronics	*3*	
2	ACSY330346	Automatic Control Systems	*3*	
3	ELEQ220944	Electrical Equipment	*2*	
4	PLCS330846	Programmable Logic Controller	3	
5	ELPS330345	Electrical Power System	3	
6	IMPR432463	Image Processing	3	
7	ELPR210644	Electric Lab	1	
8	POEP320262	Power Electronics Lab	2	
9	PPLC321346	Programmable Logic Controller Lab	2	
10	ELPR310863	Project 1	1	
11	ELPR310963	Project 2	1	
II	*Elective courses*		*9*	
1	SCDA420946	SCADA Systems	2	
2	RFID321363	RFID Technology	2	
3	ADMI320763	Advanced Microprocessor	3	
4	INCO321546	Intelligent Control	2	
5	IDMA322245	Industry Management	2	
6	NANO321463	Nano Technology	2	
7	PLCN422946	Industrial Communication Network	2	
8	NETT321263	Research in Modern Electronics Technology	2	
9	ELDA323245	Electric Drive and Application	2	
10	AUVI321563	Audio and Video Engineering	2	
11	MALE331063	Machine Learning	3	
12	BISI331863	Bio-Signal And -Image Processing	3	
13	SETE331963	Sensor Technology	3	
D	**Internship and Thesis**		12	
D.1	**Integrated-Circuits and Communications Electives**			
1	GRPR423064	Internship	2	
2	GRPR403264	Thesis	10	
D.2	**Industrial Electronics Area**			

1	GRPR324463	Internship	2	
2	GRAD401663	Thesis	10	

A5. Recommended ECET curriculum flow chart
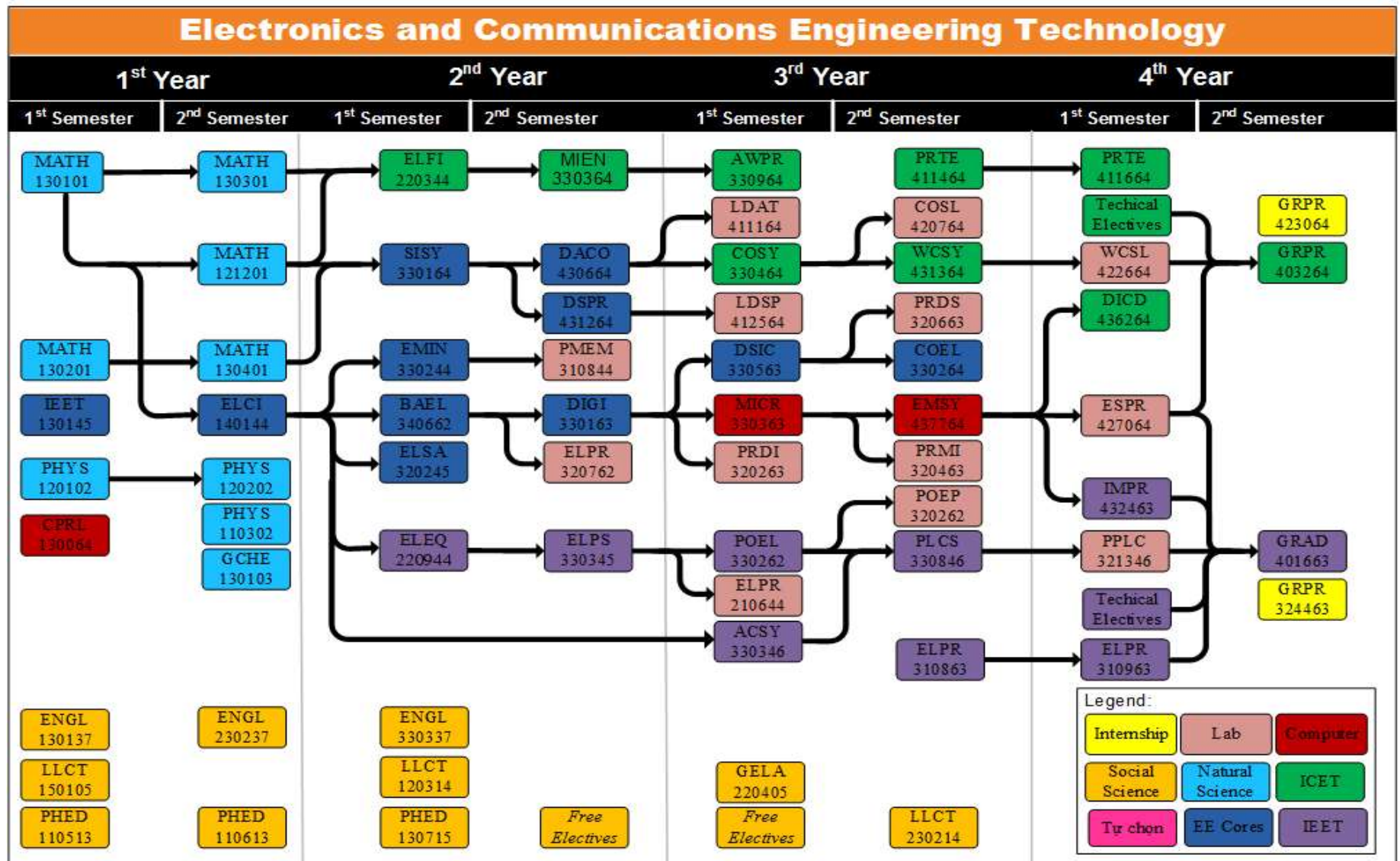
A6. Figures of lecturer and student activities

Exiting thesis report

International competitions and activities of student groups in 2017

Websites/Face-books: https://www.facebook.com/VietnamWomeninSTEM/videos/404562239897528/?hc_location=ufi (*Vietnam Women in STEM: Wepics Competition***); http://www.gof.world/news/wepics-ban-ket** (*WEPICS 2017*); **https://www.usaid.gov/asia-regional/press-releases/feb-17-2016-usaid-and-yseali-challenge-youth-innovate-food (***USAID and YSEALI challenge youth to innovate for food security***)

Social activity with Green Summer

Social activity with visiting poor families

FEEE educational philosophy and student scientific research group

IEEE 2017 International conference (students, FEEE lecturers, overseas researchers)

Self-study students at High Quality Library

IoT workshop

HCMUTE