



ASIIN Seal & EQAS-Food Label

Accreditation Report

Bachelor's Degree Programmes

Biotechnology

Chemical Engineering

Food Technology

Provided by

Ho Chi Minh City University of Technology, Vietnam

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for ¹	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) ²
Công nghệ Sinh học	Bachelor programme in Biotechnology	ASIIN	-	10
Kỹ thuật Hóa học	Bachelor programme in Chemical Engineering	ASIIN	AUN-QA 2013-2017	01, 09
Công nghệ Thực phẩm	Bachelor programme in Food Technology	ASIIN	-	08
Date of the contract: 14.09.2021 Submission of the final version of the self-assessment report: 15.11.2021 Date of the audit (online): 14.12. – 16.12.2021				
Peer panel: Prof. Dr. Axel Blokesch, Frankfurt University of Applied Sciences Prof. Dr. Günter Claus, University of Applied Sciences Mannheim Prof. Dr. Burkhard Egerer, Technical University of Applied Sciences Nuernberg Prof. Dr.-Ing. Thomas John, University of Applied Sciences Neubrandenburg Johanna Rose M.Sc., Chemisches und Veterinäruntersuchungsamt Rhein-Ruhr-Wupper, Krefeld Le Minh Tri, Ho Chi Minh City University of Science, student				
Representative of the ASIIN headquarter: Rainer Arnold				

¹ ASIIN Seal for degree programmes;

² TC: Technical Committee for the following subject areas: TC 01 – Mechanical Engineering/Process Engineering; TC 08 - Agriculture, Nutritional Sciences and Landscape Architecture, TC 10 – Life Sciences

Responsible decision-making committee: Accreditation Commission	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2014 Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering/Process Engineering as of 09.12.2011 Subject-Specific Criteria of Technical Committee 08 – Agriculture, Nutritional Sciences and Landscape Architecture as of 27.03.2015 Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 28.06.2019	

B Characteristics of the Degree Programmes

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Biotechnology	Kỹ sư Công nghệ Sinh học Bachelor of Engineering in Biotechnology	-	6	Full time	no	8 Semester	132 Vietnamese Credits / 264 ECTS	September / 2014
Chemical Engineering	Kỹ sư kỹ thuật Hóa học Bachelor of Engineering in Chemical Engineering	-	6	Full time	no	8 Semester	132 Vietnamese Credits / 264 ECTS	September / 2014
Food Technology	Kỹ sư Công nghệ Thực phẩm Bachelor of Engineering in Food Technology	-	6	Full time	no	8 Semester	132 Vietnamese Credits / 264 ECTS	September / 2014

³ EQF = The European Qualifications Framework for lifelong learning

For the Bachelor's degree programme Biotechnology, Ho Chi Minh City University of Technology (HCMUT) has presented the following objectives in the Self-Assessment Report:

“The objectives of the biotechnology programme

PO-1. Training engineers of biotechnology in the direction of Industrial Biotechnology in responding to economic development and integration in the stage of national industrialization and modernization.

PO-2. Training engineers who have basic scientific and technical knowledge, solid expertise and professional ethics. They can solve problems on their own, work in groups, have communication skills and use specialized foreign languages.

PO-3. Training engineers who can work in the fields of industrial biotechnology; an ability to factory or business management in the fields of agriculture, environment, food, medicine.

PO-4. Training engineers with sufficient knowledge and ability to continue to study Biotechnology graduate programme in country and abroad.”

For the Bachelor's degree programme Chemical Engineering, Ho Chi Minh City University of Technology (HCMUT) has presented the following objectives in the Self-Assessment Report:

“The chemical engineering programme aims to train students to have political qualities, professional ethics, social responsibility professional knowledge and skills in the field of chemical engineering; to be able to work in a competitive domestic as well as international environment.

The goals are specified as follows:

PO-1. Having professional knowledge in chemical engineering, professional working style and team leadership skills, professional ethics and social responsibilities.

PO-2. Having the ability to identify and creatively and effectively solve technical problems in the fields related to chemical engineering in order to contribute to the development of Vietnam.

PO-3. Having the ability to self-study and absorb new scientific and technical achievements related to chemical engineering, towards career success and international integration.”

For the Bachelor's degree programme Food Technology, Ho Chi Minh City University of Technology (HCMUT) has presented the following objectives in the Self-Assessment Report:

“The POs of the Food Technology programme are developed based on the vision and missions of the HCMUT, which prepares graduates knowledge, skills and attitudes in science, engineering and careers to become key staffs in the areas of food production, management and research; or become lecturers at universities and colleges. Basically, graduates should gain the following objectives:

PO-1. Have basic knowledge of math, natural science, adapting to the acquisition of professional educational knowledge and have an ability to study at a higher level.

PO-2. Have knowledge of food science and engineering, being able to solve practical problems related to techniques and technologies in food production and research; have creativity in career; have ability of self-studying and self-researching.

PO-3. Have ability of critical thinking, personal skills, professional skills, communication skills, teamwork skills and career ethics to work in a multidisciplinary and multicultural environment.

PO-4. Have knowledge in economics and politics; have basic knowledge in the social and human sciences relating to the food technology field to effectively contribute to the sustainable development of society and community.”

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Webpage HCMUT: www.hcmut.edu.vn
- Webpage Faculty of Chemical Engineering: che.hcmut.edu.vn
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The auditors base their assessment of the learning outcomes as provided on the websites and in the Self-Assessment Reports of the three Bachelor's degree programmes under review.

The auditors refer to the Subject-Specific Criteria (SSC) of the Technical Committee Life Sciences as a basis for judging whether the intended learning outcomes of the Bachelor's degree programme Biotechnology as defined by HCMUT correspond with the competences as outlined by the SSC. They come to the following conclusions:

As a cross-sectional discipline from microbiology, biochemistry and bioprocess engineering, biotechnology is dedicated to the technical use of biological processes and the development of processes based on renewable raw materials. The Bachelor's degree programme Biotechnology has a special focus on living systems (molecules, cells, tissues, and organisms) as agents for making bio-products. The interdisciplinary qualification profile of graduates combines natural and engineering sciences from the fields of chemistry, biochemistry, micro- and molecular biology as well as reaction, process and bioprocess engineering. Employment is in companies, authorities and associations, preferably for the production and quality assurance of food, food supplements, cosmetics, biocatalysts, cellulose, bioplastics, pharmaceuticals, agrochemicals and fine chemicals.

Graduates of the Bachelor's degree programme Biotechnology should be able to continue their academic education either at HCMUT or at another university. This continuation may take place immediately after graduation or, depending on the career planning of the student, after a period of practical work in the industry or the public sector. The biotechnology graduates are mainly employed in laboratories, public institution, and companies (such as the oil and gas industry); others become lecturers and technicians.

The peers refer to the Subject-Specific Criteria (SSC) of the Technical Committee Mechanical Engineering/Process Engineering as a basis for judging whether the intended learning outcomes of the Bachelor's degree programme Chemical Engineering, as defined by HCMUT, correspond with the competences as outlined by the SSC. They come to the following conclusions:

The Bachelor's degree programme Chemical Engineering is designed to train engineering students who can plan, develop, implement, assess and operate chemical processes. By teaching basic knowledge of chemistry, physics, thermodynamics, and mathematics, a basis is laid for the following chemical engineering specific content. The subject-specific training should enable graduates to design and layout process engineering apparatuses, plants and sub-processes as well as to plan, optimise, improve and efficiently operate overall processes.

Graduates of the Bachelor's degree programme Chemical Engineering should be familiar with process technology, especially with chemical processes. The programme deals with industrial applications of chemical engineering, with the inner and outer workings of chemical engineering plants. The task of chemical engineers is to produce usable intermediate or end products for daily use.

There is a wide range of possible applications in chemical engineering. Graduates should be qualified to take up further Master's studies on the one hand, and on the other hand to start a career in industry, administration, or research institutions. Typical fields of employment are as a process engineer in the pharmaceutical, cosmetics, food, biotechnology or chemical industry. In addition, they can find jobs as engineers in maintenance and plant construction, as a product or sales engineers in a marketing department or as experts in documentation, testing and occupational safety.

The peers refer to the Subject-Specific Criteria (SSC) of the Technical Committee Agriculture, Nutritional Sciences and Landscape Architecture as a basis for judging whether the intended learning outcomes of the Bachelor's degree programme Food Technology, as defined by HCMUT, correspond with the competences as outlined by the SSC. They come to the following conclusions:

The purpose of the Bachelor's degree programme Food Technology is to enable graduates to carry out activities aimed at improving the production and conservation of food, as well as the development of new products. By acquiring the necessary chemical, nutritional, toxicological and functional knowledge of raw materials and foodstuffs, graduates should be able to coordinate and develop quality control processes and quality assurance systems in the food industry, as well as be capable of making substantiated decisions that allow the continuous improvement of foodstuffs and the development of new products. In addition, they should learn about the efficient and suitable usage of physical, chemical, and biological raw materials and should be able to understand and analyse nutritious needs by applying current physicochemical, microbiological, and biological sensory techniques.

This is achieved by imparting a solid theoretical and practical scientific background in the natural sciences and by imparting the necessary knowledge and skills about the technological preparation, the analysis, the management, and the conservation of foods and food resources.

Graduates from the Bachelor's degree programme Food Technology may continue their education and pursue a Master's Degree. They are also able to find employment in the food processing industry, the plantation sector, become a researcher at a respective research institute or an entrepreneur of food processing technology.

Finally, graduates of all three undergraduate programmes should have adequate competencies in oral and written communication skills, be adaptive to the development of sciences, and have adequate English proficiency as well as a social and academic attitude.

In addition to the subject-related qualification objectives, students of all three Bachelor's programmes should be capable of working autonomously as well as in a team-oriented manner, and be able to conduct research activities. Furthermore, they should be able to solve subject-relevant problems, can present their results, have trained their analytical and logical abilities, and have an awareness of possible social and ethical effects of their actions.

The peers point out that the presentation of the intended learning outcomes in the module descriptions should follow a taxonomy, such as Bloom's taxonomy, which consists of six hierarchical levels of learning and all levels depend on a solid foundation of those that come below. In addition, the intended learning outcomes of several modules in the Biotechnology programme (e.g. microbiology, biochemistry, and molecular biology) do not comply with EQF 6. The content seems to be fine but the description of the intended learning outcomes does not reflect an appropriate level. The intended learning objectives are otherwise rated as appropriate by the peers. They are mostly compatible with the desired level of qualification and also include imparting a scientific aptitude. In the opinion of the peers, the qualification objectives are well defined, and both subject-specific and interdisciplinary

aspects are represented to a sufficient extent. Overall, and taking into account the oral explanations given during the audit, the qualification goals convey a plausible idea of the competence profile that graduates should have acquired after completing the programme. The career prospects presented are considered realistic by the peers.

Based on the Self-Assessment Report and the discussions during the online audit, the peers see that the graduates of all three undergraduate programmes under review acquire the subject-specific competences as defined in the respective SSC. The objectives and learning outcomes sufficiently reflect the intended level of academic qualification (EQF 6). In addition, the curriculum of the Bachelor's programme Food Technology complies with the standards as described by the International Food association (IFA) for the award of the EQAS-Food Label in most areas.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the peers:

The auditors confirm that the English translation and the original Vietnamese names of all degree programmes under review correspond with the intended aims and learning outcomes as well as the main course language (Vietnamese).

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Webpage HCMUT: www.hcmut.edu.vn
- Webpage Faculty of Chemical Engineering: che.hcmut.edu.vn
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The three programmes, Biotechnology, Chemical Engineering, and Food Technology, are managed by the Faculty of Chemical Engineering (FCE), which is part of the Ho Chi Minh City University of Technology (HCMUT). Ho Chi Minh City University of Technology is a

member of Vietnam National University – Ho Chi Minh City (VNUHCM), which is a ministerial-level university. All degree programmes at HCMUT are required to have a minor revision annually and a major revision every five years. The current study plans of all three degree programmes under review were designed in 2019, in the course of the last major revision.

The Bachelor's programmes Chemical Engineering and the Food Technology are offered as a regular programme (RP) and the international study programme (ISP). Both programmes, ISP and RP, have the same programme objectives and program learning outcomes. However, the ISP requires a higher level of English proficiency for admission. Lecturers who join the ISP are also required to have a high level of English language skills, more experience and publications. In order to manage the additional requirements, the Office of International Study Program (OISP) was established by the Rector. The ISP has not been implemented for the Bachelor's programme Biotechnology because the number of qualified lecturers is still too low.

All three Bachelor's degree programme under review are designed for four years and at least 132 Vietnamese credits, which is equivalent to 264 ECTS point, need to be achieved by the students. Students with superior academic performance can complete their studies within seven semesters. However, students who cannot fulfil all requirements for graduation within 13 semesters may not continue studying at HCMUT.

An academic year at HCMUT consist of two semesters and a short summer term. The summer term is normally used for conducting the internship. Some courses are offered in the summer term, which lasts for ten weeks, based on the demands of students. A regular semester consists of 15 weeks for learning and teaching, one week for mid-term tests, and two weeks for final exams. The mid-term tests are normally given at the 7th or the 8th week of a semester.

The general structure of the curriculum is similar for all three undergraduate programmes. In the first year, students mainly take general courses such as mathematics, natural sciences, social sciences, humanities, and economics with the same content for all students in the Faculty of Chemical Engineering. From the second year, students can take part in core courses and specialized courses in their respective engineering field. Furthermore, students can select electives according their personal interests and after consultation with their academic advisors. During their studies, all engineering students must spend at least six weeks to study and work in companies for their internship. In the final year, students have to complete their Bachelor's thesis. For both internship and thesis, students have to submit their reports, present and defend it in front of a panel.

The degree programmes consist of courses in the areas:

- Mathematics and Natural Sciences (60 to 62 ECTS, all compulsory)
- Social Sciences and Humanities (26 compulsory ECTS, 6 elective ECTS)
- Foreign Languages (16 ECTS, all compulsory)
- Military Training and Physical Education (no credits)
- Core Courses (70 to 80 ECTS, all compulsory)
- Specialised Courses (28 to 32 compulsory ECTS, 28 to 36 elective ECTS)
- Project (4 ECTS, all compulsory)
- Internship (4 ECTS, all compulsory)
- Thesis (12 ECTS, all compulsory)

The structure is depicted in the following table:

Modules	Fields	Chemical Engineering				Food Technology				Biotechnology			
		Credits			%	Credits			%	Credits			%
		Compulsory	Elective	Total		Compulsory	Elective	Total		Compulsory	Elective	Total	
(I)	Math and natural sciences	31	0	31	23	30	0	30	23	30	0	30	23
	Social science and Humanity	13	3	16	12	13	3	16	12	13	3	16	12
	Foreign languages	8	0	8	6	8	0	8	6	8	0	8	6
	National Defense and Physical Education												
(II)	Core	35		35	26	40	0	40	30	35	0	35	26
(III)	Specialized	14	18	32	25	14	14	28	21	16	17	33	25
(IV)	Project	2	0	2	8	2	0	2	8	2	0	2	8
	Internship	2	0	2		2	0	2		2	0	2	
	Thesis	6	0	6		6	0	6		6	0	6	
Total		111	21	132		115	17	132		112	20	132	

All undergraduate students at FCE have the same courses in the first year. After the first year, students are accepted to a specific degree programme based on their first-year GPA and their preferences. In the international programmes, all students are directly enrolled in specific programme.

In addition to the curriculum, all students at HCMUT are required to complete 15 days of social contribution (community service programme) as volunteers before graduation. Foreign students do not have to do military training and they are also exempted from the community service.

Since HCMUT has the goal to become internationally more visible and wants to further internationalising its degree programmes, the peers discuss with the programme coordinators and students what classes in regular programmes are taught in English. The programme coordinators explain that usually all courses are delivered in Vietnamese, but some courses in the honours classes (for the best performing students) are taught in English. In addition, some presentations are done in English and English textbooks are used in the advanced courses in the last two years of studies. The students confirm that some presentations are done in English, and English textbooks are used. However, students in the regular classes should be offered more opportunities to actively speaking English. This could be achieved e.g. by discussing international papers or giving oral presentations in English.

The members of the teaching staff explain on demand of the peers that they offer possible topics for the final projects according to their own research projects. All members of the teaching staff supervise theses. Students have to design a research proposal with a time schedule for the project, which is discussed with the academic advisor. If they agree, the students apply formally for being allowed to work on the suggested topic.

The peers gain the impression that the graduates of all degree programme under review are well prepared for entering the labour market and can find adequate jobs in Vietnam.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Reports
- Webpage HCMUT: www.hcmut.edu.vn
- Webpage Faculty of Chemical Engineering: che.hcmut.edu.vn
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Report, admission for three undergraduate programmes is conducted once a year in September of each year. Information about the admission procedure is described in the Advisory Book for the University Admission and on the website

of Academic Affairs Office and thus accessible for all stakeholders. In addition, HCMUT provides support on admission requirements and procedures for high school students. An admission committee is established by the Rector of HCMUT each year to manage all admission issues. High school graduates can join FCE through one of the following five admission paths:

1. National University Competency Assessment Test
2. Annual National University Entrance Exam.
3. Priority for admission according to the regulations of VNUHCM, candidates who are good students from 149 specialized/gifted high schools and high schools possessing the highest annual National University Entrance Exam average score.
4. Direct admission according to the regulations of the Ministry of Education and Training, candidates who won the National Excellent Student Prize, the National Science and Technology Prize.
5. Admission to Vietnamese and foreign candidates graduating from international high schools (Australia, USA, Canada, etc.).

In addition, students who apply for one of the international programmes, must gain IELTS ≥ 6.0 or TOEFL ≥ 79 . If not, they are encouraged to participate in a counselling programme to improve their English proficiency.

Every summer, the Vietnamese Ministry of Education and Training (MOET) will organise the Annual National Entrance Exam. All high school students in Vietnam must take part at this exam. It covers several subjects, such as Mathematics, Foreign Languages, Physics, Chemistry, Literature, and History and lasts 3 - 4 days. Based on the score in the exam and on their preferences, prospective students get admitted to the different universities.

In addition, the two National Universities in Ha Noi and Ho Chi Minh conduct their own admission exam the so called National University Competency Assessment Test. The National Universities have introduced this test in order to give high school graduates another chance to get admitted to university, it only lasts about 3 - 4 hours and consists of several questions and problems to assess the applicants' knowledge and skills in different subjects.

Most of the students of the international programmes at HCMUT are admitted via paths 1 and 2 (around 45 % each).

The number of applicants, especially for the international programmes has drastically increased with in the last few years and now exceeds by far the number of available places.

In 2020, there were 997 students applying for admission to the Chemical Engineering programme and only 169 new students were enrolled. This is equivalent to an admission rate of only 17 %. The numbers in the Food Technology programme are similar. In 2020, there were 622 high school graduates applying for admission and only 49 new students were enrolled. This is equivalent to an admission rate of only 8 %. For the Biotechnology programme, there is no international programme. Since 2017, around 70 new students are enrolled in the Biotechnology programme every year. The number of available study places in the Chemical Engineering programme (regular) is 320 per year and for the Food Technology programme (regular) 80 per year.

Since 2019, the tuition fee is fixed and the same for all semesters and all undergraduates programmes at FCE. It is 5.850.000 VND (225 €) per semester for the regular programmes and 30.000.000 VND (1153 €) for the international programmes.

The Academic Affairs Office awards scholarships to the students with excellent performance based on the student's academic performance. Students with very good results (top 10% GPA of their respective intakes at their Faculty) can receive scholarships in the following semester. In addition, students at FCE can also receive scholarships from external sources such as companies, non-government organisations, faculty alumni, and individuals.

In addition, HCMUT has a policy to award tuition fee waivers for five different groups of students. (1) students with meritorious services to the revolution or the relatives of people with meritorious services to the revolution; (2) students who are orphaned by both parents; (3) Students with disabilities in poor or near-poor households; (4) students of ethnic minorities in poor or near-poor households; (5) students of very few ethnic minorities.

As described in the Self-Assessment Report, the tuition fee for the international programmes is much higher than for the regular programmes. On the other hand, students in the international programmes have some advantages such as classrooms with air conditioners, better services in the libraries, additional extracurricular activities such as field trips, BK Innovation, OISP Camp, special soft skills classes, and financial support to encourage participation in scientific research. In addition, the class size is smaller in order to increase the interaction between lecturers and students.

In summary, the auditors find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

HCMUT does not comment on this criterion in its statement.

The peers consider criterion 1 to be mostly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Academic Guidelines
- Module descriptions
- Webpage HCMUT: www.hcmut.edu.vn
- Webpage Faculty of Chemical Engineering: che.hcmut.edu.vn
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The curriculum of all three Bachelor's degree programmes under review are designed for eight semesters. Elective courses can be chosen by the students in accordance with their areas of interest and after consultation with their academic advisor. The courses in the first two semesters of the Bachelor's programmes convey basic knowledge of natural sciences, mathematics and languages. Courses on the different sciences are offered from the third to the sixth semester. During the seventh and eighth semester, students must complete the internship and the Bachelor's thesis.

The general education courses include the areas of (1) mathematics and natural sciences, (2) social sciences, humanities, (3) foreign languages (4) military training and physical education. Four English courses are designed to help students achieving a minimum level equivalent to Test of English for International Communication (TOEIC) of 500 upon graduation. However, these English courses can be exempted for the students who have

an international standardized test of English language proficiency which is equivalent to TOEIC of 500.

The core modules consist of courses in engineering fundamentals. These modules aim to equip student with the necessary knowledge and skills in the field of engineering and is relevant for chemical engineering, food technology, and biotechnology.

The specialized modules consist of both compulsory and elective courses. Depending on each degree programme, these modules are designed to impart the necessary competences in the specific field of chemical engineering, food technology, or biotechnology.

The modules “Project”, “Internship”, and “Bachelor’s thesis” are intended to provide students with opportunities to apply their theoretical knowledge in a professional way, to learn about the requirements of the job market, and to show their proficiency with scientific work.

The internship is usually conducted during the summer time after the 6th semester. At the end, students have to write a progress report and give a presentation. The employers are also required to give feedback and comments about the students. The “Project” is a compulsory course, where students are required to design a proposal for their Bachelor’s thesis with the supports of an adviser. The result should be presented and defended in front of a panel, which consists of two lecturers. The Bachelor’s thesis is a capstone project that requires a student to apply all during the programme acquired knowledge and skills. A thesis is done in two stages (1) proposal and (2) final thesis. In the final stage, the thesis is reviewed by a lecturer and the results need to be presented in front of a panel.

The peers point out that it is difficult to conduct the Bachelor’s thesis parallel to attending courses. The students explain that they usually take the courses of the eighth semester already earlier so that they can dedicate the eighth semester to conducting the Bachelor’s thesis. HCMUT should verify this claim and make sure that the schedule is not overloaded. Students need sufficient time for self-studies and adequately preparing for the exams and conducting the Bachelor’s thesis.

While looking at the provided study plans, the peers notice that there are some compulsory classes, for which no credits are awarded. This concern the courses “Physical Training I, II, III” and “Military Training”. The peers see that this is a national regulation and all Vietnamese students have to take these courses (international students are exempted from the Military Training) and by government regulation, no Vietnamese credits can be awarded form them. However, since all mandatory parts of the degree programmes need to be awarded with ECTS points, the peers expect HCMUT to determine the students’ workload for these courses and award ECTS points accordingly.

The “Free Electives” in all three degree programmes encompass nine Vietnamese credits. In this case “free” means, that the students have the free choice of courses from all Faculties at HCMUT. However, the peers perceive that it would be more useful to reduce the number of free electives and limit them to courses offered by FCE or from programmes that have a significance for the students’ major. It also need to be taken into consideration that the “Free Electives” are intended for the third and fourth years of study and that it makes much more sense for advanced students to take in-depth or supplementary courses appropriate to their main area of study than general courses from any Faculty.

The current curricula of all three degree programmes were implemented in 2019. Before, another study plan was valid, which encompassed 141 Vietnamese credits and included more specialised subjects. In the course of changing the curriculum to the current version, some of these specialised courses were removed from the Bachelor's programme and are now only offered to Master's students. The peers are convinced that some of the removed courses are essential for and should be offered to Bachelor’s students and should be a compulsory part of the curriculum. Otherwise, graduates will not acquire all necessary competences in their respective area of specialisation. This observation is especially relevant for the Chemical Engineering and Food technology programmes. For this reason, it would be useful to include specific courses on food technology such as cereal processing technology, food fermentation, tea, coffee and cacao processing technology, etc. (basically all former specialised elective courses in the old (2014) programme) as compulsory or at least as elective courses in the Food Technology programme. In the Chemical Engineering programme, elective courses like chemical plant design, process operation, power supply transformation, and P&ID Design should be compulsory. At the same time, the number of free electives could be reduced in both programmes.

In the Biotechnology programme, the problem is somewhat different; here, the peers see that it is necessary to sharpen the profile of the programme and make it clear that it is an engineering programme. The differences to a classic natural science-oriented biotechnology programme, such as that offered by the Ho Chi Minh City University of Science, should be clearly worked out and the bioengineering orientation should be deepened. For example, this could be achieved by reducing the free electives and adding some essential bioengineering courses such as bio reaction engineering, bio reactor design, hygienic design, etc. The peers understand that the biotechnology programme has a focus on bioengineering, because companies prefer biotechnology graduates with a deep knowledge and advanced skills in engineering. This goes along with the main areas of research in the Department of Biotechnology, which focus on food technology and agriculture, there are research activities on pharmaceutical or medical related research topics.

During the audit the peers learn that HCMUT offers Master's and PhD programmes in all three areas (Biotechnology, Chemical Engineering, and Food Technology). However, not many Bachelor's graduates (only around 20 %) continue with a Master's programme at HCMUT, several join international universities for a Master's programme and most Bachelor's students do not continue their academic education but find employment in companies or public institutions after graduation. The share of students continuing with a Master's programme will increase because HCMUT now offers an integrated programme in which students can complete the Bachelor's and the Master's programme within five years. Students need a GPA above 7 in order to join the integrated programme. This integrated programme is very attractive for engineering students because only Master graduates can be employed as "engineers" in Vietnam, it is a protected professional title in Vietnam.

The peers stress that the share of practical work in the Chemical Engineering programme is rather low with only around 7 % and FCE should discuss with the employers and students if this is sufficient or should be increased. The peers are convinced that increasing the practical work in the Chemical Engineering programme would be very useful. In addition, they point out that groups of four to five students who conduct the experiments in the laboratories together are too large. This number should be reduced to two to three students so that all students get sufficient hands-on experience with practical laboratory work (see criterion 4.3).

In general, HCMUT's partners are very satisfied with the qualification profile of the graduates of the programmes under review and prefer to hire them. Unfortunately, employers from the biotechnology area were missing in the discussion with the peers. This strengthens the impression that the Biotechnology programme is less coordinated with external stakeholders and that the profile should be sharpened. The employers assess the skills and knowledge of the graduates of HCMUT to be better suited for the job market in comparison to those from other engineering programmes in Vietnam. However, in the discussion with the peers, the employers suggest establishing more international contacts and exchange programmes, in order to give students more opportunities for academic mobility. Moreover, they stress that it would be useful to prolong the duration of the internship (work practice). An internship of four weeks is considered too short; employers would like students to spend more time in the companies. Another recommendation from employers is to focus on the power supply transformation away from fossil resources to sustainable produced electric energy, which is a very important issue for a chemical engineering faculty.

In summary, the peers gain the impression that the choice of modules and the structure of the curriculum ensures that the intended learning outcomes of the respective degree programme can be achieved.

International Mobility

HCMUT provides opportunities for students to conduct internships and exchange programmes abroad. To this end, several Memorandums of Understanding (MOU) have been signed with international universities and in addition, the International Relation Office participates in international programmes such as Erasmus This allows students to sign a learning agreement and to transfer credits from foreign university to HCMUT. According to a regulation from the Ministry of Education and Training, a course taken at an international university can be considered equivalent to a course at the home university by a Scientific Academic Committee. As a member of Viet Nam National University Ho Chi Minh City, students of HCMUT can benefit from the mechanism of ASEAN Credit Transfer System, which was established to reduce the barriers for students' academic mobility.

In the international programme, students of Chemical Engineering have the opportunity to complete a Bachelor's degree at the University of Adelaide (Australia). Students have to complete the first two years of the degree programme at HCMUT, the third and fourth year of studies are conducted at the University of Adelaide. The acquired credits can be transferred between two universities.

According to the opinion of the peer group, the academic mobility of the students should be further promoted. The number of Bachelor's students who participate in international exchange programmes is still low despite students' high interest. In recent years, there have been some incoming students from France and Japan, but only between one and three per year. At the same time, several students went abroad during their studies. According to the provided statistics, in 2018, 36 students from FCE took part at an academic mobility programme. Due to the COVID-pandemic, this number declined to 19 in 2019 and 14 in 2020.

The students confirm during the discussion with the peers that some opportunities for international academic mobility exist. However, they also point out that they wish for more places and better endowed scholarships for long and short-term stays abroad. The number of available places in the exchange programmes is still limited and there are restrictions due to a lack of sufficient financial support. HCMUT can only provide limited travel grants, while the demand from students is rising. The lack of financial support hinders students from joining the outgoing programmes.

The peers understand these problems; however, they recommend increasing the effort to further internationalising HCMUT by establishing more international co-operations and exchange programmes and by offering more and better-endowed scholarships.

In addition, students would like to improve their English proficiency in order to increase their job perspectives and their chances for receiving a scholarship for continuing their academic education at an international university. To this end, the peers appreciate that in Food Technology and Chemical Engineering international programmes exist, which are taught in English. From the peers' point of view, it would be a good idea to establish an international programme also in Biotechnology.

In summary, the peers appreciate the effort to foster international mobility and support the Faculty of Chemical Engineering to further pursuing this path.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Academic Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the peers:

In the Vietnamese system, each credit is equivalent to 15 periods of theoretical lecture in class or 30 periods of practical laboratory work with additional 30 periods of self-study. In the internship, the design project and the Bachelor's thesis, it is equivalent to 60 periods. One period lasts for 50 minutes. The workload calculation is depicted in the following table:

Form of study for 1 credit	In-class periods	Self-study periods	Total Periods	Total hours
Theoretical Lecture	15	30	45	37.5
Practice in a Laboratory	30	30	60	50
Project, Thesis, Internship	60		60	50

According to the Self-Assessment Report and the module descriptions, one ECTS point is awarded for 30 hours of students' workload. As a result, there cannot be the same conversion rate between Vietnamese credits and ECTS points for all courses. For theoretical lectures, the rate would be 1 to 1.25 and for practical work 1 to 1.67.

However, the module descriptions mention a different workload. For example, 240 hours are calculated for the capstone project (Bachelor's thesis). This is not consistent with the six Vietnamese credits that are awarded, because this would result in a total workload of 300 hours (6 x 50). The same problem is relevant for the theoretical courses. For example, the module description for "Analytical Chemistry" mentions a total workload of 159 hours and three Vietnamese credits (six ECTS) are awarded. But three Vietnamese credits would mean 112 hours (3 x 37.5) and six ECTS would require 180 hours. So, the workload and credit calculation is faulty and inconsistent in several ways. Another example is the internship. According to the Self-Assessment Report, students usually spend four weeks on the internship if it is conducted full time. This would result in a workload of 160 hours (4 x 40). However, in the module description only 120 hours of students' workload are mentioned.

The peers point out that it is necessary to eliminate the inconsistencies in the workload and credit calculation of the Vietnamese as well as the ECTS system. HCMUT should follow the ECTS Users' Guide and define how many hours of students' total workload are required for one ECTS point (including lecture hours and self-study hours).

During the discussions with the programme coordinators and the students, the peers learn that so far there has been no survey asking the students to evaluate the amount of time they spend outside the classroom for preparing the classes and studying for the exams. Since this is necessary in the ECTS framework, the peers suggest asking the students directly about their experiences. This could be done by including a respective question in the course questionnaires. The peers point out that the Faculty of Chemical Engineering should follow the ECTS Users' Guide, while determining the students' total workload. This is the time students typically need to complete all learning activities (such as lectures, seminars, projects, practical work, self-study and examinations).

In other words, a seminar and a lecture may require the same number of contact hours, but one may require significantly greater workload than the other because of differing amounts of independent preparation by students. Typically, the estimated workload will result from the sum of:

- the contact hours for the educational component (number of contact hours per week x number of weeks),
- the time spent in individual or group work required to complete the educational component successfully (i.e. preparation beforehand and finalising of notes after attendance at a lecture, seminar or laboratory work; collection and selection of relevant material; required revision, study of that material; writing of papers/projects/dissertation; practical work, e.g. in a laboratory),

- the time required to prepare for and undergo the assessment procedure (e.g. exams).

Since workload is an estimation of the average time spent by students to achieve the expected learning outcomes, the actual time spent by an individual student may differ from this estimate. Individual students differ because some progress more quickly, while others progress more slowly. Therefore, the workload estimation should be based on the time an “average students” spends on self-study and preparation for classes and exams. The initial estimation of workload should be regularly refined through monitoring and student feedback.

The programme coordinators explain during the audit that on average, 60 % of the students of the Biotechnology programme finish within four years, 40 % take longer, HCMUT should check the statistics, because this would lead to a longer average time of studies than just 4.36 years for the Biotechnology programme, as mentioned in the Self-Assessment Report.

In general, it would be useful to check the submitted statistics on graduation and average time of studies, the numbers not always sum up to 100 %.

The drop-out percentage in the international programmes is usually higher than in the regular programme. The most frequent reason for leaving the programme was taking up a study programme abroad. However, most students did not want to share the reasons for dropping-out of the programme.

During the audit, the students basically confirm that their workload is adequate and that it is possible to finish the degree programme within the expected four years. However, one student complains that the workload is too high, but this point of view is not supported by the other students.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Various teaching and learning methods (including lectures, computer training and classroom and lab exercises, individual and group assignments, seminars and projects, etc.)

have been implemented. Structured activities include tutorials, homework, assignments (reading or problem exercises) and practical activities. Group project assignments are given in some courses to develop students' skills in teamwork, communication, and leadership. The assignments and exercises should help students to develop their abilities with respect to critical thinking, written/oral communication, data acquisition, problem solving, and presentations.

The most common method of learning is class session, with several courses having integrated laboratory practices. Lecturers generally prepare presentations to aid the teaching process. With individual or group assignments, such as discussions, presentations, or written tasks, students are expected to improve their academic as well as their soft skills. Laboratory work covers laboratory preparation, pre or post-tests, laboratory exercises, reports, discussions, and presentations. In addition, practical activities should enable students to be acquainted with academic research methods.

To help students achieving the intended learning outcomes and to facilitate adequate learning and teaching methods, HCMUT has developed an e-learning platform (BKEL), where students and teachers can interact.

In summary, the peer group considers the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concept of all three undergraduate programmes comprises a variety of teaching and learning forms as well as practical parts that are adapted to the respective subject culture and study format. It actively involves students in the design of teaching and learning processes (student-centred teaching and learning).

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Reports
- Academic Handbooks
- Discussions during the audit

Preliminary assessment and analysis of the peers:

HCMUT offers a comprehensive advisory system for all undergraduate students. Students in the same intake year are organised into classes and every class has an academic advisor. If a class has more than 60 students, it may require more than one academic advisor. The role of the academic advisor is to help the students with the process of orientation during the first semesters, the introduction to academic life and the university's community, and

to respond promptly to any questions. They also offer general academic advice, make suggestions regarding relevant careers and skills development and help if there are problems with other teachers. The students confirm during the discussion with the peers that they all have an academic advisor.

The academic advisors organise at least two meetings in each term for the classes they are supervising. For the International Class, the academic advisors often set up three meetings for students' supervision every semester.

From the third year, students will have a lecturer directly supervising them on the projects and the Bachelor's thesis. Each lecturer supervises 5 - 7 students and organises weekly meetings with them.

Students can receive assistance from the Student Services & Career Centre of HCMUT about career guidance and consultancy, career development training, soft skill training, and job opportunities. The Centre provides information on training and job seeking to help students develop career plans and workplace understanding. The Centre is also a bridge between students, staffs, lecturers and businesses in searching for scholarships, factory visits, internships, and employment opportunities. It is also responsible for keeping in contact with alumni associations, employers, and professional organizations. In addition, HCMUT support its graduates to find suitable jobs by annually conducting a job fair and by forwarding job vacancies to the students. Moreover, during the internship students are introduced to professional life and acquire additional skills that help them finding an adequate position after graduation. In summary, this results in good job perspectives for the graduates of all three undergraduates.

Finally, there are several student organizations at HCMUT; they include student's activity clubs, which are divided into arts, sports, religious and other non-curricular activities.

The peers notice that there are enough resources available to provide individual assistance, advice and support for all students. The support system helps the students to achieve the intended learning outcomes and to complete their studies successfully and without delay. The students are well informed about the services available to them. In summary, the comprehensive tutorial and support system for students is one of the strong points of the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

The peers understand that students need to fulfil the graduation requirements and achieve the necessary credits. In order to facilitate conducting the final project, courses in the last

semester could, for example, be offered as block courses so that students can concentrate on their final project without having to attend other classes at the same time.

The peers thank HCMUT for explaining that courses like “Military” and “Physical training I, II and III” are government requirements. The course of “Military” is implemented by the Center for National Defense and Security Training, which is separate from HCMUT. After completion the course, students are awarded a separate certificate. However, HCMUT should ask students about their actual workload for these courses and award ECTS accordingly.

The peers see that students may choose the “free electives” according to their personal interests and that students can select the courses from any faculty and even from the post-graduate study programmes. It is very helpful that students talk with their advisors about the selection of free electives and that it is possible to transfer the credits into master programmes. However, the peers still think that the amount of “free electives” could be reduced, which will leave more room for introducing some modern topics .

The peers understand that the Vietnamese credit point system is different from the ECTS and they do not expect HCMUT to change the Vietnamese system. However, in an international (European) accreditation procedure it is necessary to follow international (European) standards with respect to students’ workload. As detailed in the ECTS Users’ Guide, the university cannot assign a fixed amount of time for self-studies for each course but needs to ask students how much time they really spent on each course and then award the ECTS point accordingly. At the same time, the number of hours of students’ workload needs to be the same for each course and needs to be consistent in all documents.

The peers thank HCMUT for clarifying that the statement “60 % of the students finish within four years” is the estimation for the whole FCE in general, not only for the biotechnology programme. As can be seen from the additionally provided statistics, only about 50 % of the biotechnology students graduate within four years. This quota is rather low and HCMUT should find out the reasons why students prolong their studies and apply suitable methods to reduce the number of students that study longer than the expected four years.

The peers consider criterion 2 to be partly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation
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Evidence:

- Self-Assessment Reports
- Module descriptions
- Guidelines for Organising an Examination
- Regulation of Thesis Assessment
- Academic Guidelines

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Reports, the students' academic performance is evaluated based on (a) assignments given by lecturer on specific topics, (b) quizzes to detect readiness and comprehension of student for a specific LO, (c) progress reports that must be submitted after conducting a series of activities or practical work, (d) mid-term examinations, (e) seminars in which students present a specific topic and discuss with a lecturer or other students, (f) final examinations.

The most common type of evaluation used are written examinations; however, quizzes, laboratory work, assignments (small projects, reports, etc.), presentations, seminars, and discussions may contribute to the final grade. Written examinations, either closed-book or open-book, typically include short answers, essays, problem-solving or case-based questions, and calculation problems. Some lecturers also give multiple choice or true-false questions in examinations or quizzes. The grade from laboratory work usually consists of laboratory skills, discussions, reports, and oral exams. The final grade is the result of the different activities in the course (e.g. laboratory work, mid-term exam, the final exam, quizzes or other given assignments). Successfully passed exams are evaluated by lectures with the grading system: excellent (9-10), very-good (8-9), good (7-8), fair (6-7), ordinary (5-6), and fail (≤ 5). In general, the maximum score for each course is 10 points, and 5 points is required to pass the course. For mid-term and final exams, the grades should be delivered by the teacher within two weeks after the test-date.

At the beginning of the semester, students get all information related to the courses and exams from their academic advisor and can access the information via the digital platform BKeL. At the end of the semester, students can also access their grades via BKeL.

As described in the Academic Guidelines, students who are not satisfied with their grade may appeal to the Academic Affairs Office for reevaluation within five school days from the time that the grade is announced. When receiving the request from a student, the Academic Affairs Office should forward it to FCE, which assigns an examiner for checking the examination. The verified grade, needs to be approved by the Head of Department and the Dean of FCE, and is resubmitted to the Academic Affairs Office.

Based on the university regulation, the students must retake the whole course if they fail. However, students can request to postpone the final exam due to important reasons (such as accidents, health problems, etc.). In these cases, students will take the final exam in the next semester without repeating the whole course. The reason, why there are no re-sits of the final exam is that the final grade depends on the assessment of the learning activities that will be carried out continuously through the semester and not only on the final exam.

Students who fail a course must attend the course again in the next semesters. The number of repetitions is unlimited. Students who have passed a course and want to improve the score, may also take the course again.

Students with the worse academic results will receive academic warnings. The warning system has three levels: “Academic warning level 1”, “Academic warning level 2”, and “Suspension”. The academic warning is issued if the student violates one of the regulations, such as not affording the minimum number of required credits, finishing the semester with the average grade less than 3.0 (scale 10) or less than 4.0 in the last two consecutive semesters. Students who already have received “Academic warning level 1” would receive “Academic warning level 2” if their performance does not improve in the following semester. In those cases, the students will be suspended. It should be also noted that the student’s academic advisor receives the notifications during the course as well. Consequently, help and support would be given to improve the student’s academic performance.

The internship is conducted through collaboration with companies or other external institutions. It usually lasts four weeks if students conduct it full time but can be longer (8 weeks at most), depending on the agreement with the respective host company. During the internship, students are supervised by an employee of the host institution. At the end, students need to write a report and present their results in front of a panel of two lecturers. The evaluation takes into account the aspects work plan, discipline, teamwork, programme implementation, and activity report.

The students of all three undergraduate programmes under review are required to complete a project, which is intended to draft a proposal for the Bachelor’s thesis. During the project, students are assigned a lecturer as an advisor. The project should be assessed by two examiners.

All three degree programmes include a Bachelor’s thesis (graduation project), which is conducted independently under the guidance of one or more supervisors. It consists of literature study, practical research, and data analysis. Both the student and his /her supervisors might decide the topic and content of the project. In many cases, lecturers offer particular topics connected to their research. The Dean approves the list of thesis topics, which are

submitted by the lecturers. Students are free to contact lecturers/ supervisors to further discuss appropriate topics and then register on the digital platform. Finally, the Head of Department will assign the topics to the students (based on their registrations). Each student is supervised by one or two supervisors who are not related to the student. The results need to be presented in front of a panel of at least three teachers. Some students, approximately 20 %, conduct the Bachelor's thesis outside HCMUT; they have one supervisor at the host company and one at HCMUT. With respect to the assessment of the Bachelor's thesis, the peers point out that it is not transparent how the final grade is derived. The module description just mentions an oral defence, but the written report should also be taken into consideration.

The peers also inspect a sample of examination papers and Bachelor's theses and are overall satisfied with the general quality of the samples.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

HCMUT does not comment on this criterion in its statement.

However, the peers notice that there is a governmental regulation, which states: "Any student having thesis receiving F grade shall redo the graduate thesis or take some more professional courses whose total number of credits is equivalent to the one of the graduate thesis". HCMUT explains upon request that this is just a framework regulation issued by the government, giving the university this opportunity. Nevertheless, HCMUT is not applying this regulation and all students are required to do a thesis. The peers point out that it should not be possible to skip the final thesis and replace it by additional courses. The thesis is a crucial and essential part of the curriculum and is required to verify the students' ability for conducting independent scientific work.

The peers consider criterion 3 to be fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Reports
- Staff Handbooks

- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:

At HCMUT, the staff members have different academic positions. There are professors, associate professors, and lecturers. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities.

According to the Self-Assessment Report, there are 88 full-time lecturers and 9 technicians at FCE. In addition, there are some visiting lecturers from other universities and companies. The technicians support practical classes in terms of preparing chemicals/materials and teaching experiments. FCE has four secretaries and four other staff members who support the Dean in terms of administration. Also PhD and Master’s students work as lab assistants in the laboratories, so there is no shortage in staff members to supervise practical lab work, according to the feedback of the teachers during the audit.

Open positions are announced on HCMUT’s webpage, candidates have to do a presentation on their research activities and their teaching abilities are verified. Most of the lecturers are graduates of HCMUT, who were hired after finishing their undergraduate studies and were conducting their Master’s and PhD studies parallel to working as a lecturer or a supporting staff member. However, several teachers have graduated from international universities (for example, from USA, UK, France, Germany, Australia, Russia, Japan, Korea, Thailand, and Singapore). The UOP – a Honeywell Company (USA) - annually supports one foreign professor to teach a subject at FCE. In the international programmes, professors from abroad such as UK, USA, Canada, and Malaysia are contracted to teach some subjects ensuring that at least three subjects are taught by professors from abroad. The peers appreciate this international background.

The following table depicts the number of teachers who are involved in the three degree programmes:

Biotechnology programme				
From	Full professors	Associate professors	Doctoral holders	Master holders
FCE	3	11	31	14
Other faculties	1	3	24	40

Total	4	14	55	54
Food Technology programme				
From	Full professors	Associate professors	Doctoral holders	Master holders
FCE	3	13	34	14
Other faculties	1	3	24	40
Total	4	16	58	54
Chemical Engineering programme				
From	Full professors	Associate professors	Doctoral holders	Master holders
FCE	3	11	37	14
Other faculties	1	3	24	40
Total	4	14	61	54

All fulltime members of the teaching staff are obliged to be involved in teaching/advising, research, and administrative services. However, the workload can be distributed differently between the three areas from teacher to teacher and also depends on the academic position. For example, full professors spend more time on research activities and less on teaching than associate professors or lecturers.

HCMUT expects staff members to conduct research activities and has issued a policy, which offers some financial support for publishing papers in international journals. In addition, students are encouraged to participate actively in scientific research activities. Teachers in the international programmes need to have at least one research paper published in a scientific journal or conference proceedings per year.

Every year, associate professors or lecturers can apply for promotion to associate professor or full professor, respectively. The criteria of the positions are described by the Board of Professor Consideration. Basically, the candidates are considered based on three main criteria such as: years of working, hours of teaching graduate students, quantity and quality of scientific published papers.

At HCMUT and FCE, one of the most important requirements while hiring new staff members is that they need to have a PhD degree. The recruitment requirements of

lecturers are published on HCMUT's webpage. Candidates need to pass three rounds of evaluation such as interviewing at Department, Faculty, and University level. New lecturers usually sign a one-year "trial' contract" with HCMUT. During this first year, lectures need to acquire the University Level Teaching Certificate, which is issued after finishing a 60-hour course about teaching methods. New lecturers are also supervised by experienced teachers and have to pass at least three "trial classes", which are evaluated by the Professional Council of HCMUT. After successfully passing all requirements of the first year, HCMUT will sign another two-year and subsequently another three-year contract. After these five years, teachers receive an unlimited contract. HCMUT also offers to recruit excellent graduates to be junior researchers. They have opportunities to pursue higher education (Master and PhD) to become prospective lecturers.

During the audit, the peers discuss with the programme coordinators, if FCE is planning to increase the staff in Biotechnology and to offer an international programme. They learn that HCMUT is planning to establish an international programme if the Biotechnology programme is internationally accredited. The goal is to attract more students and consequently to hire more qualified staff members. This would make it also possible to offer more electives in the Biotechnology programme.

In summary, the peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Reports
- Staff handbook
- Discussions during the audit

Preliminary assessment and analysis of the peers:

HCMUT encourages training of its academic and technical staff for improving the didactic abilities and teaching methods. As described in the Self-Assessment Reports, faculty members regularly participate in training or workshops.

Faculty members can also further develop their competencies through several activities such as post-doctoral programmes, training, workshops, joint research, etc. Moreover, they are encouraged to present their research papers in national and international conferences, and to collaborate with colleagues from international universities.

The peers discuss with the members of the teaching staff the opportunities to develop their personal skills and learn that the teachers are satisfied with the internal qualification programme at HCMUT, their opportunities to further improve their didactic abilities and to spend some time abroad to attend conferences, workshops or seminars.

In summary, the auditors confirm that HCMUT offers sufficient support mechanisms and opportunities for members of the teaching staff who wish for further developing their professional and teaching skills.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Reports
- Video of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Basic funding of the degree programmes and the facilities is provided by HCMUT and the Faculty of Chemical Engineering. The financial sources are government funding, tuition fees from students, and industry funding.

The provided budget allows the departments to conduct the degree programmes as well as some specific activities, including student exchange programmes and participation in international conferences. However, the budget is limited and not all projects can be supported. The programme coordinators emphasise that from their point of view, all three undergraduate programmes receive sufficient funding for teaching and learning activities. Hence, the Departments do not face any financial shortages. Of course, there is limited funding to modernise or add laboratory equipment, but there are sufficient resources for adequately teaching the classes. Several of the teachers have international experience and compare the technical infrastructure and equipment with what they have witnessed at foreign universities and are then not satisfied with the facilities at HCMUT. FCE is currently building a new campus with new laboratories and then the situation will improve. The new facilities should be available in two to three years and will include an area of approximately 4,000 m² to serve as laboratories for FCE.

From the provided documents and videos of the laboratories, the peers deduct that there seem to be no severe bottlenecks due to missing equipment or a lacking infrastructure. The basic technical equipment for teaching the students is available, although it is not state of

the art in all cases. The students confirm during the discussion with the peers that, in general, they are satisfied with the available equipment, but several instruments are outdated. Moreover, the peers learn during the audit that students can use and operate the instruments in the laboratories by themselves after being trained and instructed by either senior students or lab technicians.

The peer group understands that modern research equipment for sophisticated laboratory work, sufficient in terms of quality and quantity, is not readily available and that the funds are restricted. Nevertheless, the peers cannot make a final assessment of the quality of the technical equipment and the infrastructure on the basis of the videos and the discussions alone. Only some laboratories are shown in the videos and especially the scope and design of the safety standards remain unclear (material and surface quality of the working benches, safety goggles, gloves, eye showers, fire extinguishers, emergency exits, chemical-proof cabinets, first-aid kits, ventilation system (quantitative information such as air exchange rates achieved both in the overall lab and in the fume hood would be required), fume hoods, etc.). For this reason, the peers point out that it is necessary to assess the technical infrastructure, safety measures, and facilities onsite at HCMUT. A team of at least one expert together with an ASIIN programme manager should visit FCE in order to confirm that the infrastructure, the technical equipment and the safety measures meet the required standards.

Moreover, the peers learn during the audit that students of all three degree programmes under review usually do the experiments together in groups of four to five students. The peers emphasise that all students need to have the opportunity to get hands on experience with carrying out laboratory experiments. For this reason, the number of students conducting one experiment should be reduced. In order to gain sufficient practical experience in the laboratories, groups conducting one experiment should be limited to two to three students. Otherwise, students may not acquire the necessary hands-on experience in conducting experiments.

The students express their satisfaction with the library and the available literature. The library offers direct access to international literature, scientific journals, and publications e.g. via ScienceDirect and Springer Online. From the students' point of view, there is sufficient access to current international literature and databases and a remote access is possible. In addition, it is possible to access all resources of all member universities of the Vietnam National University Ho Chi Minh City so that it is possible to get books from other universities if HCMUT does not have them. However, the students also point out that the available amount of books is limited and could be increased.

Besides the already mentioned restrictions, the auditors judge the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms etc.) to comply with the requirements for sustaining the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

The peers appreciate that in some practical courses at HCMUT students groups are smaller than four to five students. The peers point out that there should be sufficient instruments and working places in the laboratories so that in all practical courses experiments will be conducted by groups of no more than two to three students.

The peers consider criterion 4 to be mostly fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-Assessment Reports
- Module descriptions
- Webpage HCMUT: www.hcmut.edu.vn
- Webpage Faculty of Chemical Engineering: che.hcmut.edu.vn

Preliminary assessment and analysis of the peers:

The students, as all other stakeholders, have access to the module descriptions via HCMUT's Vietnamese homepage.

After studying the module descriptions, the peers see that the module descriptions do not always make transparent, how each exam contributes to the final grade and what kind of exam is required (e.g. for the capstone project). In addition, the calculation of the students' total workload and the conversion into ECTS points is not transparent. Moreover, HCMUT has to define how many hours of students' workload is required for one ECTS point. This issue is also discussed under criterion 2.2.

Furthermore, the presentation of the intended learning outcomes in the module descriptions should follow a taxonomy, such as Bloom's taxonomy (see criterion 1.1). Finally, the literature references are outdated and it needs to be made transparent what the compulsory prerequisites for taking the courses are. For this reason, it is necessary to submit the complete and updated module handbooks for all three degree programmes.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Reports
- Sample Diploma for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the peers:

The peers confirm that the students of all degree programmes are awarded a Transcript of Records, a Diploma and a Diploma Supplement after graduation. The Diploma Supplement and the Transcript of Records contain almost all necessary information about the respective degree programme. However, some information should be added. The Transcript of Records should also list the acquired ECTS points of each course and how many ECTS points are awarded for whole degree programme. The Diploma Supplement should also include statistical data about the distribution of final grade according to the ECTS Users' Guide. This allows the reader to categorise the individual result.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Reports
- Webpage HCMUT: www.hcmut.edu.vn
- Webpage Faculty of Chemical Engineering: che.hcmut.edu.vn

Preliminary assessment and analysis of the peers:

The auditors confirm that the rights and duties of both HCMUT and the students are clearly defined and binding. All rules and regulations are published on the university's Vietnamese website and hence available to all stakeholders. In addition, the students receive all relevant course material in the language of the degree programme at the beginning of each semester.

However, the peers notice that the English websites of the programmes do not include much information. For this reason, the peers expect to update the English websites of the programmes, to align the information on the university's and the faculty's webpages, and to include information about the intended learning outcomes, study plans, module descriptions, and academic guidelines of each degree programme and make them thus available to all relevant stakeholders.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

The peers appreciate that HCMUT will update the module descriptions and they expect HCMUT to submit the updated module descriptions in the further course of the procedure.

The peers understand that the Diploma Supplement is an important document. If HCMUT does not want to rank all graduates in this document, they should at least provide this ranking as an attachment to the Diploma Supplement. This attachment should automatically issued to all graduates together with the Diploma Supplement.

The peers consider criterion 5 to be mostly fulfilled.

6. Quality management: quality assessment and development

Evidence:

- Self-Assessment Reports
- Academic Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The three programmes, Chemical Engineering, Food Technology and Biotechnology are managed by the Faculty of Chemical Engineering (FCE), which is part of the Ho Chi Minh City University of Technology (HCMUT). Ho Chi Minh City University of Technology is a member of Vietnam National University – Ho Chi Minh City (VNUHCM), which is a ministerial-level university. Each programme has a Science and Academic Committee (SAC), whose members are suggested by the Dean of FCE and approved by the Rector of HCMUT and a Quality Assurance Team (QAT) whose members are also assigned by the Dean of FCE. The QAT analyses the data, write reports, and offers suggestions to SAC. The SAC reviews, revises the suggestions from QAT, and makes the final decisions to all academic concerns in FCE.

The auditors discuss the quality management system at HCMUT with the programme coordinators and the students. They learn that there is a continuous process in order to improve the quality of the degree programmes and it is carried out through internal and external quality assurance.

At university level, the Office of Quality Assurance manages the processes of internal quality assessment. In Faculty of Chemical Engineering, the internal quality assurance procedures were conducted in 2019, 2020 and 2021. Contributions from assessors during the internal quality assessments have been used to develop the curricula from version 2014 to version 2019.

In order to further improve its degree programme, HCMUT conducts several surveys, such as a stakeholder surveys for work related issues, a lecturer survey, an alumni survey (one year after graduation, a final year students survey (on the overall quality of programmes and services), and a students' survey (every semester).

Since 2013, the Quality Assurance Office conducts online-surveys about the lecturers' satisfaction with the degree programme and the curriculum. The feedback is collected, analysed, and reported to the Rector's Board of HCMUT. Based on the survey results, HCMUT can issue policies about organisation, academic issues, and finances to meet the needs of the lecturers.

As HCMUT and FCE are aware of the diversity of the labour market and the fast development of new technologies, employer surveys are conducted annually. Employers are asked about the ability of alumni to apply fundamental and professional skills into engineering practice. For each skill, employers are asked about their level of expectation for graduates and how these expectations are met. By analysing the answers, it can be seen that employers are generally satisfied with the quality profile of the graduates. The employers' feedbacks is considered by the Board of Deans to modify or update the degree programme and teaching methods in order to providing students with current knowledge, so that they can adapt themselves to different working environments in their future career.

Since 2008, the Quality Assurance Office annually conducts surveys to receive feedback from alumni at the time of graduation and one year after graduation using questionnaires. The responses of the alumni on their employment status as well as their adaptability to the working environment are collected, analysed, and transferred into reports. The alumni survey reports are then sent to the Board of Rectors of HCMUT and the Board of Deans of FCE. The survey results can be used for further improving of the programmes and continuously enhancing the training quality. In addition, FCE organises meetings between the Board of Deans, Department Heads, and alumni to get direct feedback.

The survey for final year students is also annually conducted through questionnaires. This survey focuses on the whole degree programme, teaching organisation, and supporting services.

At the end of each semester, the Quality Assurance Office conducts a students' survey about the teaching quality of lecturers for each course. Before 2013, the course evaluation surveys were paper-based. Since 2013, the course evaluation surveys have been carried out online through BKeL. Participation at the questionnaires is compulsory for the students, otherwise they cannot access their account on BKeL. The Quality Assurance Office analyses the data and sends the results to FCE and relevant lecturers, which should help lecturers adjusting their teaching methods and improving the teaching quality. If the results shows that a lecturer has not met the teaching quality requirements, the lecturer is reminded to improve the teaching quality. If a lecturer, who has already been reminded before, does not meet the teaching quality again, FCE may stop assigning the course to the lecturer.

According to the regulation "Survey of Students for Each Course", after receiving feedback from the students, the Quality Assurance Office should send an email to confirm to students that their opinions have been received. Then, the office asks the relevant faculty to answer on the students' opinion. In case, there is a plan to improve the programme, the plan should be sent to the Quality Assurance Office and the office should send this plan to the students for notification. After the plan is done, the relevant Faculty must report the results to the Quality Assurance Office, which forwards them to the students.

In addition, a survey for first-year students is annually conducted through questionnaires. The objectives of this survey are to ensure the quality of welcome services and to understand the needs of new students.

Meetings between students and representatives of the Board of Rectors, Board of Deans, Heads of Departments, and academic advisors are annually conducted at the beginning of the second semester (around March every year). The student's feedbacks on many respects including the degree programme, teaching methods, academic quality, and supporting service are discussed. The student's feedback is analysed and used as input to further improving the curriculum, teaching methods, and academic activities.

On all levels (university, faculty, department) there is always one student a member of the respective committees.

FCE organises annual staff meetings and labour union meetings with the participation of all staff members. In these meetings, the Deans listen to staffs' opinions about different aspects such as curriculum, laboratory equipment, teaching and learning strategies, graduate quality, working environment, and staff income. Based on the feedback, the

Board of Deans can update the degree programme, modify teaching and learning strategies, and allocate university budget to buy equipment for laboratories. For other issues such as salary policies, investment for laboratories, FCE raise the issues at HCMUT Staff Meetings. If possible, the Board of Rectors can change the policies of HCMUT to improve the working conditions.

External quality assurance focuses on international accreditations. For this reason, several degree programmes at HCMUT have been accredited by the American Accreditation Board for Engineering and Technology (ABET) and the ASEAN University Network Quality Assessment (AUN-QA).

The peers discuss with the representatives of HCMUT's partners from the industry and private companies if there are regular meetings with FCE, where they discuss the needs and requirements of the employers and possible changes to the degree programmes. They learn that employers are taking part at surveys to give their feedback on the content of the degree programmes. In addition, there is an alumni organisation. The peers appreciate that HCMUT stays in contact with its alumni and has a close relation with its partners from the industry. Moreover, the peers perceive that there are advisory boards with external stakeholders on university and faculty level who give feedback on the structure and design of the degree programmes and the demands of the labour market. During the meetings the employers discuss with the programme coordinators and the deans how to further improve the degree programmes. As the peers consider the input of the employers to be very important for the further improvement of the degree programmes, they appreciate the existing culture of quality assurance with the involvement of employers in the quality assurance processes.

In summary, the peer group confirms that the comprehensive quality management system at HCMUT is one of the strengths of the university and is suitable to identify weaknesses and to improve the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

HCMUT does not comment on this criterion in its statement.

The peers consider criterion 6 to be fulfilled.

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

- none

E Comment of the Higher Education Institution (14.02.2022)

HCMUT provides the following statement:

Criterion 2.1 Structure and modules

We appreciate the comments from the peers about the difficulty of doing thesis with the other courses. However, theses are done within one year by the two courses: (1) Specialized project in the 7th semester and (2) Capstone project in the 8th semester. Since 2019, the workload of the Capstone project is only 4 Vietnamese credits (8 ECTS). In case the theses are done without the other courses, student cannot satisfy the requirement of minimum number of registered credits in one semester. With respect to the Circular No 24/2019/TT-BGDĐT from the Ministry of Education and Training, the minimum credits of one semester are 14 Vietnamese credits. Until now, the students from the intake 2019 have not done the theses yet. The feedbacks of doing thesis without the other courses may come from the students of the intake 2018 backward which should follow the 2014 program. In the study plan of the 2014 program, a thesis with 9 Vietnamese credits was planned in the 8th semester without any accompany course.

We would like to clarify the term of “project” in our programs. In each program, there are three courses of projects are implemented: (1) the course of “specialized project” is a thesis proposal, (2) the course of “capstone project” is a main thesis and (3) the design projects include the courses of “project of biotechnology”, “project of unit operation and process in chemical engineering” and “food plant design”. In the design project, students are required to design a plant, a process and equipments to satisfy the given design requirements. The “project” does not only refer to the thesis proposal.

In term of the courses of “Military” and “Physical training I, II and III”, we want to clarify that the courses do not belong to our programs. These are the requirements from the government. The course of “Military” is implemented by the Center for National Defense and Security Training which is separated from HCMUT. After completion the course, students are awarded a separate certificate. We also cannot decide the student workloads for these

courses. Therefore, these courses are considered as the requirements to fulfil a bachelor degree the same as the requirement of 15 days of social contribution.

In here, we also want to clarify the meaning of the “Free Electives” which involves 9 Vietnamese credits. With these “Free Electives” credits, students can select the course from any faculty and even from the post-graduate study. We do understand the importance of emphasis on student’s major. Therefore, we have academic advisors for each class to consults students for enrolling courses. Usually, students use the “Free Electives” to study the elective specialized courses from the programs of FCE. In case students want to join master’s degree, they can enroll the courses of the post-graduate studies. Later, when they become a master’s student, the credits can be transferred and the length of master’s study can be reduced. There are also some students from FCE want to take Master of Business and Administration (MBA) after the bachelor engineering degree. They can use the “Free Electives” to study the core courses of the program of Bachelor of Business and Administration (BBA) from the School of Industrial Management, a member of HCMUT. Students who complete 5 designated core courses (15 Vietnamese credits) of BBA can process the admission of MBA without taking the full program of BBA. With the “Free Electives” course regulation, students have many options for their future studies. Moreover, the regulation does not prevent students to choose the courses in FCE to improve their major.

We also understand that a group of 5 students in the practical works is too much. We would like to make clear that not all practical courses were implemented as a group of five students. For example, the practical courses of Analytical Chemistry and General Chemistry are individual work. The practical course of Organic Chemistry is the group work of three students. Since 2022, the new equipment in the second campus are implemented, we have planned to reduce number of students in the group of practical work to two or three.

We appreciate the contributions from the peers for improving our program. We understand that the share of practical work in the Chemical Engineering programme is rather low. Based on that, we will discuss with students and our lecturer to increase the percentage of practical works in the chemical engineering program.

In the Chemical Engineering Program, we understand the importance of the knowlege of the courses “process operation”, “P&ID design”, “plant design”. The basic knowledge of

process operation is also trained in the courses of “mass transfer processes and equipments” and “heat transfer processes and equipments”. The basic knowledge of P&ID is also discussed in the course of “process design”. The knowledge of “power supply transformation” is also discussed in the course “sustainable development and environment engineering. We still keep the above courses as the elective ones for students who want to study deeper in the respective fields.

In the Food Technology program, we will bring back the mentioned courses as the elective ones.

In the Biotechnology program, we will increase the engineering knowledge such as bio-reactor in the course of “Microbial Fermentation” and hygienic design in the course of “Bio-safety and Food Safety”. Since the third revision of the year 2024, we will design the bio-reaction engineering as a separate course.

We appreciate the recommendation of increasing the duration of internship, we will also consider this concern in the third revision of the programs for the version 2024.

We have received the feedback that there is no employer from the biology technology program during the audit. We would like to confirm that we have two representatives of employers from biotechnology field as follows:

1. Tong Thanh Trung, the QMS Manager from Nedspice Processing Vietnam Ltd.
2. Dang Van Linh, the Hygiene and Quality Manager from Central Retail VN

We also submit two photos as an evidence of coordination with employers (Additional Document 1). The biotechnology program does have many activities to coordinate to employers and firms.

We appreciate the empathy from the peers for the difficulty of increasing the financial supports for student mobility. We have planned to offer financial supports for students who wish to study abroad for long and short-term.

As the request from students, we also request to increase the number of textbooks and references in our library.

Criterion 2.2 Workload

First, we clarify that we have not clearly stated that “one ECTS point is awarded for 30 hours of students’ workload” in Self-Assessment Report or Module descriptions. According to Article 7 the Circular No. 17/2021/TT-BGDĐT dated June 22, 2021 on providing for standards and formulation, appraisal and promulgation of training programs of higher education the Ministry of Education and Training (Additional Document 2), one Vietnamese credit is equivalent to 50 hours of students’ workload. Based on the circular, we consider one Vietnamese credit is equivalent to two ECTS. In other words, one ECTS is awarded for 25 hours of students’ workload.

The mentioned inconsistency in the workload calculation may come from difference between ECTS guideline and the circular 17/VBHN-BGDĐT dated 15th May 2014. The guideline of workload calculation from the circular 17/VBHN-BGDĐT is shown in the following table:

Form of study for 1 credit	In-class periods	Self-study periods	Total Periods	Total hours
Theoretical Lecture	15	30	45	37.5
Practice in a Laboratory	30	30	60	50
Project, Thesis, Internship	60		60	50

It can be seen that there is a difference between the workloads for Theoretical Lecture and Practice, Project, Thesis, Internship.

We would like to clarify the workload of a thesis. A thesis involves two courses: (1) a specialized project (two Vietnamese credits) and (2) a capstone project (four Vietnamese credits). It makes the total workloads for a thesis is six Vietnamese credits. In the draft report, there may be a misunderstanding that a thesis is only the capstone project. In addition, we do not always implement the internship as a full-time work. The schedule for the internship may vary by the arrangement of the employers. Therefore, we did not calculate the workload of internship by the multiplication between the number of weeks and 40 hours.

We appreciate the recommends from the peers for the guidance of workload calculation. We have recognized the drawback of this calculation, since the new regulation, the Circular No. 17/2021/TT-BGDĐT (Additional Document 3), have been valid from June 2021. It allows us to revise the workload calculation which follows the ECTS guideline. We are going to

involve the student workload's survey to the surveys after the courses for adjusting the student workload and number of credits for each course.

We would like to update the statistical data of graduation (Additional Document 4). The summary of all percentages in the first table did not reach 100% because we left the remaining students from the data. However, in the second table of the data we also calculate the percentages of remaining students which are the students have not graduated and still enrolled the courses in HCMUT.

In the audit, the program coordinators mentioned "60 % of the students finish within four years" which may be the estimation of graduation percentage for the whole FCE in general, not only for biotechnology program. The data in the additional document 4 should have the correct percentage for each program.

Criterion 5.1 Module Descriptions

Since June 2021, the Ministry of Education and Training has revised the new guideline for workload calculation by the Circular No. 17/2021/TT-BGDĐT (Additional Document 3). Based on the new regulation, with the workload of 50 hours, students are awarded one Vietnamese credit and two ECTS. We will update all data which are required in the report to our module descriptions. We appreciate all suggestions from the peers in these concerns.

Criterion 5.2 Diploma and Diploma supplement

In the transcript of records, we will list the acquired ECTS points of each course and the number of ECTS points are awarded for whole degree programs.

We have issues relate to printing statistical data of final grade distribution in diploma supplement. The statistical data enable to estimate the position of a student. It may make the benefits for the high-ranking students. However, it may reduce the opportunities to find job for the low-ranking students. Moreover, we expect all students to work hard to complete the degree. The grade may just express the competence of students for several years near the time of graduation. The diploma supplement, however, is the important document which may be affected to careers of graduates for very long time. By this reason, we avoid ranking for all graduates. However, we have a procedure to issue a ranking certification for graduates when it is required.

Criterion 5.3 Relevant rules

We also have a plan to improve our English website. The information suggested by the peers is necessary to publish in the English website to improve the transparency of our programs. We have appreciated all contributions and suggestions from the peers.

F Summary: Peer recommendations (22.02.2022)

Taking into account the additional information and the comments given by HCMUT, the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemical Engineering	With requirements for one year	-	30.09.2027
Ba Food Technology	With requirements for one year	EQAS-Food Label upon fulfilment of requirements	30.09.2027

Requirements

For all degree programmes

- A 1. (ASIIN 1.3) Award ECTS points to all compulsory courses.
- A 2. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.
- A 3. (ASIIN 4.3) It is necessary to visit and assess the technical infrastructure, safety measures, and facilities onsite at HCMUT.
- A 4. (ASIIN 5.1) The module descriptions need to include the correct information about the students' workload, the awarded credits (Vietnamese and ECTS), the forms of assessment, and the composition of the final grade. It needs to be made transparent what the compulsory prerequisites for taking the courses are.
- A 5. (ASIIN 5.1) The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for whole degree programme. The Diploma Supplement needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide.
- A 6. (ASIIN 5.3) Make the information about the international and regular programmes (study plans, module descriptions, intended learning outcomes, etc.) available to all stakeholders e.g. by publishing them on the Faculty's webpage.

For the Bachelor's programme Biotechnology

- A 7. (ASIIN 2.1) The profile of the Biotechnology programme needs to be sharpened and the curriculum should include subjects like bio reaction engineering, bio reactor design, and hygienic design.

For the Bachelor's programme Chemical Engineering

- A 8. (ASIIN 2.1) Elective courses like chemical plant design, process operation, and P&ID Design should be compulsory.

For the Bachelor's programme Food Technology

- A 9. (ASIIN 2.1) Include specific courses on food technology such as cereal processing technology, food fermentation, tea, coffee and cacao processing technology as compulsory in the curriculum.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.1) It is recommended to revise the description of the intended learning outcomes for the courses and to follow a taxonomy, e.g. Bloom's taxonomy.
- E 2. (ASIIN 2.1) It is recommended to further promote the academic mobility of the students and to cooperate with more renowned international universities.
- E 3. (ASIIN 2.1) It is recommended to reduce the amount of free electives.
- E 4. (ASIIN 4.3) It is strongly recommended to provide enough technical equipment so that experiments can be done by groups not larger than 2 to 3 students.

For the Bachelor's programme Chemical Engineering

- E 5. (ASIIN 2.1) It is recommended to increase the scope of practical laboratory work in the Chemical Engineering programme.

G Comment of the Technical Committees (11.03.2022)

Technical Committee 01 – Mechanical Engineering/Process Engineering (07.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the assessment of the peers without any changes.

The Technical Committee 01 – Mechanical Engineering/Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemical Engineering	With requirements for one year	-	30.09.2027
Ba Food Technology	With requirements for one year	EQAS-Food Label upon fulfilment of requirements	30.09.2027

Technical Committee 08 – Agriculture, Nutritional Sciences and Landscape Architecture (11.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the accrediting procedure and follows the assessment of the peers without any changes.

Assessment and analysis for the award of the EQAS-Food Label:

The Technical Committee confirms that the Food Technology programme complies with the IFA standards for the EQAS-Food Label if all requirements are fulfilled.

The Technical Committee 08 – Agriculture, Nutritional Sciences and Landscape Architecture recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemical Engineering	With requirements for one year	-	30.09.2027
Ba Food Technology	With requirements for one year	EQAS-Food Label upon fulfilment of requirements	30.09.2027

Technical Committee 09 – Chemistry, Pharmacy (01.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and adds an additional recommendation with respect to non-subject-specific compulsory courses such as Military Training. Otherwise, the TC follows the assessment of the peers.

The Technical Committee 09 – Chemistry, Pharmacy recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemical Engineering	With requirements for one year	-	30.09.2027
Ba Food Technology	With requirements for one year	EQAS-Food Label upon fulfilment of requirements	30.09.2027

Recommendations

For all degree programmes

(ASIIN 2.1) It is recommended to delete non-subject-specific compulsory courses such as Military Training from the curriculum.

Technical Committee 10 – Life Sciences (04.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and is of the opinion that recommendation E 4 should be upgraded to a requirement, as it is essential that students gain sufficient practical experience with experiments. Furthermore, this point is considered as a requirement in other procedures. In addition, the TC proposes to mention the electives in requirement A 1 and to add the area of "bio process engineering" to the list in requirement for the biotechnology programme. Otherwise, the TC follows the assessment of the peer group.

The Technical Committee 10 – Life Sciences recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemical Engineering	With requirements for one year	-	30.09.2027
Ba Food Technology	With requirements for one year	EQAS-Food Label upon fulfilment of requirements	30.09.2027

Requirements

For all degree programmes

(ASIIN 4.3) Update the instruments and the technical equipment in the laboratories. Provide enough technical equipment so that experiments can be done by groups of 2 to 3 students.

H Decision of the Accreditation Commission (18.03.2022)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The AC discusses about the procedure and the changes as proposed by TC 09 and TC 10. In summary, all changes are supported. An additional recommendation with respect to the non-subject-specific courses is added and the recommendation with respect to the technical equipment is upgraded to a requirement.

Assessment and analysis for the award of the EQAS-Food Label:

The accreditation Commission decides that the Food Technology programme complies with the IFA standards for the EQAS-Food Label if all requirements are fulfilled.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemical Engineering	With requirements for one year	-	30.09.2027
Ba Food Technology	With requirements for one year	EQAS-Food Label upon fulfilment of requirements	30.09.2027

Requirements

For all degree programmes

- A 1. (ASIIN 1.3) Award ECTS points to all compulsory and elective courses.
- A 2. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.
- A 3. (ASIIN 4.3) It is necessary to visit and assess the technical infrastructure, safety measures, and facilities onsite at HCMUT.
- A 4. (ASIIN 5.1) The module descriptions need to include the correct information about the students' workload, the awarded credits (Vietnamese and ECTS), the forms of

assessment, and the composition of the final grade. It needs to be made transparent what the compulsory prerequisites for taking the courses are.

- A 5. (ASIIN 5.1) The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for whole degree programme. The Diploma Supplement needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide.
- A 6. (ASIIN 5.3) Make the information about the international and regular programmes (study plans, module descriptions, intended learning outcomes, etc.) available to all stakeholders e.g. by publishing them on the Faculty's webpage.
- A 7. (ASIIN 4.3) Update the instruments and the technical equipment in the laboratories. Provide enough technical equipment so that experiments can be done by groups of 2 to 3 students.

For the Bachelor's programme Biotechnology

- A 8. (ASIIN 2.1) The profile of the Biotechnology programme needs to be sharpened and the curriculum should include subjects like bio reaction engineering, bio reactor design, bio process engineering, and hygienic design.

For the Bachelor's programme Chemical Engineering

- A 9. (ASIIN 2.1) Elective courses like chemical plant design, process operation, and P&ID Design should be compulsory.

For the Bachelor's programme Food Technology programme

- A 10. (ASIIN 2.1) Include specific courses on food technology such as cereal processing technology, food fermentation, tea, coffee and cacao processing technology as compulsory in the curriculum.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.1) It is recommended to revise the description of the intended learning outcomes for the courses and to follow a taxonomy, e.g. Bloom's taxonomy.
- E 2. (ASIIN 2.1) It is recommended to further promote the academic mobility of the students and to cooperate with more renowned international universities.
- E 3. (ASIIN 2.1) It is recommended to reduce the amount of free electives.

- E 4. (ASIIN 2.1) It is recommended to delete non-subject-specific compulsory courses such as Military Training from the curriculum.

For the Bachelor's programme Chemical Engineering

- E 5. (ASIIN 2.1) It is recommended to increase the scope of practical laboratory work in the Chemical Engineering programme.

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Biotechnology:

Objectives of degree programs are:

1. To train engineers who will meet the needs of economic development and integration in the stage of national industrialization and modernization.
2. To train engineers who will have basic scientific and technical knowledge, solid expertise and professional ethics, ability to solve problems by themselves, ability to work in groups, communication skills, and use foreign languages (English),
3. To train engineers who will be capable of working in the fields of biotechnology industry; ability to perform management activities in factories, businesses related to the fields of Agriculture, Environment, Food, and Medicine.
4. To train engineers sufficient knowledge and ability to continue to study Biotechnology graduate program in Vietnam or abroad.

Learning outcomes of degree programs are:

- a. An ability to select and apply modern knowledge, techniques, skills and tools of the biotechnology industry to carry out professional technical activities.
- b. An ability to select and apply knowledge of mathematics, science, engineering and technology to solve technical problems in practice.
- c. Ability to perform experiments, basic and in-depth analysis; be able to analyse and interpret results as well as apply experimental results in practice to improve the manufacturing processes of biotechnology products. Ability to analyse the obtained data.
- d. An ability to design biological production systems, parts or processes to solve technical problems and biotechnology safety.
- e. An ability to work effectively as a member or as a technical team leader.
- f. An Ability to identify, analyse and solve fundamental problems in the field of biotechnology
- g. An ability to convey or exchange professional issues in many forms such as writing, speaking or using graphics with objects inside and outside the engineering profession; To be able to select and use appropriate technical references.

- h. An ability to be well aware of professional development requirements; Able to develop career in a way.
- i. An ability to be well aware of and commit to professional ethical and professional responsibilities.
- j. An ability to be aware of the multifaceted impact of technical solutions in social and globalization contexts.
- k. An ability to be aware of the capacity, compatibility and continuous improvement of professional knowledge.

The following **curriculum** is presented:

Biotechnology Program				
No	Course Code	Course Name	Term	ECTS
1	LA1003	English 1	1	4
2	CH1001	Introduction to Engineering	1	6
3	MT1003	Calculus 1	1	8
4	PH1003	General Physics 1	1	8
5	CH1003	General Chemistry	1	6
6	PE1003	Physical Training 1	1	
7	MI1003	Military Training	1	
8	LA1003	English 2	2	4
9	MT1005	Calculus 2	2	8
10	MT1007	Linear Algebra	2	6
11	PH1007	General Physics Labs	2	2
12	CI1003	Engineering Drawing	2	6
13	PE1005	Physical Training 2	2	
14		Elective Courses - Group C	2	6
15	LA1007	English 3	3	4
16	SP1031	Marxist - Leninist Philosophy	3	6
17	CH2027	General Biology	3	6
18	CH2113	Analytical Chemistry	3	6
19	CH2115	Analytical Chemistry Laboratory	3	2
20	CH1005	Physical and Colloid Chemistry	3	6
21	PE1007	Physical Training 3	3	
22	LA1009	English 4	4	4
23	SP1033	Marxist - Leninist Political Economy	4	4
24	CH2021	Organic Chemistry	4	6
25	CH2033	Biochemistry	4	8
26	MT2013	Probability and Statistics	4	8
27	CH2019	Mechanical Processes and Equipments	4	6
28	SP1035	Scientific Socialism	5	4
29	CH3003	Microbiology (+Lab)	5	8
30	CH2111	Organic Chemistry Lab	5	2
31	CH2051	Heat Transfer Processes and Equipments	5	6
32	CH2043	Mass Transfer Processes and Equipments	5	6
33		Elective Courses - Group A	5	8
34	SP1039	History of Vietnamese Communist Party	6	4
35	CH3359	Microbial Fermentation (+Lab)	6	8

36	CH3019	Cell Technology (+Lab)	6	8
37	CH3375	Internship	6	4
38		Elective Courses - Group B	6	8
39	SP1037	Ho Chi Minh Ideology	7	4
40	CH3021	Protein - Enzyme Technology (+Lab)	7	8
41	CH3131	Gene Technology (+Lab)	7	8
42	CH4057	Project of Biotechnology	7	4
43	CH4095	Specialized Projects	7	4
44		Free Elective	7	6
45	CH4097	Biosafety and Food Safety	8	6
46	SP1007	Introduction to Vietnamese Law	8	4
47	CH3015	Laboratory of Unit Operations	8	4
48	CH4377	Capstone Project	8	8
49		Free Elective	8	12

Elective Courses - Group A

No	Course Code	Course Name	Term	ECTS
1	CH3351	Cell Biology (+Lab)	5	8
2	CH3357	Biology of Cells (+Lab)	5	8

Elective Courses - Group B

No	Course Code	Course Name	Term	ECTS
1	CH3361	Molecular Biology and Genetics	6	8
2	CH3367	Genetics	6	8

Elective Courses - Group C

No	Course Code	Course Name	Term	ECTS
1	IM1013	Economics	2	6
2	IM1027	Engineering Economics	2	6
3	IM1021	Entrepreneurship	2	6
4	IM1025	Project Management for Engineers	2	6
5	IM1023	Production and Operations Management for Engineers	2	6

Certification				
1	PE1003	Physical Training 1		
2	PE1005	Physical Training 2		
3	PE1007	Physical Training 3		
4	MI1003	Military Training		

According to the Self-Assessment Report, the following **objectives and learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Chemical Engineering:

Objectives of degree programs are:

1. To train engineers who will have basic knowledge of mathematics, natural science, respond to the acquisition of professional educational knowledge and the ability to study at a higher level.
2. To train engineers who will have knowledge on technical basis and industry: physical, chemical, and physical processes of chemical engineering, research, design and product development in the fields of chemicals, oil and gas, food, pharmaceuticals. Being capable of detecting and solving problems related to design and manufacture of products, processes and industrial production systems in the fields of chemicals, oil and gas, food, pharmaceuticals. There is creativity in professional activities, self-study and self-research.
3. To train engineers who will have personal and professional skills, communication, team work, professional ethics to work in a multidisciplinary and multicultural environment.
4. To train engineers who understand economics and politics. Having basic knowledge in the field of social sciences and humanities relevant to the discipline is trained to effectively contribute to the sustainable development of society and community.

Learning outcomes of degree programs are:

- a. An ability to apply knowledge of mathematics, science, and engineering in the field of chemical engineering
- b. An ability to design and conduct experiments, as well as to analyse and interpret data in the field of chemical engineering
- c. An ability to design a chemical process system and relevant equipment to meet technical requirements within realistic constraints such as environments, politics, ethics, safety, economy, society and sustainability in the field of chemical engineering
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve chemical engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in, life-long learning

j. A knowledge of contemporary issues

k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice in the field of chemical engineering

The following curriculum is presented:

Chemical Engineering Program				
No	Course Code	Course Name	Term	ECTS
1	LA1003	English 1	1	4
2	CH1001	Introduction to Engineering	1	6
3	MT1003	Calculus 1	1	8
4	PH1003	General Physics 1	1	8
5	CH1003	General Chemistry	1	6
6	PE1003	Physical Training 1	1	
7	MI1003	Military Training	1	
8	LA1003	English 2	2	4
9	MT1005	Calculus 2	2	8
10	MT1007	Linear Algebra	2	6
11	PH1007	General Physics Labs	2	2
12	CI1003	Engineering Drawing	2	6
13	PE1005	Physical Training 2	2	
14		Elective Courses - Group C	2	6
19	LA1007	English 3	3	4
20	SP1031	Marxist - Leninist Philosophy	3	6
21	CH2013	Inorganic Chemistry (+ Lab)	3	8
22	CH2113	Analytical Chemistry	3	6
23	CH2003	Physical Chemistry 1	3	6
24	PE1007	Physical Training 3	3	
25	LA1009	English 4	4	4
26	MT2013	Probability and Statistics	4	8
27	CH2019	Mechanical Processes and Equipments	4	6
28	CH2021	Organic Chemistry	4	6
29	CH2109	Physical Chemistry 2	4	6
30	SP1033	Marxist - Leninist Political Economy	4	4
31	CH2115	Analytical Chemistry Laboratory	4	2
32	CH2043	Heat Transfer Processes and Equipments	5	6
33	CH2051	Mass Transfer Processes and Equipments	5	6
34	CH2053	Organic Chemistry Lab	5	4
35	SP1035	Scientific Socialism	5	4
36	CH2041	Physical Chemistry Lab	5	4
		Elective Courses - Group A	5	6

43	CH3347	Reaction Engineering	6	6
44	CH3349	Fundamentals of Chemical Equipment Design	6	6
45	SP1039	History of Vietnamese Communist Party	6	4
46	CH3321	Chemical Process Design	6	6
47	CH3015	Laboratory of Unit Operations	6	4
48	CH3355	Internship	6	4
		Elective Courses - Group A	6	6
49	CH3133	Modeling, Simulation and Optimization for ChE	7	6
50	CH4051	Process Safety	7	6
51	SP1037	Ho Chi Minh Ideology	7	4
52	CH4053	Specialized Projects	7	4
53	CH4007	Project of Unit Operation and Process in ChE	7	4
		Free Elective	7	6
		Elective Courses - Group B	7	6
73	CH4357	Capstone Project	8	8
74	SP1007	Introduction to Vietnamese Law	8	4
75	CH3389	Sustainable Development and Environmental Tech.	8	8
		Free Elective	8	12

Elective Courses - Group A				
No	Course Code	Course Name	Term	ECTS
1	CH3327	Colloid Chemistry	5	6
2	CH3329	Advanced Analysis Methods	5	6
3	CH3331	Fundamentals of Material and Corrosion	5	6
4	CH3337	Petrochemical Technology	5	6
5	CH3339	Biochemistry and Microbiology	5	6
6	CH3341	Process Control Fundamentals	5	6

Elective Courses - Group B				
No	Course Code	Course Name	Term	ECTS
1	CH4059	Energy Auditing	8	6

2	CH3309	Experiment Design and Data Analysis	8	6
3	CH4061	Pipeline Engineering and Storage System	8	6
4	CH4063	P&ID Design	8	6
5	CH4065	Chemical Process Operation	8	6
6	CH4067	Chemical Plant Design	8	6
7	CH4069	Cleaner Production	8	6
8	CH4071	Automatic Control of Technological Process	8	6
9	CH4073	Particle and Powder Engineering	8	6
10	CH4075	Treatment and Recycling of Waste	8	6
11	CH4077	Bio- and Renewable Fuels	8	6
12	CH4079	Green Chemistry	8	6
13	CH4081	Inorganic Chemicals Production Technologies	8	6
14	CH4083	Fundamentals of Polymer Engineering	8	6
15	CH4085	Surfactant Chemistry and Technology	8	6
16	CH4087	Physical Methods for Studying Solid Phases	8	6
17	CH4089	Basics of Radio-Chemical Engineering	8	6
18	CH4091	Nano Chemistry and Applications	8	6
19	CH4093	Applied Industrial Toxicology	8	6

Elective Courses - Group C				
No	Course Code	Course Name	Term	ECTS
1	IM1013	Economics	2	6
2	IM1027	Engineering Economics	2	6
3	IM1021	Entrepreneurship	2	6
4	IM1025	Project Management for Engineers	2	6
5	IM1023	Production and Operations Management for Engineers	2	6

Certification				
1	PE1003	Physical Training 1		
2	PE1005	Physical Training 2		
3	PE1007	Physical Training 3		
4	MI1003	Military Training		

According to the Self-Assessment Report, the following **objectives and learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Food Technology:

Objectives of degree programs are:

1. To train engineers with a solid background in food science and technology; be able to solve practical problems related to engineering and technology in food production and research; have good teamwork and communication skills; know how to use foreign language expertise (English); have high professional ethics and responsibility.
2. To train engineers to become key staff for food production, management and research units, and specialized instructors for universities and colleges in the future.

Learning outcomes of degree programs are:

- a. An ability to select and apply modern knowledge, techniques, skills and tools of the food technology industry to carry out professional technical activities.
- b. An ability to select and apply knowledge of mathematics, science, engineering and technology to solve technical problems in practice.
- c. An ability to perform basic tests; ability to perform experiments, analyse and interpret results as well as apply experimental results in practice to improve food production processes.
- d. An ability to design food production systems, parts or processes to solve technical problems.
- e. An ability to work effectively as a member or as a technical team leader.
- f. An Ability to identify, analyse and solve fundamental problems in the field of food engineering technology.
- g. An ability to convey or exchange professional issues in many forms such as writing, speaking or using graphics with objects inside and outside the engineering profession; To be able to select and use appropriate technical references.
- h. An ability to be well aware of professional development requirements; Able to develop career in a way.
- i. An ability to be well aware of and commit to professional ethical and professional responsibilities.
- j. An ability to be aware of the multifaceted impact of technical solutions in social and globalization contexts.
- k. An ability to be aware of the capacity, compatibility and continuous improvement of professional knowledge.

The following curriculum is presented:

Food Technology Program				
No	Course Code	Course Name	Term	ECTS
1	LA1003	English 1	1	4
2	CH1001	Introduction to Engineering	1	6
3	MT1003	Calculus 1	1	8
4	PH1003	General Physics 1	1	8
5	CH1003	General Chemistry	1	6
6	PE1003	Physical Training 1	1	
7	MI1003	Military Training	1	
8	LA1003	English 2	2	4
9	MT1005	Calculus 2	2	8
10	MT1007	Linear Algebra	2	6
11	PH1007	General Physics Labs	2	2
12	CI1003	Engineering Drawing	2	6
13	PE1005	Physical Training 2	2	
14		Elective Courses - Group C	2	6
15	LA1007	English 3	3	4
16	SP1031	Marxist - Leninist Philosophy	3	6
17	CH2027	General Biology	3	6
18	CH2021	Organic Chemistry	3	6
19	CH2111	Laboratory of Basic Organic chemistry	3	2
20	CH2007	Food Chemistry and Biochemistry	3	8
21	PE1007	Physical Training 3	3	
22	LA1009	English 4	4	4
23	SP1033	Marxist - Leninist Political Economy	4	4
24	CH2017	Food Engineering 1	4	6
25	CH1005	Physical and Colloid Chemistry	4	6
26	CH2049	Laboratory of Food Chemistry and Bio-chemistry	4	4
27	MT2013	Probability and Statistics	4	8
28	SP1035	Scientific Socialism	5	4
29	CH2045	Food Microbiology	5	6
30	CH3369	Human Nutrition	5	6
31	CH2035	Food Engineering 2	5	6
32	CH3371	Food Analysis	5	6

33		Free Elective	5	6
34	SP1039	History of Vietnamese Communist Party	6	4
35	CH3001	Laboratory of Food Microbiology	6	4
36	CH3017	Principles of Food Processing Technology	6	6
37	CH3053	Food Plant Design	6	6
38	CH2039	Food Engineering 3	6	6
39	CH3365	Internship	6	4
40		Elective Courses - Group A	6	4
41	SP1037	Ho Chi Minh Ideology	7	4
42	CH4099	Project on Food Plant Design	7	4
43	CH3015	Laboratory of Unit Operations	7	4
44	CH3049	Sensory Evaluation of Food	7	6
45	CH4101	Food Quality Management	7	6
46	CH4103	Specialized Projects	7	4
47		Free Elective	7	6
48	SP1007	Introduction to Vietnamese Law	8	4
49	CH4001	Laboratory of Food Processing Technology	8	4
50	CH4097	Biosafety and Food Safety	8	6
51	CH4367	Capstone Project	8	8
52		Free Elective	8	6
53		Elective Courses - Group B	8	6

Elective Courses - Group A				
No	Course Code	Course Name	Term	ECTS
1	CH3379	Laboratory of Food Analysis A	6	4
2	CH3381	Laboratory of Food Analysis B	6	4

Elective Courses - Group B				
No	Course Code	Course Name	Term	ECTS
1	CH4107	New Food Product Development	8	6
2	CH4111	Food Physics	8	6
3	CH4113	Food Packaging Technology	8	6
4	CH4115	Postharvest Technology	8	6

Elective Courses - Group C				
No	Course Code	Course Name	Term	ECTS
1	IM1013	Economics	2	6
2	IM1027	Engineering Economics	2	6
3	IM1021	Entrepreneurship	2	6
4	IM1025	Project Management for Engineers	2	6
5	IM1023	Production and Operations Management for Engineers	2	6

Certification				
1	PE1003	Physical Training 1		
2	PE1005	Physical Training 2		
3	PE1007	Physical Training 3		
4	MI1003	Military Training		