ASIIN Seal & EUR-ACE® Label

Accreditation Report

Bachelor's Degree Programme
Chemical Engineering

Master's Degree Programme
Biomedical Engineering

Provided by
International University – Viet Nam National University Ho Chi Minh City

Version: 06 December 2024

Table of Content

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]
Kỹ sư Kỹ thuật Hóa học	Bachelor of Engineering in Chemical Engineering	ASIIN, EUR-ACE®	-	01, 09
Thạc sĩ Kỹ thuật Y Sinh	Master of Engineering in Biomedical Engineering	ASIIN	-	05, 14
Date of the contract: 30.08.2023 **Submission of the final version of the self-assessment report:** 21.06.2024 **Date of the audit (online):** 08.10. – 10.10.2024				
Expert panel: Prof. Dr. Philipp Wiedemann, University of Applied Sciences Mannheim Prof. Dr.-Ing. Theodor Doll, Medical University Hannover Dipl.-Ing. Manfred Kindler, Kindler International Division, Werne Dr. Ngo Vy Thao, Nong Lam University – Ho Chi Minh City Tien Manh Nguyen, Ho Chi Minh City University of Technology				
Representative of the ASIIN headquarter: Rainer Arnold				
Responsible decision-making committee: Accreditation Commission				

[1] ASIIN Seal for degree programmes;
[2] TC: Technical Committee for the following subject areas: TC 01 – Mechanical Engineering/Process Engineering, TC 05 – Materials Science, Physical Technologies, TC 09 – Chemistry, Pharmacy, TC 14 – Medicine

Criteria used: European Standards and Guidelines as of 15.05.2015 Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering/Process Engineering as of 16.03.2021 Subject-Specific Criteria of the Technical Committee 05 – Materials Science, Physical Technologies as of 29.09.2021 EUR-ACE® Framework Standards and Guidelines, 2021	

B Characteristics of the Degree Programme

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
Bachelor Chemical Engineering	Kỹ sư / Bachelor of Engineering	-	6	Full time	no	9 Semester	151 Credits (260.18 ECTS)	2023, Once a year (August)
Master Biomedical Engineering	Thạc sĩ / Master of Engineering		7	Full time	no	4 Semester	60 Credits (139.92 / 156.28 ECTS)	2012, Three times a year (May, August, November)

[3] EQF = The European Qualifications Framework for lifelong learning

For the Bachelor's degree programme Chemical Engineering, International University – Viet Nam National University Ho Chi Minh City (HCMIU) has presented the following profile in the SAR:

"The School of Chemical and Environmental Engineering (CEE) was established on September 14th, 2022 from the integration of two departments, Department of Environmental Engineering & Department of Chemical Engineering. With the "job-ready" philosophy, the education programme for chemical engineers and environmental engineers at IU is designed to meet the needs of the global labor market and for qualified engineers having practical, good English and proficient skills in the field of chemistry and environment.

Bachelor of Engineering in Chemical Engineering, Chemical Engineering (CHE) is a field of science and technology that studies and applies the knowledge of chemistry and engineering to the process of producing chemical products for industry and life. It is an important engineering discipline that combines basic knowledge of chemistry and mathematics with engineering principles and takes into account realistic economic factors.

In the trend of industrialization and modernization, chemical engineering plays a vital role, becoming indispensable in the production sector, such as the production of consumer goods, agriculture, building materials, food industry, textile industry, electrochemistry industry, chemical industry, mechanical industry, power industry, fuel, energy, etc.

Chemical engineers conceive and design processes for the production, conversion, and transportation of materials - starting with laboratory testing, followed by the implementation of technology in the final production. For example, chemical engineers working in the chemical industry are researching the creation of new polymer materials with important electrical, optical, or mechanical properties. In biotechnology, chemical engineers design production facilities that use microorganisms and enzymes to synthesize new drugs. Environmental engineering issues related to chemical engineering include the development of processes (catalytic devices, waste treatment devices) to minimize the discharge or disposal of harmful products to the environment. To do these jobs, workers must have a full and quantitative understanding of both the technical and scientific principles of chemistry, physics, and biology that underlie these technological processes.

CEE aspires to be a place where quality and prestigious chemical and environmental engineers are trained. Chemical and environmental engineers trained in the discipline will be able to meet the needs of the global job market by applying basic knowledge to solve a wide range of problems in the industry. Engineers who graduated from International University's engineering programme can communicate and use English fluently, work well in teams, and adapt well to diverse working environments."

For the Master's degree programme Biomedical Engineering, International University – Viet Nam National University Ho Chi Minh City (HCMIU) has presented the following profile in the SAR:

"Established in March 2009, the Department of Biomedical Engineering (MBME-IU) at International University - Vietnam National University Ho Chi Minh City was founded with the vision of emerging as a leading institution in Vietnam dedicated to biomedical education, research, and community engagement. By August of the same year, the 4-year Biomedical Engineering undergraduate program was approved with major code 52.42.02.04 by the Vietnam Ministry of Education and Training. Over the years, MBME-IU has evolved, introducing a Master's program in 2012, followed by the establishment of the first Biomedical Engineering PhD program in Vietnam, in 2019. In the same transformative year, the department transitioned into a school, comprising two departments: (1) Medical Instrumentation and (2) Tissue Engineering and Regenerative Medicine.

Our undergraduate program has attained assessment from the ASEAN University Network - Quality Assurance (AUN-QA) in 2015 and the Accreditation Board for Engineering and Technology (ABET) in 2018. The dual accreditation highlights MBME-IU's commitment to global standards of excellence in education. The school remains steadfast in its commitment to educational excellence, research innovation, community impact, and continuous improvement, envisioning a future where it shapes the landscape of healthcare in Vietnam.

The strategy of the School of Biomedical Engineering is to promote integrative research, education, and entrepreneurship. The close connection among these three elements generates mutual benefit among the stakeholders of the MBME field, such as universities, hospitals, and healthcare agencies. The ultimate goal is an efficient mechanism that allows the smooth transfer of technology and the exchange between students, engineers, physicians, and corporate leaders."

C Expert 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
- Module descriptions
- Webpage HCMIU: https://hcmiu.edu.vn/en/
- Webpage School of Chemical and Environmental Engineering: https://cee.hcmiu.edu.vn/en/programs/chemical-engineering-ce/chemical-engineerng-program-specifications-ce/
- Webpage CHE programme: https://cee.hcmiu.edu.vn/programs/chemical-engineering-ce/about-che/
- Webpage School of Biomedical Engineering: https://hcmiu.edu.vn/en/schools-and-departments/department-of-biomedical-engineering/
- Webpage MBME programme: https://bme.hcmiu.edu.vn/en/education/master-program/
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The experts base their assessment of the learning outcomes as provided on the websites and in the Self-Assessment Report of the Bachelor's degree programme Chemical Engineering and the Master's degree programme Biomedical Engineering.

HCMIU has defined Programme Objectives (POs) as well as Intended Learning Outcomes (ILOs) to describe the profile and the goals of the Chemical Engineering programme. While the POs describe the general goals, the ILOs are worded more specifically and describe in detail, what competencies the students should acquire during their studies. The PO were generated based on the analysis of the vision and mission of the University and the demand

from industry. They were discussed and determined by the School's Scientific Committee, which includes the members of Management Board, representatives of stakeholders and lecturers. Therefore, the POs reflect the requirements of the University and the needs of regional and nationwide companies in the area of Chemical Engineering and Biomedical Engineering. The POs are documented both on the programme's webpage and in the Student Handbook.

While the POs define the overall goals, the ILOs interpret the POs in more detail with respect to the students' abilities upon graduation. In order to assure the globally competitive quality of the students as stated in the vision and mission of HCMIU, the School of Chemical and Environmental Engineering has aligned the ILOs with international standards e.g. the criteria from the Asian University Network.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee 01 - 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 HCMIU correspond to the competences as outlined by the SSC. They come to the following conclusions:

The Bachelor's degree programme Chemical Engineering (CHE) is offered by the School of Chemical and Environmental Engineering, International University (IU), a member of Vietnam National University in Ho Chi Minh City (VNUHCM). This programme offers undergraduate students courses in chemistry and engineering in order to meet the demand for highly skilled chemical engineers. In the trend of industrialisation and modernisation, the chemical industry in Vietnam has assumed an indispensable position in the fields of consumer goods, agriculture, production of building materials, food industry, as well as textile and leather industry.

The programme is designed to provide students with a sound foundation in natural sciences (especially chemistry), mathematics and engineering. Additionally, the programme focuses on scientific research, practical skills, and a multidisciplinary approach. Specifically, students should learn about organic, inorganic, analytical and physical chemistry, chemical thermodynamics, reaction kinetics and dynamics, unit processes, process simulation and basics of process and plant design. Graduates of the Bachelor's degree programme Chemical Engineering should understand the basic phenomena, principles of experimental work/ modelling as well as process development and design in the area of chemical engineering. Practical and creative problem solving, project work, and hands-on laboratory courses are also included. Additionally, oral and written skills and the ability to utilize different source and critical evaluation of information are conveyed. Attention is given especially to students' learning outcomes on sections of 'engineering design' and 'engineering practice'.

This reflects the programme's goal in providing solid problem-solving skills and knowledge in the field of engineering. In order to achieve these goals, students should acquire knowledge of the basic sciences and technological subjects of chemical engineering and be familiar with tools and technologies used in engineering research

During their studies, students should also acquire communicative skills, learn to work in a team, and have developed a strategy for life-long learning. With respect to social competences, the students are trained in conceptual, analytical and logical thinking for a professional career. In addition to the subject-related qualification objectives, graduates of the Chemical Engineering programme 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 experts conclude that the objectives and intended learning outcomes of the Chemical Engineering programme adequately reflect the intended level of academic qualification (EQF 6) and correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 01 – Mechanical Engineering/Process Engineering. Moreover, the experts confirm that the intended learning outcomes of the Bachelors' degree programme Chemical Engineering are aligned with the EUR-ACE® Framework Standards and Guidelines (EAFSG) for engineering programmes. The EUR-ACE® Framework Standards and Guidelines requires that engineering programmes cover the following seven competence areas: Knowledge and Understanding, Engineering Analysis, Engineering Design, Investigations, Engineering Practice, Making Judgements Communication and Team-working, and Lifelong Learning. As can been seen from the provided documents, both degree programmes under review cover the required competence areas and the experts perceive during the audit discussions with teachers and students that the mentioned competences are conveyed in the respective courses.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee 05 - Material Science, Physical Technologies as a basis for judging whether the intended learning outcomes of the Master's degree programme Biomedical Engineering as presented in the Self-Assessment Report correspond with the competences as outlined by the SSC. As a result, they come to the following conclusions:

The Master's degree programme Biomedical Engineering (MBME) is offered by the School of Biomedical Engineering, International University (IU) and a member of Vietnam National University in Ho Chi Minh City (VNUHCM). The programme is designed to provide students with a robust foundation in sciences and engineering, placing a particular emphasis on a

multidisciplinary approach to practical skills in scientific research. Successful completion of the MBME programme is expected to equip graduates with the advanced knowledge and research skills in biomedical engineering, complemented by a commitment to professional integrity. Graduates are encouraged to actively contribute to the expansion of scientific knowledge, enhancement of healthcare, and the advancement of both the country's economic growth and global progress in the life sciences.

The School of Biomedical Engineering has actively forged connections with local medical device distributors, medical schools, hospitals, and international universities and companies. These collaborations have resulted in the establishment of the Industrial Advisory Board (IAB), which comprises representatives from healthcare companies, medical centres, and hospitals. The board plays a pivotal role in guiding educational objectives, strategic curriculum development, research, fundraising, and outreach.

Experts in biomedical engineering should be able to respond to engineering problems that arise in the fields of life sciences. For this reason, the Bachelor’s degree programme Biomedical Engineering includes a technical-scientific component as well as a practical technology component.

Graduates of the Master’s degree programme Biomedical Engineering should be able to conceive, design, and produce equipment and systems for the biomedical field, to collaborate with other healthcare professionals, and to understand technology-based problems, taking into account parameters such as costs, quality, safety, social impact, sustainability, time and professional ethics. In order to achieve these goals, students should acquire knowledge of the sciences and technological subjects of biomedical engineering, understand the structure and functions of the human body, and be familiar with tools and technologies used in biomedical research and in disease diagnosis, treatment, and prevention. In addition, they should be able to put into practice concepts, techniques, and methods of engineering in healthcare, in line with social, economic and ethic regulations and implications. This includes the ability to understand and apply technical equipment and medical devices.

With respect to scientific activities, students should learn how to design and carry out research projects related to the field of biomedical engineering, to interpret data, to draw conclusions, and to present and communicate their findings, ideas, and solutions. To this end, they should also learn to carry out bibliographic searches, to use databases and other sources of information related to medical technologies, and acquire the ability to work independently and as part of a team in an interdisciplinary and international context.

Finally, graduates of the Master's degree programme Biomedical Engineering should have adequate competencies in oral and written communication skills, be adaptive to the development of biomedical sciences, and have adequate English proficiency as well as a social and academic attitude.

The educational objectives and learning outcomes are expected to equip the graduates with the skills required to develop and adapt to the broad spectrum of possible occupations. Graduates have the opportunity to find employment in a various fields including bioinformatics, pharmaceutical and biotechnology companies, diagnostic laboratories, research institutes, medical diagnosis, control and therapy, and technical services in health care. Many MBME students continue their academic education by enrolling in PhD programmes after graduation.

The experts point out that there are two options in the MBME programme that the student can choose: Research Programme 1 and Research Programme 2 (see criterion 1.3). As the curriculum, the job perspectives as well as the focus of both programmes are different, Research Programme 1 focuses on research, while Research Programme 2 focuses on course work, the Programme Objectives and Intended Learning Outcomes need to be defined separately for both options. The PO and ILO are tied to the specific competencies, knowledge and skills students should acquire in each of the two options. Research Programme 1 and Research Programme 2 have each its own set of expectations, standards, and qualifications that a graduate needs to meet in order to succeed professionally. Thus, the PO and ILO need to reflect the competencies required in the respective career. Distinct PO and ILOs are necessary to ensure that students gain the appropriate knowledge, skills, and competencies that align with their future professional roles, and these are inherently tied to the goals and career paths associated with each programme.

The experts conclude that the objectives and intended learning outcomes of the Biomedical Engineering programme adequately reflect the intended level of academic qualification (EQF 7) and correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 05 – Material Science, Physical Technologies.

In order to verify that the intended learning outcomes of both degree programme are covered by the respective curriculum, HCMIU has submitted a matrix for each degree programme that shows, in which course which learning outcomes are targeted. The experts can deduce the correlation of the programmes' competence profile with the SSC and see how each course contributes to achieving the intended learning outcomes from the provided Matrix for each programme.

In summary, the experts are convinced that the intended qualification profiles of both programmes under review allow graduates to take up an occupation, which corresponds to

their qualification. The degree programmes are designed in such a way that they meet the goals set for them. The objectives and intended learning outcomes of all degree programmes under review are reasonable and well founded.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the experts:
The experts confirm that the English translation and the original Vietnamese name of the Chemical Engineering programme as well as of the Biomedical Engineering programme correspond with the intended aims and learning outcomes.

As described in the Self-Assessment Report, graduates of the Chemical Engineering programme will be awarded a Bachelor of Engineering in Chemical Engineering and a Master of Engineering in Biomedical Engineering is in awarded to the graduates of the Biomedical Engineering programme.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Webpage HCMIU: https://hcmiu.edu.vn/en/
- Webpage School of Chemical and Environmental Engineering: https://cee.hcmiu.edu.vn/en/programs/chemical-engineering-ce/chemical-engineerng-program-specifications-ce/
- Webpage CHE programme: https://cee.hcmiu.edu.vn/programs/chemical-engineering-ce/about-che/
- Webpage School of Biomedical Engineering: https://hcmiu.edu.vn/en/schools-and-departments/department-of-biomedical-engineering/
- Webpage MBME programme: https://bme.hcmiu.edu.vn/en/education/master-program/

- Discussions during the audit

Preliminary assessment and analysis of the experts:
The Chemical Engineering programme (CHE) is offered by the School of Chemical and Environmental Engineering (CEE). It is designed for nine semesters, and at least 151 credit hours (this is equivalent to approximately 260.18 ECTS points) need to be achieved by the students. MOET requires a minimum of 150 credits of a Bachelor of Engineering programme. The previous curriculum had eight semesters, which resulted in 18.75 credits per semester. This is a quite high work load, so CEE decided to reduce the workload per semester and to prolong the programme to nine semesters. The experts only refer to the current curriculum of the CHE programme, which was launched in 2023.

There is an Academic and Scientific Committee (ASC) and a Quality Assurance Team (QAT) at every School of HCMIU, which are responsible for designing the curriculum and monitoring all teaching and learning processes. The ASC reviews and revises the suggestions made by QAT and submits the final suggestions to the Dean for approval. After that, the Head of the Department will present the results to the Academic and Scientific Committee of HCMIU (ASCIU). The final decision of ASCIU needs to be approved by the President of HCMIU.

An academic year at HCMIU consists of two semesters and a short summer term. Some additional courses are offered in the summer term, which lasts for ten weeks. A regular semester consists of 15 weeks for learning and teaching, one week for midterm tests, and two weeks for final exams. The midterm tests are normally given at the 9^{th} or the 10^{th} week of a semester.

Two main semesters are offered a year. The odd semester starts in August and ends January of the following year, while the even semester lasts from February to July. The short summer semester, which starts in June, is optional for students who want to complete their studies earlier or to re-take courses they did not pass. The academic calendar is published and announced annually to the students via HCMIU's webpage. The majority of students can complete the study programme within four years. The rest can extend their study time if needed and the maximum length of time allowed for students to finish the programme is six years.

The courses of the Bachelor's degree programme Chemical Engineering can be grouped into four areas: (I) General knowledge; (II) Core knowledge; (III) Specialization knowledge; and (IV) Professional practice, research, internship and thesis.

General knowledge courses include courses in natural sciences, mathematics, social and political sciences, humanities, English language, economics, computer science, and physical

training. These courses are mainly offered in the first two semesters of the Chemical Engineering programme and cover 56 credits (88.36 ECTS points).

Core knowledge courses (36 credits, 58.82 ECTS points) in chemical engineering are offered in the second year of the programme as a foundation for the more specialised courses in the third and fourth year of studies.

Specialised knowledge courses (36 credits, 58.36 ECTS points) are offered in the third and fourth year of the Chemical Engineering programme. These courses focus on providing knowledge and skills in specific fields of chemical engineering. Compulsory courses include for example “Green Chemical Engineering”, “Chemical Reaction Engineering”, and “Sustainable Energy”. Electives can be chosen by the students in accordance with their areas of interest and after consultation with their academic advisor.

The professional practice and research courses (23 credits/ 54.63 ECTS points) aim to foster students’ research and practical skills. Students will learn about research methodology and common practices used in chemical engineering to develop essential skills in designing, managing, and conducting engineering projects. This area includes research methodology, research, internship, and thesis.

All Chemical Engineering students must spend at least 10 weeks to study and work in companies, factories, institutes, etc. during their internship (8 credits, 19.63 ECTS points). The internship is divided into three parts: internship 1 is conducted in the summer term after the second year, then after the third year internship 2 is conducted, and internship 3 after the fourth year.

In the final year, undergraduate students have to complete their Bachelor’s thesis (10 credits, 24.55 ECTS points). While the internship requires students to spend ten weeks working in a professional environment, the thesis involves the long term investigation on a designed topic for normally two to four months. The modules “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. For both internship and thesis, students have to submit their reports, present and defend it in front of a panel. In addition, HCMIU annually organises a job fair for students from all majors.

Undergraduate students have a flexible time window to complete the whole curriculum. They can take a maximum of 24 credits and a minimum 14 credits per semester. As a result, the shortest time for graduation is three and a half years and the longest allowable is seven years. It is observed that after spending one to two semesters taking intensive English courses, the IE1 or IE2 students were also able to complete the Chemical Engineering programme in time.

Common reasons for undergraduate students taking longer than four years are their starting English level, which may require them to spend the first year on Intensive English courses. Additionally, the required English level of graduation also causes students to apply for their graduation later than expected.

The internship is usually conducted during the summer time. 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 course “Research Methodology” 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.

With respect to the internships, the experts learn from the employers, that they do not receive any detailed information about the goals of the internships and what kind of projects students should conduct. The experts emphasise that having a guideline for conducting an internship at a company or other institution is essential for both the host and the interns, ensuring that the internship experience is structured, meaningful, and beneficial to all parties involved. Otherwise, there can be confusion about what the intern is expected to do, which may lead to a lack of productivity or a poor learning experience. Without a standardised guideline interns the tasks of the interns might widely differ which may lead disparities where some interns may have a rich learning experience while others may not. For this reason, the experts recommend drafting and publishing a well-defined guideline for the internships, which sets clear expectations for both the hosting institution and the intern. It should also outline the purpose of the internship, the tasks the intern will perform, and the learning outcomes they should achieve.

During the audit, students and alumni express their satisfaction with the organisation of the degree programme as it covers several disciplines, which helps them acquire knowledge about different fields and, from that, identify specific areas of interest. However, the experts notice that several non-subject-specific courses are offered in the first two semesters. They understand that this a nation-wide regulation for all undergraduate programmes. Nevertheless, they point out that it would be useful to reduce the amount of credits dedicated to these courses. Alignment with international standards and benchmarking the CHE with other chemical engineering programmes e.g. in Australia and USA would result in a reduction of the non-subject specific courses. This would allow for a reduction in the required credits and shorten the required study time.

The experts notice that there are three courses in the curriculum of the Bachelor's degree programme Chemical engineering (Physical Education I + II, Military Training) for which no credits are awarded. As these courses are compulsory all Vietnamese students, the experts suggest to remove these courses from the official curriculum and to offer them as separate courses. The scores of these courses should not be included in the student's cumulative GPA, and students will receive certificates of recognition for their accomplishment of these courses. HCMIU is free to find another solution, but it is necessary to award credits to all compulsory courses of the curriculum.

The experts discuss with the programme coordinators and the students about the amount of electives in the CHE programme. They learn that students can take at least nine credits for electives (in the seventh and eighth semester). For offering an elective usually a minimum of 10 students is required, on average six different electives are offered every semester. The experts point out that it would be useful to make transparent what electives are actually offered in what semester so that students can plan their studies accordingly. Moreover, all electives as mentioned in the module handbook should be offered regularly, otherwise they should be removed from the list. Additionally, the experts suggest to align the offered electives with the four research areas (Energy & Environment, Pharmaceuticals & Cosmetics, Materials, Process Engineering) of the School of Chemical and Environmental Engineering. This way, students can better decide what electives to choose if they want to follow a specific research path.

During the discussion with the experts, the employers and HCMIU's partner from the industry highlight that the graduates from HCMIU work professionally, are willing to learn, perform well, and can work in a team. Overall, HCMIU's partners are very satisfied with the qualification profile of the graduates.

In summary, the experts gain the impression that the choice of modules and the structure of the curriculum ensure that the intended learning outcomes can be achieved, provided that the necessary electives are offered.

The Biomedical Engineering programme is offered by the School of Biomedical Engineering. It is designed for two years, and at least 60 credits need to be achieved by the students. Starting in 2022, the programme underwent significant revisions in alignment with regulations by Ministry of Education and Training. From 2022 onwards, all students are now required to complete the 60 credit curriculum, before it was only 45 credits. The adjustment was made with a heightened emphasis on practical work. The current MBME programme features two research-based modes: research program 1 and research program 2 that are both structured into areas: (I) General Knowledge, (II) Basic and specialized knowledge, (III) Specialized research projects, and (IV) Thesis.

The General knowledge course “Philosophy” serve as the foundation and is required for further studies in the School of Biomedical Engineering.

Basic and specialized knowledge courses focus on building a solid foundation in the core principles of biomedical engineering. Students engage with essential courses that cover the breadth of the field, ensuring a robust understanding of fundamental concepts and methodologies.

Specialized research projects are electives, which cater to the specialised interests and career aspirations of students. Students have the opportunity to take course from the following five areas Medical Instrumentation, Biomedical Signal and Image Processing, Pharmaceutical Engineering, Regenerative Medicine, Entrepreneurship in MBME.

In the Thesis, students apply their acquired knowledge and skills to undertake advanced research. This final module allows for independent exploration and contribution to the field of biomedical engineering. Under the guidance of experienced faculty, students conduct in-depth research, showcasing their ability to address complex challenges and make meaningful contributions to the evolving landscape of biomedical engineering.

The five areas of specialisation are:

Medical Equipment: Focuses on designing, manufacturing, and applying advanced medical devices such as Lab-on-a-chip, Wearables, Microfluidics, etc., serving the work of diagnosis, prevention, monitoring, and treatment of diseases.

Biomedical Signal and Image Processing: Applies modern technologies such as Machine Learning, Artificial Intelligence, Simulation, Big Data, etc., to analyze medical signals and images such as EEG, ECG, CT, MRI, etc., supporting accurate diagnosis and disease prediction.

Pharmaceutical Engineering: Researching and developing pharmaceutical manufacturing equipment, creating controlled drug delivery and release systems, applying nanotechnology in Pharmaceutical Science with targeted therapy, improving treatment efficiency and reducing side effects.

Tissue Engineering and Regenerative Medicine: Focuses on researching and manufacturing advanced biomaterials and stem cell technology to support wound healing, health recovery, and improve the quality of life for patients.

Entrepreneurship in BME: Equips students with knowledge and skills in market research, product launch, business start-up and management in the field of medical devices, software, and clinical engineering.

The MBME programme offer two routes to complete the Master's degree in Biomedical Engineering. Research Programme 1 includes 53 credits out of a total of 60 credits for conducting the thesis research. Research Program 2 includes 27 course-based credits and 33 project-based credits. Programme 1 offers an in-depth concentration into a specific research topic in which the student gains the knowledge and skill through conducting research. Program 2 offers more courses in which the student can acquire knowledge through the lectures and gaining experience through conducting research. Regarding the graduation condition, one major difference is that Research Programme 1 requires the student to publish one Web of Science/SCOPUS journal while Research Programme 2 does not require any publication. In addition all MBME students need to have a high English proficiency (IELTS 6.0 or TOEFL from 550 or equivalent) in order to be able to graduate.

The differences are shown in the following table:

Training method	Total credits (ECTS)	Number of credits (ECTS)				
		General knowledge	Basic and specialized knowledge		Research projects	Thesis
			Compulsory knowledge	Electives		
RP1	60 (156.28)	3 (4.64)	4 (7.09)	-	-	53 (144.55)
RP2	60 (139.92	3 (4.64)	12 (21.27)	12 (24)	18 (49.10)	15 (40.91)

Table 1: Curriculum Structure MBME, Source: MBME students' handbook

With respect to Research Programme 1, the experts point out that the curriculum just includes two compulsory courses. The "Philosophy" course focuses on Marxist-Leninist philosophy and is compulsory for all Master's students in Vietnam. The second compulsory course "Research Methodology in Biomedical Engineering" has the following content: "The course covers basic principles for conducting research, different approaches to do research individually or in group, methods for selecting experimental tools, methods for problem solving and collection data, and experimental design. Students will also acquire skills for the presentations in public and editing of research proposals and publications and reviewing manuscripts." From the experts point of view this course is not suitable for a Master's degree programme. All students joining the programme should already have basic knowledge about research activities, conducting experiments, and doing presentations. At the same time students in Research Programme 1 do not acquire the skills and knowledge, which are expected from a Master's graduate in biomedical engineering, because the two compulsory course do not cover this area at all and the research activities that make up the rest of the programme do not include any theoretical foundation in biomedical engineering. As the SSC of TC 5 describe, Master's students should "build on an initial higher professional qualification, the master's degree programme leads towards acquiring in-

depth analytical, methodological and above all scientific competences. At the same time, the acquired competencies from the first professional qualification programme are being expanded and broadened. This should be ensured through a suitable curricular structure and it should support the relevant research and development activities of the responsible faculty. A master's degree programme can have an application orientation as well as a research orientation. Master's graduates should reach a level of knowledge and competence that in principle qualifies them for a doctoral degree in their area of specialisation." Especially for biomedical engineering, all Master's students should acquire a comprehensive blend of skills and knowledge that integrate engineering principles, biological sciences, and medical applications. These competencies prepare them for roles in healthcare, medical device design, research, and development. The current curriculum of Research Programme 1 is not aligned with these requirements. It is important that all MBME students acquire the essential knowledge and skills in biomedical engineering that are expected from a Master's graduate. For this reason, the experts expect HCMIU to add courses to Research Programme 1, which ensure that all students acquire the necessary competencies in engineering, biological sciences, and medical applications. Additionally, the experts ask HCMIU to replace the compulsory module "Research Methodology in Biomedical Engineering" by a more comprehensive module, which makes sure that all MBME students know about the different research areas in the School of Biomedical Engineering.

The experts notice that the Student Handbook for the MBME programme includes a list of 49 electives. As the programme has only a few students, they discuss with the programme coordinators, which electives a really offered. They learn that four elective courses were opened for students who chose the Research Programme 2, which requires students to take four Technical Elective courses or "Special topics in BME". These four courses are: "Biomaterials and Biomedical Engineering", "Medical Instrument Design", "Advanced Biosignal Processing", and "Drug Delivery Research Advances". As only four courses are offered and students are required to take four electives, they currently do not have a choice. For this reason, HCMIU should increase the number of offered electives and make transparent what electives are actually offered in what semester so that students can plan their studies accordingly.

As mentioned before, MBME students in Research Programme 1 need to have an accepted publication in a peer-reviewed journal in order to be able to graduate. To this respect, the experts point out that this graduation requirement can present several challenges for students. First of all, peer-reviewed journals typically have a long review and revision process, which can take several months or even longer. This may delay students' graduation timelines. Secondly, the MBME programme last only two years, which is a

limited time for students to produce publishable work, especially if they need to start from scratch. Finally, students might rush through their research or lower the quality of their work just to meet the requirement. This can diminish the overall academic value of their work. The programme coordinators explain that the School of Biomedical Engineering organises an international conference on Biomedical engineering every two years. Students have the opportunity to present their research results during the conference and are able to publish a paper in the respective proceedings. This is also accepted as the required international publication. The experts appreciate this opportunity, however, they recommend to verify if the graduation requirement of an accepted publication is feasible for a two year long Master's programme and if it is an obstacle for students to graduate in time.

International Mobility

The university's internationalisation strategy is focused on (1) promoting the image of HCMIU to foreign Universities/international students as an interdisciplinary and research-oriented university, (2) engaging higher number of foreign staff and students participating in the exchange programmes, (3) encouraging Vietnamese students to participate in mobility activities, (4) developing international collaborations by establishing joint study programmes, (5) enhancing the research capacity by cooperating with international institutions, and (7) aligning the university with international standards.

Currently, there are no international cooperations for the CHE programme. However, students from the CHE programme can go abroad to study for a semester or to do internships. For example, one student took a semester to study at the National Ilan University, Taiwan, from August 2023 to January 2024. As can been seen from the following table, the number of outgoing and incoming students in the CHE programme is rather low:

No.	Cohort	Number of incoming and outgoing students for CHE			
		Total	Incoming	Outgoing	Note
1	2018-2019	1	1	0	
2	2019-2020	5	3	2	
3	2020-2021	1	1	0	
4	2021-2022	4	4	0	
5	2022-2023	4	2	2	
6	2023-2024	4	4	0	Until 02/2024
Total		**19**	**15**	**4**	

Table 2: Number of incoming and outgoing students in the CHE programme, Source: SAR HCMIU

Student exchange is currently not a regular activity in MBME programme. Nevertheless, students still have opportunities for international exchange based on collaborations between MBME-IU and partner's universities. To this end, the School of Biomedical Engineering has established several international cooperations and signed cooperation agreements with NCHU (Taiwan), GIST (South Korea), Tianjin Univ. (China), and Tsukuba Univ. (Japan). An example of academic mobility in the MBME programme is a student, who was a visiting research trainee at Insigneo Institute for in Silico Medicine, Mechanical Engineering Department, Sheffield University. Another student will take part in an exchange programme with National Chung Hsing University, Taiwan.

Credits acquired abroad are recognized at HCMIU if the course is equivalent (70 % or above) to a course at HCMIU in terms of content, teaching pedagogy, objectives, and students' working load.

Students who want to study abroad study can receive a scholarship and financial support, if they meet specific requirements in terms of academic merits and social contribution. In addition, the Center for International Mobility at HCMIU collaborates with European Universities regarding the Erasmus+ programme with the aim of obtaining further financial support for local students to take part in international mobility programmes. Every year, HCMIU will spend about 1.5 million USD to provide scholarships to students who achieve high entrance exam scores (5 %) both for programmes at HCMIU and for international partner universities. Moreover, very good students can directly apply for scholarships from the Vietnamese government for studying abroad.

The experts acknowledge that HCMIU participates in the ERASMUS+ programme and has around 60 international partner universities. The university is also a member of University Mobility in Asia and the Pacific (UMAP), which is a consortium of Higher Education Institutions and partners, collaborating to increase opportunities for study abroad across the Asia Pacific region through a variety of short and long-term in-person and virtual exchange programmes, as well as Collaborative Online International Learning (COIL) experiences. The 25 members represent countries in and around Central Asia, South Asia, and the Pacific Rim, including Australia, and North, Central and South America. In addition, HCMIU participates in the ASEAN Credit Transfer System (ACTS), which was initiated by the ASEAN University Network (AUN) with the primary objective to facilitate student and academic mobility in ASEAN. The system has been managed through the AUN-ACTS Secretariat which is hosted by Universitas Indonesia since 2010.

However, the international academic mobility of students in both programmes is still rather low. The students confirm during the discussion with the experts that some opportunities for international academic mobility exist. 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. HCMIU can provide only a limited amount of scholarships, while the demand from students is rising.

The experts understand these problems; nevertheless, they recommend increasing the efforts to further promoting the academic mobility by establishing more international co-operations and exchange programmes and by offering more and better-endowed scholarships for Chemical Engineering students. A good starting point for initiating more international co-operations are the personal international contacts of the faculty members. It is also possible for students and teachers to apply to international organisations like the German Academic Exchange Council (DAAD) for receiving funds for stays abroad. Hence, the International Office of HCMIU could strengthen their support in international study grant acquisitions.

Especially as an international university, HCMIU should strive to further increasing the number of incoming and outgoing students. It would also be useful to invite more international guest lecturers to give classes or seminars.

Furthermore, HCMIU should try to attract more international students, e.g., by organising international summer schools. The experts are convinced that such on offer would appeal to many students, especially from Europe, and this might help to further promoting the internationalisation of HCMIU. In addition, HCMIU should make its degree programmes internationally more visible for example by better advertising the programmes and emphasising that all classes in the Bachelor's programmes are taught in English. In this respect, the experts appreciate that the School of Biomedical Engineering organises a bi-annual conference. The general topic of this year's conference is: "Healthcare Evolution towards 5P Medicine in Low- and Middle-Income Countries Ecosystem".

In summary, the experts appreciate the efforts to foster international mobility and support both HCMIU, the School of Biomedical engineering as well as the School of Chemical and Environmental Engineering to further pursuing this path.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Webpage HCMIU: https://hcmiu.edu.vn/en/

- Webpage School of Chemical and Environmental Engineering: https://cee.hcmiu.edu.vn/en/programs/chemical-engineering-ce/chemical-engineerng-program-specifications-ce/
- Webpage CHE programme: https://cee.hcmiu.edu.vn/programs/chemical-engineering-ce/about-che/
- Webpage School of Biomedical Engineering: https://hcmiu.edu.vn/en/schools-and-departments/department-of-biomedical-engineering/
- Webpage MBME programme: https://bme.hcmiu.edu.vn/en/education/master-program/
- Discussions during the audit

Preliminary assessment and analysis of the experts:
According to the Self-Assessment Report, admission for the Chemical Engineering programme is conducted once a year in September. Information about the admission procedure is available on the university's website and thus accessible for all stakeholders.

The Office of Undergraduate Academic Affairs (OUAA) in cooperation with the Office of External and Public Relations are responsible to advertise all academic programmes. For example, the OUAA conducts career orientation sessions and campus tours to reach students in various high schools in Vietnam. In addition, the HCMIU publishes its new and existing programmes in major newspapers.

Since the academic year 2017-2018, the admission to HCMIU is based on either one of the following six admission paths:

(1) National High School Achievement Exam: based on the score of three subjects, which students have registered for at their preferred.

(2) Best Academic Records of students from designated high schools.

(3) Direct admission according to the regulations of the Ministry of Education and Training, candidates who won e.g. the National Excellent Student Prize, the National Science and Technology Prize.

(4) Results from the Scholastic Aptitude Exam held by Vietnam National University, Ho Chi Minh City (VNUHCMC).

(5) Admission for candidates with International Baccalaureate. International students need to pass an interview with the Admission Committee in order to be admitted to HCMIU.

(6) Academic Records during the 10th, 11th and 12th grades of designated high schools (twinning programmes).

As the Chemical Engineering programme is taught in English, students who do not have TOEFL or IELTS certificates will have to take an English placement test, which is similar to the TOEFL test, offered by the university besides the entrance examination. They will then be placed in different levels IE0, IE1, IE2, IE3 (Intensive English) and Specialized English AE1 and AE2 based on their English proficiency.

The Chemical Engineering programme is designed for students with the English entry level of AE1 (Academic English) to be completed in four years. Students who have a lower English proficiency (IE1 or IE2) level have to spend about one year taking intensive English courses before entering the Chemical Engineering programme.

The selection from either path is made by taking the candidates with the highest scores down until the corresponding quota is filled. Most of the students at HCMIU are admitted via the first two paths, but the quota for each scheme varies each year depending on the recruitment strategy of HCMIU.

Every summer, the Vietnamese Ministry of Education and Training (MOET) will organise the National High School Achievement 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 City 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.

Details on the number of applications and admitted students are shown in the following table:

Intake Year	Applicants		
	No. Applied *(số lượng đăng ký dự thi)*	**No. Offered** *(số lượng trúng tuyển)*	**No. Admitted/Enrolled** *(số lượng nhập học)*
2018	259	66	24
2019	569	98	26
2020	412	97	44
2021	589	125	57
2022	701	50	44
2023	568	167	57

Table 3: Number of applications and admitted students in the CHE programme, Source: SAR HCMIU

As described in the Self-Assessment Report, there are currently two different ways of admission to the Biomedical Engineering programme.

1. Direct Admission: Candidates eligible for direct admission are individuals who have completed their undergraduate degree or possess a recognized decision on the equivalence of a bachelor's degree (or higher) in a field relevant to the applied programme. Proficiency in a foreign language is required. Eligible candidates fall into one of the following categories:

- Graduated or received a decision on the equivalence of a bachelor's degree (or higher) with a credit system of 150 credits or more, graduating on time.
- Graduated or received a decision on the equivalence of a bachelor's degree with distinction, achieving a GPA of ≥8.0/10.
- Graduated as the top student in the field from a regular undergraduate programme.
- Achieved first, second, or third place in national and international student Olympiad competitions.

Direct admission is limited to 20% of the total annual enrolment.

2. Regular Admission:

- Applicants who have completed their undergraduate degree or possess a recognized decision on the equivalence of a bachelor's degree (or higher) in a relevant field.
- Students participating in the university's articulation programme from bachelor's to master's level.
- International candidates who have completed an undergraduate degree in a relevant field and meet the language proficiency requirements.

The admission process involves a comprehensive list of accepted fields, acknowledging the interdisciplinary nature of biomedical engineering and allowing students with various backgrounds to apply. Setting a GPA condition and considering national prizes as a criterion for direct admission emphasises the commitment to attracting high-achieving students. To bridge knowledge gaps for non-MBME graduates, the School of Biomedical Engineering offers a 45 lecture hour "Introduction to Biomedical Engineering" course before admission, ensuring that all students have basic knowledge in the field. Furthermore, English language proficiency requirements are essential, reflecting the programme's international outlook and preparing students to engage effectively in a global academic and research environment.

Overall, the MBME programme has admitted a total of 72 students; of which 22 have graduated, 15 have dropped, and 32 are still in progress of their study. On average, the programme admits 3-4 students per year. In 2014 and 2015, there were 11 and 8 students admitted, respectively. This is largely due to the fact that the Bachelor's programme at HCMIU started in 2009 and there were a larger number of graduates who were willing to join the Master's programme in 2014 and 2015. A number of these students received scholarships to study abroad during their study, which caused a spike in dropout rate in 2016 and 2017. There were 5 dropouts each year in those two years while other years only had at most two dropouts. Notably, there have been no dropouts since 2022, suggesting an improvement in the programme helping students to better commit to finishing their studies. There are two special cases where the student has completed the programme but was not able to graduate. These two students failed to meet the English requirements and thus, did not meet the conditions for graduating.

Details on MBME students' progress are shown in the following table:

Year	Number of admitted students	Number of admitted students (*)	Number of students studying (*)	Number of students dropping	Number of students dropping (*)	Number of students deferring	Number of graduates (*)	Number of graduates	Number of students completing program but not graduating	Number of students completing program but not graduating (*)
2013	6	6	6	0	0	0	0	0	0	0
2014	11	17	17	0	0	0	0	0	0	0
2015	8	25	23	0	0	0	2	2	0	0
2016	4	29	21	5	5	0	3	1	0	0
2017	4	33	16	5	10	0	6	3	1	1
2018	5	38	18	1	11	0	8	2	0	1
2019	3	41	15	0	11	0	14	6	0	1
2020	6	47	15	2	13	0	18	4	0	1
2021	5	52	17	2	15	0	18	0	1	2
2022	4	56	17	0	15	0	22	4	0	2
2023	16	72	33	0	15	0	22	0	0	2

Table 4: Students' progress in the MBME programme, Source: SAR HCMIU

The significant increase in the number of new students in 2023 in due to the fact that for this intake, the old curriculum was changed and the new specifications (Research Programme 1 and Research Programme 2) were introduced. For the most recent admission batch, eight new Master's students enrolled in the MBME programme. Currently, the MBME programme has 37 master's students actively pursuing their studies. Out of these, nine students are following the previous study program (before 2022), while 28 students are enrolled in the new programme, which offers two options: Research Program 1 and Research Program 2. After completing one semester in the programme, students will officially register their chosen research program with the Office of Graduate Affairs. The updated statistics are as follows: six students (21%) have opted for Research Programme 2, while 22 students (79%) have chosen Research Programme 1.

Tuition fees for all programmes at HCMIU are announced publicly on the university's homepage at the beginning of each academic year. Domestic and international students pay the same tuition fees for the same programme. Twinning programmes typically have higher tuition fees than regular programmes. For the academic year 2023/24, the tuition fees for Chemical Engineering students are 48 million VND (1761 EUR) per year. The total

tuition fee for the MBME programme is 98.400.000 VND (3610 EUR). HCMIU is part of the national university system, so it follows national regulations in this matter.

The Academic Affairs Office awards scholarships to students with excellent performance. In addition, students can also receive scholarships from external sources such as companies, non-government organisations, alumni, and individuals.

There are some scholarships available at HCMIU. Directed to the top 5 % of offered applicants in the entrance examination, the Admission Scholarship covers the full or half of the fees of the scholarship holder for four years. Additionally, each semester, the Encouraging Scholarship Programme chooses the best undergraduate students in each class, based on their GPA to receive a scholarship. 4% of students will receive full scholarship (12,000,000 VND/semester) and 6% of students will receive half scholarship (6,000,000 VND/semester).

In general, HCMIU 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. Around 8 % of the students receive a scholarship from HCMIU, which includes a full or a partial tuition fee waiver.

In summary, the experts 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.

Criterion 1.5 Work load and credits

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

In the Vietnamese system, each credit in an undergraduate programme 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 and the Bachelor's thesis it is equivalent to 37.5 periods and 37.5 periods in the experimental design project. One period

lasts for 50 minutes. The workload calculation for the CHE programme is depicted in the following table:

Form of study for 1 credit	Periods	In-class hours	Self-study hours	Total hours
Theoretical lecture	15	12.5	30	42.5
Practice in Laboratory	30	25	30	55
Quizzes in class	30	25	30	55
Assignment	30	25	30	55
Project, Thesis	-	37.5	30	67.5
Internship	-	37.5	30	67.5

Table 5: Workload Calculation CHE, Source: SAR HCMIU

According to the Self-Assessment Report, for converting HCMIU credits to ECTS points, one ECTS point is awarded for 27.5 hours of students' workload. Based on this, one credit of a theoretical course at HCMIU equals 1.54 ECTS points, and one credit of practical courses on average equals two ECTS points. Additionally, the internship and thesis take a total of 75 to 120 hours for each credit, which is, on average, equivalent to 2.45 ECTS points. Each course's syllabus explicitly specifies the expected workload as well as the awarded credits and ECTS points. The typical number of credits students take for each semester is 18. Students can take up to 24 credits and no less than 14 credits each semester, except for the last semester when they perform the thesis.

For the MBME programme, the total period of studies is 2 years (4 semesters). Students who cannot fulfil all requirements for graduation within two times of the standard study plan for the programme may not continue the study at HCMIU.

Each credit in the MBME programme 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 Master's thesis it is equivalent to 54 periods. One period lasts for 50 minutes. The workload calculation for the MBME programme is depicted in the following table:

Form of study for 1 credit	Periods	In-class hours	Self-study hours	Total hours
Theoretical lecture	15	12.5	30	42.5
Laboratory lecture	30	25	30	55
Quizzes in class	30	25	30	55
Assignment	30	25	30	55
Project, Thesis	54	45	30	75

Table 6: Workload Calculation MBME, Source: SAR HCMIU

Based on this, one credit of a theoretical course equals 1.54 ECTS points, and one credit of practical courses equals two ECTS points. The thesis requires a total of 75 hours for each credit, which is equivalent to 2.72 ECTS points.

MBME students' workload is managed by splitting their time into semesters of studying and researching. The only exception is the Philosophy course which is managed by the OGAA. Students are expected to focus on their research from the second semester. Students' thesis workload would then be managed by their advisor. Work time on thesis is expected to be at least 6 months long and at most 12 months long. Students can request an extension of their thesis time by 12 months and they can do so up to two times. Permission is given by the graduate office, allowing students to take up to 4 years to finish their 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.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

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 in the CHE programme. Structured activities include tutorials, homework, assignments (reading or problem exercises) and practical activities. Students are encouraged to use various tools for learning activities, including reading textbooks, giving references to documents and scientific papers, taking notes during lectures, and doing Internet searches to fulfil homework and quizzes. 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.

HCMIU has the goal to support the transition from a teacher-centred to a student-oriented and outcome-based education in order to involve all students in the learning process and to develop their thinking and analytical skills.

The most common method of learning is class session, with several courses offering laboratory practice. 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. Additionally, practical activities should enable students to be acquainted with academic research methods. Moreover, students are encouraged to participate in scientific seminars, journal clubs, workshops and conferences organised by the university or outside institutions. Students can take part as research project volunteers in research projects run by faculty members or researchers outside the university.

As described in the Self-Assessment Report, Chemical Engineering students are expected to familiar with experimental designs and scientific research methods. During their studies, students are encouraged to participate in scientific seminars, journal clubs, workshops and scientific conferences. Students also have the opportunity to take part as research project volunteers in research projects, which are run by teachers at HCMIU or by researchers from outside our university. Moreover, students also have to conduct thesis research. They are also encouraged to publish their work, which can increase their chances of getting scholarships for their further academic education.

In the MBME programme, the emphasis is primarily on imparting specialised knowledge and providing deeper direction for graduate students in the field of biomedical engineering. This involves equipping students with the knowledge and skills to devise solutions within

the realm of biomedical technology. Graduate students are encouraged to further explore and develop appropriate solutions independently. Additionally, graduate students dedicate significant time to researching a specific direction within biomedical engineering to complete their thesis. Moreover, at the master's level, there is an expectation that graduate students can independently explore additional topics, knowledge, and skills introduced during the course. Consequently, self-study time is greater than classroom time, and assignments are more specialized. Graduate students are also guided towards specific research directions, so when studying skills such as Research Methodology, they not only learn the skills but also apply them to develop ideas and arguments for their projects.

Overall, the Master's programme in biomedical engineering is designed to foster a deeper understanding of the field, encourage independent exploration and research, and equip students with the necessary skills to contribute meaningfully to the advancement of biomedical engineering through their theses and publications.

HCMIU has recognised that gaining hands-on experience is important for advanced education. To this end, the Office of Research and Development and Center for Innovation and Technology Transfer (CITT), offers students the opportunity to be involved in practical, real-life projects. The unit not only assist professors but also students in carrying out such projects with local governments and companies.

To support teaching and learning activities at HCMIU, all classrooms and laboratories are equipped with computers, projectors, and internet access. To help students achieving the intended learning outcomes and to facilitate adequate learning and teaching methods, HCMIU has developed an e-learning platform (Blackboard), where students and teachers can interact. Through this tool, lectures, textbooks, reading materials, and study documents are uploaded in advance for students. Online quizzes/assignments and group discussion can be made available via Blackboard, allowing more lecturer-student communication after class hours. In addition, students have full access to the Central Library of HCMIU. The university's E-learning system has helped teachers utilising different teaching methods such as flipped classroom and blended learning. During the COVID-pandemic, faculty members have adapted and used some online teaching platforms including MS-TEAM, ZOOM, and GOOGLE MEET.

Since 2019, HCMIU has invested in different online teaching platforms to cope with the COVID situation. Lecturers can opt for either Zoom or Microsoft Teams for teaching online according to their preference. All these platforms allow lecture recording, group discussion and blackboard functions to create a virtual classroom experience that is very close to the real one. Besides, the Center of Information Service has conducted many training sessions for using these online platforms and provided supporting training documents.

In addition, each student has an Edusoft account, where the academic progress and results can be accessed. Students make course registration every semester through the Edusoft system, which has information of prerequisite courses, courses to study for individual students, and courses available in a particular semester. The score of each course will be displayed at the end of the semester.

In summary, the expert 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 both programmes comprise a variety of teaching and learning forms as well as practical parts that are adapted to the subject culture and study format. It actively involves students in the design of teaching and learning processes (student-centred teaching and learning).

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

The experts understand that courses in physical training and military training are compulsory requirements. They appreciate that student will receive a training certificate after completing the course and that the scores of three courses (Physical Training I + II, Military Training) are not included in the student's cumulative GPA. The experts expect to receive an official document confirming these changes.

The experts thank HCMIU for explaining that students in Research Programme 2 currently are offered eight elective courses, designed to provide comprehensive coverage of key areas within biomedical engineering. These courses are organised into four clusters to ensure that students receive a well-rounded education across various technical domains. The experts are satisfied with these opportunities.

The experts appreciate that in 2023 one CHE student went abroad for the internship at National Ilan University, and another CHE student joined an exchange program at Deakin University, Australia in October 2024. Establishing international cooperations with Genoa University (Italy) in 2020, Thammasat University (Thailand) in 2023 and National Ilan University (Taiwan) in 2024 are important steps in the right direction. The experts hope that more students will go abroad and fill these cooperations with life.

The experts are pleased that HCMIU confirms that the current structure of Research Programme 1 does not meet the Master's level standards expected in biomedical engineering, as it lacks the theoretical foundation necessary to support comprehensive skills in engineering, biological sciences, and medical applications. As the regulations from MOET are very strict, the School of Chemical and Environmental Engineering will propose the removal

of Research Programme 1 from the MBME programme to the University Education and Training Committee. The School of Chemical and Environmental Engineering plans to implement this change starting with the 2025 cohort. From 2025 onward, the MBME program will offer a single programme track, Research Programme 2. The experts support this proposal and expect to receive the verification in the further course of the procedure.

The experts consider criterion 1 to be mostly fulfilled.

2. Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions
- Student Handbook
- HCMIU Academic Calendar

Preliminary assessment and analysis of the experts:
The final grade of the course is a combination of the midterm and final exam, quizzes, assignments, homework, presentations, and lab exams and reports. Students' overall performance throughout the semester is formally monitored through course grades, which are at least 50/100 in order to pass the course. Besides the theoretical courses, the majority of the courses in the curriculum also includes practical sessions, which allow students to acquire hands-on experience in the laboratories.

The most common type of evaluation used are written examinations; however, other exams may contribute to the final grade. Written examinations 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 of theoretical courses includes midterm exam (20% - 40%), final exam (30% - 50%), quizzes, homework, presentation, etc. (20% - 40%). The final grade of a laboratory course includes laboratory assignment (70% - 80%) and laboratory final exam (20% - 30%). The details are mentioned in the respective module description.

Successfully passed exams are evaluated by lectures with a grading system based on a 100-point scale: Excellent (90 to 100), Very-good (80 to near 90), Good (70 to near 80), Rather

good (60 to near 70) and Fair (50 to near 60). The maximum score for each course is 100 points, and 50 points are required to pass the course. For midterm and final exams, the teacher should deliver the grades within two weeks after the test date.

The criteria to assess students' performance are stated in the assessment plan of each course syllabus. To ensure transparency and fairness for all students, the assessment components, their weights, and schedules are introduced to the students from the first class of the course. The course syllabus is also available on Blackboard for enrolled students to assess. In addition, students and teaching staff can also find the information related to the course specifications and assessment criteria in the Programme Specification that has been published on the department's website.

Midterm and final examinations are organised during the exam weeks (i.e. no teaching activities). The students will be informed about the exam schedule and location for the courses they are enrolling in the semester by the OUAA via Edusoft Web, at least one week in advance for midterm exam and two weeks in advance for final exams.

The internships in CHE are conducted through collaboration with companies, research institutes, or other public or private institutions connected to chemical engineering. The internship is divided into three parts, which are usually conducted in the summer break. In Internship 1 students take part in a field trip organised by the School of Chemical and Environmental Engineering to learn about the professional activities in chemical engineering-related fields. By observing and exchanging information with officials and experts at research institutes and companies, students will better understand chemical engineering in practice and aggregate these understandings into a report. In Internship 2 and Internship 3, students will work under the guidance and direction of an internship mentor who is an employee of hosting institution. At the end, students have to submit a written report, which is graded by the academic advisor and the internship mentor. The minimum length of Internship 2 and Internship 3 is five weeks, however, students can prolong the internship.

The Bachelor's thesis is a major part of the CHE programme and considered as a final assessment if the intended learning outcomes have been achieved. Regulations about thesis assessment is made known to students via the Student Handbook and the department's website. For conducting the thesis in the CHE programme, all students need to complete at least 90% of credits of the academic curriculum and finish the pre-thesis. Students enrolled in thesis work, are assigned a supervisor, who helps the students undertaking their research project.

The final project (Bachelor's thesis) consists of two stages (1) Thesis Proposal and (2) Thesis. The thesis last four months, equivalent to 675 hrs (10 credits / 24.55 ECTS points). In the

final stage, the thesis should be reviewed by a lecturer. The two stages are assessed by a panel with a presentation. This project is conducted independently under the guidance of one or more supervisors. It consists of a literature review, practical research, and data analysis. Both the student and supervisors might decide the topic and content of the project. In many cases, lecturers offer particular topics connected to their research. Students who are interested in a specific topic are able to volunteer in the lab from the second year, which allows them to collect preliminary research data. Students are requested to provide evidence of supervision arrangement to the CEE school through a thesis registration form. About eight weeks after starting the research, students must submit a progress report certified by the supervisor to the school. Students present the results to five members of the scientific committee of the Department of Chemical Engineering, the reviewer, and their supervisor. Some students, approximately 10 %, conduct their Bachelor's thesis outside HCMIU. In this case, they have a co-supervisor at the host institution and one supervisor at HCMIU. For thesis assessment, the thesis advisor and thesis reviewer give a grade (score between 0 and 100) after assessing the written report. In addition, students have to defend their thesis in front of the examination committee, which consist of three or four examiners. Each of them gives a grade (score between 0 and 100) based on the written report and the oral defense. The final grade of the thesis is then the average score of all examiners and the thesis advisor and thesis reviewer.

At the beginning of the semester, students get all course and exam-related information from their academic advisor and can access the course syllabus via the digital platform Blackboard. At the end of the semester, students can also access their grades privately through the platform.

In case that students cannot attend the exam due to unavoidable reasons such as illness, accident, death of family members, etc., they need to inform CEE school by the deadline specified in the university's policy by submitting a form asking for permission to re-sit the exam another time, along with supporting evidence.

Students who fail a course must attend it again in the next semester. The number of repetitions is unlimited. Students, who have passed a course but want to improve their score, may also take it again. Students with unsatisfactory academic performance will receive an academic warning. The academic warning is issued if a student violates one of the regulations, such as failing to complete more than 50 % of the registered credits for the semester, finishing the semester with an average grade of less than 35 (out of 100) or less than 40 in the last two consecutive semesters. Students will be suspended if receiving academic warnings more than twice. It is worth noticing 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. 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 MBME programme is designed to provide students with a sound foundation in both scientific principles and engineering methodologies, focusing on advancing independent research capabilities and practical expertise with interdisciplinary approaches to solving biomedical issues. The assessment forms used in the Master's courses are diverse but given the practical nature of the content, most courses use assessment forms based on practical assignments throughout the course rather than only focusing on the midterm and final exams. The exam forms include:

(1) Homework and assignments to assess the understanding of the elemental concepts of lecture content and the ability to apply these pieces of knowledge to answer problems.

(2) Presentations and seminars to assess the ability to find and synthesize information, research capability, communication and presentation skills.

(3) Project-based assignments to assess research skills and capability of working independently.

MBME students can re-sit the course but not the exam. If a student fails to meet the requirements for a compulsory course, they must register to retake that course when it is offered. For elective courses, students can register to retake that same course or choose another course from the designated list of elective courses. The recognised grade after retaking the course is the highest grade achieved among all attempts.

Students have the right to appeal their grade (for all grading components) if they disagree with the assigned grade. The appealing process requires the student to submit an appeal application of the Office of Graduate Affair no later than 10 days after the announcement of the final grade for the course.

Upon enrolment in the MBME programme, students will receive counselling for finding an appropriate research topic. The lecturers working in each field are also introduced, and students can actively contact them to ask for supervision. If they cannot decide, the School of Chemical and Environmental Engineering will help them find an appropriate advisor who can guide them to conduct a thesis in their desired research area. The students work with their advisors to find research ideas and design a thesis proposal. After getting approval from the advisors, the thesis/project proposal is evaluated by a School’s Thesis Proposal Committee. After approval, students can start on their research project.

Students will regularly report the progress to their advisors, who is responsible for supervising, guiding, tracking the progress, assessing, giving advice and solutions to address

arising problems, and providing other necessary support. Besides the laboratories of the MBME, students can choose to conduct the thesis/project work at any other available academic institution. In these cases, they are asked to run the work under the supervision of two co-advisors, one from the MBME faculty and one from the chosen institution.

In order to graduate, MBME students need to defend their research projects in front of the Thesis Examination Committee, which includes five members: the committee chair, two reviewers, a secretary, and a member. To ensure objectivity, the committee must have at least two members from external affiliations, at least one of whom must be a reviewer. Based on the submitted report, they will evaluate whether the thesis/project meets the criteria of a Master's-level scientific work and if the student is allowed to proceed with a defense. In the defense session, students present their work within 30 minutes in front of the committee and the advisor and answers questions and comments in one hour. The student is qualified only if they receive approval from all committee members. If there are disagreements amongst the committee members, the Chair of the School will be consulted to find a solution. The thesis grade given by the committee makes up 80 %, and the published article quality accounts for the rest of the total score. Students cannot pass the thesis examination unless an average grade of ≥55/100 is obtained. If a student fails the thesis presentation, she/he will have the option to request an extension, advisor alteration, or change of research topic.

As an international university, HCMIU uses English as the medium of instruction. Bachelor's students have to obtain IELTS 5.5 or equivalent as a graduation requirement. According to the programme coordinators, this requirement explains why, for the last five cohorts, around 60 % still have to graduate after four years. Those students who do not meet the required English level can still apply for jobs but have to get prepared to sit for a new upcoming test. According to HCMIU's Academic Regulation, students who fail to graduate are granted certificates for modules accumulated during their study duration.

The experts discuss with the students how many and what kind of exams they have to take each semester. They learn that for each course there is one midterm exam and one final exam in every semester. Usually, there are additional practical assignments or oral tests. The final grade is the sum of the sub-exams. The students confirm that they are well informed about the examination schedule, the examination form, and the rules for grading.

The experts inspect a sample of examination papers and final theses from both degree programmes and are overall satisfied with the general quality of the provided samples.

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

The experts thank HCMIU for explaining that prior to the 2019 cohort (MBME programme), the grading of the thesis consisted of two components: 80% from the evaluation by the thesis committee and 20% based on the student's publication record. However, starting from the 2019 cohort and in alignment with the guidelines from Vietnam National University Ho Chi Minh City, HCMIU revised the grading structure to enhance the assessment's focus on the thesis committee's evaluation. The updated grading system now allocates 90% of the total score to the thesis committee's evaluation and 10% to the publication record

The experts consider criterion 2 to be fulfilled.

3. Resources

Criterion 3.1 Staff and Development

Evidence:

- Self-Assessment Report
- Staff Handbooks
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:
At HCMIU, 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.

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.

According to the Self-Assessment Report, the teaching staff at the School of Chemical and Environmental Engineering consists of four Associate Professors and six PhD's lecturers,

who are supported by two Master's degree and three Bachelor's degree holders who work as researchers (one) and lab technicians (four).

The current academic staff in the MBME programme includes four Associate Professors, nine PhD's (lecturers), seven Master's (teaching assistants and lab technicians), and eight Bachelor's (lab technicians). In addition, PhD and Master's students work as lab assistants in the laboratories to supervise practical lab work in the bachelor's programmes. In addition, both the School of Biomedical Engineering as well as the School of Chemical and Environmental Engineering have administrative staff and technical assistants to support the teaching and learning activities. Furthermore, there are another 180 support staff members in different units of HCMIU such as library, labs, IT, administration, and student services.

The experts discuss with HCMIU's management how new staff members are recruited. They learn that when a department wants to recruit new staff members, the Head of Department will send an official letter to the Dean of the School. If the Dean approves, an official letter of request will be sent to the Office of Human Resource Management (OHRM) along with the recruitment requirements proposed by the department. The Office of Human Resource Management will check the request and then propose it to the Board of Presidents of HCMIU. If the President approves the request, the vacancy will be announced on HCMIU's website and through other media channels. In order to be considered, a suitable applicant must have at least a Master's degree in a related field obtained from a well-known university, preferably from overseas. Each application is carefully considered by a recruitment committee, including representatives from Board of Presidents, the Human Resources Manager, and the Heads of School and Department.

Each applicant is required to pass three rounds of selection. In the first round, all applications are assessed based on their academic qualification, professional and teaching experience, research record, field of expertise, and English proficiency. In the second round, applicants need to attend an interview with the Recruitment Committee. The purpose of this interview is to evaluate the applicant's qualifications, working experiences, and commitment to the school as well as the academic career. Finally, the applicant is required to give a "Teaching Demonstration" seminar.

As the experts learn during the audit, teachers at HCMIU have a teaching load of 270 periods per year, one period equals 50 minutes. A reduction for administrative tasks e.g. for the Dean and the Vice-Deans is possible. If teachers want to go abroad for a longer time, e.g. for conducting collaborative research activities, they do not get paid during their absence, so teacher have to look for independent financial support through their research

projects. However, teachers receive additional payment if they teach during the short summer semester. The experts regret that no paid sabbatical leave is possible by national regulation from MOET because other teachers would have to cover for the teachers on leave and absent teachers cannot be paid by the government.

In summary, the experts confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programme. Moreover, they see that the teaching load is adequate, which leaves teachers enough time for conducting research activities.

Staff Development

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

The Office of Human Resources Management is responsible for identifying training needs of staff members, developing training plans, and carrying out training activities. Annually, the Board of Presidents holds meetings with heads of schools, departments, and offices to discuss on the training needs of staff of different units. Based on the feedback of academic and non-academic units, the Office of Human Resource Management makes plans to organise training courses or workshops for the whole year.

Faculty members can also further develop their competencies through several activities such as post-doctoral programmes, trainings, workshops, and joint research. The Center for Innovation and Technology Transfer frequently provides faculties with possible collaborative projects between the university and local governmental or provincial offices. The Office of Research and Development helps with guiding academic publication procedures, such as how to identify qualified journals and conferences. Moreover, teachers are encouraged to present their research papers in national and international conferences, and to collaborate with colleagues from international universities. Furthermore, the School of Chemical and Environmental Engineering also promotes research activities by holding internal academic seminars, encouraging group research and connecting faculties with business and academic networks. Teachers receive financial support for traveling abroad in order to take part at conferences and workshops.

Newly recruited lecturers are encouraged to take some teaching training courses. Faculty members are also trained from time to time to make sure they stay updated with the latest technologies and methodologies when it comes to teaching. The most recent workshops are how to use Zoom, and other online teaching platforms.

The experts 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 HCMIU, their opportunities to further improve their didactic abilities and to spend some time abroad to attend conferences, workshops or seminars.

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

Student Support

HCMIU offers a comprehensive advisory system for all students. At the start of the first semester, every undergraduate student is assigned to an academic advisor. Each academic advisor is a member of the academic staff. He/she is a student's first port of call for advice or support on academic or personal matters.

Before a new semester starts, the advisors help students plan for their next courses. Students register for courses through an online platform (Edusoft), which allows advisors to look through all registered courses and make adjustments in consistency with the student's ability to meet educational goals. The advisors also access this platform to monitor the academic performance of their students and organise at least two meetings with them each term to discuss any issues that may influence their achievement.

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. Every advisor may access the Edusoft system to get data about students' performance such as grades, cumulative credits, cumulative GPA, and time of studying. These data are used as a reference by advisors to monitor students' performance and give appropriate recommendations. In addition to the academic advisors, the IU has established a peer advisor system, in which senior students are matched with the freshmen assisting them to be successful in the new learning environment. The students confirm during the discussion with the experts that they all have an academic advisor.

In general, students stress that the teachers are open minded, communicate well with them, take their opinions and suggestions into account, and changes are implemented if necessary.

The fourth-year students, who prepare their final project, have one or more supervisors, who are selected based on the topic of the final project. One supervisor could be an exter-

nal supervisor, if the student performs the research outside HCMIU. Each lecturer supervises not more than eight students during the Bachelor's thesis and organises weekly meetings with them. The role of the final project supervisor is to guide students in accomplishing their final project, e.g. to finish their research and complete the final project report.

As there are only few students in the Master's programme Biomedical Engineering, the students are personally advised on their course selection and possible research projects.

In 2012, HCMIU has established the Student Advisor Programme to counsel students on issues regarding psychology, health, laws, and career planning. The Office of Student Services (OSS) manages this programme by employing psychologists, medical doctors, lawyers, and educators as counsellors. The counselling is performed online, face-to-face, and via seminars.

The Office of Student Services also helps students to look for career orientations and job opportunities. Every year, OSS organises the Career Orientation Day (job fair) to connect current students, alumni, and enterprises. In addition, specialised seminars are organized to invite alumni and people from the industry to present the needs of the labour market and share their working experiences. At the same time, industry talks are organised at the department level so that companies can introduce their line of business as well as learn more about the students on this occasion. Moreover, OSS has a separate website providing information on job opportunities, internships, enterprise programmes, seminars, networking events, and industrial field trips.

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

The experts notice the good and trustful relationship between the students and the teaching staff; 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. The comprehensive support and advisory system is one of the strengths of HCMIU.

Criterion 3.2 Funds and equipment

Evidence:

- Self-Assessment Report
- Visitation of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Basic funding of the Bachelor's degree programme Chemical Engineering and the Master's degree programme Biomedical Engineering and the facilities is provided by HCMIU. Additional funds for research activities can be provided by HCMIU or the Vietnamese government (National Foundation for Science and Technology Development, NAFOSTED), but the teachers have to apply for them. In addition, there are several co-operations with industrial partners. On university level, the Office of Finance and Planning is responsible for planning the budget and assigning the funds to the schools and departments. During the discussion with HCMIU's management, the experts learn that HCMIU almost exclusively relies on tuition fees as its predominant source of income. Only around 9 % of its total budget is provided by the government or is derived from third party cooperations and business projects (e.g. the cafeteria). In addition, the Vietnamese government pays for investments e.g. in the facilities and HCMIU can apply for additional funds for example for specific research projects. Finally, the Vietnam National University – Ho Chi Minh City (VNUHCMC) as an umbrella organization provides investments especially in the area of the physical infrastructure for all eight member universities including HCMIU, which they could not afford individually.

To maintain, evaluate, and improve the physical facilities and infrastructure such as teaching and learning facilities, laboratories, equipment, and tools to meet the needs of education, research, and service, the Office of Procurement Services (OPS) and the Office of Finance and Planning (OFP) are responsible for planning and maintaining the university facilities.

Over the years, students' research funding has increased generally and specifically for MBME students. To foster research activities, funding per project for Master's students was increased to 20 million VND (733 EUR) beginning in 2023, from 7 million VND (257 EUR) in previous years. In addition to the separate financing for their own projects, Master's students who participate in lecturer projects funded by HCMIU will additional support.

HCMIU has several different laboratories that are used by the two degree programmes. This includes Applied Chemistry Lab, Engineering Lab, Computer Lab, Environmental Lab, Tissue Engineering Lab, Pharmaceutical Engineering Lab, Medical Design Lab, Clinical Engineering Lab, SEM-Cell Culture Lab, and Experimental Production Laboratory. There are six laboratories in the Department of Tissue Engineering and Regenerative Medicine and four laboratories in the Department of Medical Instrumentation, which are all used in the MBME programme. For the CHE programme there are four laboratories in the two main buildings of HCMIU and two laboratories in another building, which is located about two kilometres from the main campus.

The programme coordinators emphasise that from their point of view, both programmes receive sufficient funding for all teaching and learning activities. Hence, both the School of Biomedical engineering and the School of Chemical and Environmental Engineering 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 and conducting research activities.

However, the experts notice during the visitation of the facilities that the working space in the laboratories is very limited and additional lab space is required. This problem may be solved with the construction of a new building on campus, which will house the laboratories. The new building will increase the capacity for education and research significantly. It should be available in 2026 and will include an area of approximately 7.000 m² for more modern laboratories. Additionally, the experts point out that it would be useful if all students and teachers would be familiar with quality and risk management in laboratories. A good guideline to this respect is SO/IEC 17025, which is an international standard that outlines the general requirements for the competence of testing and calibration laboratories.

The students express their general satisfaction with the available resources and conditions of studying, thereby confirming the positive impression of the expert group. The students also express their satisfaction with the library and the available literature there. Remote access via VPN is possible. In this respect, the experts acknowledge that the HCMIU Central Library library offers direct access to international literature, scientific journals, and publications e.g. via ScienceDirect and Springer Online. 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 HCMIU does not have them.

In summary, the expert group judges the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms etc.) to comply with the requirements for adequately sustaining the degree programmes.

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

The experts appreciate that HCMIU fully agrees that understanding quality and risk management is crucial for maintaining high standards in the laboratories and will consider ISO/IEC 17025 or similar standards. The experts point out that following accreditation standards ISO/IEC 17025 for testing laboratories and ISO 15189:2022 for medical laboratories is useful for implementing Good Laboratory Practice.

The experts consider criterion 3 to be mostly fulfilled.

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Self-Assessment Report
- Module description
- Webpage HCMIU: https://hcmiu.edu.vn/en/
- Webpage School of Chemical and Environmental Engineering: https://cee.hcmiu.edu.vn/en/programs/chemical-engineering-ce/chemical-engineerng-program-specifications-ce/
- Webpage CHE programme: https://cee.hcmiu.edu.vn/programs/chemical-engineering-ce/about-che/
- Webpage School of Biomedical Engineering: https://hcmiu.edu.vn/en/schools-and-departments/department-of-biomedical-engineering/
- Webpage MBME programme: https://bme.hcmiu.edu.vn/en/education/master-program/
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The students, as all other stakeholders, have access to the module descriptions via the programmes homepages.

After studying the module descriptions, the experts confirm that they include all of the necessary information about the persons responsible for each module, the teaching methods, the intended learning outcomes, the content, the applicability, the admission and examination requirements, and the forms of assessment.

However, with respect to the MBME programme, the experts point out that the Course Objectives and Course Learning Outcomes (CLO) as mentioned in the module descriptions are not aligned with expected scientific level (EQF 7) of a Master's degree programme. Wordings such as "Basic knowledge in Bioethics in scientific research" are not sufficient for a Master's degree programme and are repeated in several modules. The experts emphasise that the CO and CLO need to reflect the academic level of a Master's programme, because they define the knowledge, skills, and competencies that students are expected to acquire, and these expectations must align with the advanced nature of the programme. At the Master's level, students are expected to engage in more complex, analytical, and critical thinking compared to undergraduate studies. The CO and CLO should reflect this by

emphasising higher-order cognitive skills such as analysis, synthesis, evaluation, and application of knowledge in real-world or research contexts. To this end, the experts suggest using an internationally accepted taxonomy (e.g. Bloom's Taxonomy) for updating the CO and CLO.

Finally, the experts point out that the module handbook of the MBME programme needs to include module descriptions for all courses (technical electives, philosophy course).

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Diploma
- Sample Diploma Supplement

Preliminary assessment and analysis of the experts:

The experts confirm that the students of the Bachelor's degree programme Chemical Engineering as well as of the Master's degree programme Biomedical Engineering are awarded a Diploma and a Diploma Supplement upon graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains all necessary information about the degree programme. The Transcript of Records lists all the courses that the graduate has completed, the achieved credits, grades, and cumulative GPA.

The experts point out that the ECTS conversion as mentioned in the Diploma Supplement of the CHE programme (one Vietnamese credit equals 1.54 ECTS points) is not correct (see criterion 1.5). Additionally, the Diploma Supplement and the Transcript of Records should list the ECTS points of each course and of the whole programme. Moreover, the Diploma Supplement needs to include information on the distribution of the final grade, in order to be able to rank the individual result.

Criterion 4.3 Relevant rules

Evidence:

- Self-Assessment Report
- All relevant regulations as published on the university's webpage

Preliminary assessment and analysis of the experts:
The experts confirm that the rights and duties of both HCMIU and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence available to all stakeholders. In addition, the students receive all relevant course material at the beginning of each semester.

The experts appreciate that the English websites of both programmes have been updated in advance of the audit and now include all required information.

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

The experts confirm that the School of Chemical and Environmental Engineering will suggest the recommendations from the experts with respect to the Diploma Supplement and the Transcript of Records to HCMIU.

The experts consider criterion 4 to be mostly fulfilled.

5. Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Student Handbooks
- Quality Assurance Handbook
- Discussions during the audit

Preliminary assessment and analysis of the experts:
Ho Chi Minh City International University is a member of Vietnam National University – Ho Chi Minh City (VNUHCMC), which is a ministerial-level university. The International University is one of altogether seven universities, all belonging to the Vietnam National University in Ho Chi Minh City (VNUHCMC). On the one hand HCMIU has to follow laws and regulations emanating from MOET and on the other hand has to deal with the fact that a considerable number of decisions (e.g. raising the tuition fees) are taken on the level of the umbrella VNUHCMC organization.

The School of Biomedical Engineering as well as the School of Chemical and Environmental Engineering have an Academic and Scientific Committee (ASC), a Quality Assurance Team (QAT), and on university level there is the Office of Quality Assurance and Testing (QATO), which analyses the data, write reports, and offers suggestions to the Board of Presidents, which is the highest academic council at HCMIU. The Board of Presidents reviews, revises the suggestions from QATO, and makes the final decisions about all academic issues at HCMIU. QATO annually publishes the improvement reports.

The experts discuss the quality management system at HCMIU with the programme coordinators and the students. They learn that there is a continuous process in order to improve the quality of the degree programme and it is carried out through internal and external quality assurance. Minor revisions in the curriculum are implemented every year, while major changes are carried out every three years.

In order to further improve its degree programme, HCMIU conducts several surveys. In 2021, HCMIU established a university entrance survey for first year students**.** This survey is conducted annually and uses multiple choice questions including and spaces for comments. The main purpose of this survey is to obtain students' opinions concerning the way they get into the HCMIU, their orientation in the first weeks as well as potential difficulties students may face at the beginning of their studies.

At the end of each semester, the Office of Quality Assurance and Testing (QATO) conducts students' surveys to collect their feedback about the courses taken. Students can provide feedback using the university's online system. The feedback is analysed by QATO and sent to the Dean of the School of Chemical and Environmental Engineering and the individual lecturers. The School of Chemical and Environmental Engineering will then review each course to ensure teaching and learning activities were carried out efficiently. If there is any negative feedback, the Dean will arrange a meeting with the lecturers in charge and request improvement for the next semester. Starting from this semester, all teachers are required to hold discussion sessions with students after the midterm and before the end of the course based on students' feedback.

HCMIU has added a member who represents students to quality assurance team at school/department level to better understand students' aspirations and feedback for the future improving the programmes.

The survey on HCMIU's services is conducted annually at the end of each year. The goal of this survey is to find out how the offered services meet the needs of the students in order to implement corrective measures and improvements to enhance the service quality of the whole university. Moreover, an exit survey is conducted for senior students before graduation. The purpose is to receive their feedback on the educational and teaching processes

in order to find room for improvement. The staff members also have their survey to evaluate the internal quality assessment activities and development of academic programmes with respect to their workload, duties, and services for supporting their teaching and research activities.

Finally, HCMIU regularly conducts surveys for alumni and employers to find out about the employment areas and professional career of the graduates and the opinion of employers on the graduates knowledge and skills as well as the needs of the labour market.

As HCMIU is 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 practice. For each skill, employers are asked about their level of expectation for graduates and how these expectations are met. The employers' feedbacks is considered by the QAT to modify or update the degree programmes 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.

The Office of Quality Assurance and Testing 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 survey results can be used for further improving the programmes and continuously enhancing the training quality. On average, the satisfaction level of the different groups (teachers, senior students, alumni, and employers) is between 70 % and 90 %.

Up to this report, 22 students of the MBME programme have graduated. According to the survey data, the majority (almost two-thirds) of the graduates are employed and nearly a quarter continued their academic education, while the rest works and studies simultaneously. Among the employees, only two of the total 17 work in non-biomedical fields, suggesting that the knowledge acquired through the Master's program was applicable in real-world settings. In the biomedical field, most of the graduates work in companies (eight people) and research institutes (six people), and one person was employed in a hospital. The similar quotas between industry and academic fields might indicate that the programme had a good balance between various applications. Meanwhile, among eight graduates pursuing further education, six people joined PhD programmes, and two graduates switched to other Master's programmes.

The experts learn during the audit that some employers are invited to give their feedback on the content of the degree programme by taking part at the surveys. In addition, partners

from the industry are invited to give lectures and to donate money for grants. As the experts 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 employer in the quality assurance process. Nevertheless, they recommend establishing an advisory board with external stakeholders at the School of Chemical and Environmental Engineering. The School of Biomedical Engineering already has an advisory board with 19 members from health care institutions, universities, and companies. The members of the advisory board should meet regularly with the Dean and the programme coordinators to discuss with them new developments in the area of chemical engineering and needs of the job market and how the School of Chemical and Environmental Engineering can accommodate these needs.

In summary, the expert group confirms that the quality management system is suitable to identify weaknesses and to improve the degree programme.

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

The experts are pleased that HCMIU believes that it is a great idea to establish an advisory board with external stakeholders at the School of Chemical and Environmental Engineering and plans to establish the advisory board with external stakeholders at the end of this fall semester.

The experts consider criterion 5 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 (05.11.2024)

HCMIU provides the following statement:

FEEDBACK FROM ASIIN PEER

RESPONSES FROM

BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM &

MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM

B. CHARACTERISTICS OF THE DEGREE PROGRAMME

Name	Final degree (original)	Areas of Specialization	Corresponding level of the EQF[1]	Mode of Study	Double/Joint Degree	Duration	Credit points/unit	Intake rhythm & First time of offer
Bachelor Chemical Engineering	Kỹ sư / Bachelor of Engineering	-	6	Full time	no	9 Semester	151 Credits (260.18 ECTS)	2018, Once a year (August)
Master Biomedical Engineering	Thạc sĩ / Master of Engineering		7	Full time	no	4 Semester	60 Credits (139.92 / 156.28 ECTS)	2012, Twice a year (August + February)

[1] EQF = The European Qualifications Framework for lifelong learning

For the Bachelor of Engineering, the duration for curriculum 2018 – 2022 is eight (08) semesters, and for curriculum 2023 is nine (09) semesters.

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF[1]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor Chemical Engineering	Kỹ sư / Bachelor of Engineering	-	6	Full time	no	8 Semester	151 Credits (253.81 ECTS)	2018, Once a year (August)
Bachelor Chemical Engineering	Kỹ sư / Engineer	-	6	Full time	no	9 Semester	151 Credits (260.18 ECTS)	2023, Once a year (August)
Master Biomedical Engineering	Thạc sĩ / Master of Engineering		7	Full time	no	4 Semester	60 Credits (139.92 / 156.28 ECTS)	2012, Thrice a year (May + August + November)

FEEDBACK FROM ASIIN	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
1. THE DEGREE PROGRAM: CONCEPT, CONTENT & IMPLEMENTATION	
The experts notice that there are three courses in the curriculum of the Bachelor's degree programme Chemical engineering (Physical Education I + II, Military Training) for which no credits are awarded. As these courses are compulsory for all Vietnamese students, the experts suggest removing these courses from the official curriculum and to offer them as separate courses. The scores of these courses should not be included in the student's cumulative GPA, and students will receive certificates of recognition for their accomplishment of these courses. HCMIU is free to find another solution, but it is necessary to award credits to all compulsory courses of the curriculum. The experts discuss with the programme coordinators and the students about the amount of electives in the CHE programme. They learn that students can take at least nine credits for electives (in the seventh and eighth semesters). For offering an elective usually a minimum of 10 students is required, on average six different	For Physical training courses and Military training, the suggestion from ASIIN. Thank you for your suggestion, however, these three courses included in the curriculum is the compulsory requirements in the regulations on training program standards (in Circular TT 17/2021/TT-BGDĐT). A student will receive a Military training certificate after completing the course. Also, we would like to confirm that the scores of three courses (Physical Training I + II, Military Training) are not included in the student's cumulative GPA. Indeed, we usually surveyed the demand of students before offering the elective courses. From the survey, we know what courses will be offered to students.

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
electives are offered every semester. The experts point out that it would be useful to make transparent what electives are actually offered in what semester so that students can plan their studies accordingly. Moreover, all electives as mentioned in the module handbook should be offered regularly, otherwise they should be removed from the list. Additionally, the experts suggest to align the offered electives with the four research areas (Energy & Environment, Pharmaceuticals & Cosmetics, Materials, Process Engineering) of the School of Chemical and Environmental Engineering. This way, students can better decide what electives to choose if they want to follow a specific research path.	For the very first student batch, the number of total students is very low (< 25 students), and they are fragmented in terms of their English level; thus, it is hard to offer several courses for each elective course group at the same time. Luckily, the number of students has increased to nearly 60 students each year, which supports us in offering several elective courses for each elective course group at the same time. Also, students are free to select elective courses from all elective courses from curriculum 2023, while students for the batch 2018 – 2022 have to select at least an elective course in each elective course group. Those allow us to offer elective courses to students easily.
However, the international academic mobility of students in both programmes is still rather low. However, the international academic mobility of students in both programmes is still rather low. The students confirm during the discussion with the experts that some opportunities for international academic mobility exist. 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. HCMIU can provide only a limited amount of scholarships, while the demand from students is rising.	In 2023, one CHE student went abroad for the internship at National Ilan University, and another CHE student joined an exchange program at Deakin University, Australia in October 2024. Moreover, the CHE programme was established in 2018 and a young programme at the International University. After a few years in operation, we faced a Covid-19 pandemic, and this prevents the exchange of students of Vietnam and the world. Although, we signed three MOU with Genoa University (Italy) in 2020, Thammasat University (Thailand) in 2023 and National Ilan University (Taiwan) in 2024. Additionally, we also signed the Student Exchange Agreement with National Ilan University (Taiwan) in 2024. Therefore, we believe that the number of students staying abroad for

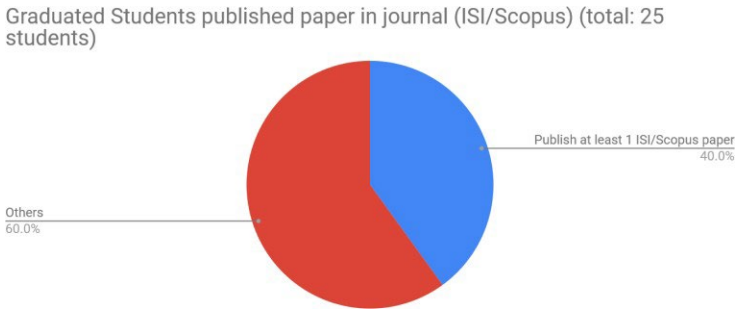
FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
The experts understand these problems; nevertheless, they recommend increasing the efforts to further promote academic mobility by establishing more international co-operations and exchange programmes and by offering more and better-endowed scholarships for Biochemistry students. A good starting point for initiating more international co-operations are the personal international contacts of the faculty members.	long- and short-term will increase, as well as the number of international students visiting the CHE programme.
The experts point out that there are two options in the MBME programme that the student can choose: Research Programme 1 and Research Programme 2 (see criterion 1.3). As the curriculum, the job perspectives as well as the focus of both programmes are different, Research Programme 1 focuses on research, while Research Programme 2 focuses on course work, the Programme Objectives and Intended Learning Outcomes need to be defined separately for both options.	Thank you for your insightful feedback on the Master of Biomedical Engineering (MBME) program at HCMIU. We appreciate your detailed observations, which have prompted us to reassess the structure of our program to better align with Master's-level expectations in biomedical engineering. **1. Background on the Two-Track Structure of the MBME Program** Since 2022, in compliance with the Ministry of Education and Training (MOET) guidelines, the MBME program at HCMIU has offered two tracks: Research Programme 1 and Research Programme 2. These options were intended to provide students with flexibility in focusing on either research or coursework. **2. Structure of Research Programme 1** According to MOET's guidelines, the structure of Research Programme 1 is designed to prioritise thesis-related work, comprising: ● Three (03) credits in Philosophy
At the same time students in Research Programme 1 do not acquire the skills and knowledge, which are expected from a Master's graduate in biomedical engineering, because the two compulsory course do not cover this area at all and the research activities that make up the rest of the programme do not include any theoretical foundation in biomedical engineering.	
All Master's students should acquire a comprehensive blend of skills and knowledge that integrate engineering principles, biological sciences, and medical applications. These competencies prepare	

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
them for roles in healthcare, medical device design, research, and development. The current curriculum of Research Programme 1 is not aligned with these requirements. The experts expect HCMIU to add courses to Research Programme 1, which ensure that all students acquire the necessary competencies in engineering, biological sciences, and medical applications.	• Four (04) credits in Research Methodology • A minimum of 53 credits dedicated to thesis research Due to this structure, there are no available slots for additional courses in Research Programme 1, which limits our ability to incorporate broader foundational coursework in biomedical engineering. **3. Decision to Remove Research Programme 1** Following the recent ASIIN audit, we convened a meeting of our Education and Training Committee to discuss your feedback. The committee acknowledged that the current structure of Research Programme 1 does not meet the Master's level standards expected in biomedical engineering, as it lacks the theoretical foundation necessary to support comprehensive skills in engineering, biological sciences, and medical applications. Given the restrictive MOET regulations, we have decided to propose the removal of Research Programme 1 from the MBME program. **4. Next Steps for Implementation** This change requires approval from our University Education and Training Committee. Our school will present the proposal at the next committee meeting, and, contingent on approval, we plan to implement this change starting with the 2025 cohort. From 2025 onward, the MBME program will offer a single program track, Research Programme 2, which emphasises both coursework and research to ensure a balanced foundation in biomedical engineering.

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
The second compulsory course “Research Methodology in Biomedical Engineering” has the following content: “The course covers basic principles for conducting research, different approaches to do research individually or in group, methods for selecting experimental tools, methods for problem solving and collection data, and experimental design. Students will also acquire skills for the presentations in public and editing of research proposals and publications and reviewing manuscripts.” From the experts point of view this course is not suitable for a Master’s degree programme.	We have updated the course syllabus of “Research Methodology in Biomedical Engineering”
The experts ask HCMIU to replace the compulsory module "Research Methodology in Biomedical Engineering" by a more comprehensive module, which makes sure that all MBME students know about the different research areas in the School of Biomedical Engineering.	
From 2022 onwards, all students are now required to complete the 60 credit curriculum, before it was only 45 credits or even less.	The Master's program originally required 45 credits from its inception, from 2013 to 2022. Starting from the 2022 cohort, the credit requirement has been changed to 60 credits, with two training modes: research program 1 and research program 2.
For this reason, HCMIU should increase the number of offered electives and make transparent what electives are actually offered in what semester so that students can plan their studies accordingly.	As previously stated, we have decided to exclude Research Programme 1 from the MBME program, retaining only Research Programme 2. This decision was made to align the program with Master’s level expectations and to ensure

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
	students acquire the necessary theoretical and practical foundation in Biomedical Engineering. **2. Current Elective Course Offerings** Research Programme 2 currently offers a selection of eight elective courses, designed to provide comprehensive coverage of key areas within Biomedical Engineering. These courses are organised into four clusters to ensure that students receive a well-rounded education across various technical domains: ● **Medical Instrumentation** ○ BM603: Medical Instrument Design ○ BM605: Biosensors ● **Biosignal Processing** ○ BM606: Advanced Biosignal Processing ○ BM607: Advanced Bioimage Processing ● **Pharmaceutical Engineering** ○ BM619: Design of Controlled Release Drug Delivery Systems ○ BM623: Drug Delivery Research Advances ● **Tissue Engineering and Regenerative Medicines** ○ BM628: Biomaterials and Biomedical Engineering ○ BM631: Biocompatibility and Biodegradation of Biomaterials Each MBME student is required to complete four technical electives, covering all main research areas within Biomedical Engineering to ensure a well-rounded skill set.

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
	3. Semester Course Offerings To assist students with their study planning, we currently offer two elective courses each semester, rotating through the available courses in a systematic manner. This ensures a balanced selection across the various technical clusters, providing flexibility and choice. ● Summer Semester of 2023-2024: We offered BM628: Biomaterials and Biomedical Engineering and BM603: Medical Instrument Design. ● Semester I of 2024-2025: We are currently offering BM606: Advanced Biosignal Processing and BM623: Drug Delivery Research Advances. ● Semester II of 2024-2025: We plan to offer one course from the Medical Instrumentation cluster and one from the Tissue Engineering and Regenerative Medicines cluster. This allows students to complete the necessary electives within a structured timeframe. **4. Future Steps to Increase Transparency and Flexibility** In response to ASIIN's feedback, we are committed to increasing transparency around elective offerings and enhancing the flexibility of the elective structure. We will implement the following actions: ● Introduce roadmap: We will provide students with a clear study roadmap at the beginning of their study, enabling them to plan their studies effectively. (please refer to Student Handout

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
	• Increase Elective Options: We are exploring options to add more electives to the MBME curriculum, broadening the selection to better meet the diverse interests and career goals of our students.
They recommend to verify if the graduation requirement of an accepted publication is feasible for a two year long Master's programme and if it is an obstacle for students to graduate in time.	Before 2022, prior to the introduction of the two research programs, students were required to publish papers indexed by "The State Council for Professorship" in order to be eligible for thesis defense. This requirement encompassed a range of publication types, including papers in ISI and Scopus- indexed journals, as well as other recognized academic journals and conference proceedings. In 2022, we revised this requirement to enhance academic rigor, mandating that students in Research Program 1 publish one paper indexed in either Scopus or ISI. This revision was made based on MOET's regulations and our statistical analysis of the publication records of previous master's graduates from 2013 to 2022, who successfully met similar publication requirements within their two-year study period. 

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<tr><th>FEEDBACK FROM ASIIN PEER</th><th>RESPONSES FROM
BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM &
MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM</th></tr>
<tr><td></td><td>However, preliminary data for the 2022 cohort shows that, as of now, no student has achieved ISI/Scopus-indexed publications within two years. This may be attributed to students prioritizing publication quality over meeting the timeline for graduation. Consequently, we have decided to remove Research Program 1 from the MBME curriculum. This change will allow us to better align the program's structure with students' academic and professional goals, streamlining the path to graduation.</td></tr>
<tr><td>However, the international academic mobility of students in both programmes is still rather low.</td><td>We will actively promote available exchange programs and scholarship opportunities to our students, encouraging them to participate in international mobility initiatives.</td></tr>
<tr><td>Criterion 1.5 Workload and credits

Table 5.

<table><tr><th>Form of study for 1 credit</th><th>Periods</th><th>In-class hours</th><th>Self-study hours</th><th>Total hours</th></tr><tr><td>Theoretical lecture</td><td>15</td><td>12.5</td><td>30</td><td>42.5</td></tr><tr><td>Practice in Laboratory</td><td>30-45</td><td>25-37.5</td><td>30</td><td>55-67.5</td></tr><tr><td>Quizzes in class</td><td>30-45</td><td>25-37.5</td><td>30</td><td>55-67.5</td></tr><tr><td>Assignment</td><td>30-45</td><td>25-37.5</td><td>30</td><td>55-67.5</td></tr><tr><td>Project, Thesis</td><td>-</td><td>45-60</td><td>30</td><td>75-90</td></tr><tr><td>Internship</td><td>-</td><td>45-90</td><td>30</td><td>75-120</td></tr></table></td><td>We modified the information in Table 5 for consistency in the calculation of total hours for each course. We modified the SAR as well.</td></tr>
</table>

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
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2. EXAMS: SYSTEM, CONCEPT AND ORGANISATION	
Preliminary assessment and analysis of the experts: (page 36)	We modified the internship information, time for the thesis, and the requirements for conducting a thesis.
All students need to complete at least 113 credits and have IELTS of at least 5.5 or equivalent to be qualified for conducting the thesis. (page 36)	To conduct the thesis in the CHE programme, all students need to complete at least 90% of the credit numbers of the academic curriculum and finish the pre-thesis (applied from curriculum 2023). Also, it requires students not to be under any academic admonishment.

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
	We revised the Draft_Accreditation report as well.
In the case of the Research Programme 1, the grade given by the committee makes up 80 %, and the published article quality accounts for the rest of the total score. Students cannot pass the thesis examination unless an average grade of ≥55/100 is obtained. If a student fails the thesis presentation, she/he will have the option to request an extension, advisor alteration, or change of research topic.	Prior to the 2019 cohort (MBME programme), the grading of the thesis consisted of two components: 80% from the evaluation by the thesis committee and 20% based on the student's publication record. However, starting from the 2019 cohort and in alignment with the guidelines from Vietnam National University Ho Chi Minh City, we revised the grading structure to enhance the assessment's focus on the thesis committee's evaluation. The updated grading system now allocates 90% of the total score to the thesis committee's evaluation and 10% to the publication record.
3. RESOURCES	
The experts notice during the visitation of the facilities that the working space in the laboratories is very limited and additional lab space is required	International University is currently in the process of constructing a new building. We will then gain the potential for expanding our laboratory facilities.
Additionally, the experts point out that it would be useful if all students and teachers would be familiar with quality and risk management in laboratories. A good guideline to this respect is SO/IEC 17025, which is an international standard that outlines the general requirements for the competence of testing and calibration laboratories.	Thank you for your suggestion. We fully agree that understanding quality and risk management is crucial for maintaining high standards in our laboratory environments. We will consider SO/IEC 17025 or similar standards for our laboratory.
4. TRANSPARENCY AND DOCUMENTATION	
However, with respect to the MBME programme, the experts point out that the Course Objectives and Course Learning Outcomes (CLO)	We have updated the course syllabus in the module handbook as well as Student Handout.

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
as mentioned in the module descriptions are not aligned with expected scientific level (EQF 7) of a Master's degree programme. Finally, the experts point out that the module handbook of the MBME programme needs to include module descriptions for all courses (technical electives, philosophy course)	(https://drive.google.com/drive/folders/1STvu_sObwVjf4v6nPqLDBOA_j79sO0cu)
Criterion 4.2 Diploma and Diploma Supplement The experts point out that the ECTS conversion as mentioned in the Diploma Supplement of the CHE programme (one Vietnamese credit equals 1.54 ECTS points) is not correct (see criterion 1.5). Additionally, the Diploma Supplement and the Transcript of Records should list the ECTS points of each course and of the whole programme. Moreover, the Diploma Supplement needs to include information on the distribution of the final grade, in order to be able to rank the individual result.	Currently, the Diploma Supplement and the Transcript of Records of students at the International University was formatted by Vietnam National University – Ho Chi Minh City. We will suggest the recommendation from ASIIN to our university and Vietnam National University as well. Also, we will suggest the exchange of Vietnam credit to ECTS points as well.
5. QUALITY MANAGEMENT: QUALITY ASSESSMENT AND DEVELOPMENT	
The experts learn during the audit that some employers are invited to give their feedback on the content of the degree programme by taking part at the surveys. In addition, partners from the industry are invited to give lectures and to donate money for grants. As the experts consider the input of the employers to be very important for the further improvement of the degree programmes, they appreciate the existing culture of	We believe that it is a great idea to establish an advisory board with external stakeholders at the School of Chemical and Environmental Engineering. We are preparing all documents and doing the paperwork according to the Vietnam's Law to establish the advisory board with external stakeholders at the end of this Fall semester, at the latest.

FEEDBACK FROM ASIIN PEER	RESPONSES FROM BACHELOR OF ENGINEERING IN CHEMICAL ENGINEERING PROGRAM & MASTER OF ENGINEERING IN BIOMEDICAL ENGINEERING PROGRAM
quality assurance with the involvement of employer in the quality assurance process. Nevertheless, they recommend establishing an advisory board with external stakeholders at the School of Chemical and Environmental Engineering. The School of Biomedical Engineering already has an advisory board with 19 members from health care institutions, universities, and companies. The members of the advisory board should meet regularly with the Dean and the programme coordinators to discuss with them new developments in the area of chemical engineering and needs of the job market and how the School of Chemical and Environmental Engineering can accommodate these needs.	

F Summary: Expert recommendations (14.11.2024)

Taking into account the additional information and the comments given by HCMIU, the experts 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 Chemical Engineering	With requirements for one year	EUR-ACE®	30.09.2030
Ma Biomedical Engineering	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 4.2) The Diploma Supplements and Transcripts of Records should list the ECTS points of each course and of the whole programme. The Diploma Supplements need to include information on the distribution of the final grade.

For Ba Chemical Engineering

A 2. (ASIIN 1.3) It is necessary to award credits to all compulsory courses.

For Ma Biomedical Engineering

A 3. (ASIIN 1.1) It is necessary to define and publish different Programme Objectives (PO) and Intended Learning Outcomes ILO for Research Programme 1 and Research Programme 2. The PO and ILO need to be verified and updated in view of the possible occupation areas.

A 4. (ASIIN 1.3) Replace the compulsory module "Research Methodology" in MBME by a more comprehensive module, which makes sure that all MBME students know about the different research areas in the School of Biomedical Engineering. All MBME students need to acquire the essential knowledge and skills in Biomedical Engineering that are expected form a Master's graduate.

A 5. (ASIIN 4.1) The module descriptions for the MBME programme need to be updated in order to correctly reflect the actually taught content and the course objectives as well as the course learning outcomes need to be aligned with the scientific demand

of a Master's programme (EQF 7). The module handbook needs to include module descriptions for all courses (technical electives, philosophy course).

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to encourage students to spend some time abroad during their studies. More international students should be attracted.

E 2. (ASIIN 1.3) It is recommended to make transparent what electives are really offered.

E 3. (ASIIN 3.2) It is recommended to expand the laboratories and to provide more working places.

E 4. (ASIIN 3.2) It is recommended to make all students and teachers familiar with quality and risk management in laboratories.

For Ba Chemical Engineering

E 5. (ASIIN 3.2) It is recommended to develop a guideline for the hosting institutions about the goal of the internships and what tasks or projects students should perform.

For Ma Biomedical Engineering

E 6. (ASIIN 1.3) It is recommended to verify if the graduation requirement of an accepted publication is feasible for a two year long Master's programme and if it is an obstacle for students to graduate in time.

G Comment of the Technical Committees (26.11.2024)

Technical Committee 01 – Mechanical Engineering/Process Engineering (25.11.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure. It suggests to delete the requirement for the Bachelor's degree programme in chemical engineering regarding the award of credit points because it relates exclusively to sports modules and military training, and both subject areas are irrelevant for the assessment of the programme anyway. Additionally, the committee suggests a reformulation of the requirement regarding the research competences of students in the Master programme, in order to give the university more options for implementing the requirement

Assessment and analysis for the award of the *EUR-ACE® label:*

The Technical Committee is in favour of awarding the EUR-ACE label.

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 Chemical Engineering	With requirements for one year	EUR-ACE®	30.09.2030

Technical Committee 05 – Material Science, Physical Technologies (26.11.2024)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedures and follows the assessment of the experts without changes.

The Technical Committee 05 – Material Science, Physical Technologies recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ma Biomedical Engineering	With requirements for one year	-	30.09.2030

Technical Committee 09 – Chemistry, Pharmacy (18.11.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and confirms that there is a particular need for improvement in the areas of the formulation of learning objectives, the curriculum of the Master's programme, the crediting of courses in the Bachelor's programme, the module handbooks, and the Diploma Supplement. A total of five requirements are to be imposed on these points. In addition, six recommendations are proposed by the expert group. The Technical Committee discusses the procedure and agrees with the proposed requirements and recommendations overall.

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 Chemical Engineering	With requirements for one year	EUR-ACE®	30.09.2030

Technical Committee 14 - Medicine (26.11.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee notes that the degree programme is primarily located in the field of engineering and that the expertise of FA 14 therefore only contributes to the process to a limited extent. The Technical Committee considers the proposed requirements to be sensible and well formulated and agrees with the vote of the experts.

The Technical Committee 14 – Medicine recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ma Biomedical Engineering	With requirements for one year	-	30.09.2030

H Decision of the Accreditation Commission (06.12.2024)

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

The Accreditation Commission discusses the procedure and decides to keep the requirement A2 as it is important that all compulsory parts of the curriculum are credited. It agrees with TC 01 to change the wording of requirement A4.

Assessment and analysis for the award of the *EUR-ACE® label:*

The Accreditation Commission support the TC in awarding the EUR-ACE label for the bachelor's degree programme Chemical Engineering.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Chemical Engineering	With requirements for one year	EUR-ACE® upon confirmation by the ENAEE administrative council	30.09.2030
Ma Biomedical Engineering	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 4.2) The Diploma Supplements and Transcripts of Records should list the ECTS points of each course and of the whole programme. The Diploma Supplements need to include information on the distribution of the final grade.

For Ba Chemical Engineering

A 2. (ASIIN 1.3) It is necessary to award ECTS credits to all compulsory courses.

For Ma Biomedical Engineering

A 3. (ASIIN 1.1) It is necessary to define and publish different Programme Objectives (PO) and Intended Learning Outcomes ILO for Research Programme 1 and Research Programme 2. The PO and ILO need to be verified and updated in view of the possible occupation areas.

A 4. (ASIIN 1.3) Ensure that all MBME students know about the different research areas in the School of Biomedical Engineering. All MBME students need to acquire the essential knowledge and skills in Biomedical Engineering that are expected from a Master's graduate.

A 5. (ASIIN 4.1) The module descriptions for the MBME programme need to be updated in order to correctly reflect the actually taught content and the course objectives as well as the course learning outcomes need to be aligned with the scientific demand of a Master's programme (EQF 7). The module handbook needs to include module descriptions for all courses (technical electives, philosophy course).

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to encourage students to spend some time abroad during their studies. More international students should be attracted.

E 2. (ASIIN 1.3) It is recommended to make transparent what electives are really offered.

E 3. (ASIIN 3.2) It is recommended to expand the laboratories and to provide more working places.

E 4. (ASIIN 3.2) It is recommended to make all students and teachers familiar with quality and risk management in laboratories.

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E 5. (ASIIN 3.2) It is recommended to develop a guideline for the hosting institutions about the goal of the internships and what tasks or projects students should perform.

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E 6. (ASIIN 1.3) It is recommended to verify if the graduation requirement of an accepted publication is feasible for a two year long Master's programme and if it is an obstacle for students to graduate in time.

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 Chemical Engineering:

Programme Objectives (PO):

Chemical Engineering Programme	
Knowledge	
PO1.1	Acquire a solid basic knowledge of science and engineering in the field of chemical engineering/chemistry and related fields (e.g., biology, pharmacology, environment, etc.).
PO1.2	Demonstrate the ability to creatively apply basic industry knowledge to solve diverse problems in career fields.
Skills	
PO2.1	Display professional ethics and understanding of environmental, social, security, and economic issues.
PO2.2	Demonstrate a full range of soft skills, management skills, teamwork ability, leadership ability, and the ability to communicate and work professionally in English.
Self-directedness and responsibility	
PO3.1	Foster an appreciation for the importance of self-improvement and lifelong learning.

Intended Learning Outcomes (ILO):

Chemical Engineering Programme	
ILO1	Identify, formulate, and solve complex chemical engineering problems by applying principles of engineering, science, and mathematics.
ILO2	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
ILO3	Communicate (in English) effectively with a range of audiences.
ILO4	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
ILO5	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
ILO6	Acquire and apply new knowledge as needed, using appropriate learning strategies.
ILO7	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

The following **curriculum** is presented:

No.	Course code	Course		Credit			ECTS
				Theory	Practice	Total	
SEMESTER I				**15**	**0**	**15**	**23.18**
1	EN007IU	Writing AE1	Required	2	0	2	3.09
2	EN008IU	Listening AE1	Required	2	0	2	3.09
3	MA001IU	Calculus 1	Required	4	0	4	6.18
4	PH013IU	Physics 1 - Mechanics	Required	2	0	2	3.09
5	CH011IU	Chemistry for Engineers	Required	3	0	3	4.64
6	PE017U	Scientific socialism	Required	2	0	2	3.09
7	PT001IU	Physical Training 1	Required	0	0	0	0.00
SEMESTER II				**16**	**2**	**18**	**28.73**
8	EN011IU	Writing AE2	Required	2	0	2	3.09
9	EN012IU	Speaking AE2	Required	2	0	2	3.09
10	MA003IU	Calculus 2	Required	4	0	4	6.18
11	PE021IU	Introduction to Vietnamese Law	Required	3	0	3	4.64
12	PE008IU	Critical Thinking	Required	3	0	3	4.64
13	CE205IU	Fluid Mechanics	Required	2	0	2	3.09
	CE206IU	Fluid Mechanics Lab	Required	0	1	1	2.00
14	**CH012IU**	**Chemistry Laboratory**	**Required**	**0**	**1**	**1**	**2.00**
15	PT002IU	Physical Training 2	Required	0	0	0	0.00
SUMMER SEMESTER (YEAR I)				**0**	**0**	**0**	**0**
16		Military education	Required	0	0	0	0.00
SEMESTER III				**13**	**3**	**16**	**26.09**
17	CHE1011IU	Introduction to Chemical Engineering	Required	2	0	2	3.09
18	CHE2103IU	Inorganic Chemistry	Required	3	0	3	4.64
	CHE2104IU	Inorganic Chemistry Lab	Required	0	1	1	2.00
19	ENEE1019IU	Applied Statistics	Required	2	0	2	3.09
	ENEE1020IU	Applied Statistics Lab	Required	0	1	1	2.00
20	ENEE1014IU	Engineering Drawing	Required	2	0	2	3.09
	ENEE1015IU	Engineering Drawing Lab	Required	0	1	1	2.00
21	CHE0011IU	Applied Mechanics	Required	2	0	2	3.09
22	PE016IU	Political Economics of Marxism and Leninism	Required	2	0	2	3.09

SEMESTER IV				**15**	**2**	**17**	**28.09**
23	CHE1051IU	Analytical Chemistry 1	Required	3	0	3	4.64
24	CHE1031IU	Physical Chemistry 1	Required	3	0	3	4.64
25	CHE1081IU	Organic Chemistry 1	Required	3	0	3	4.64
26	CHE2051IU	Heat Transfer Operations	Required	3	0	3	4.64
27	PE015IU	Philosophy of Marxism and Leninism	Required	3	0	3	4.64
28	**CHE4052IU**	**Internship 1**	**Required**	**0**	**2**	**2**	**4.91**
SEMESTER V				**13**	**3**	**16**	**26.09**
29	CHE2011IU	Reaction Kinetics and Catalysis	Required	3	0	3	4.64
30	PE019U	Ho Chi Minh's Thoughts	Required	2	0	2	3.09
31	CHE1043IU	Physical Chemistry 2	Required	2	0	2	3.09
	CHE1044IU	Physical Chemistry 2 Lab	Required	0	1	1	2.00
32	CHE2041IU	Mass Transfer Operations	Required	3	0	3	4.64
33	CHE1091IU	Organic Chemistry 2	Required	3	0	3	4.64
34	CHE1092IU	Organic Chemistry Laboratory	Required	0	2	2	4.00
SEMESTER VI				**12**	**5**	**17**	**29.00**
35	CHE2023IU	Computational Chemistry	Required	2	0	2	3.09
	CHE2025IU	Computational Chemistry Lab	Required	0	1	1	2.00
36	CHE2071IU	Mechanical Unit Operations	Required	3	0	3	4.64
37	CHE2034IU	Simulation and Optimization	Required	2	0	2	3.09
	CHE2035IU	Simulation and Optimization Lab	Required	0	1	1	2.00
38	CHE1061IU	Analytical Chemistry 2	Required	3	0	3	4.64
39	CHE4012IU	Research 1	Required	0	1	1	2.45
40	CHE1062IU	Analytical Chemistry Laboratory	Required	0	2	2	4.00
41	PE018IU	History of Vietnamese Communist Party	Required	2	0	2	3.09
SUMMER SEMESTER (YEAR III)				**0**	**3**	**3**	**7.36**
42	**CHE4062IU**	**Internship 2**	**Required**	**0**	**3**	**3**	**7.36**

SEMESTER VII				17	1	18	28.27
43	CHE1104IU	Biochemistry	Required	3	0	3	4.64
	CHE1105IU	Biochemistry Lab	Required	0	1	1	2.00
44	CHE1021IU	Process Instrumentation and Control	Required	2	0	2	3.09
45	CHE2061IU	Chemical Reaction Engineering	Required	3	0	3	4.64
46-48				*9*	*0*	9	13.91
	CHE3111IU	*Green Chemical Engineering*	*Elective*	*3*	*0*	3	4.64
	CHE3211IU	*Nanomaterials*	*Elective*	*3*	*0*	3	4.64
	CHE3221IU	*Biomaterials*	*Elective*	*3*	*0*	3	4.64
	CHE3311U	*Organic Chemistry Synthesis*	*Elective*	3	0	3	4.64
	CHE3414IU	*Advanced Engineering Drawing*	*Elective*	2	0	2	3.09
	CHE3415IU	*Advanced Engineering Drawing Lab*	*Elective*	*0*	*1*	1	2.00
	CHE3121IU	*Environmental Chemistry 1*	*Elective*	*3*	*0*	3	4.64
	CHE3131IU	*Environmental Chemistry 2*	*Elective*	*3*	*0*	3	4.64
	CHE3231IU	*Heterogeneous Catalysis*	*Elective*	*3*	*0*	3	4.64
	CHE3324IU	*Methods for Natural Products and Drugs*	*Elective*	2	0	2	3.09
	CHE3325IU	*Methods for Natural Products and Drugs Lab*	*Elective*	0	1	1	2.00
	CHE3421IU	*Pipping and Instruments System Design*	*Elective*	3	0	3	4.64
	CHE3141IU	*Sustainable Energy*	*Elective*	3	0	3	4.64
	CHE3151IU	*Natural Gas Processing*	*Elective*	3	0	3	4.64
	CHE3241IU	*Bioinorganic Chemistry*	*Elective*	3	0	3	4.64
	CHE3331IU	*Medicinal Chemistry*	*Elective*	3	0	3	4.64
	CHE3431IU	*Treatment Plant Operation*	*Elective*	3	0	3	4.64
	CHE3251IU	*Corrosion Chemistry*	*Elective*	3	0	3	4.64
	CHE0042IU	*Project 1*	*Elective*	0	1	1	2.45
	CHE0052IU	*Project 2*	*Elective*	0	1	1	2.45
	CHE0062IU	*Project 3*	*Elective*	0	1	1	2.45

SEMESTER VIII				**12**	**6**	**18**	**31.46**
49	**CHE0012IU**	**Chemical Process Design and Simulation**	**Required**	**0**	**3**	**3**	**6.00**
50	**CHE1012IU**	**Chemical Engineering Lab**	**Required**	**0**	**1**	**1**	**2.00**
51	**CHE4512IU**	**Pre-thesis**	**Required**	**0**	**2**	**2**	**4.91**
52	CHE1111IU	Industrial Chemistry	Required	2	0	2	3.09
53	**CHE2081IU**	**Occupational Health Safety and Environment (HSE)**	**Required**	**2**	**0**	**2**	**3.09**
54	CHE0031IU	Research Methodology	Required	2	0	2	3.09
55	PE020IU	Engineering Ethics and Professional Skills	Required	3	0	3	4.64
56		*Economy – Management*	Required	3	0	3	4.64
56.1	*IT120IU*	*Entrepreneurship*	*Elective*	3	0	3	4.64
56.2	*ENEE4011IU*	*Engineering Project Management*	*Elective*	3	0	3	4.64
56.3	*BA115IU*	*Introduction to Business Administration*	*Elective*	3	0	3	4.64
56.4	*BA154IU*	*Entrepreneurship and Small Business Management*	*Elective*	3	0	3	4.64
SUMMER SEMESTER (YEAR IV)				**0**	**3**	**3**	**7.36**
57	CHE4072IU	Internship 3	Required	0	3	3	7.36
SEMESTER IX				**0**	**10**	**10**	**24.55**
58	CHE4522IU	Thesis	Required	0	10	10	24.55
		TOTAL		**113**	**38**	**151**	**260.18**

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

Programme Objectives (PO):

PO1. Knowledge: Training advanced and solid knowledge about Biomedical Engineering (MBME). Equipping graduates with a strong theoretical foundation, engagement skills, advanced practical skills, and effective team leadership skills so that they can quickly adapt to the constant development of high technology worldwide and have the ability to effectively solve both new and existing technical problems.

PO2. Skills: An ability to research important technical and scientific problems. Skilled in working effectively in multidisciplinary research and team development. Graduates are trained in effective communication skills as a leader of a team in which members may have different expertise, and having knowledge of project management, business, and the impact of technical solutions in different social and environment contexts.

PO3. Professional qualifications and competencies: Training to develop a workforce with high theoretical and practical qualifications, an ability to disseminate knowledge and publish research results, an ability to be creative and apply multidisciplinary knowledge into practice, and an ability to function effectively in interdisciplinary research and group development

PO4. Working position: Lecturers and researchers in the field of biomedical engineering at universities and colleges; Lecturer, researcher, in the Universities of Medicine and Pharmacy in the field of pharmaceutical technology, medical technology, medical equipment, imaging diagnostics and functional exploration; Principal researcher, project director, manager, technical director, sales director in manufacturing and trading medical equipment companies, domestic and foreign drug factories; Head of medical equipment management department, clinical engineer at domestic and foreign hospitals.

Intended Learning Outcomes (ILO):

ILO 1. An extensive advanced knowledge of mathematical-scientific and engineering principles of biomedical engineering and their interdisciplinary expansion; as well as a critical awareness of the latest findings in their disciplines

ILO 2. An ability to analyze and solve problems scientifically which are unusual and/or incompletely; define and show competing specifications; abstract and formulate complex problems arising from a new or emerging field of Biomedical Engineering; apply innovative methods to a problem-solving process based on fundamentals and to develop new scientific methods.

ILO 3. An ability to develop concepts and solutions for fundamentally orientated and partially unusual Biomedical Engineering problems under broad consideration of other disciplines; use their creativity to develop new and inventive products, processes and methods; apply their scientific ability to judge in order to work with complex, technologically impure or incomplete information.

ILO 4. An ability to identify, find and procure necessary information; plan and carry out analytic, model and experimental investigations; critically assess data and draw conclusions; investigate and assess the application of new and emerging technologies in their discipline

ILO 5. An ability to classify and systematically combine knowledge of different fields and handle complexity; familiarize themselves speedily, methodically and systematically with the new and unknown; assess applicable methods and their limits; reflect non-technical effects of engineering activities systematically and integrate them into their actions in a responsible manner

ILO 6. An ability to function effectively as an individual and as a member of a team, including where relevant coordination of the team; use diverse methods to communicate effectively with the engineering community and with society at large; demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice; demonstrate an awareness of project management and business practices, such as risk and change management, and understand their limitations; recognise the need for, and have the ability to engage in independent, lifelong learning; work and communicate effectively in national and international contexts.

The following curriculum is presented:

Research program 1

Code	Course	ECTS	Credits		Semester
			Theory	Practical	
Compulsory general course					
PE505IU	Philosophy	4.64	3	0	1
Compulsory major course					
BM648	Research Methodology in Biomedical Engineering	7.09	2	2	1
Thesis					
BM651	Thesis	144.55	53		2-4
Total credits of the whole program		156.28	60		

Research program 2

Code	Course	ECTS	Credits		Semester
			Theory	Practical	
Compulsory general course					
PE505IU	Philosophy	4.64	3	0	1
Compulsory major course					
BM647	Research Methodology in Biomedical Engineering	7.09	2	2	1
BM601	Progress in Biomedical Engineering	7.09	2	2	1
BM602	Advanced Engineering Challenge in Medicine	7.09	2	2	1
Elective major course (BM648 or 4 technical courses)					
BM648	Special Topics in BME	24.00	0	12	2
BMxxx	Technical Elective 1	5.09	2	1	2
BMxxx	Technical Elective 2	5.09	2	1	2
BMxxx	Technical Elective 3	5.09	2	1	2
BMxxx	Technical Elective 4	5.09	2	1	2
Research Project					
BM649	Research Proposal	24.55	9		2
BM650	Project Study	24.55	9		3
Thesis					
BM652	Thesis	40.91	15		3-4
Total credits of whole program		139.92	60		

List of electives:

No.	Subject code	Subject	Number of credits			ECTS
			Total	Inclass	Lab	
	Electives		**12**	**8**	**4**	**20.36**
	Medical Instrumentation					
1	BM603	Medical Instrument Design	3	2	1	5.09
2	BM604	Design of Medical devices for the Developing Countries	3	2	1	5.09
3	BM605	Biosensors	3	2	1	5.09
4	BM606	Advanced Biosignal Processing	3	2	1	5.09
5	BM607	Advanced Bioimage Processing	3	2	1	5.09
6	BM608	Quality Control for Medical Devices	3	2	1	5.09
7	BM609	Data transmission technology in Telemedicine	3	2	1	5.09
8	BM610	Ultrasound Image Processing	3	2	1	5.09
9	BM612	Brain Computer Interface)	3	2	1	5.09
10	BM616	Computer Vision	3	2	1	5.09
	Biomedical Signals and Imaging					
11	BM605	Biosensors	3	2	1	5.09
12	BM606	Advanced Biosignal Processing	3	2	1	5.09
13	BM607	Advanced Bioimage Processing	3	2	1	5.09
14	BM610	Ultrasound Image Processing	3	2	1	5.09
15	BM611	Brain and Cognitive Sciences	3	2	1	5.09
16	BM612	Brain Computer Interface	3	2	1	5.09
17	BM613	Computational Methods in Biomedical Engineering	3	2	1	5.09
18	BM614	Advanced Computational Surgery	3	2	1	5.09
19	BM615	Pattern Recognition and Machine Learning	3	2	1	5.09
20	BM616	Computer Vision	3	2	1	5.09
21	BM617	Statistics For Brain and Cognitive Sciences	3	2	1	5.09
	Pharmaceutical Engineering					
22	BM618	Pharmaceutics-Dosage Form and Design	3	2	1	5.09
23	BM619	Design Of Controlled Release Drug Delivery Systems	3	2	1	5.09
24	BM620	Design of Oral Controlled Release Drug Delivery Systems	3	2	1	5.09
25	BM621	Nanoparticulate Drug Delivery Systems 1	3	2	1	5.09
26	BM622	Nanoparticulate Drug Delivery Systems 2	3	2	1	5.09
27	BM623	Drug Delivery Research Advances	3	2	1	5.09
28	BM624	Nanotechnology For Advanced Drug Delivery Systems	3	2	1	5.09
29	BM625	Drug Delivery Systems in Cancer Therapy	3	2	1	5.09
30	BM626	Principles Of Pharmacokinetics and Drug Delivery	3	2	1	5.09

31	BM627	Principles Of Pharmaceutical Engineering	3	2	1	5.09
	Regenerative Medicine					
32	BM628	Biomaterials and Biomedical Engineering	3	2	1	5.09
33	BM629	Characterization and Properties Of Biomaterials	3	2	1	5.09
34	BM630	Biomaterials for Clinical Applications	3	2	1	5.09
35	BM631	Biocompatibility and Biodegradation Of Biomaterials	3	2	1	5.09
36	BM632	Methods and Process In Fabrication of Biomaterials	3	2	1	5.09
37	BM633	Molecular, Cellular and Tissue Biomechanics	3	2	1	5.09
38	BM634	The Principles and Practice of Tissue Engineering and Regenerative Medicine	3	2	1	5.09
39	BM635	Tissue Mechanics	3	2	1	5.09
40	BM636	In vitro Studies	3	2	1	5.09
41	BM637	Ex vivo and In vivo Studies	3	2	1	5.09
42	BM638	Tissue: General Features and Functions	3	2	1	5.09
43		Stem Cell Technology	3	2	1	5.09
	Biomedical Entrepreneurship					
44	BM639	Entrepreneurship in Biomedical Engineering	3	2	1	5.09
45	BM640	Applied Business Leadership Skills Entrepreneurship	3	2	1	5.09
46	BM641	Finance and Accounting for Entrepreneurship	3	2	1	5.09
47	BM642	The Role of Engineering in Business	3	2	1	5.09
48	BM643	Medical Devices: Issues and markets	3	2	1	5.09
49	BM644	Issues in Vietnam's Healthcare Sector	3	2	1	5.09