ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Computer Science
Software Engineering
Information Systems
Information Technology

Provided by
Vietnam National University Ho Chi Minh City
University of Science

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Cử nhân Khoa học máy tính	B.Sc. Computer Science	ASIIN	-/-	04
Cử nhân Kỹ thuật phần mềm	B.Sc. Software Engineering	ASIIN	-/-	04
Cử nhân Hệ thống thông tin	B.Sc. Information Systems	ASIIN	-/-	07
Cử nhân Công nghệ thông tin	B.Sc. Information Technology	ASIIN	-/-	04
Date of the contract: 10.03.2023 **Submission of the final version of the self-assessment report:** 21.08.2023 **Date of the onsite visit:** 09. & 10.10.2024 **at:** VNUHCM University of Science Campus District 5				
Expert panel: Dr. Peter Braun, Technical University of Applied Sciences Würzburg-Schweinfurt Dr. Trinh Thanh Trung, Hanoi University of Science and Technology Gerhard Wächter, Manamak GmbH Tong Vo Anh Thuan, student at Ho Chi Minh City University of Information Technology				
Representative of the ASIIN headquarter: David Witt				

[1] ASIIN Seal for degree programmes

[2] TC: Technical Committee for the following subject areas: TC 04 - Informatics/Computer Science; TC 07 - Business Informatics/Information Systems.

Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 07, 2021 Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018 Subject-Specific Criteria of Technical Committee 07 – Business Informatics/Information Systems as of December 8, 2017	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	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
Computer Science	B.Sc.		6	Full time	-/-	8 Semester	!38 Vietnamese Credits / 228 ECTS	1995
Software Engineering	B.Sc.		6	Full time	-/-	8 Semester	!38 Vietnamese Credits / 228 ECTS	1995
Information Systems	B.Sc.		6	Full time	-/-	8 Semester	!38 Vietnamese Credits / 228 ECTS	1995
Information Technology	B.Sc.		6	Full time	-/-	8 Semester	!38 Vietnamese Credits / 228 ECTS	1995

"The Faculty of Information Technology, VNUHCM-University of Science (hereafter, Faculty) is a leading school of computing in Vietnam. Founded in 1995, it is one of the first schools of computing and the largest in terms of the student body and the number of the academic staff in Vietnam. It is among the most selective schools in the nation, admitting only students who achieved remarkably high scores in the annual national examination and those who won medals in national or international programming or mathematics contests. The Faculty has over 100 permanent academic staff members and many visiting professors from other prestigious domestic and international higher education institutions.

The Faculty has over 5,000 students pursuing three different degree levels including 4-year Bachelor of Science (BSc), Master's, and Doctorate covering a wide range of majors in computing. It offers various undergraduate programmes including a regular Vietnamese-taught

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

BSc, an English-taught BSc, a French-taught BSc, an Honors, a High-quality BSc, and a distance-learning BSc. […]

The Faculty consists of six academic departments covering a wide range of disciplines including Computer Science, Software Engineering, Information Systems, Computer Network and Telecommunication, Knowledge Engineering, and Computer Vision and Cybernetics.

The Faculty has research collaborations and student exchanges with well-known international institutions such as National Institute of Informatics (NII, Japan), Japan Advanced Institute of Science and Technology (JAIST, Japan), National University of Singapore (NUS), Portland State University (PSU, USA), University of Memphis (UM, USA), and University Claude Bernard Lyon 1 (UCBL, France).

Vision

Becoming a world-class school of computing, offering excellent study programmes and educational experience, which focuses on developing high-quality and creative computing solutions to contribute to the development of society.

Mission

Providing premier teaching and studying experience for undergraduate and postgraduate programmes in the field of computing. Developing students to become successful, self-determining, and ethical computing-solution developers or professional leaders, who apply their knowledge and skills to make society better."

For the Bachelor's degree programme Computer Science the institution has presented the following profile in the self-assessment report:

„The Bachelor of Science in Computer Science is the four-year programme that was first introduced in 1995. The programme offers students fundamental and in-depth knowledge and technical skills in computer science. It also trains students on personal and interpersonal skills to be ready for their future career path. Students are instructed to be able to apply technical knowledge and different skills to identify and analyse real-world computing problems; to design, implement, and verify computing solutions. The focus of the programme is to update students with in-depth and state-of-the-art knowledge on the latest advancement of computer science such as artificial intelligence (AI), deep learning, large language models, and the scientific methods and research experience.

Students pursuing this programme can follow one of four tracks, including AI-based computer science, knowledge engineering, computer vision, and data science. The students select their tracks after completing the first two years with foundation courses in mathematics, physics, and computer science. Upon completion of the programme, students are ready

to take on important roles in both industrial and academic environments such as researcher, AI engineer, vision engineering, data science and analytics. Furthermore, students will have stable knowledge and opportunities in higher education in computer science.

Students possess diverse pathways towards their graduation goal (with a minimum accumulation of 10 credits). They can opt to pursue either a graduation thesis (worth 10 credits) or engage in a capstone project (worth 6 credits), alongside participating in relevant courses (worth 4 credits). Students are required to complete at least 138 credits to fulfil the graduation requirements. “

For the Bachelor’s degree programme Software Engineering the institution has presented the following profile in the self-assessment report:

„The Bachelor of Science in Software Engineering was first opened in 1998. This four-year

programme provides students a fundamental knowledge in computing with concentrations on software engineering, and personal and interpersonal skills. Students are expected to have a good understanding of mathematics and computer science theories and fundamentals. The programme was designed to provide technical knowledge and skills on the concepts, methods, processes, techniques, and tools for professional software development. The programme instructs students to identify and form up real-world problems; understand and be able to apply the full process of software development, including discovering and analysing software requirements; design, implement, verify and validate, and deploy software solutions. Upon completion of the programme, students are ready to play important roles in software development projects in industry.

Students possess diverse pathways towards their graduation goal (with a minimum accumulation of 10 credits). They can opt to pursue either a graduation thesis (worth 10 credits) or engage in a capstone project (worth 6 credits), alongside participating in relevant courses (worth 4 credits). Students are required to complete at least 138 credits to fulfil the graduation requirements. “

For the Bachelor’s degree programme Information Systems the institution has presented the following profile in the self-assessment report:

„The Bachelor of Science in Information Systems programme started in 1995, aiming to train students who, upon graduation, are capable of applying their knowledge, skills, and

experience to analyze, construct, operate, and manage computer-based information systems in organizations effectively. In addition to the foundational knowledge in mathematics and computer science, students are equipped with in-depth knowledge and skills in database management, data analytics, as well as analyzing, designing, and developing computer-based information systems in organizations. After completing the programme, students can take on distinct roles in an organization, such as chief information officer, business analyst, data analyst, database designer, database administrator, database developer,

or data architecture solution consultant, among other positions.

Students possess diverse pathways towards their graduation goal (with a minimum accumulation of 10 credits). They can opt to pursue either a graduation thesis (worth 10 credits) or engage in a capstone project (worth 6 credits), alongside participating in relevant courses (worth 4 credits).

Students are required to complete at least 138 credits to fulfil the graduation requirements.“

For the Bachelor’s degree programme Information Technology the institution has presented the following profile in the self-assessment report:

„The Bachelor of Science in Information Technology focuses on providing students fundamental and specialized knowledge and skills in the field of Information and Communications Technology (ICT). Students are expected to have a good understanding of principles, concepts, techniques, and tools in ICT. Upon graduation, they will be able to apply their knowledge, skills, and experience to identify and analyze problems; design, implement, evaluate, and operate solutions using approaches and tools in ICT. In this programme, students can take either a general track of ICT or a computer networks specialization.

Students possess diverse pathways towards their graduation goal (with a minimum accumulation of 10 credits). They can opt to pursue either a graduation thesis (worth 10 credits) or engage in a capstone project (worth 6 credits), alongside participating in relevant courses (worth 4 credits).

Students are required to complete at least 138 credits to fulfil the graduation requirements.“

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
- Curriculum of each degree programme
- Diploma Supplements
- Module descriptions
- Objective-module-matrices
- Webpage HCMUS
- Webpage Faculty of Information Technology
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The experts base their assessment of the learning outcomes on the information provided in the module descriptions and in the Self-Assessment Report of the four Bachelor's degree programmes under review. For each degree programme, HCMUS has described Programme Objectives (PO), Expected Learning Outcomes (ELO), and Qualification Profiles. The PO and ELO are published on the Faculty's website and easily accessible for students as well as other stakeholders. Furthermore, there are regular revision processes in place that take into account feedback by external and internal stakeholders.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee Informatics/Computer Science and of the Technical Committee Business Informatics/Information Systems and use the objective-module-matrices and module descriptions for each programme as a basis for judging whether the intended learning outcomes correspond with the competences as outlined by the respective SSC.

The experts note that the relationship between POs and ELOs has been established in a comprehensible and logical manner. The development of POs of each study programme

under review involves both internal and external stakeholders so that the curricula can be adapted and modified according to the needs of the industry and the graduates on a regular basis. For example, HCMUS regularly conducts surveys, through which the different stakeholders get the chance to assess the programmes and their main objectives and adapt them if necessary. Internal stakeholders include all of HCMUS members (students, teaching staff, and non-academic employees), while the external stakeholders include the industry, alumni, the government, and society. A major revision including consultations of stakeholders takes place every five years.

The University formulates and publishes the following Programme Objectives for all programmes:

- "PO1: An understanding of ethics, professional responsibilities, and status of economy, environment, and society.
- PO2: Personal skills, teamwork skills, communication skills and CDIO (Conceive-Design-Implement -Operate) skills.
- PO3: An ability to utilize and develop professional knowledge and skills.
- PO4: An ability to apply professional knowledge to practical problems and research.
- PO5: An ability to conceptualize, analyze, design, solve and operate computing systems.
- PO6: An ability to solve computing problems using tools, methods, processes, techniques, etc."

In the Self-Assessment Report and on its webpage, HCMUS provides the following table stating the Expected Learning Objectives for all four Bachelor's degree programmes under review:

1	**Fundamental knowledge**		
1	1	Fundamental knowledge of basic sciences	
1	1	1	Mathematics
1	1	2	Physics
1	1	3	Electrics and electronics
1	2	Fundamental knowledge of computer science	
1	2	1	Knowledge on Programming
1	2	2	Computer science foundations
1	3	Advanced technical knowledge of computer science	

1	3	1	Knowledge on algorithms and data structures
1	3	2	Knowledge on operating system
1	3	3	Knowledge on computer architectures
1	3	4	Knowledge on computer networking
1	3	5	Knowledge on database
1	3	6	Knowledge on security, privacy, and confidentiality
1	3	7	IT support tools, methods, and technologies
1	4a	Advanced knowledge in Computer Science	
1	4a	1	Computer Science
1	4a	2	Knowledge Engineering
1	4a	3	Computer Vision
1	4a	4	Information Security
1	4a	5	Data Science
1	4b	Advanced knowledge in Software Engineering	
1	4b	1	Estimate Software system development cost
1	4b	2	Software Development Process and Methodology
1	4b	3	Design Software Architecture
1	4b	4	Modern and Advanced Technologies in Software Development
1	4c	Advanced knowledge in Information Systems	
1	4c	1	Data and Data Mining
1	4c	2	Information Systems
1	4c	3	Knowledge of diverse types of Information System applications
1	4d	Advanced knowledge in Information Technology	
1	4d	1	Advanced knowledge in Computer Networks and Telecommunications: Network programming; Network administration, monitoring, and maintenance; Network security; Cloud computing; Modern and future network technologies
1	4d	2	Advanced knowledge in Information Systems
1	4d	3	Advanced knowledge in Software Engineering
1	4d	4	Advanced knowledge in Computer Science
2	**Personal and inter-personal skills (soft skills)**		
2	1	Personal characteristics	

2	1	1	Independence
2	1	2	Confidence in professional environment
2	1	3	Willingness to make decisions
2	1	4	Creative thinking
2	1	5	Critical thinking
2	1	6	Adaption to new environment
2	1	7	Personal resource management (time, money, etc.)
2	1	8	Lifelong learning
2	1	9	Project management
2	2	Teamwork	
2	2	1	Forming effective teams
2	2	2	Teamwork
2	2	3	Member or leader in a team
2	2	4	Team operation, supervision, and evolution
2	3	Communications	
2	3	1	Communication skills in listening, speaking, reading, and writing
2	3	2	Presentation skills
2	3	3	Negotiation, compromise, and conflict resolution
2	3	4	Diverse connections and networking
2	4	Foreign language skills	
2	4	1	English speaking
2	4	2	English listening
2	4	3	English reading
2	4	4	English writing
2	4	5	Using specialized terminology
2	5	Leadership skills	
2	5	1	Leadership attitude
2	5	2	Problem, issue, and anomaly identification
2	5	3	Proposal and creativity in problem-solving and issue resolution
2	5	4	Building and leading organization
2	5	5	Planning and leading projects to success
2	6	Entrepreneurial skills	
2	6	1	Establishing, organizing, and managing company
2	6	2	Writing business plan
2	6	3	Corporate finance
2	6	4	Product and service ideation based on technology
2	6	5	Creativity in product/service development and marketing
3	**Context, responsibility, and ethics**		
3	1	External, social, economic, and environmental context	
3	1	1	Contemporary social, economic, and environmental issues and values
3	1	2	Roles and responsibilities

3	1	3	Historical and cultural context
3	1	4	Society's Laws and Regulations
3	2	Enterprise and business context	
3	2	1	Enterprise and organization context and cultures
3	2	2	Enterprise stakeholders, goals, and strategy
3	2	3	Enterprise's and business' laws and regulations
3	3	Ethics, responsibilities, and core personal values	
3	3	1	Ethical standards and principles
3	3	2	Professional behaviours and responsibilities
3	3	3	Commitments
3	3	4	Honesty, trust, and loyalty
4	**Scientific and research methods**		
4	1	Analytical reasoning and problem solving	
4	1	1	Problem identification and formulation
4	1	2	Modeling and analysis
4	1	3	Problem reasoning
4	1	4	Solution evaluation and proposal
4	2	Experimentation, investigation, and knowledge discovery	
4	2	1	Hypotheses formulation
4	2	2	Surveys
4	2	3	Experimental inquiry
4	2	4	Hypothesis test and defense
4	3	System thinking	
4	3	1	Holistic thinking
4	3	2	System components' interactions
4	3	3	Prioritization and focus
4	3	4	System evaluation
5	**Conceiving, analyzing, designing, and implementing computing systems**		
5	1	Conceiving ideas/problems/projects	
5	1	1	Determining problem/project goals and requirement elicitation
5	1	2	Feasibility study and analysis
5	1	3	Requirement specification
5	2	Design and formulation	
5	2	1	Design process and methods
5	2	2	Architectural design and component design (functions, database, etc.)
5	2	3	Multi-disciplinary and multi-objective design
5	3	Implementation	
5	3	1	Implementation processes and methodologies
5	3	2	Design-based implementation
5	3	3	System components integration

6	**Verification, validation, operation, maintenance, and evolution computing systems**		
6	1	Verification and validation	
6	1	1	Verification and validation processes and methodologies
6	1	2	Requirements verification and validation
6	1	3	Components, system integration verification and validation
6	2	Operation and maintenance	
6	2	1	Training and operation
6	2	2	Operation management
6	2	3	System maintenance
6	3	Evolution and disposal	
6	3	1	System improvements and evolution
6	3	2	System disposal and life-end issues

HCMU describes the following career opportunities for graduates of the four Bachelor's degree programme under review:

- "Roles in software development projects: business analyst, software developer, software programmer, software tester, system deployment and operation staff, project manager, solution consultant, etc.
- Roles in Information Systems projects: database designer, database administrator, data analyst, data engineer, Information Systems administrator, Information Systems consultant, data architecture consultant, chief information officer, etc.
- Roles in computer networks and telecommunications: computer network programmer, computer security engineer, DevOps engineer, ITC system administrator, etc.
- Research and development positions in higher education institutions, laboratories, software companies in the fields of artificial intelligence, machine learning, data science, data mining, and natural language processing, etc.
- Academic: teaching assistant, teacher, lecturer of training centers, colleges, universities, etc.
- Other fields: system and solution consultant, etc."

For the Bachelor's degree programme Information Technology, HCMUS also lists "[p]ositions in the Artificial Intelligence department: Design and build machine learning algorithms, deep learning; Design and build applications for natural language processing (language comprehension, text summarization, question and answer systems, speech recognition, etc.), computer vision, etc." as a career opportunity.

In the opinion of the experts, all four Bachelor's degree programmes in principle provide plausible and consistent learning outcomes that correspond to the EQF 6 level. This can

also be confirmed based on the module descriptions and discussions. The learning outcomes are consistent with the respective ASIIN Subject-Specific Criteria of the Technical Committees 04 and 07 respectively. However, the university only provides the above table and no competence-orientated and specifically formulated objectives. As the diploma supplements for each programme also need to be completed with the learning outcomes (see criterion 4.2), the experts are in favour of the university submitting clearly formulated learning outcomes for each programme. In this context, the differences in the individual profiles and intended competences of the respective degree programmes should also be more clearly outlined. However, the experts learn that the graduates of HCMUS are much sought after in the labor market. The representatives of industry emphasize the high quality of the graduates of these programmes under review and students as well as graduates are satisfied with and well aware of their good job perspectives.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Self-Assessment Report
- Diploma, Diploma Supplements and Transcript of Records for each programme
- Webpage HCMUS

Preliminary assessment and analysis of the experts:

The names of the four bachelor study programmes under review were chosen based on a list of programme titles issues by the Ministry of Education and Training. In the opinion of the VNUHCM-US, these are also reflecting the international current standards.

The expert panel agrees that with the names of all four bachelor's programmes reflect the intended aims and learning outcomes of the programme. The experts support that the programme names are well recognized in both English and Vietnamese and further reflect the main course language of each programme. The names of the programmes are, hence, adequate. Furthermore, they are used consistently in all relevant documents and all web pages.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Webpage HCMUS
- Webpage Faculty of Information Technology
- Discussions during the audit

Preliminary assessment and analysis of the experts:

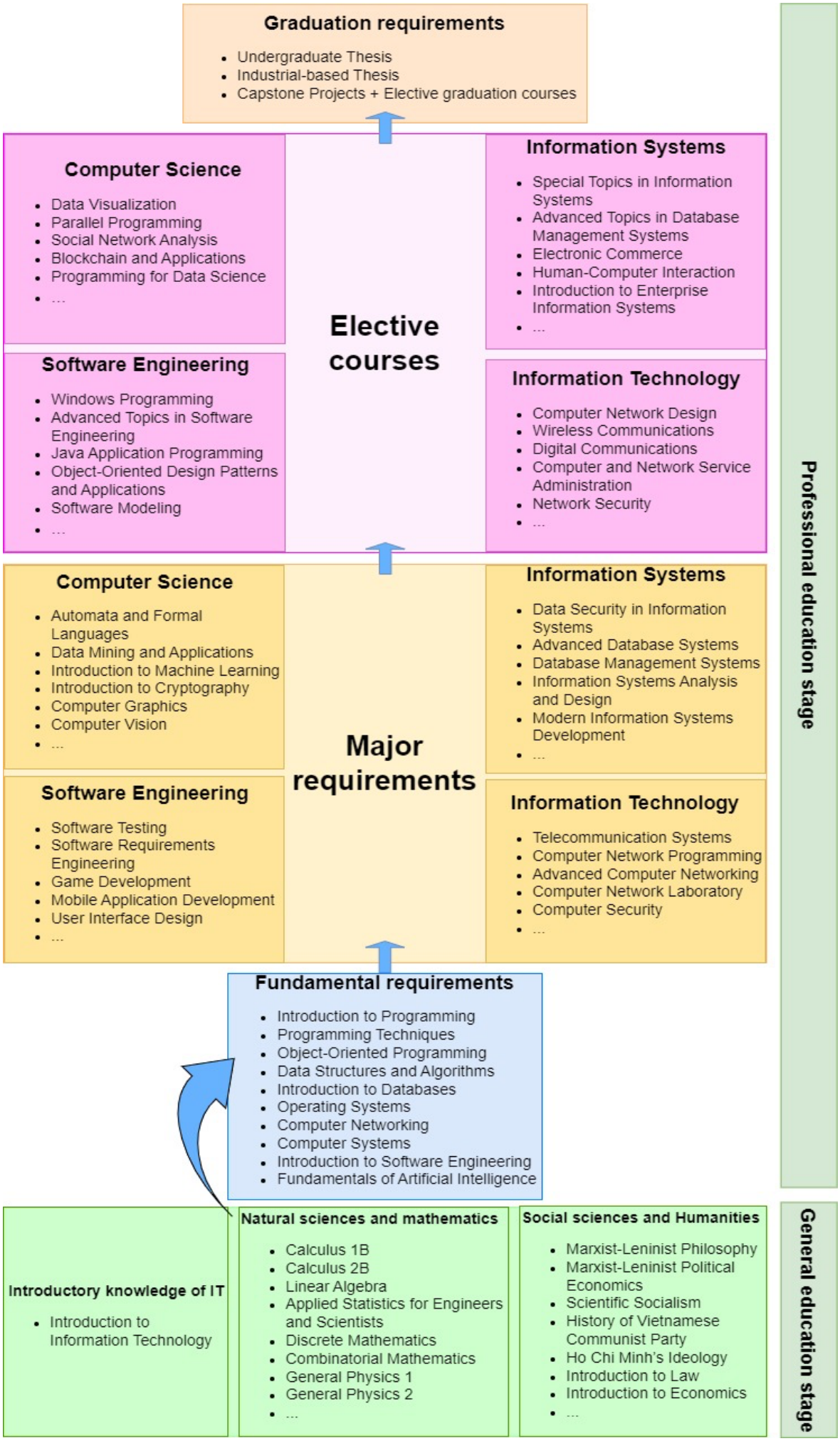
The four Bachelor's degree programme under review are managed by the Faculty of Information Technology. The curriculum of the study programme is reviewed by the experts in order to identify whether the described programme objectives and learning out-comes can be achieved by the available modules. Course descriptions as well as overviews and competence-subject matrices matching the general learning objectives and the module contents were provided for a thorough analysis. In the Self-Assessment Report, the university gives a detailed overview of how the competences acquired with the presented curricula match the SSC 04 respectively SSC 07 learning outcomes.

The study programmes are constructed using modules, which consecutively communicate the programme learning outcomes to the students. Each programme includes compulsory and elective modules to allow the students to adapt the focus of their studies to their interests. The curriculum is constructed systematically to allow the students to gain a deeper knowledge through parallel courses and prerequisite courses. The curricula considers global and regional trends in education and science. The curriculum including the module handbook and a suggested study plan is posted on the website of the university. The university uses a syllabus, which is standardized and contains basic information about the course, the instructor, course goals, content overview, evaluation criteria, learning material, and references for further reading.

Each Bachelor's programme under review has a standard duration of eight semesters (four academic years) and a minimum of 138 Vietnamese Credits (equivalent to 228 ECTS) need to be achieved by the students in each programme. All four curricula are divided into two blocks: General Education and Professional Education. The Professional education block is divided into the three groups: Pre-major requirements, Major requirements, graduation requirements. The structure of the curricula and the distribution of credits are presented in the following table:

Requirements	Number of credits				Total ECTS credits
	Required	Major Elective	Minor Elective	Total Credits	
I. General Education *	42	14	0	**56**	**88**
II. Professional Education					
II.1. Pre-major requirements	38	0	0	**38**	**61.5**
II.2. Major requirements	16	8	10	**34**	**58.5**
II.3. Graduation requirements	0	10	0	**10**	**20**
Total accumulated credits for graduation (I+II.1+II.2+III)				**138**	**228**

In its Self-Assessment Report, HCMUS provides the following figure illustrating "[t]he connection between knowledge blocks, from the general education requirements to the professional education requirements":


Graduation requirements
Undergraduate Thesis
Industrial-based Thesis
Capstone Projects + Elective graduation courses
Computer Science
Data Visualization
Parallel Programming
Social Network Analysis
Blockchain and Applications
Programming for Data Science
...
Software Engineering
Windows Programming
Advanced Topics in Software Engineering
Java Application Programming
Object-Oriented Design Patterns and Applications
Software Modeling
...
Elective courses
Information Systems
Special Topics in Information Systems
Advanced Topics in Database Management Systems
Electronic Commerce
Human-Computer Interaction
Introduction to Enterprise Information Systems
...
Information Technology
Computer Network Design
Wireless Communications
Digital Communications
Computer and Network Service Administration
Network Security
...
Professional education stage
Computer Science
Automata and Formal Languages
Data Mining and Applications
Introduction to Machine Learning
Introduction to Cryptography
Computer Graphics
Computer Vision
...
Software Engineering
Software Testing
Software Requirements Engineering
Game Development
Mobile Application Development
User Interface Design
...
Major requirements
Information Systems
Data Security in Information Systems
Advanced Database Systems
Database Management Systems
Information Systems Analysis and Design
Modern Information Systems Development
...
Information Technology
Telecommunication Systems
Computer Network Programming
Advanced Computer Networking
Computer Network Laboratory
Computer Security
...
Fundamental requirements
Introduction to Programming
Programming Techniques
Object-Oriented Programming
Data Structures and Algorithms
Introduction to Databases
Operating Systems
Computer Networking
Computer Systems
Introduction to Software Engineering
Fundamentals of Artificial Intelligence
Introductory knowledge of IT
Introduction to Information Technology
Natural sciences and mathematics
Calculus 1B
Calculus 2B
Linear Algebra
Applied Statistics for Engineers and Scientists
Discrete Mathematics
Combinatorial Mathematics
General Physics 1
General Physics 2
...
Social sciences and Humanities
Marxist-Leninist Philosophy
Marxist-Leninist Political Economics
Scientific Socialism
History of Vietnamese Communist Party
Ho Chi Minh's Ideology
Introduction to Law
Introduction to Economics
...
General education stage

The curricula of all four Bachelor's degree programmes are constantly evaluated and updated. While the lecturer can implement small changes during the semester, larger adaptions of the curriculum require the approval of the Scientific and Academic Faculty Council and consider the opinion of stakeholders. Major reviews are carried out every five years.

The expert group is very convinced of the structuring of the submitted curricula and the corresponding content level of the four Bachelor's degree programmes under review. This is also matched by the impressive research activities of the professors and students, which also find influence in the individual modules. However, the experts also discuss the number of general education courses such as physics, chemistry and biology, which are also compulsory parts of the curriculum. The experts understand that this is a national requirement and that the university cannot remove these from the curriculum. However, all stakeholders (programme managers, lecturers, students and industry) explained in the various discussion rounds that they would like to remove these courses without direct reference to the actual degree programmes and/or replace them with courses relevant to the degree programme. The experts support this view and would also be in favour of deleting and/or replacing these courses as soon as this is legally possible. This would also reduce the workload for students, as it is quite high in the first two years in particular.

The four Bachelor's degree programmes under review have a similar structure. Particularly in the first two years, the degree programmes are very similar and the individual majors mainly differentiate themselves in the subsequent years. Although the degree programmes share a certain common basis due to this similarity, it turns out that it is difficult to switch between the individual majors during the course of study. The experts recommend to facilitate switching between the different majors, for example by having students take general and foundation knowledge courses together for two years before deciding on a specific major. However, both the programme coordinators and the students make it clear that it is already possible to choose courses from the other majors in the higher semesters and the coordinators also state that there are also special advisors who help with changing majors. The experts therefore recognise that it is possible in principle to change majors and that appropriate support is available. Nevertheless, they recommend that the university consider using the joint structure of the four degree programmes to make it even easier to switch between majors.

In summary, the experts gain the impression that the content and the structure of the curricula ensure that the intended learning outcomes of each degree programme can be achieved and that the students are well prepared for entering the labour market and can find adequate jobs.

Student Mobility

"The Faculty always provides opportunities for students to engage in exchange programmes by offering financial support, recognizing academic achievements, and assessing learning outcomes, etc. Starting from the third semester onwards, students can participate in international exchanges as they will have acquired fundamental knowledge that allows for the consideration of which subjects to study abroad."

HCMUS also provides different cooperation agreements, e.g. with the Japan Advanced Institute of Science and Technology, the University of Memphis, the Oakland University (Michigan, USA), and the University of Texas at Arlington. During the discussion, the experts learn that there are about 20-30 students of the four programmes under review per year going abroad.

In response to inquiries about informing students regarding opportunities to study abroad, the programme coordinators describe that students are directly informed about such possibilities at the beginning of their studies. While some students may already possess awareness of these options, the University ensures that all students are made aware and encouraged to explore international experiences. Additionally, there are dedicated advisors whom students can contact for further guidance and support throughout the process. Furthermore, the coordinators and lecturers underline the significance of international experiences, particularly for those aspiring to pursue research careers. To facilitate the individual student mobility, personalized recommendations are offered, along with assistance in visa applications and support in securing scholarships for international opportunities. Overall, HCMUS tries to emphasize the profound benefits going abroad offers to students' academic and professional growth.

Furthermore, the experts want to know how easy it is to have credits earned abroad recognised. Typically, students are advised to engage in exchange programmes where credit transfer is guaranteed from the outset. Through participation in such programmes, students can be assured that the credits earned will be recognized seamlessly. Additionally, Memorandums of Understanding (MOUs) are established with various international universities, further facilitating credit transfer. Students must complete a learning agreement document as part of the exchange program application process. This document outlines the courses they plan to take abroad, ensuring alignment with academic goals and degree requirements.

The experts recognise that the university has created a good formal framework that simplifies the recognition of external achievements. In general, they believe that the university is well equipped to deal with student and teaching staff mobility matters. In Summary, the

experts appreciate the efforts to promote international mobility and encourage HCMUS, as well as the Faculty of Information Technology, to continue in this direction

Criterion 1.4 Admission Requirements

Evidence:

- Self-Assessment Report
- Translation of the admission regulation of VNUHCM-US
- Webpage HCMUS
- Webpage Faculty of Information Technology
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The admission at VNUHCM-US is regulated to control the number of enrolled students. According to the SAR, a review of the admission criteria is conducted every year, to combine the university's global admission criteria with the specific criteria of each department. The university posts this information on their web page and further distributes the information in mass media, social media, flyers, and shares information material of the admission-counselling day.

There are six enrolment methods at the VNUHCM-US, which can be divided into regulations for gifted students, regulations for international students and national students who participate in the national high school graduation examinations and the competency assessment examination organized by the VNUHCM. Gifted and international students often receive priority or direct admission, while in general students have to register for the admission. Applicants either submit their high school documents or register in advance for the competency assessment examination organized by VNUHCM. The applicants can name three study programmes of interest and usually apply online. The admission council evaluates all applications and selects the most suitable students based on a quota of each enrolment group.

Students during the interview testify that they are informed in detail about the requirements and the necessary steps to apply for admission into the degree programme under review.

HCMUS provides the following statistics on admission over the period from 2018 to 2022:

Intake Year	Number of students			Lowest admission score*
	Capacity	Applied	Attended	
2018	550	3702	544	22.75
2019	500	5065	459	25
2020	500	4228	520	27.2
2021	380	5731	383	27.4
2022	380	8091	405	27.2

(*) Admission scores are obtained from the national high school graduation examination (ranging from 0 to 30)

The expert panel thinks that the admission requirements and procedures are binding and transparent. The admission regulations are regularly evaluated with respect to ensuring sufficient (subject-related) prior knowledge of the students.

Criterion 1.5 Workload and Credits

Evidence:

- Self-Assessment Report
- Module handbook for each study programme
- Curriculum of each study programme
- Credit transfer regulations between the Vietnamese Qualification Framework and the European Credit Transfer and Accumulation System
- Discussions during the audit

Preliminary assessment and analysis of the experts:
VNUHCM-US calculates the workload following the Vietnamese Qualifications Framework awarding credit point. A transfer system is developed using the ECTS user's guide and presented to the expert panel prior to the on-site visit.

The Vietnamese Qualification Framework implements the following principles:

(1) One study period is equal to 50 minutes of direct classroom instruction.

(2) Each credit is equal to 15 theory periods; 30 or 45 periods for practice, experiment, or discussion; 15 or 30 exercise periods; 30 periods for essays, big assignments or projects, and graduation theses.
(3) To acquire a credit of theoretical, practical, or experimental modules, students must spend at least 30 self-study hours.

Based on the different consideration of self-study time and contact hours, the HEI developed the following conversion:

- 1 theoretical credit = 15 periods x 50 minutes + 30 self-study hours = 42.5 hours, equivalent to 42.5/27.5 = 1.5 ECTS.
- 1 practical credit (experiment/discussion/internship/project/dissertation/thesis) = 30 periods x 50 minutes + 30 self-study hours = 55 hours, equivalent to 55/ 27.5 = 2 ECTS.

The workload of the students each semester depends on the courses they choose. On average, the students take courses with a workload ranging between 14 and 25 Vietnamese credit points each semester. The intended module distribution for each semester is presented on the web page and in introductory events to first year students. An individual study plan can be developed with advice and support from lecturers, academic advisors, the Office of Academic Affairs or consulting channels from the faculty forum or alumni. The workload of each module is clearly presented in the module handbook and in the syllabus. According to the monitoring and evaluations of the study programmes, the workload is realistic.

All bachelor's programmes under review have an intended study duration of eight semesters or four academic years and require a minimum of 138 credits (equivalent to 228 ECTS). Upon request of the expert panel, the representatives of the rector's office give them a short overview of the academic year at VNUHCM-US. Generally, the year is divided into two semesters. The first semester lasts from September to January (15 weeks) whereas the second semester starts in mid-February and ends in June. In each semester, mid-term exams are held in the 9^{th} or 10^{th} week of the semesters, followed by a week of exams at the end of each semester.

The students explain to the experts, that they regard the workload to be appropriate. At the beginning of each course, the lecturer explains the workload of this module and how many hours they have to be in class and how many they are expected to study at home. Thus, they consider the workload stated in the module handbook to be accurate. However, in the discussion with the programme coordinators, it emerged that students sometimes need longer than the planned six months for their theses and often take eight to nine

months to complete them. Although this does not appear to be a structural problem, the experts recommend that the university should make sure that students only work on and complete their theses within the designated period. If it turns out that a larger proportion of students need significantly longer than the six months envisaged, this would have to be re-evaluated and the ECTS points allocated adjusted accordingly, as these should reflect the actual workload.

The experts summarize, that VNUHCM-US has implemented a credit point system, which considers contact hours and self-study time. Credits are awarded for every module based on the respective workload. The workload distribution is equal among the semesters and verified to be realistic. This lets the experts conclude, that the workload is regularly monitored and that students are involved in this process. The calculations from Vietnamese credits to ECTS points is well explained and integrated into the curricular overview presented in the SAR. However, the experts recommended evaluating the time that students are spending on their graduation theses in practice and to make sure that students really only work on the graduation thesis in the time intended for it.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Module handbook for each programme
- Discussions during the audit

Preliminary assessment and analysis of the experts:
In its Self-Assessment Report, HCMUS states that "[t]he educational philosophy of the University is 'Student-centred – Comprehensive education – Knowledge co-creation - Lifelong learning – Community engaged'. This philosophy is publicly accessible on the University's website for all stakeholders to view. Additionally, it is conveyed to all relevant parties through seminars, meetings, and conferences, serving as the foundation for our endeavours while developing the programmes. The educational philosophy also constitutes a key component of the Student Handbook, which is provided to students during orientation week. This allows them to become acquainted with the University's philosophy, mission, and vision."

HCMUS also provides the following table mapping the four categories of the educational philosophy with the respective teaching and assessments methods:

Educational philosophy	Teaching & Assessment methods
Student-centred	Student-centred learning empowers students to make active choices about what to learn, how to learn, and when to learn. Therefore, such active teaching methods as Classroom activities, Games, Think-pair-share, Project-based study, Open test, etc. are applied.
Comprehensive education	Lecturers use a variety of instructional strategies, such as collaborative learning, project-based learning, and hands-on activities, to engage students in the learning process and help them apply what they have learned to real-world situations. Both formative and summative assessments are used to identify areas where students need additional support and to provide feedback that helps students set goals and monitor their own progress.
Knowledge co-creation	Lecturers act as facilitators or guides rather than just instructors, helping students to explore and discover knowledge through discussions, debates, problem-solving, and other interactive activities. A variety of instructional strategies, such as group work, case studies, simulations, and role-plays are used, to engage students in the learning process and foster collaboration. Assessment methods emphasize on evaluating students' ability to apply knowledge, analyse and synthesize information, and work collaboratively with others. Assessment methods may include group projects, presentations, and portfolios, which allow students to showcase their skills and knowledge while also demonstrating their ability to work collaboratively and co-create knowledge with others
Life-long learning	Teaching methods are applied to help students improve their self-study, self-discovery, and initiative in learning such as Researching, Critical thinking, Negotiation, Teamwork, Flipped Classroom, etc.
Community engaged	Teaching and assessment methods are applied to promote student's self-reflecting, applying what they have learned to reality, enriching the learning experience, enhancing senses of self-responsibility and community responsibility. Examples of such methods are Role play, Case study, Problem-based study, and Reflective diary.

During the discussion rounds with teachers and students, the experts were able to confirm that the teaching concept presented is also used in practice and that different forms of teaching are utilised. In summary, the experts can confirm that a variety of learning methods are used and that they are aligned with the intended learning outcomes. In the discussions with students, the experts learn that they are generally satisfied with the quality of teaching and learning in the programmes under review. Gathering systematic feedback on the quality of teaching and learning can be achieved through the course evaluation survey conducted at the end of each semester, which serves as a valuable source of information.

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

Criterion 1.1:

In its comment, HCMUS states that "[i]n the SAR, the programme objectives were presented in the abstraction level which covers only the name of each objective for all 4 programmes. In fact, we do have expected levels (1-5) which are different for each programme." In addition, HCMUS provides attachments to its statement which should describe the expected learning outcomes of each programme in more detail.

The experts are thankful for the comments and the additional documents submitted. Although the additional documents submitted contain individual lists of learning outcomes for each programme, they still do not contain competence-oriented and concretely formulated objectives, but rather key points. As the diploma supplements for each programme also need to be completed with the learning outcomes (see criterion 4.2), the experts are still in favour of the university submitting clearly formulated learning outcomes for each programme. In this context, the differences in the individual profiles and intended competences of the respective degree programmes should also be more clearly outlined.

Criterion 1.3:

Regarding the general education courses, HCMUS submits the following statement: "Based on annual feedbacks, we are aware that students and industrial partners often comment on the number of general education courses. However, after rigorously reviewing, our Faculty Council still decided to keep Maths, Physics courses together with fundamental computing courses (Data Structures and Algorithms, Operating Systems, etc) since they are important for students' future career. Please also note that when building up the curriculum, we also follow the guidelines or international standards such as ABET, ACM, IEEE, etc where

Maths, Sciences occupy the large portion of the curriculum. In addition, in our experience, students prefer to take more credits in the first 3 years and leave the final year for internship and final project. Thus, fresh students often feel there are higher workload for them in their first 2 years."

The experts would like to thank for the detailed comments and emphasise that, in their opinion, the degree programmes are already well structured and organised. The experts recognise that the programmes are based on international guidelines and standards and that basic and advanced content, for example in maths and physics, is definitely useful. However, the experts' recommendation mainly referred to general courses that are not directly related to the four programmes, such as biology and chemistry. The additional benefit of these courses for achieving the learning outcomes could be considered further, which is why the experts stick to the associated recommendation.

Regarding changing between different majors, HCMUS submits the following statement: "We fully agree with the expert's observation. As demonstrated in our SAR, our four programs are structured similarly, with the general education and foundational knowledge components being nearly equivalent. This facilitates an environment where students can seamlessly transition between majors. However, current regulations from the Vietnamese Ministry of Education and Training do not formally permit students to switch majors (after the third year of study). Nevertheless, to accommodate students' aspirations and abilities, we allow students from one major to take courses from other majors (considered as electives) to broaden their knowledge. In the future, if there are adjustments to regulations by the Ministry of Education and Training, we believe our programs will be prepared to accommodate such transitions"

The experts acknowledge that the university is bound by national regulations and already allows students to choose courses from other majors without having to change programmes. They therefore agree that HCMUS is prepared to simplify the change should the regulations change. They are therefore in favour of retaining the recommendation.

<u>Criterion 1.5:</u>

"Regarding this statement, we affirm that students are allocated a specific duration of 6 months from the start to the completion of their graduation thesis, without exceptions.

Within this 6-month period, if a student fails to complete their thesis, it will be canceled, and the student must re-register for a new cycle with a new topic. This regulation is clearly stipulated in the university's academic regulations, and we strictly adhere to it in practice.

We believe there may be a misunderstanding regarding the perception that some students extend the duration of their thesis completion. In reality, this is inaccurate. Some (excellent) students may have been engaged in research projects with faculty lecturers early on (in years 2 or 3), and their graduation thesis in year 4 may be a small part of that larger project, which the advisor separates out for independent completion as a graduation thesis. In such cases, the workload and scale of the thesis project must be appropriately calculated according to the requirements of a graduation thesis (6 months)."

The experts appreciate the detailed clarification and are aware that the university already has sufficient regulations that clearly define the processing time for the thesis. The experts have no doubt that there is a functioning system and that there is no systematic problem. As it nevertheless appeared during the on-site discussions that there were occasional extensions, the experts maintain their recommendation to consistently ensure that the specified working period is adhered to.

The experts consider criterion 1 to be fulfilled.

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, Concept and Organisation

Evidence:

- Self-Assessment Report
- Module handbooks for each programme
- Exam regulations
- Sample of exams and theses
- Discussions during the audit

Preliminary assessment and analysis of the experts:
At the VNUHCM-US, the semesters has two examination periods. The schedule of the examination periods is announced at the beginning of each academic year

The examinations of each module are developed between the lecturers and the Science and Academic Committee of each study programme. This ensures that the exams contribute to the programme learning outcomes of each programme. Each problem of an exam is therefore representing a course objective or learning outcome. If two courses of the same module are organized, examinations are schedules at the same time and with the same contents to ensure fairness.

The information on the applied assessment method of each course is communicated with the students in the syllabus, as well as, the module handbooks. They clearly state the assessment methods and show the different criteria, which are considered in the final grade of the module. According to the regulations at the HEI, the lecturers can apply several assessment methods in one exam to deploy the most suitable methods for each problem. The form of assessment depends on the content of each module. Most modules at early semesters use written examinations to evaluate the students' knowledge and skills. For small classes (most classes in the specialization stage), individual assignments, group assignments or group work are often part of the grading policy of the modules.

The grading point systems generally apply a 10-point scale, whereas the 4-point scale and the letter scale are only used for reference purpose. Students need to achieve at least 5.0 out of 10 to pass a module. Cumulative grades are integrating multiple assessment methods. The individual weight of the percentages of the final exam varies between modules. The applied grading system is clearly stated in the syllabus, the web page and the module handbooks and is additionally communicated to the students at the beginning of each module.

The examination regulations include regulations on exam postponement to handle unforeseen circumstances (such as sickness, accidents, etc.), which prevent the students from taking the exam. Students can also retake the exam to improve their grade. Furthermore, regulations are in place to appeal about the grading if the students consider this necessary.

The students state that they are satisfied with the examinations of their study programmes. They continue that the content of the exams was always part of the lecture and that the number of exams and assignments is manageable

Although all four Bachelor's degree programmes under review present a graduation thesis in their study plan, this module is not mandatory. The credit point systems awards ten points for the graduation thesis, however, this module is not compulsory. If the students take other courses to complete their minimum of 138 credits, the graduation thesis can bebypassed. However, many students are already writing a final thesis for graduation and, in principle, the university offers adequate framework conditions in terms of regulations, support and supervision that enable successful execution. In addition, the experts were able to get an impression of the level of these theses and recognise that all of the theses provided correspond to EQF-level 6.

In summary, the forms of exams are oriented in-line with the envisaged learning outcomes of the respective courses, and the workload is allocated in an acceptable way. The experts conclude that the criteria regarding the examinations system, concept, and organization are fulfilled and that the examinations are suitable to verify whether the intended learning

outcomes are achieved or not. However, as the ASIIN criteria on which the accreditation is based require a compulsory final thesis or equivalent final project, the experts conclude that the university must introduce a corresponding compulsory final thesis or final project in all four degree programmes.

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

HCMUS provides the following statement: "When working toward ASIIN accreditation, we were aware of the requirements that students must do the final project or equivalent when they graduate. Thus, from the students intake of 2022, there are only two options for students to graduate:

- 10-credit final thesis
- 6-credit final project + 4-credit course

Please not that with the students before 2022, there is another option for them to graduate:

- Three 4-credit fourth year specialized courses (equivalent to the final project).

Thus, from the intake 2022, in both options, all students must do a final thesis or a final project to graduate."

The experts thank the university for the clarification and recognise that a regulation fulfilling the criteria is already in force for all students who have started their studies after 2022. During the on-site discussions, it was understood that it would still be possible not to complete a thesis or final project. However, as this is no longer the case, the experts waived the planned requirement and consider the criterion to be fulfilled.

The experts consider criterion 2 to be fulfilled.

3. Resources

Criterion 3.1 Staff and Staff Development

Evidence:

- Self-Assessment Report
- Staff handbooks for each degree programmes
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The teaching staff of the VNUHCM-US is divided into lecturers, senior lecturers, and advanced lecturers. The nomination to associate professor and professor is a separate process on a national level in Vietnam, which neither affects their position as a lecturer in the teaching staff nor their individual teaching load. In the recent years, the VNUHCM-US has maintained a stable number of teaching staff.

In its Self-Assessment Report, HCMUS provides the following tables on the full time academic staff at the Faculty in 2023 as well as on the student-to-lecturer-ratio in the years 2017 – 2023:

Full time academic staff at the Faculty as 2023

No.	**Academic rank/ Degree**	**Quantity**	**Percentage**	**Gender**		**Age**				
				Male	**Female**	< 30	30 – 40	41 – 50	51 – 60	> 60
1	Professor	1	1.1%	1	0	0	0	0	1	0
2	Associate Professor	7	7.5%	7	0	0	1	3	3	0
3	Doctorate (*)	30	32.3%	21	9	1	18	11	0	0
4	Masters	53	57.0%	46	7	5	40	7	1	0
5	Bachelor	2	2.2%	2	0	2	0	0	0	0
Total:		**93**	**100.0%**	**77**	**16**	**8**	**59**	**21**	**5**	**0**

(*) Excluding those in the rank of Professor and Associate Professor.

Student-to-Lecturer ratio

Academic year	Number of students	Number of lecturers		Ratio
		Full time	Part time	
2017-2018	2197	92	33	17.58
2018-2019	2440	91	49	17.43
2019-2020	2499	91	35	19.83
2020-2021	2494	97	38	18.47
2021-2022	2386	96	42	17.29
2022-2023	2056	93	42	15.23

The Vietnamese government has set specific staff-student ratios for universities. The ideal ratio of staff to active students is 1:20. As shown in the table, this regulation is complied with consistently

All staff members are required to perform three tasks of teaching, research, and participation in regular missions of the faculty. Criteria for newly hired staff includes their scientific research expertise and their pedagogical skills. Furthermore, the HEI describes in its Self-Assessment Report that "[e]ach academic staff member submits an annual personal self-assessment report, which summarizes their performance in terms of the number of hours spent on teaching, scientific research, publications, self-training activities, and the quality of their work. This report serves as the basis for the management to evaluate and rank the academic staff's performance annually. In addition to teaching, academic staff members are responsible for participating in scientific research activities. The types and quantity of research activities undertaken by academic staff members are established, monitored, and benchmarked for continuous improvement." If issues arise with the teaching methods and/or attitude, the faculty and the managing department initiates a meeting with the lecturer to discuss the problem and to find an adequate solution.

The teaching staff at VNUHCM-US is also motivated to develop their scientific research, as well as, their pedagogical skills. The faculty offers several ways to support their lecturers to obtain a PhD. This includes, pursuing a higher degree at other national and international universities without losing their employment status at the HEI. It further includes financial support and an exemption for tuition fees at their university and coverage of tuition fees at other universities. Similarly, short-term scientific visits abroad are facilitated. The faculty

financially supports attendance at scientific conferences. In addition, in its Self-Assessment Report, HCMUS provides the following table listing training activities for academic staff over the past five years:

No.	Training	Number of participants	Year
Activities organized by the University and Faculty			
1	CDIO Workshop	30	2018
2	Workshop on Education 4.0	35	2019
3	Workshop on teaching and assessment methods in Education 4.0	30	2019
4	Workshop on designing syllabus and training materials in Education 4.0	35	2019
5	Workshop on learning management systems	90	2019
6	Workshop on online learning and supporting tools	90	2020
7	Workshop on student assessment approaches in online learning	90	2020
8	Workshop on Education 4.0	35	2020
9	Workshop on guiding to use Google Meet and Microsoft Teams	60	2021
10	Workshop on sharing how to create instructional videos at home	40	2021
11	FIT Summer School on Artificial Intelligence and Machine Learning	29	2021
12	Workshop on Sharing Teaching Experience	40	2022
13	Conference on summarizing the Education 4.0 project during the 2018-2022 period	40	2022
14	FIT Summer School on Artificial Intelligence and Machine Learning	27	2022
Activities organized by outside partners			
1	Master Teaching Training #5	3	2018
2	Oracle Academy Database Programming with PL/SQL Training	6	2018
3	Workshop on Education 4.0	11	2018

4	Workshop on improving teaching effectiveness for lecturers of English-taught courses	1	2018
5	Training Workshop on “Classroom Assessment of Student Learning”	6	2018
6	Assessment Rubric Development Techniques	3	2019
7	Flipped Classroom Seminar	1	2019
8	Workshop on teaching soft skills	1	2019
9	Workshop on entrepreneurship training	2	2019
10	Workshop on digital education and integration of soft skills into courses	2	2019
11	Master Teacher Training #6	2	2019
12	Seminar on improving education quality of online learning for universities in Vietnam - AUF/DRAP	1	2020

According to the programme coordinators, VNUHCM-US is actively encouraging their employees to continue their higher education to receive a PhD degree. The teaching staff confirms this and adds that the university covers the admission and tuition fees for everyone who continues their higher education. The teaching staff confirms that the university also supports their teaching assistants to earn a master’s degree and allows them short-term visits abroad for research.

The experts discuss the various opportunities available for personal skill development with the teaching staff members. The teachers express their satisfaction with the internal qualification programme and willingness to improve their didactic skills. Additionally, they can attend conferences, workshops, and seminars abroad. The experts conclude that the teaching staff's composition, scientific orientation and qualifications, as specified in the Staff Handbook, are suitable for successfully implementing and sustaining all four Bachelor’s degree programmes under review.

The university offers student academic advising to support them in their entire learning process. Student support staff is available at university level and faculty level, such as the Student Affairs Office, the Academic Affairs Office, or the Student Assistance Center. Teaching assistants are available during lectures to be able to support the students by answering their questions. New students at VNUHCM-US are invited to a student orientation week,

which takes place in the first week of the new semester. Each faculty organizes a reception to introduce the basics to the new students and answer all their questions. The university organizes events to explain how to use the library as well as the regulations of the students' medical insurance and the dormitories. In addition, the faculty of VNUHCM-US regularly organizes a career orientation event to support interested students who yet have to find their major. During the audit, the student tell the experts that they are very satisfied with the support they receive from the university and the teaching staff. They mention, the lecturers quickly reply to their emails and that the teaching assistants are easy to approach after and outside the classes.

In its Self-Assessment Report, the HEI presents the following information on the number of support staff at the University:

Office	**Degree**			**Total**
	Bachelor	**Master's**	**Doctorate**	
Library	10	2	0	12
Student Affairs	6	9	0	15
Academic Affairs	6	4	1	11
Financial Planning	6	3	0	9
Educational Testing and Quality Assurance	5	3	1	9
Sciences and Technology	5	1	2	8
International Relations	2	4	2	8
Equipment & Facilities Management	6	9	0	15
Inspection-Legislation-Intellectual Property	4	3	0	7
Information and Communications	8	2	0	10
Personal & Administrative Affairs	5	8	0	13
Total	**63**	**48**	**6**	**117**

In addition, the Faculty has a team of support staff for student affairs, academic affairs, external relations to support teaching and learning activities. The responsibilities of support staff, which currently consists of 19 full-time members, are defined based on their expertise and experience. The table below shows the number of Faculty's supporting staff."

Staff	**Degree**				**Total**
	Other	**Bachelor**	**Master's**	**Doctorate**	
Faculty's administrative office	0	11	2	0	13
IT services	0	3	3	0	6
Student advisors (Lecturer in charge)	0	0	4	3	7
Total	**0**	**14**	**9**	**3**	**26**

In summary, the experts have a positive impression of the composition, professional orientation, and qualifications of the teaching staff in all four Bachelor's degree programmes. Its qualification ensures a successful teaching, as well as, research. Lecturers have the opportunity to further develop their professional and didactic skills and are supported in using corresponding offers. The experts reviewed the evaluations and acknowledge that the didactic skills of the lecturer are regularly reviewed. All interviewed staff demonstrate high motivation and attachment to the institution.

Criterion 3.2 Funds and equipment

Evidence:

- Self-Assessment Report
- Budget plans
- On-site visit of participating institutes and laboratories
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The VNUHCM-US has two campuses in greater Ho Chi Minh City; one is inside the city centre at District 5 whereas the other one is 20 km apart in Thu Duc – Di An, Binh Duong province. The university has classrooms and laboratories at both locations for all bachelor's programmes under review. Classrooms are suited to host large groups in the foundational classes, as well as, suitable smaller rooms for specialized modules. The campuses are covered by Wi-Fi, which is freely accessible to the entire staff and students.

The main library is located at the campus in District 5 and focuses on supporting the research and teaching activities. The library has an annual budget to maintain, update, and modernize its collection. It offers books, journals, theses, scientific reports, e-books and online data. This includes subscriptions to the major scientific journals. A second library is available at the campus outside of Ho Chi Minh City.

Each faculty further receives certain types of funding from the university. These include funds for operating expenses to purchase equipment and stationary, management funds to support management tasks, faculty office expenses, and honour programme funds to support students in the honour programme.

For the four Bachelor's degree programmes under review, "the Faculty utilizes approximately 50 classrooms and 9 computer lab rooms, which house a total of 425 computers. These rooms are carefully monitored and scheduled to optimize their usage. To ensure that the classrooms and equipment meet the needs of the students and faculty, the University conducts surveys annually to collect feedback. Additionally, the Faculty regularly reviews the equipment and makes recommendations to maintain and purchase new equipment as needed. The funding for this activity is regulated by both the University and Faculty." Furthermore, the Faculty provides a Software Engineering Lab, an Artificial Intelligence Lab, an Intelligent Systems Lab, and an Information Security Lab. What is more, lecturers and students are able to use a Studio and a "Capstone Project co-working space".

The experts find no severe bottlenecks due to missing equipment or infrastructure. The basic technical equipment for teaching students at the Bachelor level is available in sufficient numbers. In the discussion with the expert group, the students confirm that they are generally satisfied with the available equipment, infrastructure and classrooms. They also verify, that they have access to software to conduct independent research. The experts conclude that the School is well-equipped and adequately financed. They note that this provision extends opportunities for students to engage with research, even at the Bachelor's level.

The students are satisfied with the library and the literature it offers. They can access international literature, scientific journals, and publications. Students have sufficient access to current international literature and databases, and they can access them remotely. Additionally, students can access all the resources of all member universities of the Vietnam National University Ho Chi Minh City. This means that if HCMUS does not have the required books, they can be obtained from other universities.

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 all four Bachelor's degree programmes under review.

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

The experts consider criterion 3 to be fulfilled.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Self-Assessment Report
- Modul handbooks for each programme
- Discussions during the audit

Preliminary assessment and analysis of the experts:
HCMUS states, that "for each module in the curriculum are standardized and contain essential information such as the course code, credit hours, learning outcomes, course content, assessment components, and learning materials. A syllabus is written for each module every semester, which is checked by the faculty's Scientific and Academic Council. The syllabus is shared with the students online and on the department's web page.

The experts review the module descriptions for the programme and find that they mostly provide adequate information about all relevant and required aspects: module identification code, respective content, learning outcomes, examinations, teaching methods, credit points and workload distribution, grading, person responsible for the module, admission requirements, recommended literature, and the date of last amendment made. The students confirm during the discussions that information about the courses is always available online and that details concerning examinations and contents are provided at the beginning of each course by the teaching staff.

However, the experts find out, that in some cases the module descriptions are missing information on several aspects as teaching methods, module objectives and content, for example for the modules Combinatorial Algorithms and Applications (Course ID CSC10106), Capstone Project (Course ID: CSC10204), Privacy-Preserving Data Analysis (CSC 15107), and Undergraduate Thesis (Course ID: CSC10251 & CSC 10252). Therefore, the experts are in favour of the university checking the module handbooks again for missing and/or incorrect information and adapting them accordingly. In this context, the information on the teaching language ("English intensive"), the literature (not always up-to-date) and the depth of the content described in the module handbooks should also be checked again, as there are

sometimes inconsistencies and unclear formulations. For example, the contents are sometimes listed in great detail and sometimes only very rudimentarily, and in some cases outdated literature is listed.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Diplomas for each programme
- Sample Diploma Supplements for each programme
- Sample Transcript of Records for each programme

Preliminary assessment and analysis of the experts:
The VNUHCM-US issues a diploma to students who have successfully completed their studies. The diploma is issued in English and Vietnamese and lists the name of the HEI, the type of training, the basic information of the students as well as the student's academic rating. An additional transcript of records is issued in Vietnamese, which lists all courses, their amount of credits and the grade of the students. Transcripts in English are issued upon request.

Graduation at VNUHCM-US takes place in March and August each year. Students need to apply to the office of Academic Affairs, which needs to verify the completion of the studies of each student.

In conclusion, the expert panel finds that the diploma is issued together with a diploma supplement and a transcript of records. These documents provide information on the student's qualifications profile and individual performance, as well as, the classification of the degree programme with regard to the respective education system. The experts acknowledge that the grades of all modules are individually presented. However, the experts miss an overview of the objectives and learning outcomes of each study programme in the respective diploma supplement. Additionally, neither the diploma supplement nor the transcript of records contains any information on how the final grade is calculated. Also, no information on the awarded ECTS credits points is stated in the transcript of records.

Criterion 4.3 Relevant Rules

Evidence:

- Self-Assessment Report
- Webpage HCMUS
- Webpage Faculty
- Study regulations
- Examinatio regulations
- Discussions during the audit

Preliminary assessment and analysis of the experts:

VNUHCM-US issues regulations and policies on the rights and obligations of staff and students. These include admission regulations, study regulations, and examination regulations. University bodies control, on different levels, how the rules and regulations are maintained and decide on the necessity of updates. VNUHCM-US communicates all rules with staff and students. The university shares information in the orientation phases with students. Additionally, all rules and regulations are posted online on the web pages of the university and their faculties. Furthermore, offices at university and faculty level gives advice upon requests.

All four Bachelor's degree programmes offer a wide range of electives, which the experts emphasise as positive in principle. However, as this can make it more difficult for students to identify related courses and choose appropriate subjects in order to specialise in a particular direction, the experts recommend creating flow charts of the respective curricula in order to illustrate the connection between different courses and show students potential pathways through the degree programmes.

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

Criterion 4.1 & 4.2:

In its statement, the university states that it will revise the module handbooks and the Diploma Supplements and adapt them accordingly. This is supported by the experts.

Criterion 4.3:

"We will provide some study paths (i.e, diagrams, flowcharts) as suggestions for students based on their interests for future jobs. We have provided the pathways in some social channels (such as Youtube, Facebook,..)."

This is supported by the experts.

The experts consider criterion 4 not to be fully fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- Evaluation results of student surveys
- Stakeholder survey report including evaluations among lecturers, enterprises, alumni and final year students
- Statistical data on student progress and graduation
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The HEI has developed its own internal and an external quality assurance system, which is managed by the Office of Educational Testing and Quality Assurance. While the external quality assurance system focuses mainly on accreditations and reviews, the internal quality assurance system conducts a range of surveys to collect data on the university, the study programmes, modules, and its employees. The collection and analysis from stakeholders include faculty, students, alumni, and employers of an individual study programme. The Office of Educational Testing and Quality Assurance conduct the stakeholders' surveys annually. Moreover, student feedback is collected on each module each semester using an online system, which includes their opinion on the lecturer and the content of the module. The Office of Educational Testing and Quality Assurance processes and analyses the data and sends the results to the facilities. Students' satisfaction levels on modules and lecturers are further discussed among the board of deans of the faculties, who are responsible for taking action if the satisfaction rate drops below 50%. Annual feedback is also collected from recently graduated students, particularly on their employment status and satisfaction.

Individual strategies of quality assurance can further be developed within each faculty. In its Self-Assessment Report, HCMUS provides the following table on the different kind of surveys undertaken regularly:

No.	Survey objectives	Stakeholder	Method	Time	Referenced document
1	**Mid-term survey**: collecting feedback from students to adjust appropriately.	Students	Online	Middle of semester	Stakeholder survey procedure defined by the Faculty
2	**Student course evaluation**: collecting feedback and evaluation of students on the course	Students	Online	End of semester	Procedure for student's course satisfaction survey
3	**Survey on recent graduates:** - Collect students' feedback on the overall programmes. - Gather information on recent employments	Recent graduates	Online	October every year	Stakeholder survey procedure defined by the Faculty
4	**Academic staffs' feedback on teaching activities:** - Gather feedback from academic staffs on teaching activities.	Academic staffs	Online	End of semester	Stakeholder survey procedure defined by the Faculty
5	**Academic staffs' teaching skills and methods:** Gather information concerning academic staffs' teaching skills and methods	Academic staffs	Online	May and June, every year	Stakeholder survey procedure defined by the Faculty
6	**Alumni survey:** Gather information concerning alumni's employment status. Gather alumni's feedback on learning outcomes and curriculum.	Alumni	Online	March and April, every year	Alumni survey procedure defined by the Office of Educational testing and Quality Assurance.

7	**Industrial partner survey:** - Gather industrial partners' feedback on graduates. - Gather industrial partner's feedback on learning outcomes and curriculum	Industrial partners, partners	Paper- based and Online	June and July, every year	Industrial partner survey procedure defined by the Office of Educational testing and Quality Assurance.

The expert panel is interested in the composition of the different committees and on the selection of their members. The representatives of the rector's office comment, that the committees of Science and Education are not elected, but selected. Its members comprise the deans of the different faculties, all professors of the university, the rector's board and the heads of the departments. This committee normally has around 50 members whereas other committees at the faculty level, such as the Scientific Academic Committee, have about 30 members.

The experts further ask how the HEI monitors the average study duration. According to the representatives of the rector's office, the university tracks the total study period of each student. This is a firm basis for the statement that 50–60% of the students graduate within four years. The maximum duration allowed is eight years before students are ex-matriculated.

Moreover, the representatives of the Office of Testing and Quality Assurance confirm to the expert panel that they conduct surveys on the student satisfaction regularly each semester. Additionally, distributes questionnaires among the lecturers each year. The questionnaires used are reviewed annually, and questions are modified, if necessary. In addition, VNUHCM-US collects feedback from stakeholders and alumni. The students confirm that they are invited to join an online survey by the end of each course; these questionnaires contain questions on the content of the class, as well as, the lecturer. The expert panel addresses the topic of quality assurance also with the teaching staff. The teaching staff confirms to receive the results of the evaluations of their modules each semester. These surveys also contain questions on the lecturer and the teaching methodology. In addition, the lecturers fill out a self-evaluation form each year, which is discussed in a faculty meeting to receive feedback from their colleagues in the department.

However, during the various discussion rounds, it emerged that the results of the teaching evaluations are not reported back to the students. This is stated by the students and is confirmed in the discussion with the lecturers. The experts recognise that, in principle,

there is a mature and well-functioning evaluation system and the students state that they have the feeling that their comments are taken into account and that they generally feel heard. Nevertheless, the experts note that the feedback loop of the evaluations is not closed and that HCMUS must ensure that students are informed of the evaluation results.

In the discussion, the representatives from the rector's office explain to the experts, that the curriculum of each study programme undergoes a detailed review every five years. In this process, the evaluation results of students, lecturers, and stakeholders are considered. All results of the different regularly conducted surveys are discussed within a scientific committee, who additionally compares the programme content and modules to international universities. The results are presented to the faculty, who decides on a plan for further development of the programme. The final plan for improvement is then presented to the students and stakeholders. The representatives of the rector's office bring to the attention of the experts that they organize an event between the students and the dean of each faculty at the end of each semester in order to receive direct feedback from the students and provide a platform for them to ask their questions. The programme coordinators from the ETE programme add that specify they collect feedback from industry and other commercial employers. The questionnaires also include feedback on the objectives and the programme learning outcomes of the study programme. In a personal meeting with representatives of the industry, they further discuss on how to improve the learning outcomes to match the current demand on the job market. The alumni further confirm that they are also invited to join a survey, which includes questions on their current employment and salary.

The experts summarise that all four study programmes under review are subject to periodical internal quality assurance, which includes all stakeholders. The results of these processes are incorporated into the continuous development of the programme. However, as described above, the University has to ensure that the evaluation results are presented to the students in some way.

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

HCMUS provides the following statement: "To ensure that the feedback loop is closed effectively, we have recognized the importance of transparency and communication. One proposed solution is to integrate evaluation results into our survey system, providing students with visibility into their feedback. By implementing this approach, students will have the opportunity to see how their input contributes to the enhancement of our programs. We will also collaborate with the Office of Testing and Quality Assurance to streamline the process and ensure that evaluation results are accessible and actionable."

The experts are positive that the university is addressing the findings accordingly and wants to take direct action, and support the suggestions listed to reflect the results of the learning evaluations to the students and thus close the feedback loop. However, until a corresponding regulation is put into effect, the experts are still in favour of a requirement.

The Experts consider criterion 5 not to be fully fulfilled.

Additional Documents

No additional documents needed

Comment of the Higher Education Institution

HCMUS provides four documents describing the learning outcomes of each individual programme as well as the following statements:

Criterion 1.1:

“In the SAR, the programme objectives were presented in the abstraction level which covers only the name of each objective for all 4 programmes. In fact, we do have expected levels (1-5) which are different for each programme. Please find the attachment (Expected Levels of Objectives) for details of expected levels for each programme.”

Criterion 1.3:

“Based on annual feedbacks, we are aware that students and industrial partners often comment on the number of general education courses. However, after rigorously reviewing, our Faculty Council still decided to keep Maths, Physics courses together with fundametal computing courses (Data Structures and Algorithms, Operating Systems, etc) since they are important for students’ future career. Please also note that when building up the curriculum, we also follow the guidelines or international standards such as ABET, ACM, IEEE, etc where Maths, Sciences occupy the large portion of the curriculum. In addition, in our experience, students prefer to take more credits in the first 3 years and leave the final year for internship and final project. Thus, fresh students often feel there are higher workload for them in their first 2 years.”

“We fully agree with the expert's observation. As demonstrated in our SAR, our four programs are structured similarly, with the general education and foundational knowledge components being nearly equivalent. This facilitates an environment where students can seamlessly transition between majors. However, current regulations from the Vietnamese Ministry of Education and Training do not formally permit students to switch majors (after the third year of study). Nevertheless, to accommodate students' aspirations and abilities, we allow students from one major to take courses from other majors (considered as electives) to broaden their knowledge. In the future, if there are adjustments to regulations by the Ministry of Education and Training, we believe our programs will be prepared to accommodate such transitions.”

Criterion 1.5:

“Regarding this statement, we affirm that students are allocated a specific duration of 6 months from the start to the completion of their graduation thesis, without exceptions. Within this 6-month period, if a student fails to complete their thesis, it will be canceled,

and the student must re-register for a new cycle with a new topic. This regulation is clearly stipulated in the university's academic regulations, and we strictly adhere to it in practice. We believe there may be a misunderstanding regarding the perception that some students extend the duration of their thesis completion. In reality, this is inaccurate. Some (excellent) students may have been engaged in research projects with faculty lecturers early on (in years 2 or 3), and their graduation thesis in year 4 may be a small part of that larger project, which the advisor separates out for independent completion as a graduation thesis. In such cases, the workload and scale of the thesis project must be appropriately calculated according to the requirements of a graduation thesis (6 months)."

Criterion 2:

"When working toward ASIIN accreditation, we were aware of the requirements that students must do the final project or equivalent when they graduate. Thus, from the students intake of 2022, there are only two options for students to graduate:

- 10-credit final thesis
- 6-credit final project + 4-credit course

Please note that with the students before 2022, there is another option for them to graduate:

- Three 4-credit fourth year specialized courses (equivalent to final project.)

This, from the intakte 2022, in both options, all students must do a final thesis or a final project to graduate."

Criterion 4.1.:

"We will check the module handbooks for missing and/or incorrect information and adapt them accordingly."

Criterion 4.2:

"We are working with the Boards of Rectors, and Office of Academic Affairs to update these information soon. We would like to provide the GPA calculation formula (defined in academic regulations of Vietnamese Ministry of Education and Training and adopted by the University) as follows:

$$\text{GPA} = \frac{\Sigma(course\ grade \times course\ credit)}{total\ credits}$$

Where:

- course grade represents the grade received in a particular course (typically on a scale such as 0-10).
- course credit represents the number of credits associated with that course.
- sum is taken over all courses.
- total credits represents the total number of credits for all courses taken."

Criterion 4.3:

"We will provide some study paths (i.e, diagrams, flowcharts) as suggestions for students based on their interests for future jobs. We have provided the pathways in some social channels (such as Youtube, Facebook,..) as the following example: https://bit.ly/FIT_MajorIntro "

Criterion 5:

"To ensure that the feedback loop is closed effectively, we have recognized the importance of transparency and communication. One proposed solution is to integrate evaluation results into our survey system, providing students with visibility into their feedback. By implementing this approach, students will have the opportunity to see how their input contributes to the enhancement of our programs. We will also collaborate with the Office of Testing and Quality Assurance to streamline the process and ensure that evaluation results are accessible and actionable."

D Summary: Expert recommendations

Taking into account the additional information and the comments given by the University 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 Computer Science	With requirements for one year	–	30.09.2029
Ba Software Engineering	With requirements for one year	–	30.09.2029
Ba Information Systems	With requirements for one year	–	30.09.2029
Ba Information Technology	With requirements for one year	–	30.09.2029

Requirements

A 1. (ASIIN 4.1) Submit the complete and latest version of the module descriptions and make them accessible for students and teaching staff.

A 2. (ASIIN 4.2) The diploma supplement and transcript of records require additional information. The diploma supplement needs information on the objectives, learning outcomes of the programme and on the grading system. The transcript of records should contain either information on the workload in ECTS credit points or information on the conversion among credit point systems.

A 3. (ASIIN 5) The Feedback loop has to be closed.

Recommendations

E 1. (ASIIN 1.3) It is recommended to eliminate the general education courses (e.g. physics, chemistry, biology) in order to have more room for programme-related courses and to reduce the workload of the first two years.

E 2. (ASIIN 1.3) It is recommended to facilitate to change between the different majors.

E 3. (ASIIN 1.5) It is recommended to ensure that students only work on the graduation thesis in the time intended for it.

E 4. (ASIIN 4.1) It is recommended to review the module handbook, e.g. regarding teaching language (“English intensive”), the literature (not up to date) and the depth of the described content.

E 5. (ASIIN 4.3) It is recommended to create flow charts of the study plans to visualize for the students their path through the study programmes.

E Comment of the Technical Committees

Technical Committee 04 – Informatics/Computer Science

Assessment and analysis for the award of the ASIIN seal:

The TC follows the assessment of the experts without any changes.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

Degree Programme	**ASIIN Seal**	**Subject-specific label**	**Maximum duration of accreditation***
Ba Computer Science	With requirements for one year	–	30.09.2029
Ba Software Engineering	With requirements for one year	–	30.09.2029
Ba Information Technology	With requirements for one year	–	30.09.2029

Technical Committee 07 – Business Informatics/Information Systems

Assessment and analysis for the award of the ASIIN seal:

The TC follows the assessment of the experts without any changes.

The Technical Committee 07 – Business Informatics/Information Systems recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation*
Ba Information Systems	With requirements for one year	–	30.09.2029

F Decision of the Accreditation Commission

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

The AC discusses the procedure and only makes an editorial suggestion to delete the bracket in recommendation E 1. Otherwise, the AC agrees with the assessment of the experts and the technical committees without any changes.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Subject-specific label**	**Maximum duration of accreditation***
Ba Computer Science	With requirements for one year	–	30.09.2029
Ba Software Engineering	With requirements for one year	–	30.09.2029
Ba Information Systems	With requirements for one year	–	30.09.2029
Ba Information Technology	With requirements for one year	–	30.09.2029

Requirements

A 1. (ASIIN 4.1) Submit the complete and latest version of the module descriptions and make them accessible for students and teaching staff.

A 2. (ASIIN 4.2) The diploma supplement and transcript of records require additional information. The diploma supplement needs information on the objectives, learning outcomes of the programme and on the grading system. The transcript of records should contain either information on the workload in ECTS credit points or information on the conversion among credit point systems.

A 3. (ASIIN 5) The Feedback loop has to be closed.

Recommendations

E 1. (ASIIN 1.3) It is recommended to eliminate the general education courses in order to have more room for programme-related courses and to reduce the workload of the first two years.

E 2. (ASIIN 1.3) It is recommended to facilitate to change between the different majors.

E 3. (ASIIN 1.5) It is recommended to ensure that students only work on the graduation thesis in the time intended for it.

E 4. (ASIIN 4.1) It is recommended to review the module handbook, e.g. regarding teaching language (“English intensive”), the literature (not up to date) and the depth of the described content.

E 5. (ASIIN 4.3) It is recommended to create flow charts of the study plans to visualize for the students their path through the study programmes.

Appendix: Programme Learning Outcomes and Curricula

According to the Faculty's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the four Bachelor's degree programmes Computer Science, Software Engineering, Information Systems, and Information Technology:

Programme Objectives for all programmes:

- "PO1: An understanding of ethics, professional responsibilities, and status of economy, environment, and society.
- PO2: Personal skills, teamwork skills, communication skills and CDIO (Conceive-Design-Implement -Operate) skills.
- PO3: An ability to utilize and develop professional knowledge and skills.
- PO4: An ability to apply professional knowledge to practical problems and research.
- PO5: An ability to conceptualize, analyze, design, solve and operate computing systems.
- PO6: An ability to solve computing problems using tools, methods, processes, techniques, etc."

Expected Learning Outcomes for all programmes:

1	**Fundamental knowledge**		
1	1	Fundamental knowledge of basic sciences	
1	1	1	Mathematics
1	1	2	Physics
1	1	3	Electrics and electronics
1	2	Fundamental knowledge of computer science	
1	2	1	Knowledge on Programming
1	2	2	Computer science foundations
1	3	Advanced technical knowledge of computer science	
1	3	1	Knowledge on algorithms and data structures
1	3	2	Knowledge on operating system

1	3	3	Knowledge on computer architectures
1	3	4	Knowledge on computer networking
1	3	5	Knowledge on database
1	3	6	Knowledge on security, privacy, and confidentiality
1	3	7	IT support tools, methods, and technologies
1	4a	Advanced knowledge in Computer Science	
1	4a	1	Computer Science
1	4a	2	Knowledge Engineering
1	4a	3	Computer Vision
1	4a	4	Information Security
1	4a	5	Data Science
1	4b	Advanced knowledge in Software Engineering	
1	4b	1	Estimate Software system development cost
1	4b	2	Software Development Process and Methodology
1	4b	3	Design Software Architecture
1	4b	4	Modern and Advanced Technologies in Software Development
1	4c	Advanced knowledge in Information Systems	
1	4c	1	Data and Data Mining
1	4c	2	Information Systems
1	4c	3	Knowledge of diverse types of Information System applications
1	4d	Advanced knowledge in Information Technology	
1	4d	1	Advanced knowledge in Computer Networks and Telecommunications: Network programming; Network administration, monitoring, and maintenance; Network security; Cloud computing; Modern and future network technologies
1	4d	2	Advanced knowledge in Information Systems
1	4d	3	Advanced knowledge in Software Engineering
1	4d	4	Advanced knowledge in Computer Science
2	**Personal and inter-personal skills (soft skills)**		
2	1	Personal characteristics	
2	1	1	Independence
2	1	2	Confidence in professional environment
2	1	3	Willingness to make decisions

2	1	4	Creative thinking
2	1	5	Critical thinking
2	1	6	Adaption to new environment
2	1	7	Personal resource management (time, money, etc.)
2	1	8	Lifelong learning
2	1	9	Project management
2	2	Teamwork	
2	2	1	Forming effective teams
2	2	2	Teamwork
2	2	3	Member or leader in a team
2	2	4	Team operation, supervision, and evolution
2	3	Communications	
2	3	1	Communication skills in listening, speaking, reading, and writing
2	3	2	Presentation skills
2	3	3	Negotiation, compromise, and conflict resolution
2	3	4	Diverse connections and networking
2	4	Foreign language skills	
2	4	1	English speaking
2	4	2	English listening
2	4	3	English reading
2	4	4	English writing
2	4	5	Using specialized terminology
2	5	Leadership skills	
2	5	1	Leadership attitude
2	5	2	Problem, issue, and anomaly identification
2	5	3	Proposal and creativity in problem-solving and issue resolution
2	5	4	Building and leading organization
2	5	5	Planning and leading projects to success
2	6	Entrepreneurial skills	
2	6	1	Establishing, organizing, and managing company
2	6	2	Writing business plan
2	6	3	Corporate finance
2	6	4	Product and service ideation based on technology
2	6	5	Creativity in product/service development and marketing
3	**Context, responsibility, and ethics**		
3	1	External, social, economic, and environmental context	
3	1	1	Contemporary social, economic, and environmental issues and values
3	1	2	Roles and responsibilities
3	1	3	Historical and cultural context
3	1	4	Society's Laws and Regulations
3	2	Enterprise and business context	

3	2	1	Enterprise and organization context and cultures
3	2	2	Enterprise stakeholders, goals, and strategy
3	2	3	Enterprise's and business' laws and regulations
3	3	Ethics, responsibilities, and core personal values	
3	3	1	Ethical standards and principles
3	3	2	Professional behaviours and responsibilities
3	3	3	Commitments
3	3	4	Honesty, trust, and loyalty
4	**Scientific and research methods**		
4	1	Analytical reasoning and problem solving	
4	1	1	Problem identification and formulation
4	1	2	Modeling and analysis
4	1	3	Problem reasoning
4	1	4	Solution evaluation and proposal
4	2	Experimentation, investigation, and knowledge discovery	
4	2	1	Hypotheses formulation
4	2	2	Surveys
4	2	3	Experimental inquiry
4	2	4	Hypothesis test and defense
4	3	System thinking	
4	3	1	Holistic thinking
4	3	2	System components' interactions
4	3	3	Prioritization and focus
4	3	4	System evaluation
5	**Conceiving, analyzing, designing, and implementing computing systems**		
5	1	Conceiving ideas/problems/projects	
5	1	1	Determining problem/project goals and requirement elicitation
5	1	2	Feasibility study and analysis
5	1	3	Requirement specification
5	2	Design and formulation	
5	2	1	Design process and methods
5	2	2	Architectural design and component design (functions, database, etc.)
5	2	3	Multi-disciplinary and multi-objective design
5	3	Implementation	
5	3	1	Implementation processes and methodologies
5	3	2	Design-based implementation
5	3	3	System components integration
6	**Verification, validation, operation, maintenance, and evolution computing systems**		
6	1	Verification and validation	
6	1	1	Verification and validation processes and methodologies

6	1	2	Requirements verification and validation
6	1	3	Components, system integration verification and validation
6	2	Operation and maintenance	
6	2	1	Training and operation
6	2	2	Operation management
6	2	3	System maintenance
6	3	Evolution and disposal	
6	3	1	System improvements and evolution
6	3	2	System disposal and life-end issues

For the Bachelor's degree in Computer Science, the following **curriculum** is presented:

NO.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
Term 1								
1	BAA00030	National Defence Education	M	4				
2	BAA00021	Physical Education 1	M	2	15	30	0	
3	BAA00011	General English 1	M	3	30	30	0	
4	MTH00003	Calculus 1B	M	3	45	0	0	
5	MTH00081	Calculus Laboratory 1B	M	1	0	30	0	
6	MTH00041	Discrete Mathematics	M	3	45	0	0	
7	MTH00086	Discrete Mathematics - Practice	M	1	0	30	0	
8	CSC00004	Introduction to Information Technology	M	4	45	30	0	
9	CSC10001	Introduction to Programming	M	4	45	30	0	
Term 2								
1	BAA00022	Physical Education 2	M	2	15	30	0	
2	BAA00012	General English 2	M	3	30	30	0	
3	BAA00004	General Law	M	3	45	0	0	
4	*CHE00001*	*General Chemistry 1*	*E*	*3*	*30*	*0*	*30*	*Select any courses to get 6 credits in total (*)*
5	*CHE00081*	*General Chemistry Laboratory 1*	*E*	*2*	*0*	*60*	*0*	
6	*BIO00001*	*Biology 1*	*E*	*3*	*45*	*0*	*0*	
7	*BIO00081*	*Biology Laboratory 1*	*E*	*1*	*0*	*30*	*0*	
8	*PHY00001*	*General Physics 1*	*E*	*3*	*45*	*0*	*0*	
9	*PHY00081*	*General Physics Laboratory*	*E*	*2*	*0*	*60*	*0*	
10	MTH00004	Calculus 2B	M	3	45	0	0	

NO.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
11	MTH00082	Calculus Laboratory 2B	M	1	0	30	0	
12	MTH00030	Linear Algebra	M	3	45	0	0	
13	MTH00083	Linear Algebra - Practice	M	1	0	30	0	
14	CSC10002	Programming Techniques	M	4	45	30	0	
Term 3								
1	BAA00013	Academic English 1	M	3	30	30	0	
2	MTH00040	Probability Statistics	M	3	45	0	0	
3	MTH00085	Statistics – Practice	M	1	0	30	0	
4	MTH00050	Combinatorial Mathematics	M	4	45	30	0	
5	*CHE00002*	*General Chemistry 2*	*E*	*3*	*30*	*0*	*30*	*If (*) is less than 6 credits, students must choose additional courses to reach a total of 6 credits*
6	*CHE00082*	*General Chemistry Laboratory 2*	*E*	*2*	*0*	*60*	*0*	
7	*BIO00002*	*Biology 2*	*E*	*3*	*45*	*0*	*0*	
8	*BIO00082*	*Biology Laboratory 2*	*E*	*1*	*0*	*30*	*0*	
9	*PHY00002*	*General Physics 2*	*E*	*3*	*45*	*0*	*0*	
10	CSC10004	Data Structures and Algorithms	M	4	45	30	0	
11	CSC10008	Computer Networks	M	4	45	30	0	
Term 4								
1	BAA00014	Academic English 2	M	3	30	30	0	
2	BAA00101	Marxist-Leninist Philosophy	M	3	45	0	0	
3	*BAA00005*	*Introduction to Economics*	*E*	*2*	*30*	*0*	*0*	*Select 01 course (2 credits)*
4	*BAA00006*	*Introduction to Psychology*	*E*	*2*	*30*	*0*	*0*	
5	*BAA00007*	*Creativity Methodologies*	*E*	*2*	*30*	*0*	*0*	
6	*MTH00051*	*Applied Mathematics and Statistics*	*E*	*4*	*45*	*30*	*0*	*Select 01 course (4 credits)*
7	*MTH00052*	*Numerical Analysis*	*E*	*4*	*45*	*30*	*0*	
8	*MTH00053*	*Number Theory*	*E*	*4*	*45*	*30*	*0*	
9	*MTH00054*	*Predicate Calculus*	*E*	*4*	*45*	*30*	*0*	
10	CSC10003	Object-Oriented Programming	M	4	45	30	0	

NO.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
11	CSC10006	Introduction to Databases	M	4	45	30	0	
12	CSC10009	Computer Systems	M	2	30	0	0	
Term 5								
1	BAA00102	Marxist-Leninist political economics	M	2	30	0	0	
2	*GEO00002*	*Earth Science*	*E*	*2*	*30*	*0*	*0*	*Select 01 course (2 credits)*
3	*ENV00001*	*Environmental Science*	*E*	*2*	*30*	*0*	*0*	
4	*ENV00003*	*Human and Environment*	*E*	*2*	*30*	*0*	*0*	
5	CSC10007	Operating Systems	M	4	45	30	0	
6	CSC14003	Fundamentals of Artificial Intelligence	M	4	45	30	0	
7	CSC14004	Data Mining and Applications	E	4	45	30	0	
8	CSC14111	Introduction to Design and Analysis of Algorithms	E	4	45	30	0	
9	CSC16005	Digital Image and Video Processing	E	4	45	30	0	
Term 6								
1	BAA00103	Science socialism	M	2	30	0	0	
2	CSC13002	Introduction to Software Engineering	M	4	45	30	0	
3	*CSC10102*	*Career Observation*	*E*	*2*	*15*	*30*	*0*	*Elective course*
4	*CSC10103*	*Entrepreneurship in IT*	*E*	*3*	*30*	*30*	*0*	*Elective course organised in Summer term (3rd year)*
5	*CSC10104*	*Linear Programming*	*E*	*4*	*45*	*30*	*0*	*Elective course*
6	CSC14001	Automata and Formal Languages	E	4	45	30	0	
7	CSC14005	Introduction to Machine Learning	E	4	45	30	0	
8	CSC14006	Pattern Recognition	E	4	45	30	0	
9	CSC14008	Scientific Research Methodology	E	4	45	30	0	
10	*CSC10108*	*Data Visualization*	*E*	*4*	*45*	*30*	*0*	
11	*CSC14118*	*Introduction to Big Data*	*E*	*4*	*45*	*30*	*0*	
Term 7								

NO.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
1	BAA00104	History of Vietnamese Communist Party	M	2	30	0	0	
2	*CSC14109*	*Fuzzy Logic and Applications*	*E*	*4*	*45*	*30*	*0*	
3	*CSC14112*	*Biometrics*	*E*	*4*	*45*	*30*	*0*	
4	*CSC14117*	*Introduction to IoT Programming*	*E*	*4*	*45*	*30*	*0*	
5	*CSC14119*	*Introduction to Data Science*	*E*	*4*	*45*	*30*	*0*	
6	*CSC14120*	*Parallel Programming*	*E*	*4*	*45*	*30*	*0*	
7	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*Select courses to get 10 credits in total (2*)*
8	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
9	*CSC10204*	*Capstone Projects*	*E*	*6*	*0*	*180*	*0*	
10	*CSC14114*	*Applications of Big Data*	*E*	*4*	*45*	*30*	*0*	
Term 8								
1	BAA00003	Ho Chi Minh's Ideology	M	2	30	0	0	
2	CSC14002	Knowledge-Based Systems	E	4	45	30	0	
3	*CSC14101*	*Data Hiding and Secret Sharing*	*E*	*4*	*45*	*30*	*0*	
4	*CSC14105*	*Web Science*	*E*	*4*	*45*	*30*	*0*	
5	*CSC14113*	*Compiler*	*E*	*4*	*45*	*30*	*0*	
6	*CSC17001*	*Intelligent Data Analysis*	*E*	*4*	*45*	*30*	*0*	
7	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*If (2*) is less than 10 credits, students must choose additional courses to reach a total of 10 credits*
8	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
9	*CSC10204*	*Capstone Projects*	*E*	*6*	*0*	*180*	*0*	
10	*CSC14115*	*Applied Data Science*	*E*	*4*	*45*	*30*	*0*	
11	*CSC14116*	*Applied Parallel Programming*	*E*	*4*	*45*	*30*	*0*	

For the Bachelor's degree in Software Engineering, the following **curriculum** is presented:

No.	Course Code	Course Name	Course type	No. of Credits	No. of periods			Notes
					Theory	Practice	Assignment	
Term 1								
1	BAA00030	National Defence Education	M	4				
2	BAA00021	Physical Education 1	M	2	15	30	0	
3	BAA00011	General English 1	M	3	30	30	0	
4	MTH00003	Calculus 1B	M	3	45	0	0	
5	MTH00081	Calculus Laboratory 1B	M	1	0	30	0	
6	MTH00041	Discrete Mathematics	M	3	45	0	0	
7	MTH00086	Discrete Mathematics - Practice	M	1	0	30	0	
8	CSC00004	Introduction to Information Technology	M	4	45	30	0	
9	CSC10001	Introduction to Programming	M	4	45	30	0	
Term 2								
1	BAA00022	Physical Education 2	M	2	15	30	0	
2	BAA00012	General English 2	M	3	30	30	0	
3	BAA00004	Introduction to Law	M	3	45	0	0	
4	*CHE00001*	*General Chemistry 1*	*E*	*3*	*30*	*0*	*30*	*Select any courses to get 6 credits in total (*)*
5	*CHE00081*	*General Chemistry Laboratory 1*	*E*	*2*	*0*	*60*	*0*	
6	*BIO00001*	*Biology 1*	*E*	*3*	*45*	*0*	*0*	
7	*BIO00081*	*Biology Laboratory 1*	*E*	*1*	*0*	*30*	*0*	
8	*PHY00001*	*General Physics 1*	*E*	*3*	*45*	*0*	*0*	
9	*PHY00081*	General Physics Laboratory	*E*	*2*	*0*	*60*	*0*	
10	MTH00004	Calculus 2B	M	3	45	0	0	
11	MTH00082	Calculus Laboratory 2B	M	1	0	30	0	
12	MTH00030	Linear Algebra	M	3	45	0	0	
13	MTH00083	Linear Algebra - Practice	M	1	0	30	0	
14	CSC10002	Programming Techniques	M	4	45	30	0	
Term 3								
1	BAA00013	Academic English 1	M	3	30	30	0	

No.	Course Code	Course Name	Course type	No. of Credits	No. of periods			Notes
					Theory	Practice	Assignment	
2	*CHE00002*	*General Chemistry 2*	*E*	*3*	*30*	*0*	*30*	*If (*) is less than 6 credits, students must choose additional courses to reach a total of 6 credits*
3	*CHE00082*	*General Chemistry Laboratory 2*	*E*	*2*	*0*	*60*	*0*	
4	*BIO00002*	*Biology 2*	*E*	*3*	*45*	*0*	*0*	
5	MTH00040 *BIO00082*	*Biology Laboratory 2*	*E*	*1*	*0*	*30*	*0*	
6	*PHY00002*	*General Physics 2*	*E*	*3*	*45*	*0*	*0*	
7		Applied Statistics for Engineers and Scientists	M	3	45	0	0	
8	MTH00085	Statistics - Practice	M	1	0	30	0	
9	MTH00050	Combinatorial Mathematics	M	4	45	30	0	
10	CSC10004	Data Structures and Algorithms	M	4	45	30	0	
11	CSC10008	Computer Networks	M	4	45	30	0	
Term 4								
1	BAA00014	Academic English 2	M	3	30	30	0	
2	BAA00101	Marxist-Leninist Philosophy	M	3	45	0	0	
3	*BAA00005*	*Introduction to Economics*	*E*	*2*	*30*	*0*	*0*	*Select 1 course (2 credits)*
4	*BAA00006*	*Introduction to Psychology*	*E*	*2*	*30*	*0*	*0*	
5	*BAA00007*	*Creativity Methodologies*	*E*	*2*	*30*	*0*	*0*	
6	*MTH00051*	*Applied Mathematics and Statistics*	*E*	*4*	*45*	*30*	*0*	*Select 1 course (4 credits)*
7	*MTH00052*	*Numerical Analysis*	*E*	*4*	*45*	*30*	*0*	
8	*MTH00053*	*Number Theory*	*E*	*4*	*45*	*30*	*0*	
9	*MTH00054*	*Predicate Calculus*	*E*	*4*	*45*	*30*	*0*	
10	CSC10003	Object-Oriented Programming	M	4	45	30	0	
11	CSC10006	Introduction to Databases	M	4	45	30	0	
12	CSC10009	Computer Systems	M	2	30	0	0	
13	*CSC10121*	*Personal and Interpersonal Skills*	*E*	*3*	*30*	*30*	*0*	*Elective course organised in Summer term (2nd year)*
14	*CSC13102*	*Java Application Programming*	*E*	*4*	*45*	*30*	*0*	
Term 5								

No.	Course Code	Course Name	Course type	No. of Credits	No. of periods			Notes
					Theory	Practice	Assignment	
1	BAA00102	Marxist-Leninist political economics	M	2	30	0	0	
2	*GEO00002*	*Earth Science*	*E*	*2*	*30*	*0*	*0*	*Select 01 course (2 credits)*
3	*ENV00001*	*Environmental Science*	*E*	*2*	*30*	*0*	*0*	
4	*ENV00003*	*Human and Environment*	*E*	*2*	*30*	*0*	*0*	
5	CSC10007	Operating Systems	M	4	45	30	0	
6	CSC13002	Introduction to Software Engineering	M	4	45	30	0	
7	*CSC10105*	*Introduction to Algorithmic Thinking*	*E*	*4*	*45*	*30*	*0*	*Elective course*
8	CSC13008	Web Application Development	E	4	45	30	0	
9	CSC13009	Mobile Application Development	E	4	45	30	0	
10	*CSC13001*	*Windows Programming*	*E*	*4*	*45*	*30*	*0*	
Term 6								
1	BAA00103	Science socialism	M	2	30	0	0	
2	CSC14003	Fundamentals of Artificial Intelligence	M	4	45	30	0	
3	*CSC10102*	*Career Observation*	*E*	*2*	*15*	*30*	*0*	*Elective course*
4	*CSC10103*	*Entrepreneurship in IT*	*E*	*3*	*30*	*30*	*0*	*Elective course organised in Summer term (3rd year)*
5	*CSC10104*	*Linear Programming*	*E*	*4*	*45*	*30*	*0*	*Elective course*
6	*CSC10106*	*Combinatorial Algorithms and Applications*	*E*	*4*	*45*	*30*	*0*	*Elective course*
7	*CSC10107*	*Internship*	*E*	4	30	60	0	*Elective course organised in Summer term (3rd year)*
8	CSC13005	Software Requirements Engineering	E	4	45	30	0	
9	CSC13010	Software Design	E	4	45	30	0	
10	*CSC14005*	*Introduction to Machine Learning*	*E*	*4*	*45*	*30*	*0*	
Term 7								
1	BAA00104	History of Vietnamese Communist Party	M	2	30	0	0	
2	CSC13003	Introduction to Software Engineering	E	4	45	30	0	

No.	Course Code	Course Name	Course type	No. of Credits	No. of periods			Notes
					Theory	Practice	Assignment	
3	CSC13006	Software Project Management	E	4	45	30	0	
4	CSC13007	Game Development	E	4	45	30	0	
5	CSC13106	Software Architecture	E	4	45	30	0	
6	CSC13112	User Interface Design	E	4	45	30	0	
7	*CSC13103*	*Distributed Systems Development with Java*	*E*	*4*	*45*	*30*	*0*	
8	*CSC13107*	*Object-Oriented Design Patterns and Applications*	*E*	*4*	*45*	*30*	*0*	
9	*CSC13108*	*Software Modeling*	*E*	*4*	*45*	*30*	*0*	
10	*CSC16106*	*Introduction to Smart Device Programming*	*E*	*4*	*45*	*30*	*0*	
11	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*Select courses to get 10 credits in total (2*)*
12	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
13	*CSC10204*	*Capstone Projects*	*E*	*6*	*0*	*180*	*0*	
14	*CSC13118*	*Advanced Mobile Application Development*	*E*	*4*	*45*	*30*	*0*	
Term 8								
1	BAA00003	Ho Chi Minh Ideology	M	2	30	0	0	
2	*CSC13101*	*Advanced Topics in Software Engineering*	*E*	*4*	*45*	*30*	*0*	
3	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*If (2*) is less than 10 credits, students must choose additional courses to reach a total of 10 credits*
4	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
5	*CSC10204*	*Capstone Projects*	*E*	*6*	*0*	*180*	*0*	
6	*CSC13114*	*Advanced Web Application Development*	*E*	*4*	*45*	*30*	*0*	
7	*CSC13115*	*Modern Software Development Technologies*	*E*	*4*	*45*	*30*	*0*	
8	*CSC13116*	*Software Engineering Capstone*	*E*	*4*	*45*	*30*	*0*	
9	*CSC13117*	*Advanced Game Development*	*E*	*4*	*45*	*30*	*0*	

For the Bachelor's degree in Information Systems, the following **curriculum** is presented:

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
Term 1								
1	BAA00030	National Defence Education	M	4				
2	BAA00021	Physical Education 1	M	2	15	30	0	

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
3	BAA00011	General English 1	M	3	30	30	0	
4	MTH00003	Calculus 1B	M	3	45	0	0	
5	MTH00081	Calculus Laboratory 1B	M	1	0	30	0	
6	MTH00041	Discrete Mathematics	M	3	45	0	0	
7	MTH00086	Discrete Mathematics - Practice	M	1	0	30	0	
8	CSC00004	Introduction to Information Technology	M	4	45	30	0	
9	CSC10001	Introduction to Programming	M	4	45	30	0	
Term 2								
1	BAA00022	Physical Education 2	M	2	15	30	0	
2	BAA00012	General English 2	M	3	30	30	0	
3	BAA00004	Introduction to Law	M	3	45	0	0	
4	*CHE00001*	*General Chemistry 1*	*E*	*3*	*30*	*0*	*30*	*Select any courses to get 06 credits (*)*
5	*CHE00081*	*General Chemistry Laboratory 1*	*E*	*2*	*0*	*60*	*0*	
6	*BIO00001*	*Biology 1*	*E*	*3*	*45*	*0*	*0*	
7	*BIO00081*	*Biology Laboratory 1*	*E*	*1*	*0*	*30*	*0*	
8	*PHY00001*	*General Physics 1*	*E*	*3*	*45*	*0*	*0*	
9	*PHY00081*	General Physics Laboratory	*E*	*2*	*0*	*60*	*0*	
10	MTH00004	Calculus 2B	M	3	45	0	0	
11	MTH00082	Calculus Laboratory 2B	M	1	0	30	0	
12	MTH00030	Linear Algebra	M	3	45	0	0	
13	MTH00083	Linear Algebra - Practice	M	1	0	30	0	
14	CSC10002	Programming Techniques	M	4	45	30	0	
Term 3								
1	BAA00013	Academic English 1	M	3	30	30	0	
2	*CHE00002*	*General Chemistry 2*	*E*	*3*	*30*	*0*	*30*	*If (*)is less than 6 credits, students*
3	*CHE00082*	*General Chemistry Laboratory 2*	*E*	*2*	*0*	*60*	*0*	
4	*BIO00002*	*Biology 2*	*E*	*3*	*45*	*0*	*0*	

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
5	*BIO00082*	*Biology Laboratory 2*	*E*	*1*	*0*	*30*	*0*	*must choose additional courses to reach a total of 6 credits*
6	*PHY00002*	General Physics *2*	*E*	*3*	*45*	*0*	*0*	
7	MTH00040	Probability Statistics	M	3	45	0	0	
8	MTH00085	Statistics – Practice	M	1	0	30	0	
9	MTH00050	Combinatorial Mathematics	M	4	45	30	0	
10	CSC10004	Data Structures and Algorithms	M	4	45	30	0	
11	CSC10008	Computer Networking	M	4	45	30	0	
Term 4								
1	BAA00014	Academic English 2	M	3	30	30	0	
2	BAA00101	Marxist-Leninist Philosophy	M	3	45	0	0	
3	*BAA00005*	*Introduction to Economics*	*E*	*2*	*30*	*0*	*0*	*Select any 2-credit course*
4	*BAA00006*	*Introduction to Psychology*	*E*	*2*	*30*	*0*	*0*	
5	*BAA00007*	*Creativity Methodologies*	*E*	*2*	*30*	*0*	*0*	
6	*MTH00051*	*Applied Mathematics and Statistics*	*E*	*4*	*45*	*30*	*0*	*Select any 4-credit course*
7	*MTH00052*	*Numerical Analysis*	*E*	*4*	*45*	*30*	*0*	
8	*MTH00053*	*Number Theory*	*E*	*4*	*45*	*30*	*0*	
9	*MTH00054*	*Predicate Calculus*	*E*	*4*	*45*	*30*	*0*	
10	CSC10003	Object-Oriented Programming	M	4	45	30	0	
11	CSC10006	Introduction to Databases	M	4	45	30	0	
12	CSC10009	Computer Systems	M	2	30	0	0	
13	*CSC10121*	*Personal and Interpersonal Skills*	*E*	*3*	*30*	*30*	*0*	*Elective course Opened in Summer term (2nd year)*
Term 5								

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
1	BAA00102	Marxist-Leninist political economics	M	2	30	0	0	
2	*GEO00002*	*Earth Science*	*E*	*2*	*30*	*0*	*0*	*Select any 2-credit course*
3	*ENV00001*	*Environmental Science*	*E*	*2*	*30*	*0*	*0*	
4	*ENV00003*	*Human and Environment*	*E*	*2*	*30*	*0*	*0*	
5	CSC10007	Operating Systems	M	4	45	30	0	
6	CSC13002	Introduction to Software Engineering	M	4	45	30	0	
7	*CSC10105*	*Introduction to Algorithmic Thinking*	*E*	*4*	*45*	*30*	*0*	*Elective course*
8	CSC12002	Advanced Database Systems	E	4	45	30	0	
9	CSC12003	Database Management Systems	E	4	45	30	0	
10	*CSC12109*	*Introduction to Enterprise Information Systems*	*E*	*4*	*45*	*30*	*0*	
Term 6								
1	BAA00103	Science socialism	M	2	30	0	0	
2	CSC14003	Fundamentals of Artificial Intelligence	M	4	45	30	0	
3	*CSC10102*	*Career Observation*	*E*	*2*	*15*	*30*	*0*	*Elective course*
4	*CSC10103*	*Entrepreneurship in IT*	*E*	*3*	*30*	*30*	*0*	*Elective course Opened in Summer term (3rd year)*
5	*CSC10104*	*Linear Programming*	*E*	*4*	*45*	*30*	*0*	*Elective course*
6	*CSC10106*	*Combinatorial Algorithms and Applications*	*E*	*4*	*45*	*30*	*0*	*Elective course*
7	*CSC10107*	*Internship*	*E*	4	30	60	0	*Elective course Opened in Summer term (3rd year)*

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			Notes
					Theory	Practice	Assignment	
8	CSC12001	Data Security in Information Systems	E	4	45	30	0	
9	CSC12004	Information Systems Analysis and Design	E	4	45	30	0	
10	*CSC12103*	*Advanced Topics in Database Management Systems*	*E*	*4*	*45*	*30*	*0*	
11	*CSC12105*	*Electronic Commerce*	*E*	*4*	*45*	*30*	*0*	
Term 7								
1	BAA00104	History of Vietnamese Communist Party	M	2	30	0	0	
2	CSC12005	Modern Information Systems Development	E	4	45	30	0	
3	*CSC12106*	*Human-Computer Interaction*	*E*	*4*	*45*	*30*	*0*	
4	*CSC12110*	*Applied Data Analytics*	*E*	*4*	*45*	*30*	*0*	
5	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*Select courses to get 10 credits in total (2*)*
6	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
7	*CSC10204*	*Capstone Projects*	*E*	*6*	*0*	*180*	*0*	
8	*CSC12107*	*Information Systems for Business Intelligence*	*E*	*4*	*45*	*30*	*0*	
Term 8								
1	BAA00003	Ho Chi Minh Ideology	M	2	30	0	0	
2	*CSC10108*	*Data Visualization*	*E*	*4*	*45*	*30*	*0*	
3	*CSC12102*	*Special Topics in Information Systems*	*E*	*4*	*45*	*30*	*0*	
4	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*If (2*) is less than 10 credits, students must choose additional courses to reach a total*
5	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
6	*CSC10204*	*Capstone Projects*	*E*	*6*	*0*	*180*	*0*	
7	*CSC12108*	*Distributed Applications*	*E*	*4*	*45*	*30*	*0*	
8	*CSC12111*	*Modern Database Management*	*E*	*4*	*45*	*30*	*0*	

For the Bachelor's degree in Information Technology Science, the following **curriculum** is presented:

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			NOTES
					Theory	Practice	Assignment	
Semester 1								
1	BAA00030	National Defence Education	C	4				
2	BAA00021	Physical Education 1	C	2	15	30	0	
3	BAA00011	General English 1	C	3	30	30	0	
4	MTH00003	Calculus 1B	C	3	45	0	0	
5	MTH00081	Calculus Laboratory 1B	C	1	0	30	0	
6	MTH00041	Discrete Mathematics	C	3	45	0	0	
7	MTH00086	Discrete Mathematics - Practice	C	1	0	30	0	
8	CSC00004	Introduction to Information Technology	C	4	45	30	0	
9	CSC10001	Programming 1	C	4	45	30	0	
Semester 2								
1	BAA00022	Physical Education 2	C	2	15	30	0	
2	BAA00012	General English 2	C	3	30	30	0	
3	BAA00004	Introduction to laws	C	3	45	0	0	
4	*CHE00001*	*General Chemistry 1*	*E*	*3*	*30*	*0*	*30*	*Select any courses to get 6 credits in total (*)*
5	*CHE00081*	*General Chemistry Laboratory 1*	*E*	*2*	*0*	*60*	*0*	
6	*BIO00001*	*Biology 1*	*E*	*3*	*45*	*0*	*0*	
7	*BIO00081*	*Biology Laboratory 1*	*E*	*1*	*0*	*30*	*0*	
8	*PHY00001*	*General Physics 1 (Mechanics - Thermodynamic)*	*E*	*3*	*45*	*0*	*0*	
9	*PHY00081*	*General Physics Laboratory*	*E*	*2*	*0*	*60*	*0*	
10	MTH00004	Calculus 2B	C	3	45	0	0	
11	MTH00082	Calculus Laboratory 2B	C	1	0	30	0	
12	MTH00030	Introduction to Linear Algebra	C	3	45	0	0	
13	MTH00083	Linear Algebra-Practice	C	1	0	30	0	
14	CSC10002	Programming 2	C	4	45	30	0	

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			NOTES
					Theory	Practice	Assignment	
Semester 3								
1	BAA00013	Academic English 1	C	3	30	30	0	
2	*CHE00002*	*General Chemistry 2*	*E*	*3*	*30*	*0*	*30*	*If(*) have not completed 6 credits, have to select more courses to get 6 credits in total.*
3	*CHE00082*	*General Chemistry Laboratory 2*	*E*	*2*	*0*	*60*	*0*	
4	*BIO00002*	*Biology 2*	*E*	*3*	*45*	*0*	*0*	
5	*BIO00082*	*Biology Laboratory 2*	*E*	*1*	*0*	*30*	*0*	
6	*PHY00002*	*General Physics 2 (Electromagnetic - Optics)*	*E*	*3*	*45*	*0*	*0*	
7	MTH00040	Applied Statistics for Engineers and Scientists	C	3	45	0	0	
8	MTH00085	Statistics - Practice	C	1	0	30	0	
9	MTH00050	Combinatorial Mathematics	C	4	45	30	0	
10	CSC10004	Data Structures and Algorithms	C	4	45	30	0	
11	CSC10008	Computer networks	C	4	45	30	0	
Semester 4								
1	BAA00014	Academic English 2	C	3	30	30	0	
2	BAA00101	Marxist-Leninist Philosophy	C	3	45	0	0	
3	*BAA00005*	*Introduction to Economics*	*E*	*2*	*30*	*0*	*0*	*Select 1 course (2 credits)*
4	*BAA00006*	*Introduction to Psychology*	*E*	*2*	*30*	*0*	*0*	
5	*BAA00007*	*Creativity Methodologies*	*E*	*2*	*30*	*0*	*0*	
6	*MTH00051*	*Applied Mathematics and Statistics*	*E*	*4*	*45*	*30*	*0*	*Select 1 course (4 credits)*
7	*MTH00052*	*Numerical Analysis*	*E*	*4*	*45*	*30*	*0*	
8	*MTH00053*	*Number Theory*	*E*	*4*	*45*	*30*	*0*	
9	*MTH00054*	*Predicate Calculus*	*E*	*4*	*45*	*30*	*0*	
10	CSC10003	Object-Oriented Programming	C	4	45	30	0	
11	CSC10006	Introduction to Databases	C	4	45	30	0	
12	CSC10009	Computer Systems	C	2	30	0	0	
Semester 5								
1	BAA00102	Marxist-Leninist Political Economics	C	2	30	0	0	

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			NOTES
					Theory	Practice	Assignment	
2	*GEO00002*	*Earth Science*	*E*	*2*	*30*	*0*	*0*	*Select 1 course (2 credits)*
3	*ENV00001*	*Environment Science*	*E*	*2*	*30*	*0*	*0*	
4	*ENV00003*	*Human and Enviroment*	*E*	*2*	*30*	*0*	*0*	
5	CSC10007	Operating Systems	C	4	45	30	0	
6	CSC13002	Introduction to Software Engineering	C	4	45	30	0	
7	CSC14003	Fundamentals of Artificial Intelligence	C	4	45	30	0	
8	*CSC10105*	*Introduction to Algorithmic Thinking*	*E*	*4*	*45*	*30*	*0*	*Elective course*
9	CSC11004	Advanced Computer Networks	E	4	45	30	0	
10	*CSC15005*	*Introduction to Cryptography*	*E*	*4*	*45*	*30*	*0*	
11	*CSC15006*	*Introduction to Natural Language Processing*	*E*	*4*	*45*	*30*	*0*	
12	*CSC16005*	*Digital Image and Video Processing*	*E*	*4*	*45*	*30*	*0*	
Semester 6								
1	BAA00103	Scientific Socialism	C	2	30	0	0	
2	*CSC10104*	*Linear Programming*	*E*	*4*	*45*	*30*	*0*	*Elective course*
3	*CSC10106*	*Combinatorial Algorithms and Applications*	*E*	*4*	*45*	*30*	*0*	*Elective course*
4	*CSC10107*	*Internship*	*E*	4	30	60	0	*Elective course Opened in Summer semester (3rd year)*
5	CSC11002	Telecommunication Systems	E	4	45	30	0	
6	CSC11005	Computer Networks Laboratory	E	4	45	30	0	
7	*CSC11103*	*Computer Network Design*	*E*	*4*	*45*	*30*	*0*	
8	*CSC11115*	*Network Security*	*E*	*4*	*45*	*30*	*0*	
9	*CSC14001*	*Automata and Formal Languages*	*E*	*4*	*45*	*30*	*0*	
10	*CSC14005*	*Introduction to Machine Learning*	*E*	*4*	*45*	*30*	*0*	
11	*CSC15003*	*Applied Cryptography*	*E*	*4*	*45*	*30*	*0*	
Semester 7								
1	BAA00104	History of Vietnamese Communist Party	C	2	30	0	0	

No.	Course Code	Course Name	Course Type	No. of Credits	No. of Periods			NOTES
					Theory	Practice	Assignment	
2	CSC11003	Computer Network Programming	E	4	45	30	0	
3	CSC15001	Network Security	E	4	45	30	0	
4	*CSC11106*	*Wireless Communications*	*E*	*4*	*45*	*30*	*0*	
5	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*Select courses to get 10 credits in total (2*)*
6	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
7	*CSC10204*	*Capstone projects*	*E*	*6*	*0*	*180*	*0*	
8	*CSC11112*	*Research Topic in Distributed System*	*E*	*4*	*45*	*30*	*0*	
9	*CSC14117*	*Introduction to IoT Programming*	*E*	*4*	*45*	*30*	*0*	
Semester 8								
1	BAA00003	Ho Chi Minh's Ideology	C	2	30	0	0	
2	*CSC11107*	*Digital Communications*	*E*	*4*	*45*	*30*	*0*	
3	*CSC11113*	*Computer and Network Service Administration*	*E*	*4*	*45*	*30*	*0*	
4	*CSC10251*	*Undergraduate Thesis*	*E*	*10*	*0*	*300*	*0*	*If (2*) have not completed 10 credits, have to select more courses to get 10 credits in total.*
5	*CSC10252*	*Industrial-based Thesis*	*E*	*10*	*0*	*300*	*0*	
6	*CSC10204*	*Capstone projects*	*E*	*6*	*0*	*180*	*0*	
7	*CSC11111*	*Advanced Topics in Computer Networks*	*E*	*4*	*45*	*30*	*0*	