ASIIN Seal

Accreditation Report

Bachelor's Degree Programme

Advanced programme in Control Engineering and Automation
Advanced programme in Electronics and Telecommunication Engineering
International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover

Provided by

Hanoi University of Science and Technology (HUST)

Version: 24 March 2023

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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]
Chương trình tiên tiến kỹ thuật điều khiển và tự động hoá	Advanced programme in Control Engineering and Automation	ASIIN	/	01, 02
Chương trình tiên tiến Kỹ thuật Điện tử Viễn thông	Advanced programme in Electronics and Telecommunication Engineering	ASIIN	/	02
Chương trình liên kết quốc tế LUHĐiện tử-Viễn thông	International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover	ASIIN	/	02
Date of the contract: 22.03.2022 **Submission of the final version of the self-assessment report:** 05.08.2022				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes; EuroInf®: Label European Label for Informatics; Eurobachelor®/Euromaster® Label: European Chemistry Label

[2] TC: Technical Committee for the following subject areas: TC 01 - Mechanical Engineering/Process Engineering; TC 02 - Electrical Engineering/Information Technology; TC 03 - Civil Engineering, Geodesy and Architecture; TC 04 - Informatics/Computer Science; TC 05 - Materials Science, Physical Technologies; TC 06 - Engineering and Management, Economics; TC 07 - Business Informatics/Information Systems; TC 08 - Agriculture, Forestry, Food Sciences, and Landscape Architecture; TC 09 - Chemistry; TC 10 - Life Sciences; TC 11 - Geosciences; TC 12 - Mathematics; TC 13 - Physics.

Date of the onsite visit: 09-10.11.2022 **at: HUST campus**	
Peer panel: Prof. Dr.-Ing. Sebastian Engell, Technical University of Dortmund Prof. Dr.-Ing. Moustafa Nawito, IU International University of Applied Sciences Prof. Dr.-Ing. Reiner Schütt, West Coast University of Applied Sciences Nguyen Thi Thanh Thao, Senior Manager, Business Development, Qualcomm Hien Nguyen-phuong, Stu-dent at Ho Chi Minh City University of Technology	
Representative of the ASIIN headquarter: Paulina Petracenko	
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 01 – Mechanical Engineering/Process Engineering as of December 9, 2011 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of September 23, 2022	

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
Advanced programme in Control Engineering and Automation	Bằng cử nhân về Kỹ thuật Điều khiển-Tự động hoá/ The degree of Bachelor in Control Engineering and Automation		6	Full time	/	8 Semester	264 ECTS	2009
Advanced program in Electronics and Telecommunication Engineering	Bằng cử nhân Kỹ thuật Điện tử - Viễn thông/ The degree of Bachelor in Electronics and Telecommunications Engineering		6	Full time	/	8 Semester	264 ECTS	2009
International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover	Bằng cử nhân Kỹ thuật Điện tử-Viễn thông/ The degree of Bachelor in Electronics and Telecommunications Engineering		6	Full time	/	8 Semester	268 ECTS	2022

For the Bachelor's degree programme Advanced programme in Control Engineering and Automation the institution has presented the following profile on their website:

"The undergraduate programme is built and developed according to the academic curriculum of the leading universities in United States of America in accordance with Vietnamese

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

background and environment. Students can choose one of two engineering directions: Control and Automation Engineering or Electrical Power System.

Enrolling for the Advanced Program of Control and Automation Engineering - Electrical Power System, students are equipped with knowledge and know-hows in the domains of: Instrumentation and smart sensor systems, Industrial communication network systems, Programming techniques for microcontrollers, microprocessors, Traditional and modern control methods, Programming of industrial automatic production lines, Power electronic control and electric transmission, Robotic control techniques, Neural network technology and artificial intelligence (AI), Electrical grid and power system, Electrical protection and stability of electrical systems.

Typical job positions include the design and operation engineers in domestic and foreign companies and industrial corporations in the fields of electrical energy, electrical equipment, automation, as well as positions in foreign research centers, research institutes and universities cooperating with the School of Electrical Engineering.

The programme is conducted in English."

For the Bachelor's degree programme Advanced programme in Electronics and Telecommunication Engineering the institution has presented the following profile on their website:

"The programme is taught entirely in English and taught by lecturers of Hanoi University of Technology and foreign faculty. After the successful completion of the program, students are able to work as Engineer in Telecom Engineering field such as fixed or mobile network service provider, ISP, Software development engineer, hardware and embedded system design, Research and development engineers in the fields of telecommunications, Internet, hardware and software for smart devices such as mobile devices, IoT devices, and medical devices, Operational Engineer for telecommunication network systems and industrial electronic system, and as Consultant on solutions, sales of electronic and telecommunications products."

For the Bachelor's degree programme International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover the institution has presented the following profile on their website:

"Leibniz University Hannover (LUH) cooperated with Hanoi University of Science and Technology to provide training in Mechatronic Engineering since 2002, and in 2011 agreed to deploy the training program of Electronics - Telecommunications. Leibniz University is a member of TU9 – 9 leading technical universities in Germany. Students can choose to transfer and pursue a master's degree at Leibniz University Hannover after completing the program at Hanoi University of Science and Technology.

The international cooperation program ET-LUH trains knowledge and skills in the field of Electronics and Telecommunications, which is the basis for students to continue to study a Master's program at Leibniz University Hannover with 5 options: Computer Engineering, Telecommunications (Nachrichtentechnik), Automation (Automatisierungstechnik), Microelectronics (Mikroelektronik) and Electrical Engineering (Elektrische Energietechnik).

Knowledge earned during study:

- Solid basic knowledge of Mathematics and basic science to ensure the ability to self-educate to improve professional qualifications;
- Foreign language skills including English and German so that students are able to work in an international multilingual environment and ready for articulation;
- Basic core and specialized knowledge of Electronics and Telecommunications including electronic engineering, digital electronics, microprocessor engineering, information systems, control engineering so that students can meet professional requirements.
- In addition, engineers are equipped with basic knowledge of communication, culture, administration and management, skills in searching, analyzing, evaluating and detecting problems; Systems thinking, teamwork skills

Skills gained after graduation

After graduation, students will become engineers who can meet the requirements of professional skills and soft skills to work for companies and corporations operating in the field of Electronics – Telecommunications, focusing on skills in two key areas:

- Electronic engineering, computer engineering: Graduates have the ability to design and develop electronic circuits to solve real-world problems, understand the process of designing and testing a product or a system. In addition, the graduates will have good programming ability for different requirements such as microcontroller programming, embedded systems, application programming.
- Telecommunications Engineering: Engineers can understand the basic principles of a telecommunications system, can simulate, apply computational models, analyze to develop and optimize a telecommunications network system, have the ability to apply new technologies and techniques and understand how real systems are implemented and operated.”

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report
- Discussions during the Audit
- Module Handbooks for all programmes
- Objective-Module Matrix for all programmes

Preliminary assessment and analysis of the peers:
For the degree programmes under review, the higher education institution (HEI) presents an extensive description of learning outcomes in the self-assessment report (SAR). This description is accompanied by learning module matrices for each programme, matching learning objectives, modules and the ASIIN Subject-Specific Criteria (SSC). In addition, the module descriptions include the learning outcomes of each individual module.

The peers discuss the learning outcomes of each degree programme, which can be found in their entirety in the annex to this accreditation report, with regard to the following criteria: the level of academic qualification aimed at, the respective ASIIN subject-specific label (SSC), whether the intended qualification profiles allow the students to take up an occupation corresponding to their education, which stakeholders are involved in the continuous assessment and further development of the objectives. The peers refer to the SSC of the Technical Committees Electrical Engineering and Information Technology as well as Mechanical Engineering/Process Engineering as a basis for judging whether the objectives and intended learning outcomes of the degree programmes under review correspond with the criteria.

The peers conclude that the objectives and intended learning outcomes of all degree programmes under accreditation are consistent with the EQF levels aimed at and adhere to the relevant ASIIN SSC. Furthermore, they are viable and valid and allow the graduates to take up an occupation, which corresponds to their qualification. However, the peers remark that while the learning objectives can be found in the SAR, they are not fixated in any

official binding document such as the study regulations for example. This is further elaborated in chapter 5.3 of this report.

The peers discuss with the programme coordinators of HUST if and how the programme objectives and learning outcomes are regularly reviewed and updated. The peers learn that it is part of the HUST development strategies to regularly assess the stakeholders' feedback (students, industry, alumni, international partners, and staff) and the programme evaluation results to update the programme education objectives and the programme learning outcomes. As further explained in chapter 1.3 of this report, the peers learn that the programme coordinators and the teachers of the programmes to be accredited maintain a relatively close connection to the industry. This is reflected in the discussion with the industry partners, who report that they are highly satisfied with the skills and competencies of the graduates who work at their companies.

In conclusion the peers are satisfied with the qualification objectives and learning outcomes of each degree programme as they match EQF and ASIIN SSC criteria, are continuously evaluated and developed by all relevant stakeholders. Nonetheless, the objectives need to be officially anchored in a legally binding document and afterwards published on the websites of the degree programmes.

Criterion 1.2 Name of the degree programme

Evidence:

- Diploma Certificates for all degree programmes
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers agree that the names of the Advanced Programme Control in Engineering and Automation and the International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover adequately reflect their respective aims, learning outcomes and curricula. However, in the case of the Advanced Programme in Electronics and Telecommunications Engineering the peers come to the conclusion that the title of the programme doesn't reflect the curriculum and the qualification profile adequately. They argue that the title stipulates that graduates are equally skilled and qualified in the areas of Telecommunications and Electronics. Yet, the curriculum does not reflect an equal distribution of contents in both areas. Thus, there is a focus on contents of digital electronics while elements of analogue electronics and telecommunications are according to the peers underrepresented. Therefore, the expert group agrees that the title of the

programme must be aligned with the curriculum. This can occur through two options: either through the adaption of the title or the redesign of the curriculum in which elements of analogue electronics are increased.

Criterion 1.3 Curriculum

Evidence:

- Appendix - Curricula for all degree programmes
- Appendix - Module handbooks for all degree programmes
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:
All the Bachelor programmes have a duration of four years (8 semesters). The curricula of each programme consists apart from technical subjects also of a variety of general subjects such as law and politics in Vietnam and a Military service training which is not credited though. In their self-assessment report as well as the module handbook, the university explains in detail the individual competences and skills that are associated with each of these module groups and which individual modules are contained in which group. The peers thus gain a distinct overview of the curricular content of all degree programmes (cf. annex to this accreditation report).

The presented curricula of all degree programmes are positively evaluated by the expert panel, concluding that these curricula offer a comprehensive overview and sound basis of the respective fields. During the audit, the peers learn that most of the courses in each programme are mandatory for the students. In their fourth year of study, however, students can choose one elective module, which determines their specialization. It is common practice that students then connect their final thesis with their expertise gained from the elective module. In the ET-E4 and ET-LUH programmes students can choose from four elective modules. In the case of the EE-E8 programme, students can select from three elective modules. When the peers inquire for the reasons for the small number of elective modules, the programme coordinators explain that this is due to two reasons. Firstly, there would be organizational challenges if they offer a significantly higher number of elective modules considering the large number of students per cohort (between 40 to 70 students). The programme coordinators predict that there would be an unequal distribution of the students per elective module, which then would lead to difficulties organizing the unevenly sized groups. Secondly, the programme coordinators argument that they diligently select the topics of the elective modules based on the demands of the labour market. They add that

according to the feedback they receive, the students are satisfied with the options offered to them. The peers appreciate the orientation towards the demands of the market but nonetheless would favour a larger range of electives.

The close connection to the industry is further consolidated in the coordinators' presentation of the project modules. Here the peers inquire why a third of the project in the ET-E4 programme focuses on software. The programme coordinators explain that according to a survey they carried out consulting industry partners, the feedback was that there is a shortage of graduates with elevated software skills while many tasks in the companies require software skills such as developing and optimizing systems. The peers accept the choice to emphasize software skills in the project.

Overall, however, the peers also see room for improvement in various aspects of the curricula. Hence, they recommend in all programmes to reduce the number of credits devoted to Law and Politics, which encompasses e.g. "Foundations of Marxism and Leninism" and "Ho Chi Minh Ideology". Currently, in the ET-LUH and in the EE-E8 programmes these subjects are credited with 24 ECTS and in the ET-E4 programme they are credited with 14 ECTS, accounting for about ten percent of the total ECTS. The programme coordinators explain that the amount of these contents in the curricula are fixated by the government and therefore cannot be changed by HUST individually. The peers nevertheless suggest to strive fora reduction of these elements to create more room for technical content. .

Furthermore, during the audit the peers discuss intensively the definition of Advanced Programmes and their difference to regular programmes with the representatives of HUST. The programme coordinators explain that the term "Advanced" indicates that the programme has been originally designed on the basis of a technically equivalent programme from a leading university worldwide, commonly in the USA. Furthermore, it is mandatory that the Advanced Programme is taught in English and has a cooperation with a leading university abroad. After reviewing the curricula, the peers note that there is almost no difference at the technical level between the Advanced programme ET-E4 and the programme ET-LUH. The programme coordinators confirm that academically these two programmes are almost identical. After consultation with the partner university Leibniz Universität Hannover, the programme coordinators included modules on technical drawing and thermal engineering in order to ensure that Bachelor graduates from the ET-LUH programme who wish to complete their Masters at the Leibniz Universität Hannover fulfil the prerequisites to study successfully in Hannover. The peers come the conclusion that according to their understanding the title "Advanced" stipulates a higher level of the academic programme; thus all programmes that are titled "Advanced Programme" should not only show an advanced level in terms of English language skills but also in terms of technical competencies. They recommend therefore either to take the curriculum of the advanced programmes to a higher level or to change the title of the programmes.

On a more technical level, the peers identify room for improvement in the programme EE-E8. After the revision of the documents and the discussions with the teaching staff involved in the programme, the peers conclude that the scope and the depth of the module "Linear Control Systems", which is the core compulsory module in control in the program, must be increased. According to the description in the module handbook, the outcomes are strongly focused on PID controllers and 1/3 of the lectures are devoted to these. Key modern concepts as linear optimal control are missing. The course should be more oriented towards theoretical understanding than on practical design and implementation of PID controllers. In addition, the peers recommend raising the overall theoretical level in the elective modules of the programme EE-E8. The peers note that the elective modules are largely application-oriented rather than providing additional foundations. Therefore, the experts recommend increasing the theoretical level of some of the courses following the example of the module "Digital Control Systems".

In conclusion, the peers are overall satisfied with the curriculum as it ensures that the students achieve the outlined learning outcomes and qualifications of the programmes and proves that the contents taught correspond to EQF level 6. Nevertheless, they identify some deficits in the programme ET-E8, where the theoretical foundations should be strenthened. On a less critical level, the peers recommend reducing the number of credits devoted to Laws and Politics and enhancing the level of the content in Advanced Programmes.

Criterion 1.4 Admission requirements

Evidence:

- Appendix "Regulations on Formal Undergraduate Admission"
- Self-assessment report
- Discussions during the Audit

Preliminary assessment and analysis of the peers:
Based on the documents defining the admission requirements, the peers learn that most of the admission policy is centrally regulated and follows the "Regulations on Formal Undergraduate Admission". According to this document, there are three admission methods: direct admission for excellent students/talent admission, admission according to the results of the high school graduation exam, and admission based on the results of the thinking assessment exam organized by the University. Through the talent admission, HUST recruits students with excellent grades who win in national and international competitions. The target of this method accounts for 10-20% of the total target of the whole university. The admission, which is based on high school graduation exam results, covers most of the applicants at HUST. For the programmes to be accredited, applicants must prove that they achieved the grade A00 in Math, Physics, and Chemistry or alternatively the grade A01 in

Math, Physics, and English. For candidates who use an admission group with a main subject to be considered for admission by the results of the High School Graduation Exam, the calculation of entrance examination scores is as follows:

Admission score = [(Subject 1 + Subject 2 + Subject 3 + Main subject) x 3/4] + Priority score (based on Region / Priority object.)

The third admission is constituted by a thinking assessment test. Here, the applicants must achieve a certain admission score by completing tests in the field of Math, English and reading comprehension.

The auditors find the terms of admission to be binding and transparent as they are available on the website of HUST in both Vietnamese and English. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

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

The peers conclude that there are a few programme-specific deficits with regard to criterion 1. Thus, the peers require SEEE to increase the scope and the depth of the course Linear Control Systems which is the core compulsory course in control in the programme EE-E8 Control Engineering and Automation. Furthermore, the title of the programme Electronics and Telecommunications Engineering must be aligned with the curriculum since the number of Telecommunications content in the curriculum is disproportionally low in comparison to Electronics. In addition, the peers have several recommendations for all programmes to be accredited. They suggest to elevate the course content of the Advanced programmes so that the title “Advanced” is also mirrored in the level of the programme. Moreover, they recommend to reduce the number of credits devoted to Laws and Politics. Finally they suggest to offer more elective courses at a higher theoretical level following the example of the course digital control systems in the programme EE-E8.

Criterion partly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Objective-Module Matrix for all programmes
- Module Handbooks for all programmes
- Study Plans/Curricula for all programmes
- Self-assessment report
- "Regulations on training organization and management"
- "Regulations on recognizing credits and converting equivalent modules of HUST"
- "Academic Statute"
- "Statistics of outgoing students"

Preliminary assessment and analysis of the peers:

The study programmes under review are divided into modules, which comprise a sum of teaching and learning. The panel considers the structure of the modules adequate and manageable and ensuring that the learning outcomes can be reached. As outlined in Criterion 1.3, the students have the opportunity to develop an expertise in a particular field by choosing optional technical modules. Furthermore, the structure of the programmes to be accredited enables the students to visit an industrial environment three times during their studies. The first time, students conduct an on-site visit of a company as part of the completion of the module "Introduction to Engineering" in the third semester. The second time, students complete a one-month internship at the end of the third academic year and, the third time, students carry out six-weeks final internship at a company, which serves among other things to explore a particular profession in more detail and find a topic for their final thesis. The programme coordinators add that they have established official cooperations with about 50 companies; all of the cooperations have been carefully checked and approved by representatives of HUST. The coordinators explain furthermore that students can move their internships to the summer break and in this manner extend the internship to a total of two months. The students report in the audit discussion that they are overall satisfied with the organization and implementation of the internship and state that the tasks in the internships are aligned with the qualification profile of the programmes. The peers appreciate that the students are exposed to the industrial environment during their studies. However, they express that the overall time students spend in industry is rather short to gain a deep insight into the professional world and to collect profound experiences in the field of their choice, which would also enhance their technical comprehension. In particular, the peers believe that the extent to which students perform engineering-related tasks can be raised. The industry representatives agree with the peers and welcome the idea to increase the duration of the internships. Thus, the peers recommend to extend the

length of the internships and to let students carry out more engineering tasks during the practical work. Moreover, the peers suggest to document the information about the internships including the exact activities performed by students more thoroughly. The programme managers assure the experts that there are general internship guidelines that apply for all programmes at HUST, however, the peers would like more in depth and formalized information on the specific internships integrated in the programmes to be accredited.

After reviewing the documents, the peers notice a difference in the number of “Soft Skills” modules taught in the different programmes. Hence, whereas the programme ET-E4 contains the module “Soft Skills”, which encompasses 4 ECTS, the other programmes do not exhibit such a module. In addition, the programmes ET-E4 and EE-E8 feature modules focusing on interdisciplinary skills such as “Introduction to Management” and “Applied Psychology” while the programme ET-LUH in contrast does not teach similar contents. Yet, the peers recognize that all programmes include modules in which students acquire and/or enhance their soft skills. For example, according to the learning objectives of the modules „Fundamentals of Digital Image Processing” and “Design project I” in the programme ET LUH, students develop presentation skills, communication and teamwork skills, facilitate active learning, and train their creative thinking. They conclude that a unification of the elements directed towards interdisciplinary and soft skills would be advantageous and that the requirements of the three programmes and the choices of the students should be streamlined. The programme coordinators explain that they are currently in the process of redesigning the curricula in order to harmonize the credits planned for the acquisition of soft skills. The peers welcome these undertakings and strongly recommend a fast implementation of the restructuring of the curricula so that all programmes feature the same amount of ECTS for soft skill modules and offer similar choices.

Similarly, the peers notice a varying amount of credits planned for the learning of English between the three programmes. In the EE-E8 program, the English modules comprise 32 ECTS, while in the ET-E4 and ET-LUH programs, the English modules encompass 12 ECTS each. Here too, the programme coordinators explain that they are currently in the process of redesigning the curricula of the programmes so that students from every programme obtain the same amount of English language skills and credits for these modules. The peers appreciate this initiative but and again strongly recommend a fast implementation so that all programmes are harmonized in terms of the English-language modules.

The general regulations on the recognition of achievements and competences acquired outside the higher education institution are bindingly and transparently recorded in the “Regulations on training organization and management” and “Regulations on recognizing credits and converting equivalent modules of HUST”. These documents stipulate among other things that students are allowed to conduct graduation projects/dissertations at another institution (abroad) but must defend at their final project at HUST. Altogether, the

maximum amount of the recognized, transferable volume must not exceed 50% of the full-course academic programme volume. The peers welcome that the regulations for recognizing achievements ensure that the learning outcomes are reached at the level aimed for and are transparently communicated.

Mobility

HUST offers its students various options in terms of student mobility. By participating in several scholarship programmes such as ERASMUS Mundus and based upon cooperations with a wide array of universities abroad, students can choose from a broad catalogue of destinations and partner universities for an exchange semester. For instance, HUST has cooperations in countries such as Germany, Finland, Japan and Indonesia. The basis of the semester abroad is constituted by the Memorandum of Understanding and the Learning Agreement, which guide the process and organization of a stay abroad and ensures the recognition of all achievements at the home university. In the audit discussions, the programme managers state that they are actively encouraging students to go abroad and are continuously trying to widen the options for financial support of the students. According to the statistics of outgoing students, 17 students from the programmes EE-E8 and ET-E4 carried out a semester abroad in the last five years. The peers appreciate the different options for student mobility at HUST as well as the programme managers' efforts but encourage that more opportunities are created and more students seize the opportunity for an exchange semester.

In conclusion, the peers are predominantly satisfied with the overall structure of the programmes and the options students are offered to individualize their studies. However, they see potential for improvement in terms of the harmonization of the courses offered and the number of credits for English and soft skill courses and with respect to the internships and therefore recommend to implement changes in these matters.

Criterion 2.2 Work load and credits

Evidence:

- Module Handbooks for all programmes
- "Academic Statute"
- "Regulations on training organization and management"
- Self-Assessment Report
- Discussions during the audit
- Annex: Evidence of Enrollment/Graduation/Dropout/Average study time

Preliminary assessment and analysis of the peers:

According to the submitted documents, the total credit load is 264 ECTS in the EE-E8 and ET-E4 programmes and 268 ECTS in the ET-LUH programme. The workload is spread relatively evenly over the semesters. Moreover, the effective number of credits the students can take depends on their achievements in the previous semester. In the three Bachelor's degree programmes, students need to take at least 12 credits and maximum up to 24 credits in one semester. The workload of the last two semesters is markedly reduced to give the students enough time for their theses as well as to already start looking for a job. This mechanism is supposed to ensure that the students can really handle the workload. It also means that theoretically, students can finish their studies in less than 8 semesters respectively, although this is relatively rare due to the high workload in general.

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

Table 2. 3. Workload of some forms of study

Form of study for 1 Vietnamese credit (=2 ECTS)	In class-periods	Self-study periods	Total periods	Total hours
Theoretical lecture	15	30	45	37.5
Practice in a laboratory	30	30	60	50.0
Quizzes in class	30	30	60	50.0
Assignment	45		45	37.5
Project, thesis	60		60	50.0
Internship	60		60	50.0

According to the ECTS credit system, 1 ECTS equals 25-30 hours of students' workload. As a result, there cannot be the same conversion rate between Vietnamese credits and ECTS points for all courses. For theoretical lectures, the rate would be 1 to 1.25 and for practical work 1 to 1.67.

However, the module descriptions mention a different workload. For example, 540 hours are calculated for the Bachelor's thesis of all three study programmes. This is not consistent with the 6 Vietnamese credits (12 ECTS) that are awarded, because this would result in a total workload of 300 hours (6 x 50). The same problem is relevant for the theoretical courses. For example, the module description for "English 1" mentions a total workload of 90 hours and 3 Vietnamese credits (6 ECTS) are awarded, while 3 Vietnamese credits would mean 112,5 hours (3 x 37.5) and 6 ECTS would require 180 hours. Therefore, the peers underline that the workload and credit calculation is faulty and inconsistent in several ways.

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

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

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

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

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

As the statistical data provided by HUST shows, the average length of study was five years in the three programmes in the last five years. According to the SAR, this is due to all the

written examinations and also due to the fact that they have research and a final thesis or work next to studying. It also becomes evident that this is a common phenomenon in the advanced programmes as the statistics show that most students in the advanced programmes in SEEE tend to graduate after five years. The peers see fact that the programmes are conducted in English as a possible factor that contributes to exceeding the expected study time. During the audit, the students confirm that they consider the workload high, however, manageable and that it is theoretically possible to finish the degree programmes within the expected four years. Additionally, the peers learn that almost all students complete the degree programmes as there have only been a handful of students who dropped out of the degree programmes in the last five years.

Another point of discussion during the audit refers to the component of German-language courses in the ET-LUH programme. In the programme it is mandatory that students acquire 24 ECTS by completing German-language courses. These 24 ECTS are added to the 268 ECTS that are needed to graduate in the ET-LUH programme. The peers inquire during the audit why the German courses are an obligatory part that are calculated additionally though and whether the students perceive the extra German courses manageable in terms of the entire workload. The programme managers explain that it was part of the agreement with Leibniz Universität Hannover to have undergraduate students at HUST acquire 24 ECTS in German so that the graduates are eligible to apply for a Master programme at Leibniz Universität Hannover. At the same time, the programme managers cannot deduct technical modules from the programme at the expense of German courses. For this reason, it was decided to add these 24 ECTS to the regular modules. The programme managers furthermore inform the peers that the students have the option of attending German courses in the evening so that the sessions do not clash with their regular modules. Alternatively, students can take the German course at the Goethe institute. The certificate is then recognized by HUST and converted into the 24 ECTS required for the programme. The students in the audit discussions report that attending the German classes during their studies is manageable and that they appreciate the flexibility in obtaining the credits. The peers also appreciate the flexibility that HUST offers its students. Nevertheless, they recommend to consider reducing the workload/ECTS for the German courses or not including the German courses as a compulsory part of the programme.

In conclusion, the peers agree that the students' total workload must be assessed and the ECTS points must be awarded accordingly. Furthermore, it is recommended to reduce the workload for German-language courses in the ET-LUH programme and to make the students responsible for reaching the necessary initial level before or at the beginning of their studies.

Criterion 2.3 Teaching methodology

Evidence:

- Module Handbooks for all programmes
- "Academic Statute"
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

From the presented material as well as the discussions on site, the peers conclude that the members of the HUST teaching staff are dedicated to offering students a high quality of teaching and overall studying experience. The teaching methodology follows the guidelines of the Vietnamese Ministry of Education and Training and HUST's own organization and management of the study programmes. According to the self-assessment report, HUST places special emphasis on active and research-based learning. Thus, the teaching methods include experiment-based learning, blended learning, project-based learning, research-based learning, teamwork, and in-class discussions, besides the traditional formats of lectures, practical classes, seminars, course papers/projects, professional internships, experimental classes, and final academic assessments. Experimental classes are carried out in laboratories with a group of maximum 20 students. Generally, class sizes vary in regular programmes between 80 and 100 students whereas the advanced programmes have cohorts of around 40 students. The teachers explain that the smaller classes in advanced programmes allow them to conduct more projects and have more interaction in class. In order to foster soft skills, in many modules students have to carry out group projects and subsequently present their results. To familiarize students with independent academic research and writing, students have to write reports on experimental sessions in technical modules and are actively encouraged to pursue independent working in the laboratories. The peers are satisfied with the diversity of teaching methods and especially appreciate the interactive approach. The discussions with students during the audit and survey results demonstrate that students are satisfied with the applied teaching methods. Furthermore, the experts are glad to see that the students receive different opportunities to learn and apply their knowledge in practical lessons such as laboratory sessions or internships. Yet, as described in Criterion 2.1 the peers recommend to increase the duration of the internships and to assign more engineering tasks to the students during the professional internships.

In conclusion, the peers are satisfied with the variety of teaching methods which contribute to the achievement of the learning objectives.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers were able to gain a ggood impression of the offers related to support and assistance for the students at HUST. The student support ranges from medical and mental health to financial support. Students with high academic results can apply for scholarships every semester. In order to receive a scholarship, students must be in the top 10% GPA of their respective intakes at their faculties. Furthermore, HUST also provides financial assistance to students based on their family income, to students with disabilities, to students from ethnic minorities and to students facing difficulties during the Covid-19 pandemic. In terms of medical and mental health support, students can use the healthcare services of HUST and consult a therapist for psychological counselling.

The Academic advisory board of SEEE monitors the students' academic performances and reaches out to students whose grades are dropping. Students who encounter difficulties during their studies can consult their homeroom teacher. Every class unit is assigned a homeroom teacher who functions as a mentor. Furthermore, students receive extensive consultation at the beginning of their studies. In the orientation sessions, students are provided information regarding the study programme, accommodation, financial support, school events, etc. In addition, SEEE organizes a meeting for all students at the beginning of every semester. Finally, the school advises students on career options and on finding a suitable company for an internship.

The peers are content to hear of the various platforms and services that offer student support. They are particularly impressed by the teachers and their commitment to support their students to the best of their ability, which became evident in the discussions with teachers and students. For example, students confirm the teachers' willingness to help students at any time when they are having difficulties and express their gratitude to the enormous support they receive from their teachers. In conclusion, the peers are convinced that the support and assistance measures in place at HUST contribute to the successful completion of the study programmes under review.

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

The peers conclude that the three programmes fulfil most of the criteria. However, due to the absence of the assessment of the students' workload and the incongruent correlation between workload and ECTS points, the peers request HUST to verify the students' total workload and award the ECTS points accordingly. HUST must also define how many hours of students' workload is required for one ECTS point.

In a less critical, the peers recommend to extend the duration of the internships and to push for students carrying out engineering work in the companies and to harmonize the number of credits for English-language and soft skill modules be-tween as well as the soft skill modules offered the three programs. Furthermore, they suggest to reduce the workload for German-language courses and to make the students responsible for reaching the necessary initial level before or at the beginning of their studies

Criterion predominantly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Module Handbooks for all programmes
- Annex: Graded exams, reports, final projects and other student work
- "Academic Statute"
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

All course content within the reviewed study programmes is subject to examinations. The examination type is defined in the module descriptions. Teachers agree on the examination types as well as the exact syllabus before the beginning of each semester. Examination and test regulations are clearly specified in the training regulations of Hanoi University of Science and Technology. However, at the moment they are not available in English on the website of HUST. As elaborated in Criterion 5.3, the English version of the Examination Regulations must be made accessible to all stakeholders. Examinations are structured in a way that the success in learning the content of each module is assessed by a mid-term and a

final exam. Mid-term exams are conducted in the week 9 and final exams in the weeks 17 to 19. For the mid-term and final exam a variety of types of examinations may be applied such as written exams, multiple-choice-tests, laboratory tests, reports, group projects, oral presentations. In project-based modules, student performance is assessed weekly throughout the semester. In this process, teachers include in their grading the students' performance in class discussions, homework assignments, and presentations, among other things. The contribution of the elements to the final grade and how the final grade is calculated for each module can be found in the module descriptions. The peers are content with the variety of the types of examinations and the distribution of the exams as mid-term and final exams. Furthermore, they conclude that the exams are designed in a way that leads to an adequate assessment of the students' achievement of the learning objectives. The students report to be equally satisfied with the number, diversity, and distribution of the examinations as well as the fairness of the teachers' grading. If students are unsatisfied with a grade, they can file an appeal, which students have found to be handled seriously and swiftly.

At the end of each Bachelor programme, students are required to complete a Bachelor thesis. The thesis is typically carried out in the last semester and accounts for 16 ECTS. In the final thesis, students must demonstrate the knowledge they have acquired during their studies and their ability to independently solve a technical problem. The grade consists of three components: the student's work process evaluated by the instructor, the thesis content itself, and the final defence presentation evaluated by the defense council. During the audit, the peers examine samples of theses and discuss the organization and structure of the final thesis project thoroughly with students and teachers. In terms of finding a research topic, the students report that usually teachers or the supervisor will suggest a topic in the field that the students have specialized in. Alternatively, students can propose the topic for their graduation thesis based on their previous internship and their practical experience in industry. The final project can be done in small groups (maximum three students) instead of individually, if the scope of the project is extensive enough. The final thesis is reviewed by a revision committee consisting of three to five people, the student's supervisor and another assessor. The supervisor must at least have a Master degree in order to supervise Bachelor theses. Overall, the peers can confirm that the level of the exemplary graduation theses and exams submitted by the HEI correspond to the EQF level 6 of the programmes. Yet after the examination of exemplary Ba theses, the peers recommend optimizing the regulations and procedure of the graduation thesis in order to ensure a consistent quality of the Ba thesis. The programme coordinators explain that the Bachelor thesis must meet a certain level in both quantity and quality. However, these requirements are not formally and precisely defined. Thus, the peers recommend defining a certain set

of requirements for the thesis, which should include e.g. the evidence of the application or improvement of scientific methods for the design of controllers and automation systems or electronics and that it must incorporate a review of the relevant literature. This should ensure that all Ba theses feature a consistent quality**.**

Based on the university regulation, the students must retake the whole course if they fail. However, students can request to postpone the final exam due to important reasons (such as accidents, health problems, etc.). In these cases, students will take the final exam in the next semester without repeating the whole course. The reason, why there are no re-sits of the final exam is that the final grade depends on the assessment of the learning activities that will be carried out continuously through the semester and not only on the final exam. Students who fail a course must attend the course again in the next semesters. The number of repetitions is unlimited. Students who have passed a course and want to improve the score, may also take the course again. The peers appreciate that corresponding rules are in place. However, according to the information obtained during the discussions, there are currently no official rules and regulations on disability compensation measures. As a result, students solely depend on the initiative of the respective lecturers. To guarantee that students with disabilities can study on an equal footing, HUST must establish formal compensation measures that specify under which conditions and how exams are modified to accommodate students' special needs.

The peers conclude that the criteria regarding the examination system, concept, and organization are predominately fulfilled and that the examinations are suitable to verify whether the intended learning outcomes are achieved. However, HUST must provide regulations that illustrate measures and compensations for disabled students and make examination regulations accessible to all stakeholders. Furthermore, peers define and implement a consistent quality of the Bachelor thesis, which must report the application or improvement of scientific methods including a review of the relevant literature

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

In conclusion, the peers that the examination procedures mainly follow criterion 3. However, there is no concrete and binding documentation of the disability measures and compensations for disabled students. Thus these must be implemented. Furthermore, the peers recommend to define and implement a consistent quality of the Bachelor thesis, which reports the application or improvement of scientific methods including a review of the relevant literature.

Criterion partly fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Staff Handbook
- Annex: List of Support Staff
- Annex: Staff Research Achievements
- Annex: List of Incoming & Outgoing Scholars
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The documents submitted by HUST provide an overview of the staff involved in the three programmes under review and of their qualifications. Accordingly, in 2021 in SEEE there were 178 permanent academic researchers with teaching assignments. The majority of them were PhD holders (114) followed by 37 associate professors, 24 Master's holders and three full professors. In the ET-E4 and ET-LUH programmes, there are 23 lecturers and in the EE-E8 programme, there are 24 teachers. Moreover, HUST presents a list of Incoming & Outgoing guest lecturers. Acoording to the self-assessment report, HUST regularly invites guest lectures from countries such as the USA, Japan, Australia, and Germany. After the audit discussions and the revision of the documents, the peers conclude that the academic staff is well qualified and covers the areas of expertise necessary for the three programmes. The peers are impressed by the fact that around one third of the academic staff is female which is according to the statements of the staff members not uncommon in Vietnam. Furthermore, the peers express their satisfaction with the quantity and quality of the research publications of the teaching staff. Particularly impressive is the fact that SEEE faculty published 413 reviewed (?) publications between 2020 and 2021. Yet, the peers remark that the research topics are rather diverse and that there is no clear research strategy. Exemplary research fields include fast control, digital power systems, and smart sensors. Therefore, the peers suggest developing a specific research profile that would help HUST stand out among other universities.

In addition, HUST reports to have sufficient non-academic staff that is working in libraries, laboratories, information technology systems, and other support services. The support staff team of SEEE consists of 23 people. Beyond that there are 38 librarians, 15 IT-Service members and 15 administration staff members, and 79 people providing other services

such as medical service. The peers agree that the number of non-academic staff is sufficient to provide students an excellent study experience.

In summary, the peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes. The students are supported by an extensive range of academic and non-academic staff.

Criterion 4.2 Staff development

Evidence:

- Annex: List of Staff attending Workshops
- Annex: List of Incoming & Outgoing Scholars
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the self-assessment report and the audit discussions, staff development is carried out on a regular basis to improve the quality, competence and performance of the teaching staff. Every year SEEE offers various opportunities for teaching staff to advance with their academic career and/or further develop their teaching and professional skills. For example, SEEE actively encourages and supports teachers with a Master degree to complete a PhD whether it is at HUST or abroad. Furthermore, lecturers can participate in courses on pedagogical or English skills. According to the self-assessment report, it is for all teachers mandatory to have obtained a didactic training and certification at the beginning of their teaching career. In addition, the teachers inform the peers during the audit discussions that they have the opportunity to attend an English workshop two times per year. This is especially important for teachers in the advanced programmes to help them improve their English skills. The teachers report to be generally well supported by HUST with regard to their teaching and research tasks. Particularly, due to a rise in the teachers' salary and the introduction of a performance-based remuneration scheme a few years ago, they are now in a better position to focus on their individual research. Hence, they confirm to regularly participate in workshops, conferences and research publications.

In summary, the peers confirm that HUST offers sufficient support mechanisms and opportunities for members of the teaching staff who wish to develop their professional and didactical skills further.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

In their SAR, the university states that enough funding is provided to maintain and update the working spaces. In terms of its infrastructure, HUST has 153 laboratories and 32 practice workshops. For the programmes ET-E4 and ET-LUH, there are four designated laboratories (Circuit Theory, Electromagnetic, Communication Engineering, and Computer Room). For the programme EE-E8, students and teachers have access to an even larger number of laboratories including the Laboratory of Circuit Theory, Laboratory of Modelling and Simulation, Laboratory of Analog Electronics, Laboratory of Electrical Machine and Control, etc. During the on-site visit, the peers inspect various laboratories and the equipment. They are impressed by the number of complex and high-quality experimental setups that are accessible for students. The laboratory staff explains that much of the equipment has recently been added and was sponsored by the World Bank in the context of the SAHEP project. When inquiring the teaching staff about the experiments that students carry out using the new equipment, the peers arrived at the conclusion that these setups would enable more active and demanding experimentation than currently ise foreseen. In the discussion round with the students, they report to be satisfied with the laboratories and the overall infrastructure including workspaces.

In summary, the peers confirm that HUST offers enough work spaces and laboratories and that all laboratories are equipped with modern and sophisticated instruments to accommodate the needs of the students as well as of the teaching staff in conducting practical training and research. In addition, the current funding allows maintaining the current standard and purchasing further instruments if necessary. The high standard of the equipment offers the potential of even more high-level experimental work related to advanced methods and demanding problems.

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

The peers conclude that the criterion is fulfilled. They recommend, however, that the laboratories should also enable experimenting with the application of advanced content or the solution of complex problems.

Criterion fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-Assessment Report
- Module descriptions
- Webpage HUST
- Webpage School of Economics and Management
- Webpage School of Applied Mathematics and Informatics

Preliminary assessment and analysis of the peers:
The peers observe that the module descriptions contain the necessary information about the persons responsible for each module, the Vietnamese credit points awarded, the intended learning outcomes, the applicability, the admission and examination requirements, the forms of assessment, and details explaining how the final grade is calculated.

However, the peers note that the module descriptions do not make the calculation of the students' total workload and the conversion into ECTS or Vietnamese credit points transparent. This issue is discussed in more detail under criterion 2.2. Furthermore, the module descriptions do not contain enough information about the different teaching methods in the individual modules. For those reasons, it is necessary that HUST submits the complete and latest version of the corresponding module descriptions and makes them accessible for students and teaching staff.

In the discussion with the teachers, it also becomes evident that some module descriptions in the programme EE-E8 do not reflect the actual content of the modules. For example, the project descriptions prescribe a narrower range of topics than is actually available.

Under criterion 5.3, it will be described to what extent the module handbooks for all three programmes must be accessible to the students as well as to all stakeholders.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Diploma for each degree programme
- Sample Diploma Supplement for each degree programme
- Sample Transcript of Records for each degree programme

Preliminary assessment and analysis of the peers:
The peers confirm that the students of all three degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Transcript of Records lists all courses that the graduate has completed, the achieved credit points, grades, and cumulative GPA. The Diploma Supplements are bilingual (Vietnamese and English). The Diploma Supplement and the Transcript of Records contain almost all necessary information about the respective degree programme. However, some information should be added. The Diploma Supplement must contain detailed information about the intended learning outcomes, the official duration, the access requirements and the grading system of the degree programme. Therefore, the peers urge HUST to include this information in the Diploma Supplement. Furthermore, the peers note that neither the Transcript of Records nor the Diploma Supplement contains the conversion of Vietnamese credits into ECTS. HUST must indicate how many ECTS credits are awarded for every individual degree programme. Therefore, the peers point out that the Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree programme. Moreover, the Diploma Supplement should follow the European template and needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide. This allows the reader to categorise the individual result.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Reports
- Webpage HUST
- Webpage School of Electrical Engineering

Preliminary assessment and analysis of the peers:

After the audit conversations and the analysis of the documents, the auditors confirm that a variety of rights and duties of both HUST and the students are defined and binding. The

students confirm in the discussions that they are aware of their rights and receive all relevant course material in the language of the degree programme at the beginning of each semester. However, as already mentioned, not all information is fixed in a binding manner. For example, the learning objectives of all three degree programmes are not specified in any official, binding document in English. The same applies to the examination regulations, as these are not defined in an official English document. Consequently, the learning objectives and the examination regulations must be defined in binding documents in Vietnamese as well as English.

Furthermore, the peers notice that the Vietnamese as well as the English websites of the programmes do not include sufficient information. For this reason, the peers expect HUST to update both versions of the websites of the programmes, to align the information on the university's and the School's webpages, to include information about the intended learning outcomes, study plans, module descriptions, and academic guidelines of each degree programme and make them thus available to all relevant stakeholders.

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

In conclusion, the peers identify several deficits in the programmes. Firstly, the module descriptions must be revised with regard to the teaching methods, the students' workload (incl. self-study time) and the awarded credits (Vietnamese and ECTS). Particularly in the programme Control Engineering and Automation, the module descriptions of Project 1 and of Project 2 in accordance must be revised in terms of the actual scope of problems that can be addressed. Furthermore, the peers request the revision of the Transcript of Records and the Diploma Supplement. The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree programme. The Diploma Supplement needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide and inform about the intended learning outcomes, the official duration, the access requirements and the grading system of the degree programme. Finally, the all regulations and information about the degree programmes (study plans, module descriptions, intended learning outcomes, etc.) must be well-anchored and made available to all stakeholders e.g. by publishing them on the Faculty's webpage.

Criterion not fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Annex: „Regulations on Internal Quality Management“
- Annex: “Decision on the promulgation and application of the document of quality management system of HUST”
- Samples and Results of Alumni Surveys, Student Surveys, Industry Surveys
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the self-assessment report, HUST has an extensive quality management system which aims at constantly improving the quality of the degree programmes and the experience of students and faculty. The central unit responsible for quality management is the Center for Quality Assurance (CeQUA). Every year, HUST develops a quality assurance plan on the basis of regular tasks and the university’s general quality policy. The individual Schools are obliged to follow these plans and carry out self-assessment tasks such as the revision of the curricula. The process of curriculum development is divided into three major steps. First, at the end of every academic year lecturers of the individual School meet in order to assess and discuss the courses syllabi. The lecturers hereby consider among other things the students’ learning results, inspiration from other institutions, and new trends in the technical fields. The second step consists of conducting surveys and analysing the feedback from students, alumni, employers, and other stakeholders. Finally, the School’s Scientific Council, which receives the results of surveys and reports from other groups, suggests improvements to the individual programs. HUST states to carry out all surveys on a regular basis. Alumni, for instance, are asked for their feedback once at the time of their graduation and once a year after their graduation. General student feedback regarding their study experience is collected once per academic year. Teaching evaluations are conducted at the end of each semester for each module. Via an online tool, students can give their feedback anonymously on aspects such as the teaching quality, the course content and their learning progress. Afterwards, the results of the surveys are sent to the teachers for further improvement of the courses and teaching.

In the audit, the peers inquire whether the results of the surveys are also shared and discussed with the students. The programme managers explain that students do not receive

the survey results. However, students report that while their feedback is not officially discussed, they generally feel that their criticisms are noticed as they have witnessed changes in the curricula. Some students, for example, who had suggested changes to some modules, were able to see how those changes were implemented subsequently. Generally students indicate to be satisfied with the programmes to be accredited and confirm that the programmes are very demanding but feasible. The peers are glad to hear that students are generally satisfied with the programmes and that their feedback seems to be recognized. However, to ensure a closed feedback loop, the peers agree that the results of all teaching and student evaluations have to be shared with the students. Furthermore, the peers learn that there is no formal definition of how teaching and student evaluations are conducted and how the results are processed. They point out that all steps of the evaluations have to be formally and bindingly recorded. In addition to including students in the feedback loop, the regulation should also address the mechanism for handling complaints to ensure that all students' responses are formally processed.

HUST also regularly consults industrial enterprises for the assessment and development of the programmes. In extensive surveys, companies are asked among other things about changes in the labour market, expected qualifications of the graduates, and their satisfaction with interns and graduates from HUST. On this basis, the Board of Deans discusses whether the curricula and the learning objectives of the individual programmes need to be revised. In the audit discussions, the industry partners report to be highly satisfied with the students from HUST, both in terms of their skills and their work ethic. Furthermore, the industry partners confirm that their suggestions are generally adopted by HUST, however, the implementation of the recommendations usually takes some time. The peers appreciate that HUST has a close relationship with the industry and regularly collects feedback from its industry partners. Yet, they see potential for improvement in the systematic procedure of acquiring and processing the feedback from industry partners. Since the individual steps of the procedure are not formalized or carried out systematically, the peers believe that more accurate feedback would be received when carried out on an institutional level. The peers therefore recommend to introduce institutionally organized mechanisms to improve the systematic analysis of the industry's feedback and to gain a wider overview of the industry's feedback.

In conclusion, the peers agree that HUST's quality management ensures a continuous assessment and improvement of the programmes to be accredited that involves all stakeholders. However, the peers identify a few deficits. A closed feedback loop must be implemented and formalized. Secondly, it is recommended to introduce an institutional mechanism to collect and process the industry's feedback.

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

In conclusion, the peers can see a well-established quality management system. Nevertheless, they identify a few deficits with regard to the teaching evaluation. Thus, they request to define formally how student feedback about the quality of teaching is handled, including a complaint handling mechanism and to ensure a feedback loop.

D Additional Documents

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

D 1. Module descriptions for internships and internship reports

E Comment of the Higher Education Institution (24.02.2023)

The following quotes the comment of the institution:

"Criterion 1.1:

In fact, the information of all education programs is published in the School website in both Vietnamese and English version. The information relating to the objectives and other information can be accessed through:

https://seee.hust.edu.vn/advanced

https://seee.hust.edu.vn/chuong-trinh-dao-tao-tien-tien

https://seee.hust.edu.vn/international-joint-program

https://seee.hust.edu.vn/dao-tao-quoc-te

The program curriculums have been signed and stamped and we will scan and upload the official version to the School website soon from now on.

Criterion 1.2:

The Advanced Programme in Electronics and Telecommunication Engineering (ET-E4) has been undergoing a reformation in its name and program content to orient ET-E4 towards the core telecommunications technologies of the next generation networks, rather than electronics. We expect next fall semester (September 2023), the transformation process will be completed.

Criterion 1.3:

Vietnamese universities are bound by the education law of the Ministry of Education and Training, that defines the mandatory number of credits for Laws and Politics. But we will discuss with the University management board to figure out how we could manage the workload in this section.

Yes, ET-E4 is under modification to push the program forward to the advanced communication technologies. For EE-E8, the program concentrates in one specialized direction, instead of covering multiple directions as the standard program. The curriculum has a difference compared to the standard program as well. However, the education committee will review the EE-E8 program to see what we could improve in the program.

The School will incorporate with the Department of Automation, the program director and the corresponding subject groups to quickly improve the corresponding subjects. Those subjects will be modified within from 6 months to 1 year.

Criterion 2.1

The school will discuss this issue with the University management board to figure out a proper solution for students to implement 10-week to 3-month internship without affecting their study track and standard study plan badly. The internship subject then will have to increase to 4 Vietnamese credits, instead of 2 credits like now.

We have supplemented the Internship guideline document in which students are guided the process, and implementation. The guideline was sent to the Peers via email. You alse can access to the evidence via the following link: https://drive.google.com/drive/folders/1iX3748SIMMeI__bIzbNgkZDYkpKTLUjk?usp=share_link

EE-E8 has been modified to align the English module to the HUST START program of the University, by which, it will have the similar English requirement structure as ET-E4.

About the soft skill modules, in fact, students of these 3 programs currently have the same choices of studying them. But the peers are right, all facts and information should be updated and presented in the program curriculums.

Criterion 2.2

SEEE will recheck all syllabi to ensure that they follow the same template. The procedure and modification may take 6 months.

We will start the process for reviewing the ET-LUH program. The tentative solution for the German requirement can be implemented as same as the English requirement of the advanced programs, in which we will do the following:

- Recruited students with sufficient German certificates will be exempted from the number of German credits corresponding to the level of their German certificate

- Students without any knowledge of German can still be recruited, but after that they will have to study the full German program

This German requirement is to ensure 2 things:

(1) the number of recruited students at the entrance.

(2) students will be able to pursue higher education in Germany as expected by the program. And this is also one of the signatures of ET-LUH that makes the program different from the others.

The conclusion on the prolonged study length is basically incorrect. In fact, HUST changed the advanced program from the Engineering program (5 years) to the Bachelor program (4 years) from Intake 2017 only. So it means, by the time we submitted SAR to the ASIIN peers, we had data of only 1 batch of 4-years B.Sc graduates of 2021 (i.e. cohort K62). Year 2021 is the transition point for the advanced programs, 2 cohorts (Intake 2017 of the B.Sc program and Intake 2016 of the Engineer program) both graduated in the same year.

Therefore, in the statistical data and evidences, the peers saw the data mix of both 4-year B.Sc students and 5-year Engineer students. We admit that the workload of our programs is a bit high, but most students still can manage to fulfill their study within the standard study length, as we have experienced and observed from the day these programs started.

But, in another side, we also predict that there will be some extension in the study length of the next cohort due to the impact of Covid-19. Therefore, SEEE and HUST are making our best effort to open classes in the summer time as well as open every class in every semester to facilitate students to finish their study goal on time.

Criterion 3.1:

In fact, the application and improvement of scientific methods are mandatory for the students of our school. No student is allowed to do the BA thesis by only learning the theory. This ideology is demonstrated though our BA-thesis evaluation criteria of Supervisor, Reviewer, and the Final thesis Jury board; as well as in the thesis guideline. The evaluation template and thesis guideline can be found here:

https://drive.google.com/drive/folders/1iX3748SIMMeI__bIz-bNgkZDYkpKTLUjk?usp=share_link

However, we agree that the documents may not be clear and straightforward enough to strongly state such mandatory requirements. We will modify and include these concerns in our next version of the Thesis guideline and evaluation template, for example: literature review should be included as one chapter.

For the consistency aspect, since the 3 programs were managed by 2 different schools before (with different policies and rules), the protocols and requirements obviously vary accordingly, as shown in the evidences. After the merge of the 2 schools (School of Electrical Engineering and School of Electronics and Telecommunications) in December 2021, during the transition, the School of Electrical and Electronic Engineering has been still in the process of synchronizing all protocols, requirements, and expectation in all matters. The procedure and requirement for the BA thesis was synchronized by July 2022, but we will work more in this matter to make it more consistent from the School level to the subject group level.

We have the policies for students of that situation, presented in B.3.1.4.University's official regulations on the undergraduate education program (Article 6. Exam postponement, exam exemption, grade petition.)

https://drive.google.com/file/d/1_cOLr3Dmj5hPMUTtO0kRjT2M5hpLBrq6/view

Moreover, Hanoi University of Science and Technology has added a new policy to support students with disabilities by October 2022, presented in the following link:

https://drive.google.com/file/d/1evdBjJu2h3vQtwdGjHRZ0ogMa38zS0VT/view?usp=share_link

Criterion 5.1

The module syllabus and description are currently in compliance with HUST's prescribed templates, which should include the total workload, the timeline and activities of each lecture session. By the description of each lecture period, the teaching methods such as teamwork, homework, muddiest point, or lecturing are presented.

But you are right, the information may not apply for all syllabi, so we'll recheck and request each subject group to supplement the missing information in their syllabi.

For the accessibility to the syllabi for all students and teaching staff, there are 2 ways for them to access to the information by now:

(1) Through the website of SEEE, since all program curriculums are uploaded there

(2) Through our internal management system (https://qldt.hust.edu.vn), in which students and faculty can access to the syllabus of each module.

Criterion 5.2:

This issue belongs to the University top level. We will discuss with them about it.

Criterion 5.3:

The information of all education programs can be found in the following links in both Vietnamese and English:

https://seee.hust.edu.vn/chuong-trinh-dao-tao-tien-tien

https://seee.hust.edu.vn/advanced

https://seee.hust.edu.vn/dao-tao-quoc-te

https://seee.hust.edu.vn/international-joint-program

The other instructions, forms and documents can be found both in Vietnamese and English as follows:

https://seee.hust.edu.vn/bieu-mau-va-tai-lieu

https://seee.hust.edu.vn/student-form-documents

The program curriculums are signed and stamped by now, so we will upload them to the school website soon.

Criterion 6

Yes, we will work on an institutional mechanism to collect the industry's feedback. So far, it is mandatory for us to invite industrial partners to participate in our education committee and School committee to provide their opinions in necessary knowledge an engineer will need and what is the lacking knowledge and skills of the graduates by now...etc.. Industrial partners are invited to accompany us in regular activities such as student orientation meetings, tech talks, job fairs, in-school internship or project work, and final thesis defense.

In addition, HUST has been building and just got the first version of the Internship-Project work hub done. In this hub, the industrial partners can offer Intern jobs and students can apply. Companies can feedback about students' performance, including evaluation on their background, by which the School can see which knowledge and skill are lacking or insufficient.

For the student feedback loop, since December 2022, we have boosted up the feedback loop, including these steps:

- The education department collects evaluation scores and comments for each subject from students
- The education department sends the data to SEEE
- Each Department of SEEE who is in charge of the subjects receives the data, then sends the corresponding individual evaluation result to each lecturer for self-reflection. The lecturers themselves actively reflect from the student feedback and come up with an improvement plan. If any serious problem in teaching is found, the Department will meet the corresponding lecturer for further discussion."

Summary: Peer recommendations (27.02.2023)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Advanced programme in Control Engineering and Automation	With requirements for one year	30.09.2028
Ba Advanced programme in Electronics and Telecommunication Engineering	With requirements for one year	30.09.2028
Ba International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover	With requirements for one year	30.09.2028

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.

A 2. (ASIIN 3) Disability measures and compensations for disabled students must be implemented.

A 3. (ASIIN 5.1) The module descriptions need to include the correct information about the teaching methods, the students' workload (incl. self-study time) and the awarded credits (Vietnamese and ECTS).

A 4. (ASIIN 5.2) The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree programme. The Diploma Supplement needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide.

A 5. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the intended learning outcomes, the official duration, the access requirements and the grading system of the degree programme.

A 6. (ASIIN 5.3) Make the information about the degree programmes (study plans, module descriptions, intended learning outcomes, etc.) available to all stakeholders e.g. by publishing them on the Faculty's webpage.

A 7. (ASIIN 6) The teaching evaluation is to be formally defined and organised in such a way that feedback of the results to the students is ensured.

For the Ba Advanced programme in Control Engineering and Automation

A 8. (ASIIN 1.3) Increase the scope and the depth of the course Linear Control Systems which is the core compulsory course in control in the program.

A 9. (ASIIN 5.1) Revise the module descriptions of Project 1 and of Project 2 in accordance with the actual scope of problems that can be addressed.

For the Ba Advanced programme in Electronics and Telecommunication Engineering

A 10. (ASIIN 1.2) Align the curriculum with the title of the programme.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended that the title "Advanced" should not only indicate English-language courses but also advanced course content

E 2. (ASIIN 2.1) It is recommended to extend the duration of the internships and to push for students carrying out engineering work in the companies.

E 3. (ASIIN 2.1) It is recommended to harmonize the number of credits for English-language and soft skill modules between as well as the soft skill modules offered the three programs.

E 4. (ASIIN 3.1) It is recommended to define and implement a consistent quality of the Bachelor thesis, which reports the application or improvement of scientific methods including a review of the relevant literature.

E 5. (ASIIN 6) It is recommended to introduce an institutional mechanism to collect and consider feedback from industry partners.

E 6. (ASIIN 1.3) It is recommended to reduce the number of credits devoted to Laws and Politics.

For the Ba Advanced programme in Control Engineering and Automation

E 7. (ASIIN 1.3) It is recommended to offer more elective courses at a higher theoretical level following the example of the course digital control systems.

E 8. (ASIIN 4.3) It is recommended that the laboratories should also enable experimenting with the application of advanced content or the solution of complex problems.

For the Ba International Cooperation Aca-demic Programme in Electronics-Telecommunications with Leibniz Universität Hannover

E 9. (ASIIN 2.1) It is recommended to reduce the workload for German-language courses and to make the students responsible for reaching the necessary initial level before or at the beginning of their studies.

F Comment of the Technical Committees 02- Electrical Engineering and 01 Mechanical Engineering (06.03.2023)

Technical Committee 02 – Electrical Engineering/Information Technology (06.03.2023)

Assessment and analysis for the award of the ASIIN seal:

The committee members discuss the case and follow the assessment of the peers without any changes.

The Wählen Sie ein Element aus. recommends the award of the seals as follows:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**
Ba Advanced programme in Control Engineering and Automation	With requirements for one year	30.09.2028
Ba Advanced programme in Electronics and Telecommunication Engineering	With requirements for one year	30.09.2028
Ba International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover	With requirements for one year	30.09.2028

Technical Committee 01 – Mechanical Engineering/Process Engineering (06.03.2023)

Assessment and analysis for the award of the ASIIN seal:

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

The Wählen Sie ein Element aus. recommends the award of the seals as follows:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**
Ba Advanced programme in Control Engineering and Automation	With requirements for one year	30.09.2028
Ba Advanced programme in Electronics and Telecommunication Engineering	With requirements for one year	30.09.2028
Ba International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover	With requirements for one year	30.09.2028

G Decision of the Accreditation Commission (24.03.2023)

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

The Accreditation Commission discusses the accreditation case. On the basis of recommendation E8, it proposes to add requirement A 11 “Credit points are to be awarded for the compulsory German courses and the workload is to be determined accordingly”. Since German courses are a compulsory part of the programme but are not included in the ECTS total for the entire programme, the Accreditation Commission believes that ECTS points should also be awarded for these courses and that these should be included in the calculation of ECTS for the entire programme. Furthermore, they propose changing the wording of recommendation E 1 in order to emphasize the core issue. In addition, they suggest deleting recommendation E4 regarding the quality of the Bachelor thesis. As the recommendation proposes the presentation of grading criteria for the Bachelor thesis, they believe that as long as the experts are satisfied with the quality of the (exemplary) Bachelor theses, the exact grading criteria is up to the higher education institution and does not need to be presented or assessed for the purpose of this accreditation. They suggest, however, that the issue should still be illustrated in the report itself. Finally, they propose changing the wording of the recommendation E 7 to ensure a better understanding of the recommendation.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**
Ba Advanced programme in Control Engineering and Automation	With requirements for one year	30.09.2028
Ba Advanced programme in Electronics and Telecommunication Engineering	With requirements for one year	30.09.2028

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover	With requirements for one year	30.09.2028

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.

A 2. (ASIIN 3) Disability measures and compensations for disabled students must be implemented.

A 3. (ASIIN 5.1) The module descriptions need to include the correct information about the teaching methods, the students' workload (incl. self-study time) and the awarded credits (Vietnamese and ECTS).

A 4. (ASIIN 5.2) The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree programme. The Diploma Supplement needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide.

A 5. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the intended learning outcomes, the official duration, the access requirements and the grading system of the degree programme.

A 6. (ASIIN 5.3) Make the information about the degree programmes (study plans, module descriptions, intended learning outcomes, etc.) available to all stakeholders e.g. by publishing them on the Faculty's webpage.

A 7. (ASIIN 6) The teaching evaluation is to be formally defined and organised in such a way that feedback of the results to the students is ensured.

For the Ba Advanced programme in Control Engineering and Automation

A 8. (ASIIN 1.3) Increase the scope and the depth of the course Linear Control Systems which is the core compulsory course in control in the program.

A 9. (ASIIN 5.1) Revise the module descriptions of Project 1 and of Project 2 in accordance with the actual scope of problems that can be addressed.

For the Ba Advanced programme in Electronics and Telecommunication Engineering

A 10. (ASIIN 1.2) Align the curriculum with the title of the programme.

Ba International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover

A 11. (ASIIN 2.1) Credits have to be awarded to the compulsory German courses and the workload has to be determined accordingly.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) As the title composition “advanced” only refers to the English-language courses, it is recommended to avoid it.

E 2. (ASIIN 2.1) It is recommended to extend the duration of the internships and to push for students carrying out engineering work in the companies.

E 3. (ASIIN 2.1) It is recommended to harmonize the number of credits for English-language and soft skill modules between as well as the soft skill modules offered the three programs.

E 4. (ASIIN 6) It is recommended to introduce an institutional mechanism to collect and consider feedback from industry partners.

E 5. (ASIIN 1.3) It is recommended to reduce the number of credits devoted to Laws and Politics.

For the Ba Advanced programme in Control Engineering and Automation

E 6. (ASIIN 1.3) It is recommended to offer more elective courses at a higher theoretical level following the example of the course digital control systems.

E 7. (ASIIN 4.3) It is recommended that the students should be allowed to utilize the laboratories in order to experiment with the application of advanced content or the solution of complex problems.

For the Ba International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover

E 8. (ASIIN 2.1) It is recommended to reduce the workload for German-language courses and to make the students responsible for reaching the necessary initial level before or at the beginning of their studies.

Appendix: Programme Learning Outcomes and Curricula

According to self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Electronics and Telecommunications Engineering:

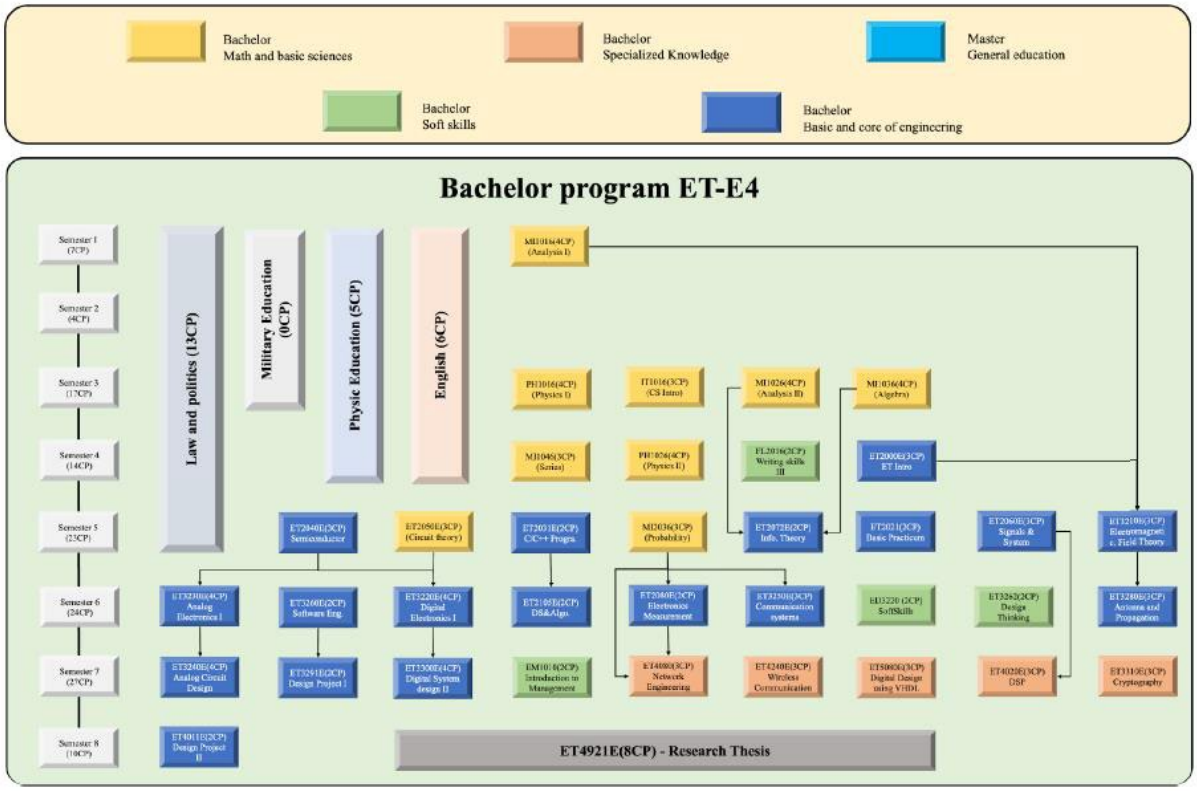
Program Education Objectives (PEO)	Description
PEO-1-ETE4	To apply knowledge of Math and science, and fundamental knowledge of Electronics and Telecommunications, to participate in design and to work in operation/evaluation of technical solutions/ systems/ processes/ products in social realities; and to be able to self-educate and enhance specialty for future career.
PEO-2-ETE4	Ability to apply administration and management knowledge, systematical thinking, professional attitudes, and skills to adapt to international, multi-culture working environment and society.

Table 1.6: PLO of ET-E4

PLO (Program learning outcomes)	Description
PLO-1-ETE4	Strong knowledge of Maths, Science and fundamental knowledge of Electronics and Telecommunications to be able to self-educate for specialty enhancement.
PLO-2-ETE4	Broad knowledge to be adaptive to operation/evaluation of technical solution/ system/ process/ product.
PLO-3-ETE4	Basic knowledge of administration and management.
PLO-4-ETE4	Skillful in investigation, analysis, and evaluation of the practicability and reliability of information sources.
PLO-5-ETE4	Skillful in presentation and technical reports.
PLO-6-ETE4	Skillful in computer tools for Electronics and Telecommunications field.
PLO-7-ETE4	Analysis, discovery, and critical thinking.

PLO-8-ETE4	Analysis, synthesis, evaluate data and information for usage and exploitation of technologies.
PLO-9-ETE4	Teamwork skills, including knowledge sharing, adaptive and respective others to reach for common objectives.
PLO-10-ETE4	Communication skills in foreign languages (IELTS 6.0).
PLO-11-ETE4	Respect and obey the law.
PLO-12-ETE4	Professional ethics and attitudes, responsibilities.
PLO-13-ETE4	Perseverance, Patience, wisdom in the face of difficulties and challenges of work and life.

The following **curriculum** is presented:



According to self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme International Cooperation Academic Programme in Electronics-Telecommunications with Leibniz Universität Hannover:

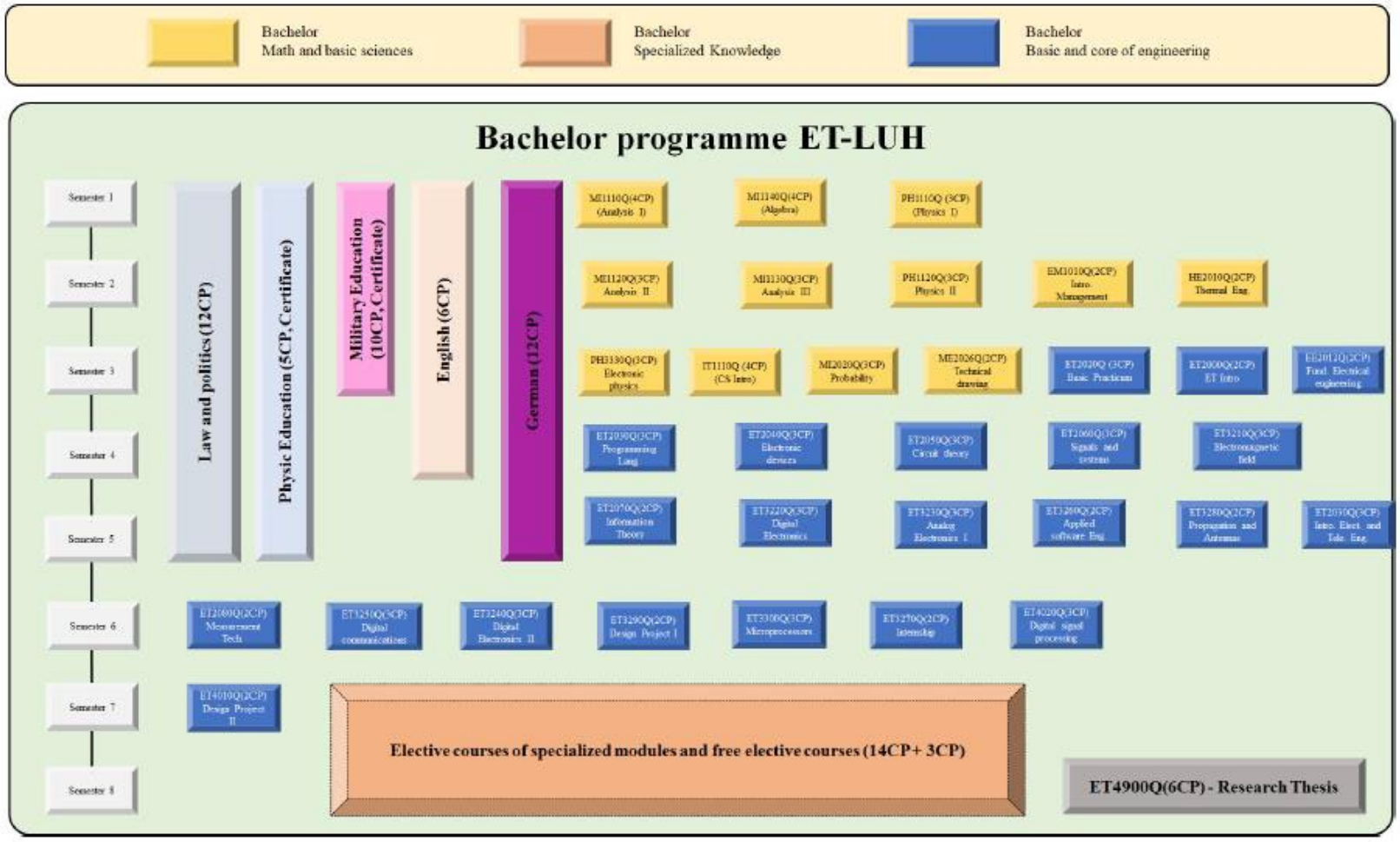
Program Education Objectives (PEO)	Description
PEO-1-ETLUH:	Have a solid basic knowledge of Natural Sciences, specialized knowledge in Electronics - Telecommunications to meet job requirements in various fields in the industry including operation, evaluation and development of systems, processes, products in practice, understanding of the vast multidisciplinary context of science and technology, capable of self-study, self-updating knowledge to keep up with changing trends of the industry;
PEO-2-ETLUH:	Have the ability to think analytically, handle and solve problems, the ability to learn, look up and apply knowledge into practice;
PEO-3-ETLUH	Ability to apply administration and management knowledge, professional attitudes, and skills to adapt to international, multi-culture working and studying environment and society.

Table 1.10: PLO of ET-LUH

PLO (Program learning outcomes)	Description
PLO-1-ETLUH	Gained a solid in-depth knowledge of the basic mathematical and specialized knowledge, the core fundamentals of electronics and telecommunications to understand the concepts and phenomena of electronic engineering and information technology.
PLO-2-ETLUH	Be able to think systematically and have problem-solving skills, be able to apply existing knowledge to research tasks and handle assigned tasks.
PLO-3-ETLUH	To select and apply actual methods of modeling, analyzing, processing to solve the problems, to design and run experiments and computer simulations to explain the results.
PLO-4-ETLUH	Have the abilities to develop electronic circuits, equipment, products to solve a problem, testing and perfecting the product to put it into practice.
PLO-5-ETLUH	Be capable of searching technical literature and other information sources.
PLO-6-ETLUH	Skillful in presenting, writing professional reports, presenting and criticizing issues, communicating effectively.
PLO-7-ETLUH	Willing to participate in teamwork or collaboration, adapt and respect each other to reach a common objective.
PLO-8- ETLUH	Communication skills in foreign languages (B1 German & English).
PLO-9- ETLUH	Demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context (nontechnical effects).

PLO-10- ETLUH	Commit to professional ethics, responsibility and professional working, respect and obey the law, understanding about intellectual property.
PLO-11- ETLUH	Demonstrate an awareness of project management and administration, such as risk management.
PLO-12- ETLUH	Self-study, self-updating knowledge continuously, persistent in the face of difficulties and challenges, self-discipline, and time management ability.

The following **curriculum** is presented:



According to self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Control Engineering and Automation:

Program Education Objectives (PEO)	Description
PO-1-EEE8	Have a wide background knowledge such that they can adapt to different work profiles in the wide field of Control Engineering and Automation; be able to work independently, creatively and be able to self-educate to accommodate the rapid changes in the era of the 4th industrial revolution.
PO-2-EEE8	Have professional skills and personal qualities to succeed in their careers; have scientific and professional work methods; good system thinking and analytical thinking; be able to integrate in multi-national workplaces.
PO-3-EEE8	Have social skills to work effectively in multi-disciplinary teams and integrate in international work environment.
PO-4-EEE8	Have abilities to self-educate, to research and to keep updated with state-of-the-art knowledge and skills; Be able to search for practical problems, to make creative use of scientific and technological tools to solve engineering problems.

Table 1.2: PLO of EE-E8

Program learning outcomes (PLOs)	Description
PLO-1-EEE8	Comprehensive knowledge of core and advanced engineering in control engineering and automation.
PLO-1.1-EEE8	The ability to apply the basic knowledge of mathematics, physics, and information technology in the calculation and simulation of systems, processes and technical products related to applications of the engineering subject.
PLO-1.2-EEE8	The ability to apply the core and advanced knowledge in electrical engineering, control engineering, measurements and automation to understand problems, products, technical devices related to applications of control engineering and automation.
PLO-1.3-EEE8	The ability to apply the core and advanced knowledge in electrical equipment and power systems, combined with the ability to exploit the use of software tools to

	participate in the solution design, manufacture chains and technical products in control engineering and automation.
PLO-2-EEE8	Have necessary professional skills and personal attributes to succeed in career.
PLO-2.1-EEE8	Ability to identify, analyze and solve technical problems.
PLO-2.2-EEE8	Systematic inference and evaluative inference.
PLO-2.3-EEE8	Active inference, flexibility, creativeness, discovery and time management skills. Understand contemporary issues and pursue life-long learning.
PLO-2.4-EEE8	Understand professional ethics, integrity and intellectual property.
PLO-3-EEE8	Have necessary social skills to effectively work in a multi-disciplinary group and international environment.
PLO-3.1-EEE8	Teamwork Skills in an interdisciplinary working environment
PLO-3.2-EEE8	Effective communicative skills in writing, oral presentations and discussions, using electronic and communication media
PLO-3.3-EEE8	Effective use of English at work, achievement of a TOEIC score conforming to the requirement of HUST.
PLO-4-EEE8	Conceiving, designing, implementing and operating control engineering and automation in the enterprise and societal context.
PLO-4.1-EEE8	Understanding the impact of engineering solutions on the society, the economy and the environment in the global perspective. Understanding the society regulations in the field of electrical engineering, control and automation.
PLO-4.2-EEE8	Ability of engineering problem identification, conceiving engineering solutions and participating in the project development. (C)
PLO-4.3-EEE8	Ability to participate in the implementation, manufacturing process of systems and products in control engineering and automation. (I)
PLO-4.4-EEE8	Ability to participate in the operation of systems and products in control engineering and automation.(O)

The following **curriculum** is presented: