ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Electrical Engineering
Automation and Control Engineering

Master's Degree Programmes
Electrical Engineering
Automation and Control Engineering

Provided by
Ton Duc Thang University

Version: 06 December 2024

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Kỹ sư Kỹ thuật điện	Bachelor Degree in Electrical Engineering	ASIIN	/	02
Kỹ sư Kỹ thuật điều khiển và tự động hóa	Bachelor Degree in Automation and Control Engineering	ASIIN	/	02
Thạc sĩ Kỹ thuật điện	Master Degree in Electrical Engineering	ASIIN	/	02
Thạc sĩ Kỹ thuật điều khiển và tự động hóa	Master Degree in Automation and Control Engineering	ASIIN	/	02
Date of the contract: 05.09.2022 **Submission of the final version of the self-assessment report:** 05.04.2023 **Date of the onsite visit:** 22.-23.05.2023 **at:** Ton Duc Thang University, Ho Chi Minh City				
Peer panel: apl. Prof. Dr.-Ing. Reinhard Moeller, University of Wuppertal Prof. Dr.-Ing. Nauth, Frankfurt University of Applied Sciences				

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[1] ASIIN Seal for degree programmes

[2] TC: Technical Committee for the following subject areas: TC 02 - Electrical Engineering/Information Technology.

Sen.-Prof. Dr.-Ing. Harald Weber, University of Rostock Tran Huu Cong, industry representative from FPT Software Truong Ngoc Quang Vinh, student from Da Nang University of Science and 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 Technical Committee 02 – Electrical Engineering/Information Technology as of September 23, 2022	

B Characteristics of the Degree Programmes

a) Name	Final degree (origi-nal/English translation)	b) Areas of Specializa-tion	c) Corre-sponding level of the EQF[3]	d) Mode of Study	e) Dou-ble/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Ba Electrical Engi-neering	Kỹ sư/ B. Eng.		6	Full time	/	8 Semester	240.42 ECTS/155 CPs	1997
Ba Automation and Control Enginerring	Kỹ sư/ B. Eng.		6	Full time	/	8 Semester	238.42 ECTS/153 CPs	1997
Ma Electrical Engi-neering	Thạc sĩ/ M. Sc.		7	Full time	/	3 Semester	85 ECTS/60 CPs	2018
Ma Automation and Control En-ginerring	Thạc sĩ/ M. Sc.		7	Full time	/	3 Semester	85 ECTS/60 CPs	2016

For the Bachelor's degree programme Ba Electrical Engineering the institution has presented the following profile on their website:

"This program provides a wide range of teaching programs in electrical engineering fields such as high-voltage generation, transmission and distribution as well as control and management of low voltage systems. Designing, installing and operating electricity systems in industrial plants, residential areas as well as national power networks are main tasks of an electrical engineer. Students will also learn decision making, problem solving, and critical thinking and communication skills through practical projects. In addition, our research and teaching programs are enhanced by the essential contribution of many experts from power companies, industrial factories, and construction companies. The increasing in the demand of electricity of the economy, including industrial and residential properties, offer many job opportunities for graduates from Electrical Engineering major.

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

The curriculum of Electrical Engineering program is developed based on the reference to the corresponding programs of top universities in the world. The curriculum is highly practical-oriented with modern equipment, especially, the students have opportunity to observe right on the spot the on-grid high power solar energy system, which is firstly implemented in the universities located in Ho Chi Minh City.

By pursuing the Bachelor degree in Electrical Engineering, students are provided with basic knowledge of the field as well as the specialized knowledge and skills in one of the following areas:

a) Generation, transmission, and distribution of electricity: students are provided with necessary knowledge and skills to design power plants, transmission lines, to design power distribution network for industrial zones, for urban residential area, buildings, and factories.
- Design the electrical supply which is compatible to IEC Standard,
- Design power plants, power grid, and substations,
- Economic operation and stabilization of power systems, and related subjects: lightning protection, relay protection and power automation, etc.

b) Power devices and equipment for factories, buildings, and residential area: students are provided with necessary knowledge and skills that are related to the design of electric machines and electrical drives for industry, refrigeration systems, and lighting systems.
- Apply PLC, industrial communication networks, and SCADA to industry and real life,
- Industrial – residential refrigeration, electrical drives, and lighting systems,
- Design lightning protection for civil and industrial construction.

a) Renewable energy: students are provided with necessary knowledge and skills that are related to the applied research on renewable energy, such as solar energy, wind energy, biomass, etc. for industry and real life; to generate electrical energy, to save and to use energy more efficiently."

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

„The Automation Control program provides practical knowledge associated with the production process in industry, where human activities are entirely replaced by operations of machines and robots. Using modern electronic and computer technologies to design and

manufacture production lines and automatic equipment in all areas of Vietnam industry is one of the main tasks of our engineers in the Automation Control Department. Students will also learn decision making, problem solving, critical thinking, and communication skills through practical projects. The curriculum is highly practical-oriented, especially, the students can have hands-on experience with modern equipment sponsored by big corporations in all over the world.

By pursuing the bachelor degree in Automation and Control Engineering, students are provided with knowledge and skills in one of the following areas:

a) Control of automation equipment and systems:
- Provides the knowledge abouth the automatic control technology from basic to advanced, from classic to modern (PID, Fuzzy logic, neural networks, Kalman filtering, etc.) with the aim to get optimal, stable, and intelligent control for the system.
- Provides the skills to design, implement, maintain, and fix the automation equipment and systems, special-purpose sensors to automaticalize both manufacturing and real-world activities.
- Provides the programming skill on industrial control equipment such as microcontroller, PLC, and data acqusition devices (DAQ).

b) Manufacturing process automation and industrial communications: provides the students with necessary knowledge to analyze and design the control systems for production line automation and monitoring the manufacturing process, the data acquisition and monitoring systems (SCADA), standards for industrial communication networks like MODBUS, PROFIBUS, CAN bus, etc.

c) Robot design and control: provides the students with knowledge and skills to design and prototype the mechanical – electrical part, as well as design the artificial intelligence algorithms for the robots, which are applied in various fields from supermini robots in medicine to large robots in industrial factories."

For the Master's degree programme, Electrical Engineering the institution has presented the following profile on their website:

"At present, the needs of graduates in the field of electrical engineering are increasingly tending to shrink, but the direction of the energy management aspect is very necessary. Specifically, EVN is implementing a series of power management programs, the key of which is to build a roadmap towards a competitive electricity market over the next five years. Therefore, for the power sector of Vietnam, the demand for highly qualified human

resources in the field of electrical engineering and understanding of energy management is very significant and urgent. Other businesses (not Electricity) operate in the wholesale and retail business such as PVN (Petro Vietnam) - the owner of many large power plants; Industrial parks (wholesale and retail for each factory in the area), large industrial plants (for example steel, minerals, cement), and investment firms. Trading in electric power products, there is a demand for high-level human resources with knowledge of energy management. Therefore, the master's degree program in electrical engineering will combine two majors, Electrical Engineering and Energy Management. Students will study the subjects of basic knowledge and compulsory subjects, then choose intensive orientation according to the elective subjects. This maximizes the ability of students to equip themselves with practical knowledge to effectively serve their work and study interests.

Graduates of the programme can work

- As consultants, managers and leaders of domestic and international companies.
- In companies and/or brand establishment.
- As lecturer, researcher at universities, colleges and institutes."

For the Master's degree programme, Automation and Control Engineering the institution has presented the following profile on their website:

"After graduation, the graduates from the Master's program in Automation and Control Engineering offered by Ton Duc Thang University, the graduates will accumulate the following competences:

- Conduct the analysis, problem solving and design on core advanced automation and control engineering theory.
- Develop in-depth knowledge in automation and control engineering fields.
- Apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in automation and control engineering.
- Apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in automation and control engineering.

After completion of the Master's program in Automation and Control Engineering offered by Ton Duc Thang University, the graduates must be able to:

- Apply in-depth knowledge of sciences, mathematics and engineering in automation and control engineering.

- Develop mathematical models of engineering processes, calculate strength properties of complex systems using modern tools and design databases for automation and control engineering.

- Apply scientific knowledge and creativity, analyze, synthesize and critically evaluate data in automation and control engineering.

- Conduct reliable theoretical and experimental research using the engineering techniques, skills, and tools required to be able to solve real-world problems in the automation and control engineering from initial specifications to a deliverable system.

- Design, implement, validate and deploy a component, device, system, or process in automation and control engineering to meet desired needs within realistic constraints.

- Consult, plan, manage and deploy projects related to automation and control systems and devices.

- Demonstrate skills to work in a professional team in a competitive environment, skills to communicate effectively with the international engineering community, and leadership skills in the workplace.

- Engage in independent learning and continuous professional development.

- Evaluate the impact of automation and control engineering solutions in a global, economic, environmental, societal and ethical context, including political issues, health, safety, manufacturability, and sustainability."

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report

- Study plans of the degree programmes

- Module descriptions

- Diploma Supplements

- Websites of all study programmes

- Discussion during the audit

- Objective-module-matrix per programme

Preliminary assessment and analysis of the peers:

The experts base their assessment of the learning outcomes on the information provided on the websites, the Diploma Supplements, the objective-module-matrices and in the Self-Assessment Report of the four degree programmes under review.

The Educational Objectives of the Bachelor in Electrical Engineering program offered by the Faculty of Electrical and Electronics Engineering are:

- "PO1: Graduates will become the electrical engineers with good basic knowledge, both in theory and in experiments.

- PO2: Graduates are able to pursue advanced degrees or certifications in engineering, academia, research and display critical thinking, creativity; independent learning and desire for lifelong learning.

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[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

- PO3: Graduates are able to design, implement, operate the electrical systems; manage, consult, and provide technical support on electrical equipment and projects.

- PO4: Graduates have ability to work independently as well as together in groups in high pressure environment; ability to develop and integrate in high quality job market;

- PO5: Graduates excel in careers in electrical engineering fields with high level of professionalism, professional ethics, social responsibility and good health.

Moreover, graduates should have obtained the following learning outcomes:

- PLO1: Apply the ideology as well as current policies of the government.

- PLO2: Apply general knowledge such as mathematics, physics, chemistry and programming languages.

- PLO3: Use English efficiently (equivalent to PET B1 Cambridge or IELTS 5.0), use Microsoft Office proficiently (equivalent to MOS certificate with the score at least 700/1000).

- PLO4: Analyze basic electric and electronic circuits.

- PLO5: Apply the specialized knowledge to solve regular process in electrical engineering.

- PLO6: Investigate the practical problems that may happen in electrical engineering systems and select the proper methods to solve unusual problems.

- PLO7: Improve and upgrade the electrical engineering systems.

- PLO8: Conduct research to develop new solution for the problems in electrical engineering

- PLO9: Design, implement and operate electrical systems.

- PLO10: Provide consulting, to plan, manage and deploy the projects related to electrical systems.

- PLO11: Communicate effectively, including teamwork communication.

- PLO12: Manage time and resources effectively.

- PLO13: Display integrity and responsibility, follow strictly the safety rules and professional ethics.

- PLO14: Demonstrate a passion to self-study and self-research to improve the specialized knowledge to be able to solve the urgent problems in electrical engineering."

Students who graduate from the Bachelor's programme in Electrical Engineering can pursue the following professions:

- Lecturers/researchers in research centres, institutions and universities,

- Engineers in the organization of electricity from central government to local authority,

- Designers and consultants in manufacturing companies, factories, and infrastructure developing companies.

The Educational Objectives of the <u>Bachelor in Automation and Control Engineering program</u> offered by the Faculty of Electrical and Electronics Engineering are:

- "PO1: Graduates will become automation and control engineers with good basic knowledge, both in theory and in experiments.

- PO2: Graduates are able to pursue advanced degrees or certifications in engineering, academia, research and display critical thinking, creativity; independent learning and desire for lifelong learning.

- PO3: Graduates are able to design, implement, operate the control systems; manage, consult, and provide technical support on automatic control equipment and projects.

- PO4: Graduates have ability to work independently as well as together in groups in high pressure environment; ability to develop and integrate in high quality job market;

- PO5: Graduates excel in careers in automation and control engineering fields with high level of professionalism, professional ethics, social responsibility and good health.

Furthermore, graduates should have obtained the following learning outcomes:

- PLO1: Apply the ideology as well as current policies of the government in practice.

- PLO2: Apply general knowledge such as mathematics, physics, chemistry and programming languages.

- PLO3: Use English efficiently with IELTS 5.0 or equivalent, use Microsoft Office proficiently with MOS 750.

- PLO4: Analyze basic electronic circuits and basic automatic control systems.

- PLO5: Apply the specialized knowledge to solve regular process in automation and control engineering.

- PLO6: Investigate the practical problems that may happen in automation and control engineering and select the proper methods to solve unusual problems.

- PLO7: Improve and upgrade the automatic control systems.

- PLO8: Conduct research to develop new solution for the problems in automation and control engineering.

- PLO9: Design, implement and operate automatic control systems.

- PLO10: Provide consulting to plan, manage and deploy the projects related to automation and control systems.

- PLO11: Communicate effectively, including teamwork communication.

- PLO12: Manage time and resources effectively.

- PLO13: Display integrity and responsibility, follow strictly the safety rules and professional ethics.

- PLO14: Demonstrate a passion to self-study and self-research to improve the specialized knowledge to be able to solve the practical problems in engineering or passion to be leaders or entrepreneurs."

Students who graduate from Bachelor' programme of Automation and Control Engineering can pursue the following professions:

- Lecturers/researchers in research centres, institutions and universities,

- Engineers in domestic and international manufacturing companies

- Technical consultants, automation equipment vendors

- Designers of electrical products

The Educational Objectives of the Master in Electrical programme are:

- "PO1: Graduates will be able to conduct the analysis, problem solving and design on core advanced electrical engineering theory.

- PO2: Graduates will be able to develop in-depth knowledge in electrical engineering fields.

- PO3: Graduates will be able to apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in electrical engineering.

- PO4: Graduates will be able to demonstrate professional ethics, social responsibility, entrepreneurship or leadership skills in the workplace, to function professionally in a globally competitive world, to communicate engineering results effectively, and to engage in lifelong learning.

In addition, graduates should have obtained the following learning outcomes:

- PLO1: Apply in-depth knowledge of sciences, mathematics and engineering in electrical engineering.

- PLO2: Develop mathematical models of engineering processes, calculate strength properties of complex systems using modern tools and design databases for electrical engineering.

- PLO3: Apply scientific knowledge and creativity, analyze, synthesize and critically evaluate data in electrical engineering.

- PLO4: Conduct reliable theoretical and experimental research using the engineering techniques, skills, and tools required to be able to solve real-world problems in the electrical engineering from initial specifications to a deliverable system.

- PLO5: Design, implement, validate and deploy a component, device, system, or process in electrical engineering to meet desired needs within realistic constraints.

- PLO6: Consult, plan, manage and deploy projects related to electrical systems and devices.

- PLO7: Demonstrate skills to work in a professional team in a competitive environment, skills to communicate effectively with the international engineering community, and leadership skills in the workplace.

- PLO8: Engage in independent learning and continuous professional development

- PLO9: Evaluate the impact of electrical engineering solutions in a global, economic, environmental, societal and ethical context, including political issues, health, safety, manufacturability, and sustainability."

Graduates of the Master's programme Electrical Engineering can work as consultants, managers and leaders of domestic and international companies or pursue an academic career.

The Educational Objectives of the <u>Master in Automation and Control Engineering</u> programme offered by the Faculty of Electrical and Electronics Engineering are:

- "PO1: Graduates will be able to conduct the analysis, problem solving and design on core advanced automation and control engineering theory.

- PO2: Graduates will be able to develop in-depth knowledge in automation and control engineering fields.

- PO3: Graduates will be able to apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in automation and control engineering.

- PO4: Graduates will be able to demonstrate professional ethics, social responsibility, entrepreneurship, or leadership skills in the workplace, to function professionally in a globally competitive world, to communicate engineering results effectively, and to engage in lifelong continual learning.

Furthermore, graduates should have obtained the following learning outcomes:

- PLO1: Apply in-depth knowledge of sciences, mathematics, and engineering in automation and control engineering.

- PLO2: Develop mathematical models of engineering processes, calculate strength properties of complex systems using modern tools and design databases for automation and control engineering.

- PLO3: Apply scientific knowledge and creativity, analyze, synthesize, and critically evaluate data in automation and control engineering..

- PLO4: Conduct reliable theoretical and experimental research with the engineering techniques, skills, and tools required to be able to solve real-world problems in automation and control engineering from initial specifications to a deliverable system.

- PLO5: Design, implement, validate, and deploy a component, device, system, or process to meet desired needs within realistic constraints.

- PLO6: Consult, plan, manage and deploy projects related to automation and control systems and devices.

- PLO7: Work in a professional team in competitive environment, to communicate effectively with the international engineering community, and to develop leadership skills in the workplace.

- PLO8: Engage in independent learning and continuous professional development

- PLO9: Evaluate the impact of automation and control engineering solutions in a global, economic, environmental, societal and ethical context, including political, health, safety, manufacturability, and sustainability."

Graduates of the Master's programme Automation and Control Engineering can work in the fields of design, research, development, and technical support or become lecturers and/or researchers at higher education institutions.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee Electrical Engineering and Information Technology as a basis for judging whether the intended learning outcomes of the four programmes correspond with the competences as outlined by the SSC. As a result, they come to the following conclusions:

The experts are convinced that the intended qualification profiles of the four programmes under review allow graduates to take up an occupation, which corresponds to their qualification. From the discussion with the employers, who are very satisfied with the qualification profile of the graduates, the experts gain the impression that they are well prepared for entering the labour market and find adequate jobs in Vietnam.

The degree programmes are designed in such a way that they meet the goals set for them. The objectives and intended learning outcomes are concise, and transparently anchored and published. In order to verify that the intended learning outcomes of the four degree programmes are covered by the respective curriculum, TDTU has submitted a matrix for each degree programme that shows, in which course which learning outcomes are targeted. The peers can deduce the correlation of the programmes' competence profile with the SSC and see how each course contributes to achieving the intended learning outcomes from the provided Matrix for each programme.

However, the experts note that the learning outcomes of the two Bachelor's degree programmes do not include competences in the fundamentals of computer science based on a structured programming language. As these competences are an essential part of the undergraduate education in electrical engineering and automation and control technology, the experts demand that these competences be included in the learning outcomes of the two Bachelor's degree programmes. This aspect is discussed in more detail in Chapter 1.3.

The experts confirm that the objectives and learning outcomes are regularly analysed and further developed. Students, alumni and industry partners are regularly consulted in this context and contribute to the development process.

The auditors conclude that the objectives and intended learning outcomes of the degree programmes adequately reflect the intended level of academic qualification (EQF 6 for the Bachelor's programmes and EQF 7 for the Master's programmes). The programmes also correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee Electrical Engineering and Information Technology.

Criterion 1.2 Name of the degree programme

Evidence:
- Self-Assessment Report
- Diploma Supplements

Preliminary assessment and analysis of the peers:

The experts confirm that the English translation and the original Vietnamese names of the Bachelor's and Master's degree programmes correspond with the intended aims and learning outcomes as well as the content of the respective degree programme

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Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report

- Study plan

- Module descriptions

- Discussions during the audit

Preliminary assessment and analysis of the peers:

The two Bachelor's programmes have a duration of four years (8 semesters). The two Master's programmes have a duration of 1.5 years (3 semesters).

The first two years of the Bachelors' programmes is designated to the study of general knowledge (Mathematics, social/politics studies, English, etc.) and basic courses in Electrical Engineering (Circuit Analysis, Measurement Lab, Electric Safety, etc.) as well as the acquisition of soft skills (presentation & communication, teamwork & leadership, etc.). The third year of study focuses on either specialisation courses in electrical engineering or automation and control engineering, depending on the degree programme. In addition, students are required to complete an eight-week internship in a company of their choice. In the fourth year of study, students take specialisation courses and elective courses in the respective subject area and complete their final thesis.

The Master's degree programmes are structured similarly: In the first semester, students attend courses in philosophy, English, research methods and specialised courses in the respective department. The second semester consists mainly of electives. In the third semester, students complete their Master's thesis.

The experts learn that the degree programmes at TDTU are very practice-oriented and prepare students for a career in industry. However, in recent years TDTU has developed a new strategy aimed at increasing the research component in all degree programmes and becoming a more research-oriented university overall in the future. Consequently, students are encouraged to participate in student research programmes, assist faculty in research activities and publish scientific papers in collaboration with lecturers. The experts welcome the new strategy and TDTU's efforts to evolve from a practice-oriented to a research-oriented university. They encourage lecturers to strengthen students' autonomous thinking

and action so that they are increasingly able to conduct independent research and solve problems on their own.

Regarding the internal assessment of the degree programmes, the experts are informed that the curriculum of every programme if reviewed every two years by the Faculty committee following the reviewing plan of the university. On average, up to ten percent of the curriculum is modified during that cycle. The process includes the feedback by industry partners, lecturers and students, which is collected every semester.

Upon the review of the curricula of the programmes to be accredited, the experts identify a few peculiarities that are discussed with the programmes coordinators during the audit. For instance, they notice that the two Bachelor's programmes under review are very similar; particularly, the first two academic years are almost identical. They enquire why the study programmes are not combined into one study programme with two different focal points. The programme coordinators explain that companies pay a lot of attention to the title of the degree programme of graduate students. Therefore, the specialisation of the degree programme should be directly apparent from the name of the degree programme. Furthermore, they argue that they consider the focus and qualification profiles of the two degree programmes to be clearly different, which is why the degree programmes are offered separately. The experts can follow the arguments of the study programme coordinators and accept the separation of the two study programmes.

The auditors also discuss with those responsible for the Bachelor's programme in Automation and Control Engineering why the course "Signals and Systems" is only offered in the fifth semester and not at the beginning of the programme. The coordinators explain that elements of the topic are already covered earlier in other courses. For example, students already learn about the Fourier and La Place transforms at the beginning of their studies. In the course "Signals and Systems", the students can then apply and deepen their already acquired knowledge. The auditors are pleased that the fundamental elements of the subject are taught early on in the programme and accept the current module structure.

Moreover, the auditors notice that English plays an important role in all programmes. Hence, almost ten percent of the credits per degree programme must be earned through English language courses. The study programme coordinators explain that this is for two reasons: TDTU's executive management has recognised that the English language skills of its students are relatively poor and has taken measures to improve the skills of TDTU students. In addition, it is part of TDTU's mission to become a more international university and to promote student and academic mobility. The experts welcome TDTU's efforts as they will also help graduates have better opportunities for international careers.

As mentioned in Chapter 1.1, the auditors also note that the two Bachelor's programmes offer students hardly any opportunities to acquire competences in the fundamentals of computer science based on a structured programming language. The experts, however, consider these competences to be an essential part of the education of Bachelor students in electrical engineering and automation and control engineering. They insist that the Department of Electrical Engineering introduce courses on structured programming languages for Bachelor students, which should include non-object-oriented and object-oriented programming languages such as C, C++ or Python. They also emphasise that this subject should be covered in depth and not in breadth. That is, courses should focus on a few programming languages that should be taught thoroughly. For example, students should have a comprehensive understanding of the theoretical basics such as data structure, efficient program structure, error handling, and software evaluation, so that they are then able to learn other programming languages independently.

Overall, the experts gain the impression that the curricula of the reviewed degree programmes are designed in such a way that students achieve the learning objectives and graduates are well prepared for the labour market and the search for suitable jobs in Vietnam.

Criterion 1.4 Admission requirements

Evidence:
- Admission Regulations
- Webpage TDTU
- Self-Assessment Report
- Discussion during the audit

Preliminary assessment and analysis of the peers:
According to the Self-Assessment Report, there are five different paths of admission into underdgraduate (Bachelor's degree) programmes. The minimum requirement for all five methods is that the candidates have graduated from high school "or equivalent according to the provisions of Article 5 of the Regulations on University Admission and Admission to preschool education college-level programs issued together with the Circular No. 09/2020/TT-BGDDT dated May 7, 2020 of the Minister of MOET."

"Method 1: Admission based on the high school results

The first method is applied to those who have finished their high school programme in the recent year. It is divided into 2 bookings: the first one for TDTU allied high schools or from high schools in the TDTU allied provinces, and the second one for the others.

<u>Method 2: Admission based on the high school graduation exam results</u>

The second method is applied to those who have officially graduated from high school after taking graduation exam

<u>Method 3: Priority admission according to TDTU's regulations</u>

The third method is for candidates from specialised high schools across the country or some key schools in Ho Chi Minh City; candidates with an international English certificate; candidates graduating from high school abroad; candidates studying international programmes at international schools in Vietnam; candidates with SAT, A-Level, IB, ACT certificates. Except for the first case, the others are used to guarantee the English requirement of high quality and joint programs.

<u>Method 4: Direct admission, priority admissions according to the Admission Regulation of the MOET</u>

The fourth method follows the government's regulations to support minor communities, and encourage excellent persons.

<u>Method 5: Admission is based on the results of the competency assessment test of Ho Chi Minh City's Vietnam National University</u>

The last method is based on another prestigious test's result."

In its Self-Assessment Report, TDTU states the admission requirements for the two <u>Master's degree programme. </u>Students must:

- Have graduated from their Bachelor's programme with above average results in the same or related fields as the applied major
- Have certain English requirements depending on which language is used in the considered Master's degree programme. If the programme is in English, students must have a level of English that is equivalent to TOEIC 600, TOEFL iBT 50, IELTS 5.5, or PET/FCE 160. If Vietnamese is the main language of instruction, students must prove English skills equivalent to TOEIC 500, TOEFL iBT 45, IELTS 4.5, or PET/FCE 140.
- Submit an essay of at least 10 pages on their research direction.

In the discussions during the audit, the representatives of the rector's office explain that students have to pay tuition fees of around 1000€ per year. However, they also explain that students coming from abroad do not have to pay tuition fees in order to increase the number of international incomings. Furthermore, TDTU provides "scholarships for students

from the schools that have signed MOU with TDTU" as well as for students "with outstanding performance in both academia and extra-curricular results". In addition, students "with difficult circumstances will get financial support from the University. The Faculty also provides support for study abroad programmes with scholarships from cooperated international universities."

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

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

TDTU state that they understand the experts' call to include courses on the basics of computer science by teaching structured programming languages. They state that they plan to modify the curricula to address this concern. For example, they intend to update the content of the 'Fundamentals of Programming' module to teach programming skills. In addition, there will be some specific changes in other modules where the HEI will add more tutorials on programming languages to help students improve their programming skills. Experts welcome TDTU's plans. However, as no measurements have been taken yet, they agree to maintain the requirement.

Criterion predominantly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:
- Self-Assessment Report
- Study plan
- Module descriptions
- Academic Handbook
- Regulation on the Bachelor's Admission and Training
- Regulation on the Master's Admission and Training
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The curriculum of the Bachelor's degree programmes is designed for eight semesters. The Master's programmes have a length of three semesters.

In the Bachelor's programmes the curricula are divided into four categories: general knowledge/skills, fundamental knowledge/skills in the corresponding major, advanced and specific knowledge /skills in the corresponding major, and courses to prepare for graduation like graduation project and career development internship. The first years focus on the general and fundamental modules whereas in the higher academic years, students advance their skills and knowledge in their specialized field and complete their internship and their graduation project. In the Bachelor's programme Electrical Engineering, students can take electives courses up to 6 credits. In the Bachelor's programme Automation and Control Engineering 4 credited are assigned for electives. In the third academic year, students are required to complete an eight-week internship (4 credits, 240 hours) at a company of their choice. The performance of the students is co-evaluated by the industrial supervisor and a lecturer of the faculty.

The Master's programmes are structured similarly to the Bachelor's programmes. Here, the curricula are divided into 4 categories as well: general knowledge (English, philosophy, and research methodology) (15 credits), mandatory courses in the respective field (9 credits), elective courses (21 credits), and the Master thesis (15 credits). As part of the elective courses, students have to complete at least one research topic course. Furthermore, by choosing a certain group of courses, students can form a specialization. In the Master's programme Electrical Engineering these tracks include: Optimal operation in power system, Renewable energy, Energy Management, and Power system control. In the Master's programme Automation and Control Engineering, the optional specializations are Robotics, Mechatronics, Measurement, and Control of Electrical Drives.

The experts note that the degree programmes are divided into modules and that each module is a sum of teaching and learning whose contents are concerted. They gain the impression that the choice of modules and the structure of the curriculum ensure that the intended learning outcomes of the respective degree programme can be achieved. The internships are well embedded in the programmes and contribute to the achievement of the learning outcomes.

International Mobility

Study achievements acquired abroad are recognised at TDTU in accordance with the "Regulations for Admission and Training for Bachelor's and Master's Studies". Recognition takes place by applying for recognition to the management of the respective study programme.

Students who wish to study abroad may receive a scholarship and financial support if they meet certain requirements in terms of academic merit and social contribution.

TDTU has a number of partner universities abroad. In particular, the Faculty of Electrical Engineering and Electronics cooperates with Saxion University of Applied Science (Netherlands) and National Cheng Kung University (Taiwan). Due to the close partnership and the similar structure of the Bachelor's programmes at the two universities, students can continue their Bachelor's studies at Saxion University of Applied Science after completing the first two years at TDTU.

Teaching staff are also encouraged to participate in academic exchange opportunities. The faculty has collaborations with universities in the Netherlands, the Czech Republic and Norway, among others. The faculty furthermore organises the international conferences AETA (Advanced Engineering: Theory and Applications) every year.

Overall, however, the experts note that the number of students and teaching staff going abroad is rather small. There are only isolated cases of students and teaching staff spending a semester abroad. Therefore, the experts recommend increasing the international exchange of students and teaching staff. They suggest introducing a mobility window, i.e. a semester designated for mobility opportunities. By explicitly including such a window and referring to mobility opportunities, students should develop a greater awareness of mobility opportunities. The experts also see this recommendation as being in line with TDTU's strategy to become a more international institution.

Criterion 2.2 Work load and credits

Evidence:
- Self-Assessment Report
- Module Handbooks for all degree programmes
- Curricula for all degree programmes
- Academic regulations according to credit institutions
- Guidance document on how to convert Vietnamese credit system to European credit transfer system
- Student and graduate survey forms and results
- Discussions during the audit

Preliminary assessment and analysis of the experts:

According to the legal requirements, the total credit load is 155 Vietnamese credits (equivalent to 240 ECTS) for the Bachelor's degree programme Electrical Engineering, 153 Vietnamese credits (equivalent to 238 ECTS) for the Bachelor's degree programme Automation and Control Engineering and 60 Vietnamese credits (equivalent to 85 ECTS) for the two Master's degree programmes Electrical Engineering and Automation and Control Engineering, respectively. 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 four degree programmes, students need to take at least 10 credits and maximum up to 40 credits in one semester. The workload of the last two semesters in the Bachelor's degree programmes and the workload of the last semester in the Master's degree programmes are 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 or 4 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, in the project work and the thesis it is equivalent to 30 periods. One period lasts for 50 minutes. The workload calculation is depicted in the following table:

Course type	In-class periods	Self-study periods	Total study periods
Theoretical lecture	15	30	45
Practice, experiment or discussion	30	30	60
Internship	-	-	30
Project, graduation project	-	-	30

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 1.42 and for practical work 1.83.

However, the module descriptions mention a different workload. For example, the module descriptions for "Mathematics 1" mention a total workload of 135 hours (45 hours contact time, 0 hours exercises, 90 hours self-study) and 3 Vietnamese credits (4.25 ECTS) are

awarded, while 3 Vietnamese credits would mean 112.5 hours (3 x 37.5) and 4.25 ECTS would require 127.5 hours. Therefore, the experts underline that the workload and credit calculation is faulty and inconsistent in several ways. The experts 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. TDTU must 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).

Moreover, with regard to the workload of the thesis module in all four degree programmes under review, the experts ask the students how much time they have in order to write their thesis and how much time they actually need in order to finish it. From the Bachelor's students they learn that it requires them 14 weeks in order to finish the Bachelor's thesis which is worth 14 Vietnamese credits (14.67 ECTS, according to module handbook). According to the Vietnamese credit calculation, this would mean 420 hours (14 x 30), whereas 14.67 ECTS would require 440 hours. Moreover, according to the conversion rate between Vietnamese credits and ECTS points suggested by TDTU in its guidance document on how to convert Vietnamese credit system to European credit transfer system, 1 TDTU credit equals 1.83 ECTS points for graduation theses. In this case, 14 Vietnamese credits would be worth 25.6 ECTS points, instead of 14.67 ECTS points as outlined in the Bachelor's module handbooks. As already mentioned in the previous paragraph, the workload and credit calculation is faulty and inconsistent in several ways.

During the discussions with the programme coordinators and the students, the experts 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 experts suggest asking the students directly about their experiences. This could be done by including respective questions in the course questionnaires. The experts point out that the faculty 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 TDTU shows, the average length of study was around 4,5 years in both <u>Bachelor's degree programmes</u> and around 2 years in the <u>Master's degree programmes</u> in the last 3 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. Moreover, for the Bachelor's degree programmes, the lack of English certificates (which are one of the PLOs of the programmes) are a common issue. Therefore, the faculty puts a lot of effort into motivating the graduating students to take the English proficient certification in advance to meet the requirement. In addition, other co-curricular or extra-curricular programs have been organized to help students improve their English skills, especially English for their specializations.

Additionally, the experts see that almost all students complete the degree programmes as, in average, there have only been around 33% of the students of the FEEE who dropped out of the degree programmes in the last few years. The data verifies that all four degree programmes under review can be completed in the expected period.

During the audit, the students emphasise that they consider the workload high but manageable and that it is possible to finish the degree programmes within the expected four or two years.

Criterion 2.3 Teaching methodology

Evidence:
- Self-Assessment Report
- Module Handbooks for all degree programmes
- Curricula for all degree programmes

- Discussions during the audit

Preliminary assessment and analysis of the experts:

Teaching staff at TDTU apply various teaching and learning methods, which are outlined in the module handbooks and linked narrowly to the respective course learning outcomes. According to them, various teaching and learning methods (including lectures, computer training and classroom and lab exercises, individual and group assignments, seminars and projects, etc.) have been implemented. Structured activities include tutorials, homework, assignments (reading or problem exercises) and practical activities. Group project assignments are given in some courses to develop students' skills in teamwork, communication, and leadership. The assignments and exercises should help students to develop their abilities with respect to critical thinking, written/oral communication, data acquisition, problem solving, and presentations.

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

During the audit, the teachers particularly emphasise the role of internships and project-based learning in the curricula in the context of student-centred learning. Furthermore, teachers of all four programmes heavily employ the problem-based and project-based learning method. The problem-based learning method is supposed to encourage critical thinking and cooperative learning and improving problem-solving skills by solving real-world problems. The project-based learning method is a teaching approach that involves students' interests and motivations, links theoretical concepts learned in the classroom and their applications explored during activities outside the school, and is supposed to provide more opportunities for direct interaction between students. It should have the potential to deepen student understanding and enhance interaction between students in completing authentic problem-based assignments that occur in everyday life.

The Master's programme additionally focuses on developing the students' skills in autonomously carrying out and solving (research) projects. Thus, teaching and learning methods mostly include projects and essay assignments.

To help students achieving the intended learning outcomes and to facilitate adequate learning and teaching methods, TDTU has developed a student information system (student portal), where students and teachers can interact.

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

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report

- Student Handbook

- Discussions during the audit

Preliminary assessment and analysis of the peers:

TDTU offers a comprehensive advising system for its students, both in terms of academic support and general student life support. If students need academic counselling, they can contact the academic counselling team of the respective faculty or their individual academic supervisor (mentor). These offer, among other things, help in designing the study plan, finding a suitable company for an internship or preparing a research proposal for the Bachelor's or Master's thesis/project. Through a student portal, students can access all relevant information about their studies and TDTU, view their study progress and receive news about student life at TDTU. To improve students' academic knowledge and skills, the Faculty of Electrical Engineering offers an Electronics Club and an English Club. The Electronics Club regularly organises competitions and workshops such as "MATLAB and Applications" and "Technical Drawing with AutoCAD Software". In general, TDTU places great emphasis on extracurricular activities; this is also evident from the large number of sports clubs.

To support students in their career planning and bring them into contact with industry at an early stage, the faculty regularly organises career events and invites companies such as Siemens or Phuong Nam Telecom Company to seminars. They also advise students on choosing the right company for their internship.

As far as general support for students is concerned, they can turn to the Counselling and Support Office. The office offers psychological counselling on a range of topics. In addition, TDTU offers scholarships for students with exceptional academic performance and financial support for students from low-income families.

The students report that they are aware of the numerous support services offered by TDTU. They especially praise the teaching staff, who are open-minded and offer help at any time. They also appreciate the job fairs, which help them get in touch with a variety of companies.

The experts are pleased about the good and trusting relationship between students and teachers and about the fact that there are enough resources for individual support, counselling and assistance for the students. The support system helps students to achieve the desired learning outcomes and to complete their studies successfully and without delay. The comprehensive support and counselling system is one of TDTU's strengths.

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

TDTU submits a detailed explanation on the calculation of the workload. The experts review the documents and conclude that the calculation seems logical and sound. They agree that the requirement is therefore obsolete.

Furthermore, the experts appreciate that the TDTU is continuously striving to promote student and academic mobility. However, as the numbers are still relatively low, they believe that there is still room for improvement and that academic and student mobility can be further enhanced.

Criterion fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:
- Self-Assessment Report
- Module descriptions
- Examination Regulations
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The design, organisation and assessment of examinations at TDTU follows the Educational Guidelines for Examinations issued by the Ministry of Education and Training and the Examination Regulations set by TDTU. All assessment methods are designed to individually

measure the extent to which students have achieved the respective learning outcomes of the module and the programme.

The most common type of assessment is written examinations; however, other examinations may also be included in the final grade. In <u>Bachelor's programmes</u>, assessment of theoretical courses, which make up the majority of courses, consists of a combination of progressive assessment (to track student progress; 30%), midterm examination (20%) and final examination (50% of final grade). These three types of examinations usually include quizzes, homework, e-learning exercises, multiple choice questions, constructed response tests, essays, presentations and reports. In laboratory courses, the final grade is based on the students' results in the practical test. In project courses, students are graded based on their project and presentation at the end of the course. In <u>Master's courses,</u> the assessment of theoretical lectures is based on the progressive assessment (40%) and the final report (60% of the final grade). In contrast to the Bachelor's programmes, students in the Master's programmes must also complete courses on advanced research topics, where students must submit a final research report (100% of the final grade).

Successfully passed exams are evaluated by lectures with a grading system based on a 10-point scale: Excellent (9 to 10), Very good (8 to near 9), Good (7 to near 8), Fairly good (6 to near 7) and Average (5 to near 6). The maximum score for each course is 10 points, and 5 points are required to pass the course.

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

The <u>Bachelor's thesis/ project</u> is a major part of the degree programmes and considered as a final assessment if the intended learning outcomes have been achieved. The Graduation project (14 credits) can be completed in one of two forms: as a thesis or synthesis project. The department decides about the form depending on the academic achievements of the student. The thesis/project is an independent work of study. Its topic and content must be discussed with the respective supervisor before the beginning of the project. Every student has 14 weeks to complete the graduation project. In the 8th week, students are evaluated for their progress of their project so far. At the end of the project, there are two weeks to review the project. A graduation defense will be held after the completion of reviewing

process. The grade of the graduation project is the average grade from the advisor, reviewer and members of the graduation project defense committee.

The <u>Master's thesis</u> is awarded 15 credits. Before starting the thesis, students have to submit a research proposal to their academic supervisor. After the completion of the thesis, they need to defend their thesis in front of a committee, which consists of 5 members: the chairman, secretary, two reviewers and another member. The committee must have at least two members outside of TDTU. The faculty encourages students to publish their projects in international journals.

Students who have failed a course must attend it again in the next semester. Students who have passed a course but want to improve their result can also repeat it. Students who cannot take the exam for unavoidable reasons (e.g. illness, accident, death of a family member, etc.) may apply to retake the exam. Students with disabilities will receive appropriate support for the examination. If students are not satisfied with their grade, they can file an appeal. In this case, the exam will be re-assessed by another teacher. The student also has the right to see the original examination and to have the grade explained by the teacher. However, in the audit discussions, students report that it is not a lived practice that students are given the opportunity to see the original exam or to have the grade explained in detail by the teacher. Yet, they affirm that they are aware of their right to appeal or to have the exam rechecked. The experts therefore recommend that teachers put the TDTU guidelines into practice and give students the opportunity to see the original exam and have the grade explained to them.

In addition, the experts discuss with the teachers the reasons why students who have failed the exam always have to re-take the entire course in the next semester. The teachers explain that the intention of TDTU is to ensure that all students have achieved the learning outcomes of the respective module. By retaking the whole course, students are more likely to illustrate in the end that they have learned the subject and achieved the respective learning outcomes. They add that students can use the summer semester to repeat the failed exam. This way, their study time will not be extended either. The examiners understand TDTU's motives. Nevertheless, they suggest that students who narrowly fail the exam should be given the opportunity to retake the exam without repeating the entire course. This would save students the time of repeating the whole course.

The experts conclude that the assessment methods are appropriately chosen in all programmes under review to assess the achievement of module and programme learning outcomes. Students confirm that they are well informed about the examination schedule, form and rules for grading.

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

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

TDTU assures the experts that all students have the right to see the original exam and receive an explanation for the assessment of their exam if they disagree with the results of the reassessment. The experts welcome the fact that there is a regulation that allows students to view the original examination. However, as students were not aware of this during the audit, the experts suggest retaining the recommendation and communicating this opportunity more clearly to students.

Regarding the experts' suggestion that students should be allowed to repeat the final exam of a module within a short period of time without repeating the entire module, TDTU states that they understand the experts' reasons, but also express their belief that it is usually best for the students' learning process to repeat the entire course. In addition, all teachers must adhere to a strict grading scale that indicates at what point a student must repeat the course. For these reasons, the experts agree to maintain the recommendation.

Criterion fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:
- Self-Assessment Report
- Staff Handbook
- Study plan
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The Faculty of Electrical and Electronics Engineering (FEEE) at TDTU follows a standardized process for recruiting faculty members. Criteria for recruitment include graduation from reputable foreign universities, English proficiency, research expertise, teaching experience,

and specific aptitudes required by FEEE. Applicants undergo preliminary assessment, followed by interviews with the head of the department and the FEEE dean. They are also required to give a lecture or presentation. Successful candidates proceed to interviews with the TDTU President and FEEE Dean and the TDTU Recruitment Board.

The following table illustrates the number of the different academic staff members at the FEEE in the last years:

	Abroad			Domestic							Total
	PhD (postdoctoral research)	Master (doctoral research)	Engineer (master studying)	Assistant professor	PhD	Master (doctoral research)	Master	Bachelor (master studying)	Engineer	Bachelor	
2019–2020	1	9	0	1	23	9	2	1	1	2	49
2020–2021	2	8	0	1	26	7	3	0	1	2	50
2021–2022	5	4	0	2	29	5	4	0	0	1	50

The workload of teachers is clearly defined, with full-time doctoral degree holders assigned 486 teaching hours annually, and Master's degree holders assigned 414 teaching hours. Workloads can be adjusted based on research outputs. The FEEE regularly monitors whether academic staff are meeting their teaching and research obligations and evaluates their workload.

Staff-to-student ratios are closely monitored as well to enhance education quality. TDTU states that the student-staff ratio does not exceed MOET's national target of 20 students to 1 lecturer.

As already mentioned, the mission of TDTU is to become a research university in the next 5-10 years. To realize this vision, they focus on regular publications, conferences, and participation incentives for teachers. FEEE is one of TDTU's leading faculties in research, and statistics show that the number and quality of FEEE's scientific research is increasing year by year. Between 2020 and 2021, for example, the FEEE published 139 publications. In light of the FEEE's goal to raise the quality of teaching and research to an international level, most faculty members have completed their academic degrees abroad. TDTU further strengthens internationalisation by employing 2 full-time foreign lecturers and 4 part-time foreign lecturers and regularly inviting guest lecturers from abroad.

In addition to the teaching staff and researchers, the university and FEEE ensure that there is sufficient administrative staff to assist teachers and students.

TDTU's support staff encompasses library personnel, facility support staff, personnel in computing and computer services, teaching support staff, student services, dormitory support staff, and security personnel. The FEEE specifically includes academic and student service staff, secretarial staff, and laboratory personnel within its support staff category.

The experts review the staff handbook and confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes. They particularly welcome the efforts of TDTU and FEEE to raise the academic qualifications of academic staff in order to improve the quality of research and teaching. They also agree that there is sufficient administrative staff to assist teachers and students in the programmes under review.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Report

- Staff Handbooks for all degree programmes

- Regulation: On Internal Expenditure of University of Science and Technology

- Discussions during the audit

Preliminary assessment and analysis of the experts:

According to the self-assessment report and the discussions during the on-site audit, TDTU encourages the continuing professional development of its staff according to their training and developmental plan. For this purpose, various opportunities are provided. Faculty members regularly participate in didactic training that encompasses curriculum design, teaching material, and innovative teaching and learning methods. Moreover, workshops related to subject-specific fields are held to refresh and to deepen various didactic competences in each semester. The lecturers can also regularly participate in external didactical trainings offered and funded by the government. New academic staff is required to complete compulsory teacher training. In this case, experienced faculty members teach and supervise the work of apprentices and tutors.

The teaching staff is encouraged to study abroad or to participate in international research projects and conferences in order to enhance their knowledge, increase their English proficiency and to build international networks. For this purpose, the university informs about possible scholarships to support academic mobility. The experts learn from the teaching staff that there are many different options to apply for funding for research projects, not

only from TDTU but also from the government and big companies the university collaborates with. In general, the exchange programmes are funded by international partner universities and organizations. TDTU particularly encourages its academic staff to enhance their professional qualifications through scholarships for doctoral projects. The general rule at the TDTU is that lecturers who do not have a PhD degree are required to plan their completion and determine their completion time. Academic staff enrolled in a PhD programme in Vietnam are exempted from their workload with full salary for three years and the university fully covers their tuition fees. Furthermore, TDTU encourages its staff members to pursue a PhD abroad and offers scholarships as an incentive. As a result, a number of lecturers have earned their doctorates abroad.

During the audit, the experts discuss with members of the teaching staff about their obligations to do research and incentives to reach for higher levels of professorship. In response, the experts learn that teaching staff cannot solely be lecturers but are obliged to devote at least a third of their time to research. In terms of their career progression, however, the present staff indicate that the financial benefits of aiming e.g. for full professorship are not in relation to the additional responsibility and workload.

Finally, the experts inquire in the audit to what extent teachers are in contact with the industry and how they receive up-to-date information about new developments in the industry. The teachers state that they are occasionally invited by the companies to visit them and learn about the newest technologies and processes. By supervising student projects carried out in companies, the teachers also establish contacts with different companies and occasionally start their own projects with them. The experts enquire whether the faculty also invites guest lecturers from industry. The teaching staff explain that there are guest lecturers from time to time, but this does not happen on a regular basis. The experts gain the impression that the faculty's teaching staff is in contact with industry and the latest developments there, but they are also of the opinion that the relationship with industry could be strengthened, for example, through further research cooperation with industry or also other institutions and more guest lecturers from the industrial sector.

In summary, the experts appreciate the university's efforts in the further development of its employees and consider the support mechanisms for the continuing professional development of the teaching staff adequate.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report

- On-site visit of participating institutes and laboratories

- Discussions during the audit

Preliminary assessment and analysis of the experts:

Basic funding of the degree programmes and the facilities is provided by TDTU and the different faculties. To ensure sufficient operational funds, TDTU develops a financial plan for each academic year in compliance with the state's regulations for universities.

From the discussion with the Rector's office and the programme coordinators, the experts learn that the primary funding sources of TDTU are tuition fees from students and technology transfer from industry. The figures presented by the university show that the faculties' income is stable and the funding of the degree programmes is secured. The academic staff emphasise that from their point of view, all programmes under review receive sufficient funding for teaching and learning activities as well as research, which results in facilities that are equipped according to the standard and good access to literature, databases and modern software. The students confirm this positive impression and state their satisfaction with the available resources.

In the self-assessment report, TDTU gives an extensive overview of the available learning spaces and libraries. Moreover, they list detailed information of all laboratories available per study programme. During the on-site visit, the experts take a look at some central facilities, relevant research and teaching facilities and, in particular, a selection of different laboratories available for the four study programmes. The TDTU main campus houses 3 large halls, 7 conference rooms and many classrooms equipped with projectors or smart TVs. In addition, students and staff can use seminar rooms for discussions and seminars.

The Department of Automation and Control Engineering has three laboratories, which consist of the automatic control, robotics and industrial communication networks laboratories. They are equipped with industrial PLCs and IoT controllers, an industrial robot system and electrical drive systems. The Department of Electrical Engineering has two laboratories, which use the equipment from ABB and LabVolt, among other things. The university has licensed Microsoft Office and other standard software and provides the students full access to this software.

During the audit, the experts find that the facilities and laboratories are adequate and contain everything necessary for the programme's objectives. Since the improvement of the research environment is one of the main goals formulated in the university's strategic plan,

the experts, however, notice that the facilities are currently equipped primarily for teaching, but less for research. They therefore recommend investing more in equipment (hardware and software), especially that of the Master's programmes, so that research goes beyond the state of the art and incorporates new technologies.

In addition, during the audit, the students expressed the wish to have more opportunities to deepen their programming skills, especially with regard to CAD. For example, they suggest setting up a student programming club where they can practise their skills together. The experts understand the students' wish and agree with them. They also believe that it would be very beneficial for students to expand their programming skills, as the study programmes under review offer enough programming courses to meet the learning objectives, but overall they are only at an introductory level. The experts therefore recommend setting up a freely accessible programming laboratory including CAD to promote the students' programming skills.

With regard to library capacities, TDTU's central library includes a 24/7 self-study area and 7 functional floors, which can serve about 3,000 users at the same time, including group and personal study rooms, an online conference room, a creative communication space and a computer area. The general catalogue provides access to almost 250,000 titles, including books, serials, theses, scientific reports and more, in addition to digital and electronic databases. Additionally, the library website provides access to a range of online publishing databases. During the audit, students express their satisfaction with the respective programmes' facilities as well as with the library capacities and available literature.

In summary, the expert group appreciates the range of learning tools and resources available to the students and judges the available funds, the technical equipment, and the infrastructure (laboratories, library, class rooms etc.) to comply with the requirements for adequately sustaining the degree programmes.

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

TDTU states that they intend to implement the experts' recommendations. However, as the university has not provided any evidence of implementation, the experts are of the opinion that the proposals should be retained. These include inviting more guest lecturers from industry and overall greater research co-operation with industry and/or other institutes, setting up a freely accessible programming laboratory including CAD and investing in more equipment (hardware and software) so that research also incorporates the latest technologies.

Criterion fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module Handbooks for all degree programmes

Preliminary assessment and analysis of the peers:

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

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Diploma per programme
- Sample Diploma Supplement per programme

Preliminary assessment and analysis of the peers:

The experts confirm that the students of the four programmes are awarded a Diploma and a Diploma Supplement upon graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Transcript of Records lists all the courses that the graduate has completed, the achieved credits, grades, and cumulative GPA. The Diploma Supplement contains almost all the necessary information about the degree programme. However, it does not list the learning outcomes achieved by the student upon completion of the programme. Therefore, TDTU must ensure that the Diploma Supplement contains information on the graduate's qualifications profile.

Criterion 5.3 Relevant rules

Evidence:

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

Preliminary assessment and analysis of the peers:

From the documents provided and the discussions during the audit, the peers learn that TDTU follows a policy of transparent and open rules and regulations. All required rules and regulations are made accessible to students at any time online. The discussion with the students confirms that they feel well informed about regulations and comfortable about the access to any information about their degree programmes and the courses.

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

The TDTU states that it is considering updating the Diploma Supplement to include the qualification profile of graduates. As the document does not yet contain all the necessary information, the experts adhere to their assessment.

Criterion partly fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Quality handbook
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The experts discuss the quality management system at TDTU with the programme coordinators and the students. They learn that TDTU has an extensive quality management system, which is aimed at constantly improving the quality of the degree programmes and the experience of students and faculty members. The central unit responsible for quality management is the Department for Testing and Quality Assurance (DTQA). DTQA has developed a quality handbook, which sets out the University's quality control mechanisms for the whole university. The individual faculties are obliged to follow this handbook 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 faculty 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 faculty's academic committee, who receives the results of surveys and reports from other groups, suggests improvements to the individual programmes. According to TDTU, all surveys are carried out on a regular basis. Alumni, for instance, are asked for their feedback at the time of their graduation as well as and a year after their graduation. General student feedback regarding their study experience is collected once per academic year. Teaching evaluations are conducted shortly after the middle 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.

During the audit, the experts enquire whether the results of the surveys are also shared and discussed with the students. The programme coordinators explain that the students receive the survey results. The university provides minutes of meetings between students and lecturers, which show that students are informed of the survey results. TDTU also provides minutes of faculty meetings which show that faculty members take the evaluation results into account for the further development of the programmes.

The audit discussion with the students reveals that those in charge are always eager and open for feedback aside from the official evaluations and that students have the impression that their comments are taken into consideration with regard to the further improvement of the programmes. This becomes apparent in the already mentioned constant curricular revision process that is performed under participation of students and industry partners. The experts are glad to hear that students are satisfied with the programmes and included in the feedback loop.

TDTU also regularly consults the industry 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 TDTU. 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 satisfied with the students from TDTU, especially in terms of their work ethic. Furthermore, the industry partners confirm that their suggestions are generally adopted by TDTU. The experts appreciate that TDTU has a close relationship with the industry partners and regularly collects feedback from them. Thus, the experts agree that the quality management circles at TDTU are well established and work under participation of all stakeholders.

In summary, the experts are satisfied with the quality management system at TDTU, especially with the continuous feedback loops and the involvement of important stakeholder groups such as students, alumni and representatives from the industry.

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

The experts adhere to their assessment.

Criterion fulfilled.

D Additional Documents

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

1. Evidences that TDTU communicates the results of the teaching evaluations to the students

After the audit, TDTU has submitted minutes of faculty meetings and meetings between students and lecturers/ faculty members, which show that students are informed of the survey results.

E Comment of the Higher Education Institution (11.11.2023)

The following quotes the comment of the institution:

"**Criteria 1.1**

We agree that the fundamentals of computer science should be included in the competences.

In the program learning outcomes, there are outcomes related to this competence (PLO 1, 2); however, they have not been explicitly stated.

In the curriculum, there are already subjects that contribute to the above outcomes, including C Programming, Simulation Lab, CAD in Electrical and Electronic Engineering, and other project-based courses. However, we agree with the assessors that these courses should be more diverse and cover contemporary programming languages, both non-object-oriented and object-oriented. We plan to modify our curricula to address this concern. In the updated curricula for the 2022 intakes, we have replaced the module 'C Programming' with 'Programming Fundamentals' and will update the content of this module with more programming languages. Additionally, there will be several specific changes in other modules where we will add more tutorials on programming languages to help students improve their programming skills.

The evidence for this statement includes:

- List of updated modules in the 2022 curricula of Bachelor programmes that include the programming language tutorials
- Updated course syllabi of the related module

Criteria 1.3

We agree that the fundamentals of computer science should be included in the competencies.

In the program learning outcomes, there are outcomes related to this competence (PLO 1, 2), but they have not been explicitly stated.

In the curriculum, there are already subjects that contribute to the above outcomes, including C Programming, Simulation Lab, CAD in Electrical and Electronic Engineering, and other project-based courses. However, FEEE agrees with the assessors that these courses

should be more diverse and cover contemporary programming languages, both non-object-oriented and object-oriented. We plan to modify our curricula to address this concern. For example, we have explicitly added MATLAB/Python tutorials to the syllabuses of courses such as Electric Machine, Electrical Supply; Generation and Transport of Electrical Energy; Advanced Power System Protection and Control; Simulation Lab; Control Systems 1; and Control Systems 2. In particular, the module "C Programming" has been replaced by "Programming Fundamentals" in the 2022 curricula of both undergraduate programs. In this new module, not only C language but also other languages such as Python will be introduced to the students. More advanced programming courses will be added in the next curriculum modification cycle.

FEEE plans to open tutorial sessions for specific languages that are necessary for our offered Bachelor program (Python, Revit, etc.). FEEE has collaborated with allied enterprises to sponsor our Faculty with free accounts for the students to learn and practice programming for the basic fields of electrical engineering and automatic and control engineering. Specifically, EoH company sponsors 1500 ERa accounts (for the cloud-based IoT platform), and some alumni sponsor three scholarships for participating in the Revit training course.

The evidence for this statement includes:

- List of updated course syllabi of the related modules that include the programming language tutorials.
- Scholarship sponsor for students on the Revit training course.
- Workshop planned by the Electronic Club that related to programming languages or computer-aid tools.
- Photos of the MoU signing ceremony between FEEE and EoH company, who sponsors 1500 ERa account for cloud-based IoT.

Criteria 2.1 (page 23)

We appreciate the assessors' feedback and would like to address this matter by separating it into two aspects: students and teaching staff.

Teaching Staff: While the number of teaching staff going abroad may have been moderate, it is not an isolated case. Our institution consistently sets staff mobility goals each academic year, which we have successfully achieved in the past. We have carefully planned cooperation with our partners for staff mobility through projects with institutions such as NTNU, University of Pardubice, PKNU, Incheon National University, and participation in international conferences like AETA 2016, 2018, and 2019. Although the COVID-19 pandemic temporarily impacted these activities, we have resumed and expanded them. The number of

academic staff going abroad has increased in recent years. In the academic year 2022-2023, four academic staff members spent at least one month abroad.

Student Mobility: We acknowledge that the number of outbound students has been limited, primarily due to the COVID-19 pandemic. However, our plans for extending student mobility activities have been in place since 2021. Increasing outbound student mobility is a strategic goal for each academic year. We continue to encourage students to undertake graduation projects abroad, collaborating with partners such as NCKU (National Cheng-Kung University) and CGU (Chang Gung University) in Taiwan to facilitate semester-long graduation projects. We are also actively engaging new international partners to explore additional opportunities for student mobility.

Criteria 2.2

Regarding the ECTS conversion matter, we understand there may have been some misunderstandings during the onsite visit. To clarify and ensure the accuracy of the ECTS conversion at TDTU, please refer to the evidence file for more details on the ECTS conversion. We kindly request the expert panel's understanding and agreement concerning this clarification.

In addition, we are pleased to inform you that TDTU has commenced the official collection of learner feedback on the workload of all programs since the academic year 2023–2024. The valuable insights gained from this feedback will be carefully considered in the ongoing process of curriculum revision.

The evidence for these statements includes:

- ECTS Conversion guide
- Student feedback on course questionnaire

Criteria 3 (page 31)

We can confirm that students have the right to review the original exam and to receive an explanation of their exam grading if they disagree with the regrading results. This practice has been in effect for many years and continues to be upheld.

We would like to express our gratitude to the assessors for bringing this matter to our attention. It is possible that some students who participated in the interview may not have been aware of this rule because they did not raise many appeals. To ensure all students are informed of their rights, we will make additional announcements using various communication methods.

We deeply appreciate the experts' recommendation to permit students who narrowly missed passing the exam the opportunity to retake the exam without the need to repeat the entire course. We fully recognize the validity of the assessors' perspective. However, our assessment system is predominantly based on continuous evaluation, with the final exam accounting for 50%, the mid-term exam for 20%, and the remaining 30% distributed among quizzes, tests, and homework throughout the course. This approach allows students to mitigate a low score on any given day by performing well in other assessments. Moreover, students facing illness or other challenges can request exam postponements under Clause 2, Article 25 of the Regulation on university degree organization and training (Decision No. 1830/QD-TĐT, September 8, 2021).

According to the university's regulation, if a student fails a course, they must retake that course or enroll in an equivalent or replacement course in line with the Ministry of Education and Training's regulations (Clause 2, Article 3, Circular No. 08/2021/TT-BGDDT, March 18, 2021).

The evidence for these statements includes:

- Evidence to show the students who registered to see their original exam
- Class meeting minutes to show the announcement on the appeal procedure in class meeting
- Evidence to show the students who registered to see their original exam
- Class meeting minutes to show the announcement on the appeal procedure in class meeting

Criteria 4.2 (page 34)

We express deep appreciation for the experts' thoughtful consideration of the teaching staff's research obligations and the incentives that motivate them to pursue higher levels of professorship. In fact, TDTU did receive this feedback from the current academic staff and has developed a new policy that includes this demand. Due to the need to strictly adhere to government regulations, particularly those of the MOET, it took some time to prepare the new regulations. At this moment, TDTU has updated its regulations, which now include guidance on providing financial benefits for staff members who are promoted to higher academic positions, such as full professorship.

The evidence for this statement includes:

- The Annex 7 in the Regulations on financial expense for internal activities, which shows the new policy to support the full-time academic staff who are promoted to higher academic positions

Criteria 4.3

The FEEE completely agrees with the assessors about the recommendation of investing more in equipment. The FEEE is currently working on a new proposal to upgrade the research laboratory and will submit it to the university board in 2024.

Regarding the laboratory for Automation and Control Engineering, we have discussed and reached an agreement with Siemens that they will sponsor the equipment for building the Automation and Control lab. We are in the process of preparing the necessary documentation and lab materials to implement the new lab.

The evidence for this statement includes:

- Budget plan for maintenance, upgrading, and purchasing equipment in the fiscal year 2024

In addition, we totally agree with the assessor's suggestion of setting up a programming laboratory, and, in fact, we received this feedback from the students in the last academic year. We are planning to include the programming club activity in the activities of our current Electronic Club. Specifically, regarding the CAD tool for electrical engineering, we have just received sponsorship from one of our partner enterprises for a Revit license, which we can use for training the students in the new programming club. This should become active at the end of 2023 or the beginning of 2024.

The evidence for this statement includes:

- Scholarship sponsor for students on the Revit training course
- Workshop planned by the Electronic Club that related to programming languages or computer-aid tools

Criteria 5.2

TDTU is considering updating the diploma supplement with information on the program learning outcomes (PLOs) for students enrolled in the 2022 cohort onwards.

F Summary: Peer recommendations (22.11.2023)

Taking into account the additional information and the comments given by TDTU 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 Electrical Engineering	With requirements for one year	30.09.2029
Ba Automation and Control Engineering	With requirements for one year	30.09.2029
Ma Electrical Engineering	With requirements for one year	30.09.2029
Ma Automation and Control Enginerring	With requirements for one year	30.09.2029

Requirements
For all programmes

A 1. (ASIIN 5.2) The Diploma Supplement must provide information on the graduate's qualifications profile.

For the Bachelor programmes

A 2. (ASIIN 1.1, 1.3) Ensure that students acquire competencies in the foundations of computer science on the basis of structured programming language.

Recommendations
For all programmes

E 1. (ASIIN 2.1) It is recommended to establish a mobility window and overall to strengthen student and academic mobility

E 2. (ASIIN 3) It is recommended that students have the opportunity to check the original exam.

E 3.   (ASIIN 3) It is recommended that students can retake the final exam of a module within a short amount of time without retaking the entire module.

E 4. (ASIIN 4.2) It is recommended to invite more guest lecturers from the industry and strengthen the research cooperation with industry and/or other institutions.

E 5. (ASIIN 4.3) It is recommended to establish a freely accessible programming lab including CAD.

For the Master programmes

E 6. (ASIIN 4.3) It is recommended to invest more into the equipment (hardware and software) so that research moves beyond the state of the art and includes new technology.

G Comment of the Technical Committee 02

Technical Committee 02 – Electrical Engineering/Information Technology (24.11.2023)

Assessment and analysis for the award of the ASIIN seal:

The expert committee discusses the procedure and follows the assessment of the experts. They recommend a slight change to the wording of recommendation E6.

The Technical Committee 02 – Electrical Engineering/Information Technology recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Electrical Engineering	With requirements for one year	30.09.2029
Ba Automation and Control Engineering	With requirements for one year	30.09.2029
Ma Electrical Engineering	With requirements for one year	30.09.2029
Ma Automation and Control Engineering	With requirements for one year	30.09.2029

H Decision of the Accreditation Commission (08.12.2023)

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

The commission discusses the case and changes the wording of requirement A2 and recommendation E2 in order to underline the issue.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Electrical Engineering	With requirements for one year	30.09.2029
Ba Automation and Control Engineering	With requirements for one year	30.09.2029
Ma Electrical Engineering	With requirements for one year	30.09.2029
Ma Automation and Control Engineering	With requirements for one year	30.09.2029

Requirements
For all programmes

A 1. (ASIIN 5.2) The Diploma Supplement must provide information on the graduate's qualifications profile.

For the Bachelor programmes

A 2. (ASIIN 1.1, 1.3) Ensure that students acquire competencies in structured programming languages as a foundation of computer science.

Recommendations

For all programmes

E 1. (ASIIN 2.1) It is recommended to establish a mobility window and overall to strengthen student and academic mobility

E 2.   (ASIIN 3) It is recommended to actively inform students about their right to access checked exams.

E 3.   (ASIIN 3) It is recommended that students can retake the final exam of a module within a short amount of time without retaking the entire module.

E 4.   (ASIIN 4.2) It is recommended to invite more guest lecturers from the industry and strengthen the research cooperation with industry and/or other institutions.

E 5.   (ASIIN 4.3) It is recommended to establish a freely accessible programming lab including CAD.

For the Master programmes

E 6.   (ASIIN 4.3) It is recommended to invest more into state-of-the-art equipment (hardware and software).

I Fulfilment of Requirements (06.12.2024)

Analysis of the experts and the Technical Committee (22.11.2024)

Requirements
For all programmes

A 1.   (ASIIN 5.2) The Diploma Supplement must provide information on the graduate's qualifications profile.

Initial Treatment	
Peers	Fulfilled Justification: The experts review the revised Diploma Supplement and find that the new document includes adequate information on the graduate's qualifications profile.
TC 01	Fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
TC 02	Fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
AC	Fulfilled Vote: unanimous Justification: The commission follows the vote of the experts.

For the Bachelor programmes

A 2.   (ASIIN 1.1, 1.3) Ensure that students acquire competencies in structured programming languages as a foundation of computer science.

Initial Treatment	
Peers	Fulfilled Justification: The experts note that TDTU has made several changes to ensure that students acquire skills in structured programming languages. For example, the compulsory module 'Data Structures and Algorithms' has been added to the two bachelor programmes. In addition, the content of several modules such as "Programming Fundamentals" has been revised and sharpened with regard to object-oriented programming languages and non-object-oriented programming languages. The experts find that

	the new compulsory module is well designed and enhances the bachelor's programmes. The other additional course contents are also valuable additions.
TC 01	Fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
TC 02	Fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
AC	Fulfilled Vote: unanimous Justification: The commission follows the vote of the experts.

Decision of the Accreditation Commission (06.12.2024)

Degree programme	ASIIN-label	Accreditation until max.
Ba Electrical Engineering	All requirements fulfilled	30.09.2029
Ba Automation and Control Engineering	All requirements fulfilled	30.09.2029
Ma Electrical Engineering	All requirements fulfilled	30.09.2029
Ma Automation and Control Engineering	All requirements fulfilled	30.09.2029

Appendix: Programme Learning Outcomes and Curricula

According to website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme <u>Electrical Engineering</u>:

"From 3 to 5 years after graduation, the graduates from the Bachelor/Engineer programme in Electrical Engineering offered by Ton Duc Thang University, the graduates will accumulate the following competences:

STT	Programme Educational Objectives
1	Become a technically qualified electrical bachelor/engineer to address complex problems, apply learned skills and knowledges in engineering careers and propose effective solutions.
2	Be able to pursue advanced degrees or certifications in engineering, academia, research and display critical thinking, creativity; independent learning and desire for lifelong learning
3	Demonstrate the ability to work independently as well as together in groups in high pressure environment; ability to develop and integrate in high quality job market.
4	Excel in careers in electrical engineering fields with high level of professionalism, professional ethics, social responsibility and good health.

Programme learning outcomes (PLO):

After completion of the Bachelor/Engineer programme in Electrical Engineering offered by Ton Duc Thang University, the graduates must be able to:

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Engineering			
1	X	X	Knowledge	**PLO1**: Apply broad and sound knowledge in mathematics, information technology, natural	Fulfill subjects according to the correlation matrix of

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Enginee-ring			
				and social sciences, especially in electrical engineering and related fields in practical situations.	PLO1 in the educational program; MOS1, MOS2, certificate at least 750 scores; National Defense and Security Education certificate.
2	X	X	Engineering investigation	**PLO2**: Investigate complex electrical engineering problems in a methodical way including problem identification, literature survey, design and conduct of experiments, analyze and synthesize data and information to derive valid conclusions or evaluation.	Fulfill subjects according to the correlation matrix of PLO2 in the educational program
3	X	X	Problem analysis	**PLO3**: Select proper methods to investigate and solve practical problems to improve the performance of electrical systems.	Fulfill subjects according to the correlation matrix of PLO3 in the educational program
4	X	X	Project management	**PLO4**: Apply knowledge and skills of project management and business practices to consult, plan, manage and deploy the projects within the constraint of time and resources	Fulfill subjects according to the correlation matrix of PLO4 in the educational program

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Enginee-ring			
5	X		Develop-ment of so-lution	**PLO5a**: Apply critical thinking and creativity to upgrade systems and devices in electrical engineering.	Fulfill subjects according to the correlation matrix of PLO5a in the educational program Pass Professional Skills Exam
		X		**PLO5b**: Apply critical thinking and creativity to research and develop new solutions for problems in electrical engineering.	Fulfill subjects according to the correlation matrix of PLO5b in the educational program Pass Professional Skills Exam
6	X		Communi-cation and teamwork skills	**PLO6a**: Coordinate working task in a group and communicate effectively, both oral and writing, on complex engineering activities such as being able to comprehend and write effective technical documents, make effective presentations and defending of their own ideas.	Fulfill subjects according to the correlation matrix of PLO6a in the educational program; IELTS 5.0 or above certificate (or equivalent certificates)
		X		**PLO6b**: Coordinate working task in a group and communicate effectively, both oral and writing, on complex engineering activities such as being able to comprehend and write effective technical documents,	Fulfill subjects according to the correlation matrix of PLO6b in the educational program;

| No | Degree | | Category | PLO Description | Measuring scale |
	Bachelor	Enginee-ring			
				make effective presentations and defending of their own ideas, and give and receive clear instructions.	IELTS 5.5 or above certificate (or equivalent certifi-cates)
7	X		Life-long learning	**PLO7a**: Practice self-study to improve the specialized knowledge enabling them to be leaders or entrepreneurs in electrical engineering.	Fulfill subjects according to the correlation matrix of PLO7a in the educational program
		X		**PLO7b**: Practice self-study and self-research to improve the specialized knowledge enabling them to be leaders or entrepreneurs in electrical engineering.	Fulfill subjects according to the correlation matrix of PLO7b in the educational program
8	X	X	Professional ethics	**PLO8**: Apply ethical principles and commit to professional ethics, responsibilities, and health, safety and legal regulations in engineering practice.	Fulfill subjects according to the correlation matrix of PLO8 in the educational program; Achieve training points according to student work regulations; Participate and pass the topics of Essential Skills for Sustainable Development in the educational program;

The following **curriculum** is presented:

Electrical Engineering - Curriculum

Y1	**General knowledge** Mathematics Informatics Social & political sciences	C Programming Physical training English	**Soft skills** TDTU culture Attitude Self-studying	**EE core courses** Measurement techniques & analytical software Simulation lab Measurement lab Circuit analysis Electronic materials CAD in EE
Y2	**General knowledge** Mathematics Informatics Physical training English Political sciences	**Soft skills** Attitude Presentation & communication Teamworking and leadership		**EE core courses** Electric Safety Electronic Circuit Design & lab Circuit analysis & lab Electronic project Engineering analysis Digital system design & lab Electromagnetic field Control systems & lab Electric practice
Y3	**Soft skills** Critical thinking Startup Tools & techniques for enterprises	**EE core courses** Microcontrollers & lab Power electronics & lab Electric machines & lab	**EE specialization courses (mandatory)** Generation & transport of electrical energy PLC & lab Electrical supply Electromagnetic transient process Electrical network design project Power system plant & lab Electrical drives & lab Graduation internship	
Y4	**EE specialization courses** Industrial communication network & labs Renewable energy Individual project	**EE elective courses (select 3 courses)** High voltage engineering Power system analysis Power system operation & economics Power system protection Lighting design basics Modern refrigeration & air conditioning engineering		**Graduation Thesis**

According to website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme <u>Automation and Control Engineering</u>:

"**Programme Educational objectives:**

From 3 to 5 years after graduation, the graduates from the Bachelor/Engineer programme in Automation and Control Engineering offered by Ton Duc Thang University, the graduates will accumulate the following competences:

No.	Programme Educational Objectives
1	Address complex problems, apply learned skills and knowledges in engineering careers and propose effective solutions.
2	Pursue advanced degrees or certifications in engineering, academia, research and display critical thinking, creativity; independent learning and desire for life-long learning.

| 3 | Work independently as well as together in groups in high pressure environment; ability to develop and integrate in high quality job market. |
| 4 | Excel in careers in automation and control fields with high level of professionalism, professional ethics, social responsibility and good health. |

Programme learning outcomes (PLO):

After completion of the Bachelor/Engineer programme in Automation and Control Engineering offered by Ton Duc Thang University, the graduates must be able to:

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Engineering			
1	X	X	Knowledge	**PLO1**: Apply broad and sound knowledge in mathematics, information technology, natural and social sciences, especially in automation and control engineering and related fields in practical situations.	Fulfill subjects according to the correlation matrix of PLO1 in the educational program; MOS1, MOS2, certificate at least 750 scores; National Defense and Security Education certificate.
2	X	X	Engineering investigation	**PLO2**: Investigate complex automation and control engineering problems in a methodical way including problem identification, literature survey, design and conduct of experiments, analyze and synthesize data and information to derive valid conclusions or evaluation.	Fulfill subjects according to the correlation matrix of PLO2 in the educational program

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Enginee-ring			
3	X	X	Problem analysis	**PLO3**: Select proper methods to investigate and solve practical problems to improve the performance of automation and control systems.	Fulfill subjects according to the correlation matrix of PLO3 in the educational program
4	X	X	Project management	**PLO4**: Apply knowledge and skills of project management and business practices to consult, plan, manage and deploy the projects within the constraint of time and resources	Fulfill subjects according to the correlation matrix of PLO4 in the educational program
5	X		Development of solution	**PLO5a**: Apply critical thinking and creativity to upgrade systems and devices in automation and control engineering	Fulfill subjects according to the correlation matrix of PLO5a in the educational program Pass Professional Skills Exam
		X		**PLO5b**: Apply critical thinking and creativity to research and develop new solutions for problems in automation and control engineering	Fulfill subjects according to the correlation matrix of PLO5b in the educational program Pass Professional Skills Exam
6	X		Communication and teamwork skills	**PLO6a**: Coordinate working task in a group and communicate effectively, both oral and writing, on complex engineering activities such as being able	Fulfill subjects according to the correlation matrix of PLO6a in the educational program;

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Enginee-ring			
				to comprehend and write effective technical documents, make effective presentations and defending of their own ideas.	IELTS 5.0 or above certificate (or equivalent certificates)
		X		**PLO6b**: Coordinate working task in a group and communicate effectively, both oral and writing, on complex engineering activities such as being able to comprehend and write effective technical documents, make effective presentations and defending of their own ideas.	Fulfill subjects according to the correlation matrix of PLO6b in the educational program; IELTS 5.5 or above certificate (or equivalent certificates)
7	X		Life-long learning	**PLO7a**: Practice self-study to improve the specialized knowledge enabling them to be leaders or entrepreneurs in automation and control engineering	Fulfill subjects according to the correlation matrix of PLO7a in the educational program
		X		**PLO7b**: Practice self-study and self-research to improve the specialized knowledge enabling them to be scientific experts, leaders or entrepreneurs in automation and control engineering	Fulfill subjects according to the correlation matrix of PLO7b in the educational program
8	X	X	Professio-nal ethics	**PLO8**: Apply ethical principles and commit to professional ethics, responsibilities, and	Fulfill subjects according to the correlation matrix of

No	Degree		Category	PLO Description	Measuring scale
	Bachelor	Enginee-ring			
				health, safety and legal regulations in engineering practice.	PLO8 in the educational program; Achieve training points according to student work regulations; Participate and pass the topics of Essential Skills for Sustainable Development in the educational program;

The following **curriculum** is presented:

Curriculum Overview

Y1

General knowledge

Mathematics   C Programming
Informatics   Physical training
Social & political sciences   English

Soft skills

TDTU culture Attitude
Self-studying
5S and Kaizen skills

AC core courses

Measurement techniques & analytical software Simulation la
Measurement lab
Circuit analysis   Electronic materials
CAD in EE

Y2

General knowledge

Mathematics   Informatics
Physical training   English
Social & political sciences

Soft skills

Attitude
Presentation & communication
Teamworking and leadership

AC core courses

Electric Safety   Electronic Circuit Design & lab
Circuit analysis & lab   Electronic project
Engineering analysis   Digital system design & lab
Electromagnetic field   Control systems
Electric practice

Y3

Soft skills

Critical thinking Startup
Team building and leadership
Decision making

AC core courses

Microcontrollers & lab
Power electronics & lab
Electric machines & lab

AC specialization courses (mandatory)

Signals & systems   PLC & lab
Control systems (digital)   Digital signal processing & lab
Embedded system project   Electrical drives & lab
Graduation internship

Y4

AC specialization courses

Industrial communication network & labs
SCADA   Process control & lab
Individual project

AC elective courses (select 2 courses)

Electrical supply   Renewable energy
Digital system design & lab   Digital image processsing
Robotics   Intelligent control

Graduation Thes

According to website, the following **objectives** and **learning outcomes (intended qualifica-tions profile)** shall be achieved by the Master's degree programme Electrical Engineering:

"**Programme Educational objectives:**

After graduation, the graduates from the Master's program in Electrical Engineering of-fered by Ton Duc Thang University, the graduates will accumulate the following compe-tences:

o	Programme Educational Objectives
1	Conduct the analysis, problem solving and design on core advanced electrical engineering theory.
2	Develop in-depth knowledge in electrical engineering fields.
3	Apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in electrical engineering.
4	Demonstrate professional ethics, social responsibility, entrepreneurship or leadership skills in the workplace, to function professionally in a globally competitive world, to communicate engineering results effectively, and to engage in lifelong learning.

Programme learning outcomes (PLO):

After completion of the Master's program in Electrical Engineering offered by Ton Duc Thang University, the graduates must be able to:

No	Category	PLO Description
1	Knowledge	PLO1: Apply in-depth knowledge of sciences, mathematics and engineering in electrical engineering.
2	Problem formulation	PLO2: Develop mathematical models of engineering processes, calculate strength properties of complex systems using modern tools and design databases for electrical engineering.

3	Engineering analysis	PLO3: Apply scientific knowledge and creativity, analyze, synthesize and critically evaluate data in electrical engineering.
4	Development of solution	PLO4: Conduct reliable theoretical and experimental research using the engineering techniques, skills, and tools required to be able to solve real-world problems in the electrical engineering from initial specifications to a deliverable system.
5	Enegineering practice and product development	PLO5: Design, implement, validate and deploy a component, device, system, or process in electrical engineering to meet desired needs within realistic constraints.
6	Project management	PLO6: Consult, plan, manage and deploy projects related to electrical systems and devices.
7	Communication and teamwork skills	PLO7: Demonstrate skills to work in a professional team in a competitive environment, skills to communicate effectively with the international engineering community, and leadership skills in the workplace.
8	Life-long learning	PLO8: Engage in independent learning and continuous professional development.
9	Professional Ethics	PLO9: Evaluate the impact of electrical engineering solutions in a global, economic, environmental, societal and ethical context, including political issues, health, safety, manufacturability, and sustainability.

The following **curriculum** is presented:

REGULAR MASTER PROGRAM (18 MONTHS): 60 CREDITS

General knowledge (15 credits)		
English (10 credits)	Marxism – Leninism philosophy (3 credits)	Scientific research methodology (2 credits)

Mandatory courses (9 credits)		
Power System Stability and Optimization	Electricity Market Structure and Operation	Intelligent Control

Selective courses (21 credits, including at least 1 advanced research topic)			
Optimal operation in power system research area	**Renewable energy research area**	**Energy Management research area**	**Power system control research area**
Flexible AC Transmission and HVDC	Renewable Sources and Applications	Demand Side Management	Advanced Power Electronics and Applications
Power System Analysis	Advanced Topics in Energy Saving, Renewable and Green Energy Technology	Power Quality Management	Automation Control for Electrical Drives
Advanced Topics in Electricity Market	Advanced Topics in Modern Technology of Electrical Engineering Fields	Reliability Analysis and Risk Management in Power Systems	Advanced Power System Protection and Control
Advanced Topics in Energy Measurement and Supervisory	Smart Grid	Energy Management and Efficiency	SCADA and Substation Automation

Advanced Topics in Electric Safety and Reliability		Analyzing and Managing Energy Projects	Advanced Topics in Control of Electrical Drives

Master Thesis (15 credits)

According to website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Automation and Control Engineering:

"**Programme Educational objectives:**

After graduation, the graduates from the Master's program in Automation and Control Engineering offered by Ton Duc Thang University, the graduates will accumulate the following competences:

No	Programme Educational Objectives
1	Conduct the analysis, problem solving and design on core advanced automation and control engineering theory.
2	Develop in-depth knowledge in automation and control engineering fields.
3	Apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in automation and control engineering.
4	Apply materials, computer-based model designs, systems, processes and tools for research, computation, simulations, analysis, and design in automation and control engineering.

Programme learning outcomes (PLO):

After completion of the Master's program in Automation and Control Engineering offered by Ton Duc Thang University, the graduates must be able to:

No	Category	PLO Description
1	Knowledge	PLO1. Apply in-depth knowledge of sciences, mathematics and engineering in automation and control engineering.

2	Problem formulation	PLO2. Develop mathematical models of engineering processes, calculate strength properties of complex systems using modern tools and design databases for automation and control engineering.
3	Engineering analysis	PLO3. Apply scientific knowledge and creativity, analyze, synthesize and critically evaluate data in automation and control engineering.
4	Development of solution	PLO4. Conduct reliable theoretical and experimental research using the engineering techniques, skills, and tools required to be able to solve real-world problems in the automation and control engineering from initial specifications to a deliverable system.
5	Engineering practice and product development	PLO5. Design, implement, validate and deploy a component, device, system, or process in automation and control engineering to meet desired needs within realistic constraints.
6	Project management	PLO6. Consult, plan, manage and deploy projects related to automation and control systems and devices.
7	Communication and teamwork skills	PLO7. Demonstrate skills to work in a professional team in a competitive environment, skills to communicate effectively with the international engineering community, and leadership skills in the workplace.
8	Life-long learning	PLO8. Engage in independent learning and continuous professional development.
9	Professional Ethics	PLO9. Evaluate the impact of automation and control engineering solutions in a global, economic, environmental, societal and ethical context, including political issues, health, safety, manufacturability, and sustainability.

The following **curriculum** is presented:

REGULAR MASTER PROGRAM (18 MONTHS): 60 CREDITS			

General knowledge (15 credits)			
English (10 credits)		Marxism – Leninism philosophy (3 credits)	Scientific research methodology (2 credits)

Mandatory courses (9 credits)			
Nonlinear and Adaptive Control		Optimal and Robust Control	Intelligent Control

Selective courses (21 credits, including at least 1 advanced research topic)			
Robot research area	**Mechatronics research area**	**Measurement research area**	**Control of Electrical Drives research area**
Robotics	Microcontroller and Embedded Systems	Advanced Digital Signal Processing	Advanced Power Electronics and Applications
Multivariable Control	Advanced Digital Image Processing	Wireless Sensor Network	Automation Control for Electrical Drives
CIM & FMS	VHDL	Renewable Sources and Applications	Modelling & System Identification
Automation for Process Control			
Advanced Topics in Robot	*Advanced Topics in Mechatronics*	*Advanced Topics in Measurement*	*Advanced Topics in Control of Electrical Drives*

Master Thesis (15 credits)			