ASIIN Seal & Euro-Inf® & EUR-ACE® Label

Accreditation Report

National Engineering Diploma
Computer Science
Electrical Engineering
Electromechanical Engineering

Provided by
École Internationale Supérieure Privée Polytechnique de Sousse (EPI)

Version: 25 March 2025

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]
Diplôme National d'Ingénieur en Génie Informatique	National Computer Science Engineering Diploma	ASIIN, Euro-Inf® Label	ASIIN, 20.09.2019-30.09.2024 (with extension until 2025)	04
Diplôme National d'Ingénieur en Génie Electrique	National Electrical Engineering Diploma	ASIIN, EUR-ACE® Label	ASIIN, 20.09.2019-30.09.2024 (with extension until 2025)	02
Diplôme National d'Ingénieur en Génie Electromécanique	National Electromechanical Engineering Diploma	ASIIN, EUR-ACE® Label	ASIIN, 20.09.2019-30.09.2024 (with extension until 2025)	02
Date of the contract: 17.08.2023 **Submission of the final version of the self-assessment report:** 03.06.2024 **Date of the onsite visit:** 22.-23.10.2024 **at:** EPI Campus, Sousse				
Expert panel:				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes; Euro-Inf®: Label European Label for Informatics

[2] TC: Technical Committee for the following subject areas: TC 02 - Electrical Engineering/Information Technology; TC 04 - Informatics/Computer Science.

apl. Prof. Dr.-Ing. Dipl. Phys. Habil Kirsten Weide-Zaage, Leibniz University of Hannover Dr. Nawel Souissi, Private Institute for Science and Technology in applied Informatics-PRISTINI School of AI Prof. Dr. Andreas Schwill, University of Potsdam Alfred Schulte, Robert Bosch GmbH Mohamed Anis Oueslati, Université de la Manouba	
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 7, 2021 Subject-Specific Criteria Technical Committee 02 – Electrical Engineering/Information Technology as of September 23, 2022 Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
NED Computer Science	National Engineering diploma in Computer Science	- Software Engineering - Artificial Intelligence - Cybersecurity - Cloud Computing - Internet of things and Robotics Programming -Virtual Reality and Game Engineering	7	Full time	/	6 Semesters	180 ECTS	09/11/2011
NED Electrical Engineering	National Engineering diploma in Electrical Engineering	- Embedded Systems - Industrial Control - Biomedical Instruments	7	Full time	/	6 Semesters	180 ECTS	22/10/2012
NED Electromechanical Engineering	National Engineering diploma in Electromechanical Engineering	- Automation and Mechatronics - Aeronautics - Industrial Maintenance	7	Full time	/	6 Semesters	180 ECTS	08/09/2011

"The Ecole Internationale Supérieure Privée Polytechnique de Sousse (EPI) is a multi-disciplinary engineering Grande Ecole specialising in the fields of Information and Communication Technologies, Civil Engineering, Electronics, Mechanics, etc."

EPI includes several specialized schools focused on different areas of education:

- School of Engineering – Offers engineering programmes in various disciplines.
- School of Business – Provides education in business management and related fields.
- School of Architecture and Design – Focuses on architecture, interior design, and urban planning.
- School of IT and Digital Technologies – Specializes in information technology, digital innovation, and computer science.

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

"EPI is a private higher education establishment (State-approved under No. 02-2011) whose mission is to contribute to the training of engineers and technical executives, to carry out applied research and technology transfer activities, to implement partnership actions with companies and universities (national and international) and to participate in the dissemination of scientific and technological culture."

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

„The aim of the Computer Engineering training at the École Internationale Supérieure Privée Polytechnique de Sousse (EPI) is to train future engineers capable of taking responsibility for large-scale projects in the areas of "software development", "Internet of Things and Robotics", "Virtual Reality and Game Development", "Cyber Security and Cryptography", "Artificial Intelligence and Data Sciences" and "Cloud Computing and Networks".

The student thus begins his training at the EPI with two semesters of common core, at the end of which he has the possibility of choosing between 6 areas of specialization. The specialty training thus lasts 4 semesters, the last semester being reserved for the end-of-studies project."

For the Master's degree programme Electrical Engineering the institution has presented the following profile in the self-assessment report:

"EPI-Polytec's Electrical Engineering course is multi-disciplinary, covering several areas of current interest and enabling graduate engineers to integrate the Tunisian or foreign industrial fabric and to apply their skills in various sectors, particularly in the medical field, Telecommunication, agricultural, textile, etc. This multidisciplinary training is highly appreciated by the major national and international industrial groups and also by several international research laboratories where many of our students have prepared their graduation projects and have continued their Master's degree.

The target professions for electrical engineers, as referenced in the ASIIN accreditation guide, include:

1. Power Systems Engineer: Specializing in the generation, transmission, and distribution of electrical power, including grid optimization and renewable energy integration.
2. Electronics Engineer: Designing, testing, and manufacturing electronic components and systems, such as circuits, sensors, and microprocessors.

3. Control Systems Engineer: Designing and optimizing control systems for various applications, including robotics, manufacturing, and automotive systems.
4. Renewable Energy Engineer: Designing, installing, and maintaining renewable energy systems such as solar panels, wind turbines, and hydroelectric systems.
5. Telecommunications Engineer: Designing and managing telecommunications systems, including wireless networks, fiber optics, and satellite communications.
6. Instrumentation Engineer: Developing and maintaining instrumentation and measurement systems used in various industries, such as aerospace, automotive, and healthcare.
7. Automation Engineer: Designing, implementing, and maintaining automated systems for industrial processes, including PLC programming and robotic automation.
8. Power Electronics Engineer: Designing and optimizing power electronics systems, including inverters, converters, and motor drives, for applications such as electric vehicles and renewable energy systems.
9. Embedded Systems Engineer: Developing software and hardware for embedded systems used in consumer electronics, automotive systems, and IoT devices.

These professions demonstrate the diverse career opportunities available to electrical engineers, spanning industries such as power generation, electronics, telecommunications, and automation."

For the Master's degree programme Electromechanical Engineering the institution has presented the following profile in the self-assessment report:

The Electromechanical Engineer at the International Multidisciplinary School EPI-Polytechnique Sousse acquires training including the fundamental aspects, as well as cutting-edge news, of electricity and mechanics.

It designs and tests equipment in various sectors such as energy, aeronautics, production, IT, biomedical, robotization, etc.

The fields of involvement of the versatile engineer cover a wide range of professional activities:

- Master the necessary tools for the production and development of electromechanical systems.
- Lead projects integrating the design, construction and analysis of systems in industrial and economic environments.
- Manage and mobilize human resources and material resources

- Must possess a set of technical, economic, social, etc. knowledge

To this end, this engineer is called upon to:

- Estimate manufacturing costs,
- Monitor the manufacturing, assembly, verification and maintenance of products,
- Ensure the assembly of prototypes and the manufacturing, testing and installation of devices to ensure high quality manufacturing.
- Take care of writing guides for the evaluation, operation and maintenance of installations.
- Ensure that the designed product meets safety and quality standards as well as technical specifications."

C Expert 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:

- Objective-module-matrices
- Programme Handbooks
- Self-Assessment Report
- Study plans
- Module descriptions
- Website
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee Computer Science and the Technical Committee Electrical Engineering and Information Technology as a basis for judging whether the intended learning outcomes of the three programmes correspond with the competences as outlined by the SSCs.

The experts note that the programme learning outcomes including the objective-module-matrices can be found on the websites of the three study programmes, in the respective Study Programme Handbook and Diploma Supplement as well as in the Self-Assessment Report. They confirm that the intended learning outcomes are transparently anchored and published and thus are available to students, lecturers and interested third parties.

The National Engineering Diploma (NED) Computer Science programme offers six specializations:

[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.

- Software Engineering
- Artificial Intelligence
- Cybersecurity
- Cloud Computing
- Internet of things and Robotics Programming
- Virtual Reality and Game Engineering

Depending on the specialization selected by the students, they will receive a different qualification profile. Graduates of the specialization in Software Engineering will be able to develop and optimize software and have skills in modeling and object-oriented programming, web development, native mobile development, hybrid development, design patterns, virtualization and cloud services, software testing, DevOps processes, business intelligence, Machine Learning, Deep Learning, as well as skills in interpersonal communication. Students, who take the specialization Artificial Intelligence, will have an understanding of the basics of AI and data science as well as advanced techniques such as machine learning and natural language processing. This allows them to develop their ability to solve real-world problems using AI and data science techniques, while developing their skills in programming, data analysis and solution design. Students of the Cybersecurity Specialization will gain an in-depth understanding of concepts and tools related to advanced network administration, and the administration of information security solutions, while developing their practical skills through concrete projects. By working on these projects, students gain experience that prepares them to enter the job market with the skills and confidence needed to succeed in Security Expert, Information Systems Manager (CISO) roles or Information Systems Directors (DSI). The specialization in Cloud Computing and Networks aims to train students in the design, implementation and management of infrastructure and IT solutions based on the Cloud. This results in varied missions: analysis of the data storage system and audit, selection of the most appropriate Cloud services, creation of scalable architectures, etc. while relying on technologies like AWS, Microsoft Azure, Google Cloud Platform, etc. The specializations in IoT and Robotic Programming aims to train students in designing interconnected computer systems and intelligent robots. Graduates will be able to design and deploy innovative solutions suitable for different sectors such as manufacturing, healthcare, smart cities and agriculture. The specialization in Virtual Reality and Game Engineering aims to train students in the design, development and management of innovative systems and applications in the fields of virtual reality (VR), augmented reality (AR) and video games. A more detailed explanation of the professional classification for each specialization is provided in the self-assessment report.

The NED programme in Electrical Engineering programme is divided into three specializations:

- Embedded Networks and Systems
- Biomedical Instrumentation
- Industrial Control

Students in the Electrical Engineering programme will acquire a foundation in core areas such as analog and digital electronics, power electronics, automation, and telecommunications, enabling them to analyze, design, and implement complex systems. Moreover, depending on the specialization, graduates gain expertise in specialized fields such as biomedical instrumentation, embedded systems, and industrial control, developing skills in medical device maintenance, mobile development, and designing control strategies for industrial systems. Students will also develop scientific research abilities, including critical analysis, time management, and teamwork for applied projects. Additionally, they will acquire leadership and project management skills, along with knowledge of company management, quality procedures, and safety standards. Finally, students will be prepared to address modern challenges in renewable energy, smart grids, and the integration of information and communication technologies in various sectors.

In the NED programme Electromechanical Engineering, students can choose between the following three specializations:

- Automatic and mechatronics
- Aeronautics
- Industrial maintenance

Graduates of the Electromechanical Engineering programme at the EPI-Polytechnique Sousse acquire a range of skills, combining theoretical and practical knowledge of mechanics, electricity and industrial systems. They learn to design, test and maintain equipment in sectors such as energy, robotics, aeronautics and biomedical engineering. Their training emphasises project management, resource mobilisation, safety standards and quality assurance, while promoting innovation, ethical practice and global adaptability. Specialist skills include automation, mechatronics, renewable energy, product design and systems optimisation, as well as research and technical problem-solving. These skills prepare graduates for roles such as automation engineer, power systems engineer and robotics engineer, enabling them to thrive in multidisciplinary and international contexts.

The experts review the intended learning outcomes of the three programmes and confirm that their level adequately reflects EQF level 7. The experts also agree that they are in line with the ASIIN Subject Specific Criteria (SSC) of the Technical Committee on Electrical Engineering and Information Technology and the Technical Committee on Computer Science and thereby in line with the criteria used to award the Euro-Inf® Label.

Nonetheless, the experts find that they are very extensive and in some cases relate more to the topics covered in the respective programmes than to the actual competences. In addition, the description is sometimes generic to the general field of engineering rather than focusing on subject-specific learning outcomes. This observation applies to both the programme learning outcomes and the module learning outcomes. The experts therefore urge that the intended learning outcomes and objectives at programme and module level be revised so that they are clear, precise and competence-oriented. Learning outcomes should refer to the full range of competences, as suggested, for example, by the Dublin descriptors.

Since EPI-Polytechnique Sousse also applied for the EUR-ACE® label for the Electrical and Electromechanical Engineering programmes, the experts check whether the learning outcomes are aligned with the EUR-ACE® Framework Standards and Guidelines (EAFSG) for engineering programmes. The EUR-ACE® Framework Standards and Guidelines requires that engineering programmes cover the following seven competence areas: Knowledge and Understanding, Engineering Analysis, Engineering Design, Investigations, Engineering Practice, Making Judgements Communication and Team-working, and Lifelong Learning. The self-assessment report and the module descriptions illustrate that the degree programmes under review cover all the required competence areas such as engineering analysis, design, and practice as well as communication and team-working skills. The experts are convinced that the mentioned competences are conveyed in the respective courses. They conclude that the intended learning outcomes of all programmes are aligned with the EUR-ACE® Framework Standards and Guidelines (EAFSG).

The experts discuss the professional classification illustrated for each programme and specialization and conclude that these are plausible and in line with the intended learning outcomes and objectives. They confirm that the individual qualification profiles allow students to take up an occupation, which corresponds to their qualification. They learn that the graduates of EPI are much sought after in the labour market. The representatives of industry emphasize the high quality of the graduates of the programme under review and students as well as graduates are satisfied with and well aware of their good job perspectives.

During the audit, the experts learn that all programmes at EPI Sousse are regularly reviewed, including the intended learning outcomes. This process involves all relevant stakeholders such as students (e.g. through surveys), alumni, teachers and industry partners. Minor adjustments to programmes are made every year, while major revisions, including stakeholder consultations, take place every three to five years.

In summary, the experts confirm that the three NED programmes adequately reflect level 7 of the European Qualification Framework (EQF). The programme learning outcomes are

consistent with the respective ASIIN Subject-Specific Criteria of the Technical Committees of Electrical Engineering & Information Technology and Computer Science as well as the EUR-ACE and Euro-Inf framework standards. They aim at the acquisition of specific competences and are well-anchored, binding and easily accessible to all stakeholders.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Self-Assessment Report
- Diploma Supplements
- Programme Handbooks
- Website of the Study Programmes

Preliminary assessment and analysis of the experts:
The degree programmes are taught in French, which is matched by the French name of the degree programmes “Ingénieur en Génie Informatique”, “Ingénieur en Génie Electrique” and “Ingénieur en Génie Electromécanique”. Furthermore, EPI issues English translations of Diploma documents and provides translated versions of the websites of the study programmes as well as of the programme handbooks.

The experts confirm that the titles of each programme correspond to the intended objectives and learning outcomes and to the content of the programme. They also verify that, in the case of the Electrical and Electromechanical Engineering programme, the French and English versions of the titles are used consistently. However, in the case of Computer Science, the experts note that there are different versions of the English programme title found in various documents/sources. For example, while the self-assessment report always refers to 'Computer Science', the Diploma Supplement, the Module Handbook and the programme website refer to 'Computer Engineering'. In some other sources the term "Computer Science Engineering" can be found. The programme coordinators state in the review that they are aware of the discrepancies in the English programme title and that they intend to address this issue. The experts support the programme coordinators' plans and urge them to ensure that the same programme title is used in all sources.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans
- Internal regulations

- Academic calendar
- Module descriptions
- Overview of students' mobility
- Objective-module-matrices
- Discussions during the audit

Preliminary assessment and analysis of the experts:
Structure & Content

EPI is a private school accredited by the Tunisian Ministry of Higher Education and Scientific Research. Since its foundation in 2003, EPI has focused on providing quality education in engineering, computer science, and other technical fields, combining academic knowledge with practical experience to prepare students for the demands of the global job market. Industry internships allow students to get professional experience while progressing in their curriculum.

At EPI, each student has to undertake a two-year long preparatory course (which is worth 120 ECTS) before beginning with their speciality, in this case computer science and electrical or electromechanical engineering. The "preparatory cycle" is open to individuals passing their final secondary education examination with success and holding the Baccalaureate, SAT, or equivalent diploma in science or technology fields. It allows graduates to access one of the study fields offered by the school without competitive examination, as the transition is made based on continuous assessment.

The preparatory cycle encompasses common subjects like mathematics, physics, chemistry, computer sciences, engineering principles, communication and design as well as language classes in French and English. With regard to the language courses, the four language skills listening, speaking, reading and writing are continuously assessed through various projects and activities. Students who reach at least intermediate level B (there are levels A, B and C) receive specialized preparation for the TOIEC exam while those studying French are similarly prepared for the DELF exam. Both the DELF and the TOIEC exams are offered for free. EPI signed three partnerships with international language centres (AMIDEAST, The British Council and The French Institute). The mentioned subjects are taught for all students at EPI and are supplemented with specialized subjects related to the aimed engineering degree.

After the second year of study, students decide which of the engineering study programmes they want to pursue. In the following, the discussion of the curricula will focus on those three years when students study their specification ("engineering cycle"). At EPI, those are the last three years of a five-year programme. Yet, as presented under criterion

1.4, the study programmes may also be studied by students, who have already achieved a Bachelor's degree or a License.

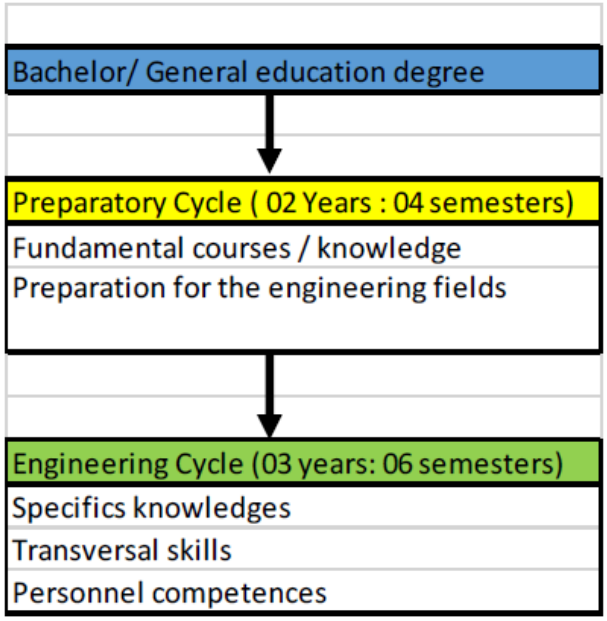
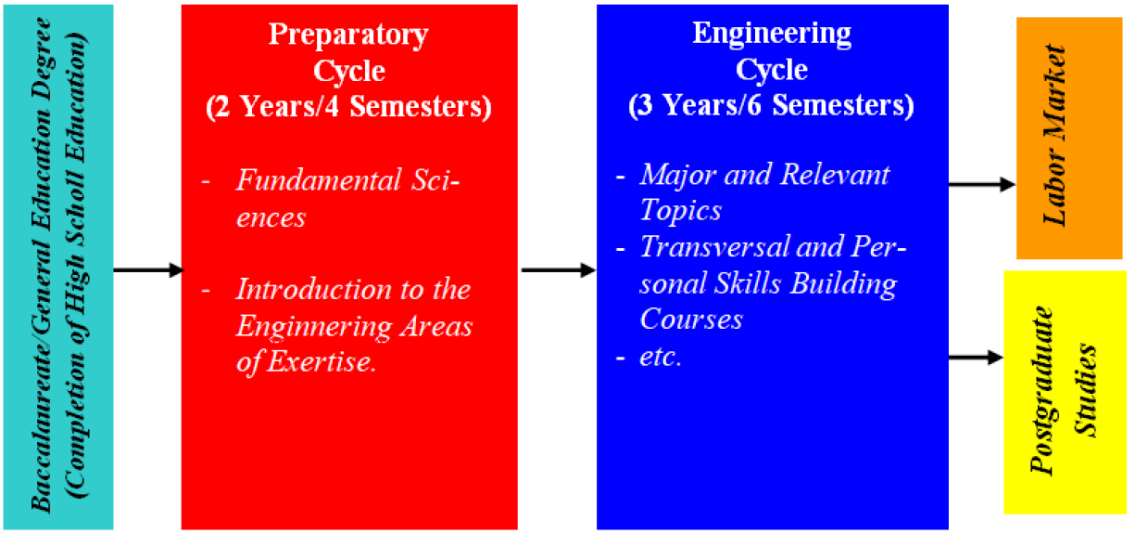


Figure 2: Curriculum Structure

In the Self-Assessment Report and the curricula, EPI describes how the learning outcomes of the three degree programmes are to be achieved in the individual modules and thus explains the significance of each module for the programmes as a whole. The curricula are reviewed by the experts in order to identify whether the described learning objectives can be achieved by the available modules. Course descriptions as well as matrices matching the general learning objectives (subdivided into knowledge, skills and competences) and the module contents were provided for a detailed analysis.

The three programmes under review are designed for three years and offered as full-time study programmes. To complete the engineering cycle, students must acquire at least 180 ECTS credits so that they receive the National Diploma with a total of 300 ECTS credits at the end of their 5-year training programme. Students can extend their study time if needed; the maximum time allowed for students to finish the preparatory cycle is three years, whereas it is a maximum of four years in the engineering cycle. At EPI, each semester is equivalent to 16 weeks, including 14 weeks of learning activities and two weeks of examination (midterm and final exams).

The following figure illustrates the structure of the programmes under review:



The Computer Science programme is structured so that students spend the first academic year together and then choose one of six specialisations: Software Engineering, Artificial Intelligence, Cybersecurity, Cloud Computing, Internet of Things and Robotics Programming, and Virtual Reality and Game Engineering. The specialisation lasts three semesters. In the sixth and last semester, students carry out the final project (PFE), which is worth 24 credits.

The Electrical Engineering programme is designed so that the first three semesters consist of a common core that all students complete. In the fourth and fifth semesters, students are divided into three specialisations: Embedded Networks and Systems, Biomedical Instrumentation and Industrial Control. The final semester is reserved for the Final Project (PFE) (24 credits).

The Electromechanical Engineering programme has a larger common core than the other two programmes. Here, students study the first four semesters together and only divide into three specialisations in the fifth semester: Automatic and Mechatronics, Aeronautics and Industrial Maintenance. In the last semester, students also complete the final project (PFE) (24 credits).

Apart from the specialization areas, there are no elective modules for the students; yet, students can further specialize or choose to focus their expertise through the two mandatory internships as well as PFA and the PFE. The graduation research project can be completed with an industry partner for a more practical or within a research team at EPI for a more academic focus. Students can also individualize their qualifications profile by participating in student clubs or associations, as well as their individual projects during the practical workshops of the study programmes.

The detailed study plans of both study programmes can be found at the end of this report.

In the self-assessment report, EPI states that it considers practical training a fundamental basis for Engineering students to constitute the strength of the qualification granted by the diploma. As such, the study programmes under review currently entail four different kinds of practical trainings. First, practical work is carried out in the laboratories. Here, students put into practice the theoretical knowledge they have received during their courses. Second, students undertake projects. At the end of the second year, students have to complete a research project (PFA). Here, students develop and research a theme relating to a subject of their field of study and capture the findings in a report and/or a presentation. Third, students have to participate in two mandatory internships that have each one-month standard duration, in order to gain an understanding of the nature of working in an EPI's industrial partners' facility of their chosen area. The first internship is supposed to be done right after the end of the first year of the engineering cycle, whereas the second internship is completed right after the end of the second year of the engineering cycle. Finally, the graduation project (PFE) enables students to carry out practical work associated with this project at the industrial level. Here, they must apply all the theoretical and practical knowledge they have received during their years of study. The practical training is valued by the students as this allows them to apply the skills they learned in the programmes in a real working environment. The students point out that the university, especially the internship department, is very supportive in finding placements for the internships and always encourages them to gain as much practical experience as possible. The experts are also generally satisfied with the practical aspects of the programmes as this can additionally help the students to specialize in a particular field of interest.

The university has established useful guidelines for these internships and every student has one advisor at the company and one at the university to ensure that the work contributes to achieving the programme's learning outcomes. The assessment methods to evaluate this phase is comprehensive and includes a written report and a presentation of their results in front of a jury. The evaluation takes into account the aspects work plan, discipline, teamwork, programme implementation, and activity report.

The experts review the three curricula and find that the three programmes under review provide a high level of education in the respective technical field at EQF level 7 and are in line with the SSC of the Technical Committees Electrical Engineering/Information Technology and Computer Science. They also confirm that three curricula are designed to provide students with the engineering competences required by the EUR-ACE® Framework Standards and Guidelines (EAFSG) and by EQANIE, which is responsible for providing the Euro-Inf® label.

Nevertheless, the experts see room for improvement in each of the three programmes. In particular, they are critical of the specialisations. On the one hand, the experts appreciate the integration of different specialisations in the three programmes, as this allows students to follow their personal interests and build up a unique expertise. They also welcome the inclusion of different specialisations that reflect current developments in science and technology, such as Artificial Intelligence and Virtual Reality and Game Engineering in the Computer Science programme. On the other hand, the experts consider that the precise implementation of the specialisations and their integration into the study programmes is lacking.

In the Electrical Engineering programme, for example, the experts discuss in particular the "Biomedical Instruments" specialisation with the programme coordinators. First of all, the experts wonder whether this specialisation can be reasonably integrated into the programme, as it refers to a large discipline that is even offered as a separate programme at many other universities. The programme coordinators explain that they introduced this specialisation in response to feedback from industry that there was a need for more biomedical engineers. The experts appreciate that the inclusion of this specialisation is based on the needs of the industry and confirm that they also consider it to be a relevant discipline. However, they advise EPI to ensure that the specialisation covers the field sufficiently whilst being well integrated into the rest of the programme. In addition, the experts note inconsistencies in the module descriptions of this specialisation. For example, the module "Biology" introduces the topic cell biology, but not the whole science behind the term biology. The same applies to the module "Sterilisation", where the title of the module suggests that it covers a much wider field than it actually does. The experts also point out that the actual content description is fine and makes a valuable contribution to the specialisation as well as to the programme in general. However, they urge EPI to revise the module descriptions, as several module titles use terms that refer to relatively large disciplines, whereas only parts of these disciplines are actually covered in the respective modules. They therefore request that the titles, content description and module learning outcomes be brought into line.

The experts identify even greater shortcomings in the Electromechanical Engineering programme. Although they consider the disciplines of "Aeronautics" and "Automation and Mechatronics" to be relevant fields in themselves, the experts consider them to be too broad to be covered in a specialisation lasting only one semester. For example, the experts consider that the content currently taught within the one semester of each specialisation only provides students with an overview or introduction to Aeronautics and Automation and Mechatronics respectively, and does not provide a deep insight into each discipline as suggested by the title of the specialisation or the learning outcomes.

The experts therefore suggest either dropping the two specialisations and, alternatively, perhaps offering only a few modules in this area as electives, or extending each specialisation to at least two semesters and, consequently, significantly increasing the content taught within each specialisation. In addition, the experts note that the content taught in the two specialisations does not fully match the specialisation title in terms of technical congruence. For example, in 'Automation and Mechatronics', there is little automation content and this needs to be expanded to adequately reflect the title. Overall, the experts require the EPI to ensure that the title, content and learning outcomes of the specialisations are consistent.

In the context of the Electromechanical Engineering study programme, the experts also address the issue of the inadequate coverage of Embedded Systems in the curriculum. It is noted that the subject is addressed in only one module, entitled "Connected objects (IOT)", albeit in a relatively limited capacity. Given the pivotal role of Embedded Systems in the Electromechanical Engineering discipline and its indispensability to the attainment of the programme's learning outcomes, the experts call for the integration of a more substantial Embedded Systems component into the curriculum.

In discussions with programme coordinators and teachers, the experts learn that students have the opportunity to obtain various certificates, e.g. in Microsoft Office. However, students in the two programmes, Electrical Engineering and Electromechanical Engineering, report that they would like more opportunities to obtain, or at least be prepared to obtain, certificates in their respective technical fields. The experts think this is a good idea. Recognising the financial and administrative limitations of directly awarding certificates, the experts recommend that students should be given the opportunity to prepare for certificates in Industrial Controlling in Electrical Engineering, and in Automation and Mechatronics in Electromechanical Engineering (e.g. from Siemens).

According to the self-assessment report, the programme coordinators of the Computer Science degree programme have recently decided to introduce a preparatory cycle specifically tailored to the Computer Science degree programme, as has already been introduced for the Electrical Engineering and Electromechanical Engineering degree programmes. During the audit, the experts receive a study plan with the module titles of the new preparatory cycle. They welcome the introduction of a specific preparatory cycle for Computer Science. However, they note several identical modules in the preparatory cycle and in the NED programme in Computer Science. They therefore ask whether it is intended to revise the curriculum of the NED programme in order to avoid repetition. The programme coordinators explain that they plan to have a trial year to test the new prep cycle curriculum. They then intend to review the curriculum of the NED programme in the light of the prep cycle and update the curriculum if necessary. They also explain that there are in fact no repetitions

between the prep cycle and the NED programme, because although the module titles may be the same, the actual content of the subjects is different. The experts are pleased to hear that the repetitions seem to be the result of rather unspecific module titles which misleadingly give the impression that the same content is being taught. Nevertheless, the experts request EPI Sousse to provide the detailed module descriptions of the preparatory cycle in order to compare them with the modules offered in the NED programmes and to verify the differences. In general, the experts ask EPI Sousse to ensure that the NED programme in Computer Science only includes modules corresponding to EQF level 7.

Furthermore, after reviewing the module descriptions, the experts have the impression that several important elements in the foundations of theoretical computer science are missing from the Computer Science programme. For example, they miss content on Turing machine, computability, complexity, NP-completeness, run-time order, and Chomsky's hierarchy. In the audit discussion with the programme coordinators and teachers, they learn that these elements are actually taught, but are not included in the content descriptions of the modules. For example, introduction to Turing Machines is taught in the Artificial Intelligence specialisation, and NP-completeness is covered in the context of Advanced Algorithms. Similarly, other apparently missing content is covered in other modules. The experts are glad to hear that these important fundamentals are covered in the programmes. However, for transparency to all stakeholders, they request that the module descriptions be revised to reflect what is actually taught.

Furthermore, the experts wondered why Logic Programming and Prolog are not contained in the curriculum, not even in the AI specialization, while Logic Programming is mentioned as a prerequisite in module “Artificial Intelligence Foundations”. The experts ask the university to correct this and other discrepancies and thoroughly edit the module handbook.

Overall, the experts consider the Computer Science programme to be of high quality and to teach state-of-the-art content. However, the experts recommend including even more advanced content such as generative AI. They also suggest that more resources should be made available to students for the developing and running AI models and Generative AI models especially real data and adequate computational resources.

In general, when reviewing the curricula and module descriptions of the three programmes, the experts note that there are many small modules, such as "Python", which is worth only 2 ECTS points. During the audit discussions, the programme coordinators explain that they deliberately keep some modules so small because they prefer to have modules that are very specialised and focused on a specific topic. The experts can understand this, but still suggest that consideration be given to combining smaller modules that also cover similar topics in order to advance the level of the content covered in the modules

e.g. combining Data base and DBMS workshop, Advanced Algorithmics 1+2, Object Oriented Programming and Object Modeling.

Periodic Curriculum Review

The curricula are regularly reviewed and commented on by students and teachers, as well as external stakeholders such as alumni or private sector partners. Changes are made on a regular basis to ensure that the curricula meet modern standards. In addition to EPI's own objectives and learning outcomes, the curricula take into account industry recommendations, international higher education standards and curricula from other universities around the world. For example, the decision to add the different specialisations to the programmes under review was based on feedback from industry and students a few years ago.

International mobility

The Self-Assessment report as well as the discussions make it very clear that international recognition is one of EPI’s primary goals for the next years. The experts learn that the university already provides various mobility opportunities for students. These include semesters abroad, short programmes, internships, and international conferences. To foster these, there are cooperation agreements with several partner institutions worldwide, for instance in France, Bulgaria and China.

Students are encouraged to go on exchange specifically during the final stage of their studies, either during the internship period or while writing the final theses. Partly due to the COVID-19 pandemic, the number of students participating in mobility programmes between 2020 and 2021 was relatively low, but is increasing again after the pandemic. A Student Affairs Office has been established in order to coordinate EPI’s efforts and to support the students in the planning and administration of international mobility. Moreover, the university provides scholarships for international mobility programmes and manages various external scholarships sponsored by the Tunisian government or the European Union.

Qualifications obtained at other universities in Tunisia or abroad are recognized in line with the courses at EPI. Before a stay abroad, the university concludes a learning agreement with the respective student to ensure that the courses taken are relevant to the study programme and can thus be recognized.

In their discussion with the experts, the students confirm the existence of opportunities for international academic mobility. The experts appreciate the efforts to promote international mobility and encourage EPI to continue in this direction. However, they also see the need for more international exchange opportunities. As a university who is seeking to become internationally recognized, EPI should continue to increase the number of incoming and outgoing engineering students. During the audit discussions, students express a clear

interest in more places and better endowed scholarships for long and short-term stays abroad. The number of available places in the exchange programmes is still limited. EPI can only provide limited amount of places and travel grants, while the demand from students is rising. The lack of available places and financial support hinders students from joining the outgoing programmes. Therefore, the experts recommend increasing the efforts to further internationalize EPI by establishing more international cooperations, for instance, for internships, conferences and publications as well as exchange programmes, by offering more and better-endowed scholarships and by better communicating the existing offers to the students.

Criterion 1.4 Admission Requirements

Evidence:

- Self-Assessment Report
- Admission regulations
- Website
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The admission requirements and conditions are defined for all three study programmes under review in the admission regulations. In accordance with the provision of Law No. 73/2000, regulating private higher education in Tunisia, two types of admissions are possible: admission through the preparatory cycle and direct admission to the study programmes (engineering cycles).

The preparatory cycle is open for all students holding a technical baccalaureate. Students that have completed this two-year preparatory cycle have a right to choose any of the offered engineering programmes at EPI.

It is also possible to apply directly to the engineering programmes. Any student, whether Tunisian or international, is eligible for the study programmes if he or she holds a technology license (EQF 6) matching the chosen engineering course, a Master's degree or has completed a preparatory cycle at a different university. Master's degree students may directly advance to the second year of the chosen programme if they have already achieved the necessary skills and knowledge in their previous degree.

EPI selects students based on the application form, which can be downloaded from the website, an interview and a multiple choice test (for French and English level assessment). The programme coordinators also stress that the interview and the students' motivation

are the main criteria for selecting the students, alongside their capabilities in Mathematics, Physics and English.

If students apply from outside (e.g. with a licence) and have not already completed the preparatory cycle at EPI, the admission jury checks whether the student's previous achievements are appropriate and sufficient to ensure that the student will be able to successfully achieve the learning outcomes of the relevant NED programme. During the audit, the experts inquire about how this process works and what the exact technical requirements are for each programme. The programme coordinators explain that the admission jury examines the student's transcript and checks whether certain knowledge and learning outcomes that correspond to the respective NED programme have already been achieved. If only a few competences are missing, it is possible that students will be required to take compensatory modules. The experts welcome this process, but point out that this process is not detailed in an official document, nor are the exact technical requirements or the completion of compensation modules defined. They therefore call for these aspects to be officially and bindingly defined and thus made transparent to all stakeholders.

The 2021-2024 data for the programmes show a relatively stable number of applicants and admitted students. Over the last three academic years, the Computer Science programme has received between 223 and 293 applications for a maximum of 500 places. In Electrical Engineering there were between 24 and 34 applications for 100 places, and in Electromechanical Engineering between 34 and 49 applications for 100 places. On average over the last three years, around 95% of applicants have been admitted to all three programmes. Overall, the experts note that the number of applicants and the number of students admitted have remained relatively similar in recent years. They are pleased that the programmes remain relatively popular and consider the ratio of applicants to admitted students in both programmes to be reasonable.

During the discussion with the students, the experts gain the impression that students are well informed about the admission requirements and procedures as all necessary information is gathered on EPI's website. Since the rules are based on decrees by the ministry, the experts deem them binding, transparent and adequate for selecting the best students for the degree programmes. However, it should be made clear what the exact subject-specific requirements and to what extent graduates of a license can catch up on the content of the preparatory cycle.

Criterion 1.5 Workload and Credits

Evidence:

- Self-Assessment Report

- Internal regulations
- Website
- Discussions during the audit

Preliminary assessment and analysis of the experts:
All modules in the three programmes are assigned ECTS credits. The workload is spread evenly over the semesters. Every semester in the three programmes comprises 30 ECTS credits while each credit is valued 25 working hours (including lecture hours and self-study hours). Feedback concerning the workload is collected through the course evaluation survey at the end of each semester and adaptions are made if necessary.

The experts confirm that the class hours are indicated in the module descriptions. However, the distinction between classroom work and self-studies is so far not made transparent in the module descriptions. EPI makes the workload distribution of classroom hours and self-study time transparent in detailed tables in the Self-Assessment Report. However, this distribution must also be publicly comprehensible for students. The extent to which self-study time has to be shown in the module descriptions as part of the workload distribution is explained in more detail in chapter 4.1.

As mentioned before, the experts notice that many modules are quite small in terms of credit points and they worry that this might lead to a high number of exams per semester and consequently to a heavy workload for the students. They learn that this is to some extent countered by the fact that only half the exams are written exams while the remaining exams are covered by presentations and project work. Moreover, the length of the exams is proportionate to the amount of credit points for the module. The students also emphasise that they consider the workload high but manageable. As the statistical data provided by EPI shows, the average length of study was six semesters in the past few years in the three programmes under review. Additionally, the experts see that almost all students complete the degree programmes as there are only 4 % of the students who dropped out of the three degree programmes in the last years. The data verifies that the degree programmes under review can be completed in the expected period.

During the on-site visit, the students confirm that the workload is generally well reflected by the number of credits awarded and equally divided through the study years and programmes. They also emphasize that they have enough time for repetition and self-study. The experts consider the workload to be overall manageable and transparent.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

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

Preliminary assessment and analysis of the experts:
From the presented material as well as the discussions on-site, it becomes apparent that the pedagogical skills and adequate teaching methodology are highly valued at EPI and in the programmes under review. The pedagogical skills and teaching methods are also part of the evaluations that EPI carries out for each course.

As was already pointed out, the teaching methodology in the programmes is strongly attached to practical approaches and the students' ability to find adequate jobs after the completion of both programmes. Teaching is usually done in the form of (interactive) lectures, seminars, role plays and simulations, tutorials and practical work. 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 and soft skills. To support the practical orientation and familiarise students with academic research methods, both programmes contain a large number of projects and an end-of-year project at the end of the fourth semester (PFA), next to the final project, which is also aimed at the practical application of the competencies acquired during the studies.

The used teaching methods at EPI are generally as follows:

- Lecture: The teacher presents the lesson and responds to students' questions.
- Interactive Lecture: The teacher delivers the lesson, interspersed with activities involving both students and the teacher.
- Direct Instruction: The teacher presents the lesson and provides guidance for independent student work during practical sessions.
- Project-Based Learning: Students apply course concepts to complete a specific project.
- Field Work: Students apply course material in real-world settings.

EPI also submits an overview for each degree programme showing the learning methods used for each module.

To support teaching and learning activities at EPI, all classrooms and laboratories are equipped with computers, projectors, and internet access. In addition, students have full access to the (physical and virtual) library of EPI. During the audit, students state that they are very satisfied overall with the learning methods used, confirming that they are implemented in a diverse and goal-orientated way.

Moreover, at EPI, the Human Resources Management and the programme managers are responsible for staff training. They annually revise their measures for professional development and maintaining professional expertise. Accordingly, EPI regularly schedules training sessions related to teaching techniques and pedagogy aiming to enhance the teaching staff's competences and skills (see chapter 3.1 for more details).

The experts acknowledge that all members of the teaching staff are dedicated and committed to good teaching and are also open to use new/alternative forms of teaching where appropriate. The experts further appreciate that the programmes are taught by professionals from the industry who have the necessary qualification to teach in university programmes and thus specialized in a specific field of the programmes under review. Overall, the teaching methodology is considered up-to-date and adequate in order to convey the contents envisaged by both programmes.

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

Criterion 1.1

EPI Sousse has thoroughly revised the intended learning outcomes and objectives at both the programme and module levels. The revised objectives are now explicitly competence-oriented and aligned with the Dublin descriptors. The experts have reviewed these changes and confirmed that the requirement has been adequately met and fulfilled.

Criterion 1.2

EPI Sousse also states that it has revised all documents related to the programme title 'Computer Science'. Their experts confirm that the documents show that the programme title of Computer Science is now used consistently in all official documents and platforms.

Criterion 1.3

The experts recommended combining related modules to reduce the number of small modules and enhance curriculum coherence. EPI Sousse acknowledges this recommendation but explains that, based on their experience, the current structure ensures pedagogical

consistency, supports progressive learning, and maintains a balanced workload for students. The experts recognize these arguments but maintain their recommendation, suggesting that EPI Sousse consider this approach again in the future.

The experts recommended increasing efforts to internationalize EPI Sousse by expanding international collaborations, organizing more conferences and publications, establishing exchange programs, offering better-funded scholarships, and improving communication about existing international opportunities. EPI Sousse agrees with this recommendation and is committed to further improving in this area. They aim to strengthen international partnerships, increase the number of courses offered in English, and encourage participation in international research projects with partner institutions. The experts commend these efforts and plans, encouraging EPI Sousse to continue pursuing these initiatives in the future.

Concerning the experts' recommendation to provide students in Electrical Engineering and Electromechanical Engineering with opportunities to prepare for industrial certification in areas such as electrical engineering, automation, and mechatronics (e.g., Siemens certification), EPI Sousse states to have implemented several measures to address this recommendation, including collaborations with training centers and the introduction of relevant certifications. While the experts appreciate these initiatives and recognize them as steps in the right direction, they find that concrete evidence of their full implementation is lacking. Therefore, they recommend keeping this point under review for the next accreditation.

Cf. Alignment of Module Titles and Content in Biomedical Instruments Specialization in Electrical Engineering: EPI Sousse has updated the module titles to accurately reflect the content taught within the specialization of Biomedical Instruments. Efforts were made to harmonize the specialization with the broader Electrical Engineering programme, ensuring clarity and coherence. The experts acknowledge the improvements and find that the revised titles better reflect the thematic content of the modules. However, they note that some titles, such as "F.I. Atomic and Nuclear Physics for Medical Applications," might be misleading, as they imply a broader coverage than what is actually provided. The experts, therefore, recommend a further review and revision of the titles so that they represent concisely the module content and its scope.

Cf. Electromechanical Engineering:

The experts take note that EPI Sousse has taken several steps to enhance the specialization structure within its engineering programme, addressing the requirements outlined above. The institution has decided that specializations will commence in the second semester of GEM4, ensuring a more structured differentiation between study tracks. Two specific mod-

ules will additionally distinguish each specialization. Furthermore, to reinforce the respective specialization tracks, additional specialized modules will be introduced in the first semester, thereby initiating the specialization process earlier in the curriculum. The EPI also states that it will strengthen the 'Embedded Systems' component by adding another module on this topic in the first semester.

The expert panel acknowledges and appreciates EPI Sousse's efforts in restructuring the curriculum to give greater prominence to the specialization tracks and Embedded Systems. They recognize the value of the planned modifications in strengthening the depth and focus of each specialization. However, the experts highlight an inconsistency in the terminology used in previous documentation. While earlier references were made to a specialization in Aeronautics, the current designation refers to Aerospace Engineering. Given the significant distinction between these two fields, the experts request further clarification on this matter. Additionally, in order to fully assess and validate the proposed changes, the experts require access to the syllabi and updated study plans of the individual study tracks and the newly introduced modules. Until these documents are provided and reviewed, the experts maintain their requirement for further substantiation of the curriculum modifications.

Cf. Computer Science:

EPI Sousse has updated the module descriptions to reflect the actual content taught in the curriculum. The experts find that the previous inconsistencies have been resolved and that the recommended concepts are now appropriately included. As a result, they consider this requirement fulfilled.

To address concerns about overlapping content between the preparatory cycle and the Master's programme, EPI Sousse has provided a detailed module description manual for the preparatory cycle. The experts reviewed this documentation and confirm that there is now a clear distinction between the preparatory cycle and the Master's programme, ensuring an appropriate academic level for all courses. Consequently, this requirement has been deemed fulfilled.

Regarding the experts' recommendation to incorporate more advanced content, such as Generative AI, and provide students with real-time data access for AI modeling, EPI Sousse states to have introduced a dedicated "Generative AI" module, replacing the previous Data Visualization module starting next academic year. The data visualization component will now be integrated into the Business Intelligence Power BI module. The experts find that both recommendations regarding AI content and data have been adequately adopted and implemented by EPI Sousse.

Criterion 1.4:

The experts asked EPI to provide additional information on how students who have not already taken the preparatory cycle at EPI have to complete additional modules so that the engineering cycle modules can be followed without any problems. They asked EPI to clarify to what extent graduates of a license can catch up on the content of the preparatory cycle. Therefore, EPI updated the admission procedure and the corresponding requirements to provide greater clarity and structure (See Appendix 9). The main objective of this revision is to guarantee fair and structured admission of applicants with a bachelor's degree, while ensuring that they have the necessary prerequisites to succeed in the engineering cycle. In addition, compensation mechanisms have been incorporated to make up for any shortfalls in prior learning identified during the assessment process. The experts appreciate the update and confirm that this procedure complies with the ASIIN criteria.

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, Concept and Organisation

Evidence:

- Self-Assessment Report
- Module descriptions
- Website
- Examination regulations
- Exams calendar
- Academic calendar
- Samples written exams and final theses

Preliminary assessment and analysis of the experts:

At EPI, assessment is conducted according to the regulations defined in the examination regulations. The assessment system at EPI has two purposes: a formative (mid-term exam as well as continuous assessment) and a summative purpose (final exam). The mid-term exams and continuous assessments are used by the teachers to continuously monitor the progress of achieving the course objectives and usually take place in the middle and throughout of the semester. A typical form of continuous monitoring is reporting on a specific topic, an oral presentation or a combination thereof. Laboratory work is assessed

through reports and practical work exams. The final exams are used to display whether the course objectives have been met at the end of each semester.

Successfully passed exams are evaluated by lectures with a grading system based on a 20-point scale:

Tunisia Grading Scale	GPA	US Grade	Grade Description
18.00 to 20.00	4	A+	Highly Honorable with Praise
16.00 to 17.99	3.7	A	Very Good - Highest Honors
14.00 to 15.99	3.3	A-	Good - High Honors
12.00 to 13.99	3	B	Fairly Good - Honors
10.00 to 11.99	2	C	Satisfactory
0.00 to 9.99	0	F	Fail

To pass the course, a student must obtain at least 10 out of 20 points in the course's total score. Students who fail in an exam scheduled in the two main sessions have the opportunity to retake the exam they already failed one time in a second session. Main sessions are usually scheduled right after the end of the first and the second semester of each year. The second session is scheduled at the end of the year for all classes and in January for terminal classes. The main sessions last for one week each, the second session lasts for two weeks. If a student's average is above 10 at the end of the academic year, he or she is allowed to enter the next year. Otherwise, the student needs to repeat the whole year.

Experts and students welcome the integration of both continuous assessment and final examinations, as continuous assessment allows close monitoring of students' learning progress, while final examinations ensure verification of the learning outcomes of the module. However, when reviewing the samples of student assessment in all three study programmes during the audit, the experts note that a remarkably high number of written tests, especially those used for final examinations, are multiple-choice tests. The experts are surprised by the extensive use of multiple-choice tests, especially for final examinations, as this is not an assessment form that is ideal for testing a wide range of advanced competences such as those acquired in a Masters programme. They are pleased to hear that students are also regularly assessed through other forms of assessment such as oral exams and presentations but still believe that multiple-choice tests should be used - if at all - as mid-term tests but not as final exams. They therefore urge that more competency-based assessment methods should be used, particularly for the final examination.

Regarding the organisation of the examination, the experts learn that the examination periods are communicated at the beginning of each academic year. A detailed schedule is published in the MyEPIApp in due time that informs about the exact time and date when each exam takes place and about the form of the exams. Consequently, the organization of the exams guarantees examinations that avoid delay to students' progressions. The relevant rules for examination and evaluation criteria are transparently put into a legal framework, as both students and teachers confirm in the audit discussions. However, the experts notice that there haven't been any rules defined for disability compensation measures, illness and other mitigating circumstances. As a result, students solely depend on the initiative of the respective lecturers. To guarantee that students with disabilities or special needs can study on an equal footing, EPI has to establish formal compensation measures that specify under which conditions and how exams are modified to accommodate students' special needs.

For the Master's thesis or final graduation project (PFE), the course registration, performance, and assessment procedures are similar to those of the internships. The project score will be an average of the scores given by both the supervisor and the committee. As stated in the Self-Assessment Report, the graduation project is the final assignment for the last year of the National Diploma programmes under review. It is considered a crucial assessment of whether the students have achieved the intended learning outcomes. The regulations for thesis examination are communicated to students through the MyEPIApp and the department's website.

The thesis consists of three stages: (1) proposal, (2) midterm progressing state, and (3) final thesis. The thesis duration is four months and can be extended to a maximum of six months. The project is conducted independently under the guidance of the supervisors, either in hosting industries or in foreign universities under a Memorandum of Understanding or international partnership programme.

The goal of the thesis is to provide students with a comprehensive understanding of theoretical knowledge and its practical application, as well as to familiarise them with methods of argumentation and the process of making valid points based on research. The thesis also aims to help students develop a more academic perspective. Both the student and supervisors might decide the topic and content of the project. In many cases, lecturers offer particular topics connected to their research. Students are requested to provide evidence of supervision arrangement to the department through a thesis registration form. In the middle of the thesis implementation period, the department conducts a progress review to verify progress and identify any obstacles or violations. Students present the results to the responsible committee formed at the respective department, the reviewer, and their supervisor.

During the on-site visit, the experts were provided with a selection of examinations and theses to review. They confirm that these represent an adequate level of knowledge as required by EQF level 7 for the National Diploma programmes in Computer Science, Electrical Engineering and Electromechanical Engineering. However, with regard to the examinations, as mentioned above, the experts call for the use of more competency-based forms of assessment and a reduction in the number of multiple-choice tests. With regard to the thesis, the experts consider that the samples provided show that the content and level are sufficient for Masters programmes. However, they observe an overall rather disappointing level of academic format in all sample theses in all three programmes. This is particularly evident in the lack of references and citations, or the incorrect type of references used. The experts also note that the sample theses do not have a coherent and systematic structure. The experts attribute this to the lack of academic guidelines provided to students and the lack of academic work and writing practice in the three programmes. The experts therefore recommend that EPI Sousse establish guidelines for the completion of the Master's thesis and that students be taught the appropriate standards of academic work and writing. The experts also recommend that the university develop a template with instructions for academic writing and the creation of graphics, citations, etc. Overall, the Master's thesis should include and demonstrate the following components: The student's derivation of a specific research or development problem/hypothesis within the topic (given by the teacher) from the literature review, the explanation and description of the methodology chosen to solve the problem, the presentation of the development/research steps and results, and the verification/validation of the research or development problem/hypothesis. References must be listed in the bibliography and made visible in the text.

The experts conclude that the EPI Sousse has a sound examination system, which is confirmed by the students. They also consider that the level of the examinations is appropriate and corresponds to EQF level 7. However, EPI Sousse needs to provide official rules and regulations on disability/special needs, to implement compensatory measures and to use competence-based forms of assessment. The experts also recommend that academic guidelines be established for the completion of the final thesis and that students be given in-depth training in academic work and writing.

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

Regarding the requirement to establish formal compensation measures that specify under which conditions and how exams are modified to accommodate students' special needs, EPI states that based on circular n°41/24 issued by the Tunisian Ministry of Higher Education (See Appendix 10), which sets out the guidelines for managing and supporting students

with special needs, the EPI Group has developed its own internal procedure. The aim of this approach is to guarantee an inclusive, equitable and appropriate educational environment, enabling its students to succeed in their academic careers under the best possible conditions. The experts agree that the needs of students with special needs are taken into account and that the studyability of the programmes is improved. They consider the requirement to be fulfilled.

EPI Sousse has responded to the experts' suggestion regarding the Master's thesis by developing a Master's Thesis Preparation Guide and a methodology framework to align final projects with scientific standards. Additionally, academic writing workshops will be integrated into extracurricular activities, covering research methodology, plagiarism prevention, and scholarly communication. The experts acknowledge these efforts but find the guide focuses more on formatting than scientific writing. They recommend keeping this recommendation so that it will be reassessed in the next accreditation, particularly when evaluating thesis papers.

To enhance competency-based assessments, EPI Sousse plans to limit multiple-choice tests to certification-related courses and discontinue them in final exams, expand assessment methods to include case studies, problem-solving tasks, and applied projects, and to diversify evaluation approaches with written tests, practical applications, and oral exams. The experts appreciate these initiatives but, as they are not yet fully implemented, recommend keeping the suggestion under review for the next accreditation.

3. Resources

Criterion 3.1 Staff and Development

Evidence:

- Self-Assessment Report
- Staff Handbook
- List of publications
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

In the Self-Assessment Report as well as the staff handbook, the university presents data about the number and overall qualification of staff for the Computer Science, Electrical Engineering and Electromechanical Engineering programmes.

Based on legal requirements, university teachers practicing in private universities are not eligible to title promotion (full professor, associate professor). This means that full professors and associate professors teaching at EPI are all non-permanent academic staff who already teach in other public universities. Consequently, the staff is composed of permanent/full-time staff members solely employed by EPI and of non-permanent/part-time staff that is recruited either among the staff of the public higher education institutions or among industry and public authority partners.

In the Computer Science degree programme, there are 102 teachers (29 permanent and 73 non-permanent teachers) at the time of the audit (60 of whom are assistant professors, with the rest being senior lecturers, assistants or Computer Science experts). In the Electrical Engineering degree programme, there are 24 lecturers (7 permanent, 17 non-permanent) of which 3 are professors, 7 of whom are assistant professors and the rest being lecturers. In the Electromechanical Engineering degree programme, there are 25 teachers (2 permanent and 23 non-permanent) (17 of whom are assistant professors and with the rest being lecturers and senior lecturers).

The experts discuss with the teachers the distribution of their workload. The teachers explain that all teachers are required to spend at least 20 hours per week on teaching, but this can be increased on request. The number of research hours depends on the scope of the individual project and is usually between 5 and 15 hours per week. The remaining time is spent on supervision and administrative tasks.

Programme managers also perform administrative tasks/oversee departments and participate in the educational management. They act as supervisors to the students and provide personalized follow-up to the students. Even though the permanent teachers currently cover over 50% of the total teaching load, EPI plans to further increase their number to meet the goal of having at least one permanent teacher for every 25 students. For this reason, EPI continues to launch recruitment campaigns throughout the academic year. As non-permanent teachers are still reachable by the students (see criterion 3.2), the experts do not regard the high number of non-permanent teachers as problematic. On the contrary, they see the advantage in the fact that students can gain perspectives both from public universities and directly from industry.

During the discussions, the experts learn that EPI has defined an adequate recruiting process for teaching staff and that preparation for the next academic year might also include recruitment for further teaching staff as Tunisia faces an emigration of engineers, doctors and higher education professors. Recruitment of teaching staff is however always able to be done in time for the next academic year. The teaching staff indicate that they are satisfied with the working relationship with EPI. The experts also notice that the staff members

are very motivated and convinced of the offered study programmes as it is their primary goal to fulfill the needs of the market.

With regard to staff development, EPI encourages the training of its academic staff to improve their didactic abilities and teaching methods. As stated in the Self-Assessment Report, academic staff regularly undergo training in Pedagogy, Management, Leadership, and Quality Assurance. Newly recruited staff has to participate in mandatory orientation sessions to familiarize themselves with the institution's ethos and operational procedures, while senior staff members are key in mentoring new recruits, helping them integrate into the team and supporting their professional development. Moreover, at the end of each semester, the permanent and non-permanent teaching staff of the degree programme under review hold a meeting to discuss the curriculum as well as the different departments' training needs. The department plans year-round training courses and workshops based on feedback from academic and non-academic units. Staff members are also trained occasionally to ensure they stay updated with the latest technologies and methodologies when it comes to teaching. Several teaching staff members have received such training by their employer (in case of industry partners) or at other universities.

The experts ask how EPI supports its teaching staff in terms of research activities (publications, participation in conferences, sabbaticals, etc.). They learn from the programme coordinators that according to legal requirements, private universities in Tunisia do not have the right to start research laboratories. However, a number of permanent teaching staff at EPI is a member of a research laboratory at a public university through which they have the opportunity to publish papers in scientific journals and participate in international conferences. In addition, all final research projects are carried out in collaboration with industrial partners or at partner universities with active applied research in the field related to the respective study programme. Teachers participating in a (research) exchange programme are usually assigned to a partner university abroad that has an MoU with EPI. To further motivate its faculty to engage in research and to encourage greater student involvement, EPI has implemented a bonus programme. This programme allows teachers to earn bonuses based on the number of projects they carry out, articles they publish, student contributions to research, number of patents obtained and national and international communications.

The experts welcome the EPI's efforts to promote research activities and support its management in pursuing them further. However, in view of the teachers' wish to be more involved in research projects and to participate more often in international conferences, also in order to include this content in the curricula and to pass it on to their students, the

experts suggest that more measures and support mechanisms should be considered for teachers to carry out research projects and to involve their students.

The experts conclude that overall the teaching staff's composition, scientific orientation and qualifications, as specified in the teacher's list and staff handbook, are suitable for successfully implementing and sustaining the degree programmes under review.

Criterion 3.2 Student Support and Student Services

Evidence:

- Self-Assessment Report
- Website
- Discussions during the audit

Preliminary assessment and analysis of the experts:
During the on-site discussions with the programme coordinators, the teachers and especially the students, the experts gather a comprehensive impression of the offers related to supporting and assisting the students. Being a private university, EPI manages to offer classes in the small size of 20-30 students, which enables close relations between staff and students and thus allows for constant and direct feedback in case any issues arise. Each student is also assigned to a member of the teaching staff (programme manager) that acts as a first contact person for all academic and non-academic consultations that a student may need.

The students confirm that they are very satisfied with the support and assistance they receive from their teachers and that they can contact them at any time if problems occur, whether related to the taught subjects or of a personal nature. As most teachers are non-permanent teachers or professionals, meaning they hold other occupations as well, the experts ask how students hold contact to these members of staff. They learn that permanent as well as non-permanent teachers have fixed office hours on certain days during which they are always available in person at EPI. The timetable for this can be found at the relevant offices and can also be viewed via the MyEPIApp. The MyEPIApp enables students not only to request documents, access results, and view timetables but also to communicate directly with various services to share their opinions and suggestions. It allows students to schedule meetings with programme managers, teachers, or administrative staff, and facilitates the collection of student feedback on various topics.

Apart from subject-specific support, EPI also offers several other means to aid its students: the Student Affairs Department supports international mobility, timetables and issuance of documents, the Internship Department provides information on training and job seeking

to help students develop career plans and workplace understanding. The office is also a bridge between students, staffs, lecturers and businesses in searching for scholarships, factory visits, internships, and employment opportunities. It is also responsible for keeping in contact with alumni, employers, and professional organizations. Career days and forums are regularly organized to facilitate networking with private companies, which are seeking potential engineers. The Pedagogical Forum is held at the beginning of the first semester, immediately after registrations are completed. The forum's purpose is to introduce students to various subjects, remind them of general academic regulations, exams, and study plans, facilitate interaction with department heads, and encourage academic engagement. At the start of the second semester, EPI organizes the Orientation Forum which aims to present the objectives and career opportunities for each specialization area of the programmes. In summary, good job perspectives for the graduates of the programmes arise from these activities. The students and graduates confirm to be satisfied with the support offered by EPI for finding internships and employment.

The experts notice that there are – besides the mentioned restriction for students with special needs – enough resources available to provide individual assistance, advice and support for all students. The support system helps the students to achieve the intended learning outcomes and to complete their studies successfully and timely. The students are well informed about the services available to them.

Criterion 3.3 Funds and equipment

Evidence:

- Self-Assessment Report
- On-site visit of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the experts:
Being a completely private institution, EPI is funded solely by tuition fees as no government support is provided to sustain the institution. From this budget, EPI offers teaching material, the maintenance of teaching equipment, scholarships and allows its staff to participate in conferences. Both administrative and teaching staff submit their projected needs and expense plans at the end of an academic year for the upcoming academic year. The administrative and financial office/director’s office then takes charge of managing, revising, and monitoring the budgetary process.

During the on-site visit, the experts were able to gain a comprehensive impression of the facilities and laboratories at EPI. Each of the 40 classrooms at EPI is equipped with one or two whiteboards and a video projector/data show. The average capacity of a classroom is between 25 and 35 students. The auditorium can accommodate 300 students. Three additional amphitheaters can be used for larger lectures and events. EPI also provides space for student life and club activities (2 co-working spaces and 2 reading rooms), as well as a library.

Moreover, the Electrical Engineering and Electromechanical Engineering programmes use a total of 9 laboratories including the Mechanical Lab, the RDM Lab, the Industry 4.0 lab, the Robotics labs, the Hydraulics Lab, the Automation lab and 3 labs for Electrical Engineering. The experts are particularly impressed with the Industry 4.0 Lab. EPI established this laboratory in collaboration with industry partners to prepare students for the future of engineering by integrating Industry 4.0 technologies into their education. The lab serves as a platform to familiarize students with the convergence of advanced technologies, such as IoT, AI, and robotics, which are essential for modern industry. It encourages innovation and helps students gain practical experience with emerging tools and techniques, enabling them to stay competitive in an increasingly digital and automated world.

A detailed overview of the laboratories is given in a laboratory material list that is submitted prior to the on-site visit. A variety of software tools related to the computer science, electrical engineering, and electromechanical engineering such as CAD and Python is installed in the computer laboratories. These software tools are used by students during workshops, lab assignments and periodic projects.

During the discussions with programme coordinators and industry representatives, the experts learn that EPI works with several companies in the field of Computer Science and Electrical as well Electromechanical Engineering programmes. Within the framework of these cooperations, the students can complete their internships or final theses and have access to all the equipment and material available in the partners' facilities.

The experts appreciate the range of learning tools and resources available to the students and lecturers and consider EPI's facilities and available equipment in the laboratories to be of appropriate standards. In summary, the expert group judges the available funds, the technical equipment, and the infrastructure (laboratories, library, classrooms etc.) to comply with the requirements for adequately sustaining the three degree programmes.

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

EPI agrees with the experts' recommendation to strengthen policies and support mechanisms for teachers to undertake research projects and participate in international conferences, and outlines its current undertakings. The experts welcome several of the EPI's strategies, such as a bonus scheme to encourage publication in indexed scientific journals and other support mechanisms. However, as this is a long-term initiative, they feel that EPI should continue to follow up and monitor the recommendation.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Module descriptions

Preliminary assessment and analysis of the experts:

The experts review the module descriptions for the three programmes and find that they provide adequate information on the following aspects: module identification code, content, learning outcomes, examinations, credit points, workload, grading, person responsible for the module and admission requirements. However, they lack information about the teaching methods used in the module and the recommended literature, as they currently only provide web references or useful links. This information therefore needs to be included in the module descriptions. In addition, the experts note that the module descriptions indicate the workload in class per module, but not the self-study time. Therefore, EPI has to ensure that the module descriptions provide information on the workload distribution, including class hours as well as self-study time. As mentioned in chapter 1.3, the module descriptions in Computer Science also need to be edited and completed in such a way that they reflect the actual content taught, since the current content descriptions do not refer to all the topics covered in the modules. Furthermore, in Electrical Engineering, the modules of the specialisation "Biomedical Instruments" need to be changed so that the module title, the content description and the intended learning outcomes are consistent, as there are discrepancies between these three categories (cf. chapter 1.3).

The students confirm during the discussions that information about the courses is always available online or via the MyEPIApp and that details concerning examinations and contents are provided at the beginning of each course by the teaching staff.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Diplomas
- Sample Diploma Supplements
- Sample Transcript of Records

Preliminary assessment and analysis of the experts:
The experts confirm that the students of the degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Transcript of Records lists all courses that the graduate has completed, the achieved credit points, grades, and cumulative GPA.

However, the experts notice that the Diploma Supplement is mapping the French education system instead of the Tunisian one. EPI has to include the appropriate higher education system in the Diploma Supplement. Furthermore, it also has to be clearly stated that the National Diploma/Master`s degree leads to the acquisition of 300 ECTS credits including the first degree (e.g. by mentioning that students acquire 120 ECTS credits in the preparatory cycle).

In addition, the experts note that the Diploma Supplement of each programme states that students may be admitted to the second year of the National Engineering Programme if they hold a "Master's degree in scientific, technical, business or management studies or equivalent". The experts point out that students with a previous degree in business or management studies should not be admitted to any of the three programmes under review, as they would not have the appropriate qualifications to manage the National Engineering programmes. They therefore request that this reference to business and management be removed and that the admissions wording is corrected and brought into line with the wording in the self-assessment report. The programme coordinators explain that this is indeed an error and that only students with an appropriate engineering background are admitted to the three programmes under review.

Finally, the experts note that the Diploma Supplement and the Certificate do not indicate the specialisation that the graduate has completed within the respective programme. They therefore recommend that the specialisation be included in the final documents.

Criterion 4.3 Relevant Rules

Evidence:

- Self-Assessment Report
- All relevant regulations on the studies, examination, admission and quality assurance are published on the university's website

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

The experts appreciate that the English and French websites of the programmes include sufficient information about the intended learning outcomes, study plans, module descriptions and academic guidelines of the degree programmes and are made available to all relevant stakeholders.

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

Criterion 4.1:

With regard to the requirement to ensure that the module descriptions include information about class hours as well as self-study time, EPI submits updated module descriptions for both programmes that specify this aspect (see Appendix 4 and Appendix 5). Additionally, the modifications are included in the description manual and have been shared on the website. This information is thus available to all stakeholders and the experts consider the requirement to be fulfilled.

Criterion 4.2:

With regard to the requirement to include the Tunisian education system instead of the French one in the Diploma Supplement as well as to clearly state that the National Diploma/Master`s degree leads to the acquisition of 300 ECTS credits including the first degree, EPI submits an updated version of the Diploma Supplements that include the correct information (Information on the Tunisian study system as well as information on the credits to be acquired to obtain the engineering degree: 300 ECTS divided into 120 credits for the preparatory cycle and 180 credits for the engineering cycle. Therefore, the experts consider both requirements regarding the Diploma Supplement to be fulfilled.

EPI has implemented the experts' requirement to enhance clarity and consistency within the program. All irrelevant references to business and management have been removed to maintain the engineering curriculum's focus. The admission criteria have been revised to align with the terminology used in the Self-Assessment Report, ensuring uniformity across all documentation. Additionally, the Diploma Supplement now explicitly states the student's specialization, providing clearer academic and professional recognition. As a result, the experts confirm that all requirements related to the Diploma Supplement have been fully met.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Study regulations
- Internal regulations
- Academic calendar
- Performance indicators
- Samples of questionnaires
- Survey results
- University Quality Manual
- Discussions during the audit

Preliminary assessment and analysis of the experts:
From the documents presented and from the discussions during the on-site visit the experts gain a good impression of the quality management procedures that are in place at EPI and for the programmes under review.

In 2019, EPI introduced a quality management system in line with the standards of ISO 9001:2015 for administrative and managerial activities. Moreover, EPI is currently working on developing a quality management system in line with the standards of ISO 21001. The quality management system also includes regular surveys about the level of satisfaction

and expectations of students, academic staff and other staff members, alumni and employers. The results of these surveys are reported at regular staff meetings. The aggregated results are then analysed and evaluated by the Scientific Committee at the end of the academic year and translated into concrete plans to improve the programmes.

At the end of each semester, students evaluate each of their courses anonymously and online through MyEPIApp. The questionnaire covers the teacher's performance, the subject content, the learning outcomes, the students' workload and the exams.

Since EPI is a private university funded exclusively by the tuition fees, the reliance on students' feedback and the necessity to ensure and improve the employability of the graduates are of major importance to the coordinators. The discussion with the students revealed that those in charge are always eager and open for feedback and that students have the impression that their comments are taken into consideration with regard to the further improvement of the programmes. Feedback from alumni on study conditions such as infrastructure, course content, academic atmosphere, administration, internships and industry partners, mobility and academic partners is collected in a standardized form via surveys, e-mails, social media, direct discussion during meetings and forums (especially orientation forum and career events). During the on-site discussions, the director explains that these surveys help EPI to keep track of their alumni, especially in order to understand in what positions and which countries they are employed.

The industry representatives confirm in the discussion that EPI is eager to receive feedback about new developments, trends and the employability of their graduates and that the university is open to implement changes to the curricula and to respond to developments in the fields of Computer Science, Electrical Engineering and Electromechanical Engineering. For this purpose, an annual career event is organised by the university. In addition, employers and programme coordinators regularly exchange information via the MyEPIApp.

Concerning the internal feedback loops, the results of the course evaluations are centrally assessed and analysed before they are communicated to the scientific committee who would then be responsible to initiate any measures if problems or needs for improvement have been detected. The students confirm that the results are made accessible to them. In case the satisfaction of the students with staff members is deficient, the head of department will contact the respective teacher, discuss the issue and propose solutions. If no improvement can be achieved over a longer period, the staff member will be dismissed. Thus, the experts agree that the quality management circles at EPI are well established and work under participation of all stakeholders.

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

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

As EPI does not submit any response with regard to criterion 5, the experts adhere to their previous assessment.

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution (03.03.2025)

The institution provided a detailed statement as well as the following additional documents:

- Appendix 1 : Handbook of Computer science
- Appendix 2 : Description program- matrice
- Appendix 3 : diploma suplement
- Appendix 4 : Handbook of electrical program
- Appendix 5 : Handbook of electromecanical program
- Appendix 6 : extracts of mail exchangement with siemens
- Appendix 7 Handbook ICT preparatory Cycle
- Appendix 8 generative IA module description
- Appendix 9 extracts of mails exchanges with Nvidia
- Appendix 10 partnership with UTS-sofia bulgarie
- Appendix 11 minutes of electromecanical departement
- Appendix 12 : admission requirements
- Appendix 13 : circular 41-24-of ministry of higher education
- Appendix 14 : procedure for managing and supporting students with special needs
- Appendix 15 : guidelines of master’s thesis
- Appendix 16 : Research encouragement
- Appendix 17 : minutes of electrical departement
- Appendix 18 : Evaluation criteria for the assessment of teachers
- Appendix 19 : electromechanical proposition study plan

The following quotes the comment of the institution:

“Introduction

This report presents the actions taken in response to the comments made by the ASIIN Technical Accreditation Committee. Each section details the corrections made, the improvements planned and the measures being implemented to ensure optimum compliance with quality requirements and international standards.

In this report, we will refer only to those criteria where the experts have made recommendations, suggestions or requests for corrections.

1. Criterion 1.1. Objectives and Learning Outcomes of a Degree Programme

1.1 Experts' recommendation: The experts therefore urge that the intended learning outcomes and objectives at programme and module level be revised so that they are clear, precise and competence-oriented. Learning outcomes should refer to the full range of competences, as suggested, for example, by the Dublin descriptors.

Actions Taken :

Following the experts' recommendation, we have thoroughly revised the intended learning outcomes and objectives at both the programme and module levels. The revised objectives are now explicitly competence-oriented and aligned with the Dublin descriptors. This ensures clarity, precision, and a comprehensive approach to skills development across our curriculum (refer to appendices 1 to 5).

2. Criterion 1.2. Name of the Degree Programme

2.1 Experts' recommendation: The experts urge the programme coordinators to ensure that the same programme title is used in all sources for Computer science.

Actions Taken :

In response to the experts' recommendation, we have ensured that the programme title for Computer Science is consistently used across all official documents and platforms, including the Self-Assessment Report (SAR), module descriptions, diploma supplement, and website. This alignment enhances clarity and ensures uniformity in all communications regarding the programme (refer to appendix 1, appendix 2, appendix 3).

3. Criterion 1.3. Curriculum

3.1 Experts' recommendation: Experts advise EPI to ensure that the specialisation Biomedical covers the field sufficiently whilst being well integrated into the rest of the programme. In addition, the experts note inconsistencies in the module descriptions of this specialisation. They urge EPI to revise the module descriptions, as several module titles use terms that refer to relatively large disciplines, whereas only parts of these disciplines

are actually covered in the respective modules. They therefore request that the titles, content description and module learning outcomes be brought into line.

Actions Taken :

The Biomedical Instrumentation specialization, part of the Electrical Engineering program, aims to train engineers specialized in the maintenance and diagnostics of medical equipment, while incorporating technological advancements. This interdisciplinary program ensures that students acquire a solid foundation in electrical engineering, complemented by fundamental knowledge in biology and medicine, essential to meet the demands of the biomedical field.

This specialization covers a wide range of skills, including in-depth knowledge of analog and digital electronics, medical robotics, and embedded systems. It also encompasses topics such as biomedical instrumentation, physiological signal processing, and cutting-edge technologies, such as Artificial Intelligence (AI) and the Internet of Things (IoT), applied to the medical domain.

Following the remarks made by the ASIIN experts, corrective measures have been implemented to enhance the coherence and integration of this specialization within the overall program:

1. **Module Titles Revision**

Module titles have been updated to accurately reflect the content taught :

- Old title: Biophysics and Atomic and Nuclear Physics / New title: Atomic and Nuclear Physics for Medical Applications
- Old title: Qualitology and CMAO / New title: Biomedical Management: Quality, Maintenance and Procurement
- Old title: Electronics & Nuclear Instrumentation / New title: Nuclear Instrumentation and Radiation Applications
- Old title: Medical Robotics / New title: Programming and Integrating Robotic Systems with ROS2
- Old title: Biomedical Instrumentation / New title: Automated Systems and Biomedical Equipment Maintenance
- Old title: Telemedicine E-health / New title: Telemedicine and Interoperability: Foundations and Technological Infrastructure
- Old title: Medical Imaging Techniques / New title: Medical Imaging Techniques: CT, Ultrasound, and MRI

- Old title: Anatomy – Physiology – Neurophysiology / New title: Fundamentals of Anatomy, Physiology, and Neurophysiology for Medical Instrumentation
- Old title: Biology / New title: Cell Biology and Microbiology Applied to Biotechnology
- Old title: Sterilization, Safety, and Standards / New title: Safety, Maintenance, and Sterilization of Biomedical Equipment

2. **Program Integration Improvement**

The specialization has been harmonized with the other components of the Electrical Engineering program to ensure clarity and coherence. As part of this effort, the content of each module within the specialization has been thoroughly reviewed to clearly define the objectives, learning outcomes, and detailed content. This revision was undertaken to enhance student understanding and ensure that the modules effectively convey the knowledge and skills required in the biomedical field.

These refinements help provide students with a structured and transparent learning pathway, making it easier for them to grasp the connections between theoretical foundations and their practical applications in maintaining, diagnosing, and improving medical equipment. This approach also ensures that the specialization remains aligned with the expectations of the biomedical sector while maintaining its rigorous engineering focus.

3. **Revised Documentation**

The Electrical Engineering program handbook has been revised to reflect these changes, ensuring consistency across the curriculum (refer to appendix 4) . A copy of the meeting minutes from the department's pedagogical committee, which details the discussions and decisions made regarding the revision of the specialization's modules, is also included in the (appendix 17) for further transparency.

These adjustments reflect our commitment to the continuous improvement of our programs to ensure alignment with international academic standards and the expectations of the biomedical sector.

3.2 <u>Experts' recommendations</u>:

1- The experts suggest either dropping the two specialisations aeronautics and automation and mechatronics and, alternatively, perhaps offering only a few modules in this area as electives, or extending each specialisation to at least two semesters and, consequently, significantly increasing the content taught within

each specialization. In addition, the experts note that the content taught in the two specialisations does not fully match the specialisation title in terms of technical congruence. Overall, the experts require the EPI to ensure that the title, content and learning outcomes of the specialisations are consistent.

2- The experts call for the integration of a more substantial Embedded Systems component into the curriculum of electromechanical engineering

Actions Taken :

In response to the ASIIN accreditation experts' remarks concerning the specializations in Aeronautics and Automation and Mechatronics, we have taken the following measures to improve the consistency of the titles, content, and learning outcomes of these specializations, ensuring their alignment with academic and professional expectations:

1. **Retention of Common Core Modules**
   The teaching modules for semesters S1 and S2 of GEM3 will remain common core subjects for all students. This approach ensures a solid foundation in electrical engineering before specialization, providing all students with fundamental and transversal skills.

2. **Strengthening of Embedded Systems and Microcontrollers**
   The GEM4 curriculum, Semester 1, will be enhanced with an additional module on Embedded Systems and Microcontrollers, while still maintaining this semester as a core common semester for all students. This enhancement aims to equip students with essential skills in a field that is transversal to several specializations (automation, aeronautics, etc.).

3. **Introduction of Specializations Starting from Semester 2 of GEM4**
   Specializations will begin in Semester 2 of GEM4, with each specialization differentiated by two specific modules:

   - **Automation and Mechatronics**: General Mechatronics and Production Techniques, including FAO (Computer-Aided Manufacturing).
   - **Aerospace Engineering**: General Avionics, Fluid Dynamics, and Aerodynamics Principles.
   - **Industrial Maintenance**: Industrial Maintenance Strategies and Predictive Maintenance Diagnostics.

This new structure addresses the experts' concerns regarding the alignment between the specialization titles and their technical content. Each specialization is now clearly defined and corresponds to the specific needs of the sector.

4. **Further Strengthening of the Automation and Mechatronics Option in GEM5**
   The Automation and Mechatronics option will be further strengthened in Semester 1 of GEM5 with a new module on **Intelligent Sensors and Data Processing**. Additionally, the **General Mechatronics** module will be updated and renamed **Design and Modeling of Mechatronic Systems** to better reflect the technical focus of this specialization. The **Automation Software** module will be replaced with a new module on **Advanced API Programming**.
5. **Further Strengthening of the Aerospace Engineering Option in GEM5**
   The Aerospace Engineering option will also be enhanced in Semester 1 of GEM5 with a module on **Embedded Electrical Systems in Aerospace**, providing more advanced technical expertise aligned with the field's demands.
6. **Further Strengthening of the Industrial Maintenance Option in GEM5**
   The Industrial Maintenance option will be strengthened with a module on **Advanced Automation and Robotics** in Semester 1 of GEM5, ensuring students acquire modern skills suited to Industry 4.0 needs.

These curriculum updates will be implemented starting from the academic year 2025/2026. The course syllabi for the new modules will be prepared and validated during the next pedagogical meeting.

We are confident that these changes will enhance the consistency of the specializations, align the titles, content, and learning outcomes, and ensure a better alignment with international academic standards and industry needs. We remain committed to continuous improvement in order to offer high-quality training that is fully aligned with the demands of the sector. (Refer to appendix 5, appendix 11 and appendix 19).

3.3. <u>Experts' recommendation</u>: the experts recommend that students should be given the opportunity to prepare for certificates in Industrial Controlling in Electrical Engineering, and in Automation and Mechatronics in Electromechanical Engineering (e.g. from Siemens)

<u>Actions Taken</u> :

Following the recommendation from ASIIN experts regarding the opportunity for our students to prepare for certifications in Industrial Controlling in Electrical Engineering and Electromechanical Engineering, we have implemented several actions to address this recommendation and enhance our institution’s certification and training offerings.

a) <u>SOLIDWORKS Certification - Recognized Certification Center Since 2022</u>

In line with the industry's needs and to ensure our students are optimally prepared in the field of Computer-Aided Design (CAD), we are proud to be a SOLIDWORKS Certification Center recognized since 2022. All of our students enrolled in the Electromechanical and Electrical Engineering programs have free, unlimited access to the full SOLIDWORKS certification package. This certification is a recognized industry standard for 3D modeling, simulation, and product design. We have implemented this initiative to provide our students with a well-regarded qualification that enhances their employability and prepares them for the challenges of the industry.

b) Pearson VUE Certification Center - Reduced Rates

We have also established a Pearson VUE certification center on our campus, which is a leading global provider of professional certifications. This center offers our students reduced rates for a wide range of certifications in Electrical Engineering, Mechanical Engineering, and Automation. Through this partnership, our students can obtain high-level certifications that will strengthen their professional profile and open doors to the global job market.

c) Trainer Training with Siemens - NX Platform

In response to the experts' recommendation, we have set up a trainer training program in collaboration with Siemens through the NX platform. NX is one of the most advanced platforms worldwide for Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), and Computer-Aided Engineering (CAE), widely used in cutting-edge sectors such as automation, mechatronics, and electrical engineering. Through this partnership, our trainers are now qualified to prepare and guide our students toward obtaining Siemens-recognized certifications in key fields such as Automation, Mechatronics, and Electrical Engineering (refer to appendix 6).

d) Impact on Our Students

All of these actions are specifically aimed at enhancing our students' technical skills, providing them with recognized certifications in core areas like Electromechanical Engineering, Electrical Engineering, and Automation. These certifications, obtained through partnerships with renowned industry leaders like Siemens and SOLIDWORKS, will ensure that our students are optimally prepared to meet industry demands and increase their employability, equipping them with practical, applicable skills for the professional world.

In conclusion, we remain fully committed to offering our students high-quality training and certification opportunities in advanced technological fields. These initiatives aim to ensure

that our graduates are well-prepared, qualified, and competitive, both locally and internationally.

3.4. Experts' recommendation: The experts request EPI Sousse to provide the detailed module descriptions of the preparatory cycle in order to compare them with the modules offered in the NED programmes and to verify the differences. In general, the experts ask EPI Sousse to ensure that the NED programme in Computer Science only includes modules corresponding to EQF level 7.

Actions Taken :

In response to the experts' request, EPI Sousse has provided a **detailed module description manual** for the preparatory cycle, allowing for a comprehensive comparison with the modules offered in the NED programmes (refer to appendix 7).

Since the preparatory cycle is a **recently introduced programme**, its impact on third-year students will only take effect starting from the **2025/2026 academic year**. Consequently, to ensure alignment with EQF level 7 requirements, we have **updated the module descriptions** for core courses, particularly **Advanced Algorithmics 1 and 2**, to reflect the expected level of competence and ensure consistency within the programme (refer to appendix 1 page 24 et page 69).

We remain committed to continuously reviewing and updating our programme structure to align with international academic standards and best practices.

3.5. Experts' recommendation: For transparency to all stakeholders, the experts request that the module descriptions be revised to reflect what is actually taught particularly regarding content on Turing machine, computability, complexity, NP-completeness, run-time order, and Chomsky's hierarchy.

Actions Taken :

In response to the experts' request for greater transparency regarding module content, EPI Sousse has **updated the module descriptions** for **Advanced Algorithmics 2 and Natural Language Processing (NLP)**. These updates ensure that the descriptions accurately reflect the topics already covered in the courses, including **Turing machines, computability, complexity, NP-completeness, run-time order, and Chomsky's hierarchy**, as discussed during the audit.

By aligning the **documented curriculum** with the **actual teaching practices**, we aim to provide **clear and precise information** to all stakeholders while maintaining high academic standards.

(refer to appendix 1 page 69 et page 198).

3.6. Experts' recommendation: the experts wondered why Logic Programming and Prolog are not contained in the curriculum, not even in the AI specialization, while Logic Programming is mentioned as a prerequisite in module "Artificial Intelligence Foundations". The experts ask the university to correct this and other discrepancies and thoroughly edit the module handbook.

Actions Taken :

In response to the experts' remarks regarding the absence of **Logic Programming and Prolog** in the curriculum, we would like to clarify that these topics are **fully integrated** into the new **Preparatory ICT Programme**, (refer to appendix 7 page 23, page 41 page 63).

This ensures that students acquire the necessary background before enrolling in the **Artificial Intelligence Foundations** module, aligning the prerequisites with the actual content covered. In addition, we periodically carry out a thorough review of the module manual to ensure the consistency of all course descriptions and eliminate any anomalies.

3.7. Experts' recommendation: the experts recommend including even more advanced content such as generative AI. They also suggest that more resources should be made available to students for the developing and running AI models and Generative AI models especially real data and adequate computational resources.

Actions Taken :

Following the experts' recommendation, we have added a dedicated "Generative AI" module, which will replace the Data Visualization module starting next academic year. The data visualization component will now be covered within the Business Intelligence Power BI module. The detailed module description for Generative AI will be officially included in the module handbook by the end of this academic year and will be implemented in the curriculum from the next intake. However, it is already available (refer to appendix 8).

To ensure that students have adequate resources for developing and running AI and Generative AI models, we are negotiating with Nvidia for the acquisition of a DGX A100 supercomputer (refer to appendix 9). In addition, we are providing access to:

- Real datasets: Public datasets (Kaggle, Hugging Face Datasets, Google Dataset Search), industry partnerships, and synthetic data.
- Computational resources: Cloud-based solutions (Google Colab Pro, AWS, Azure, GCP), university clusters, and resource-sharing with other research labs.*

These actions aim to provide our students with the necessary tools to develop state-of-the-art AI models and ensure they remain at the forefront of technological advancements.

3.8. Experts' recommendation: The experts suggest that consideration be given to combining smaller modules that also cover similar topics in order to advance the level of the content covered in the modules e.g. combining Data base and DBMS workshop, Advanced Algorithmics 1+2, Object Oriented Programming and Object Modeling.

Actions Taken :

We acknowledge the experts' suggestion to combine smaller modules covering similar topics in order to advance the level of content. However, after careful consideration, we have decided to maintain the current module structure for the following reasons:

- Pedagogical consistency and progressive learning: The current distribution allows students to gradually build their competencies. For instance, separating Database and DBMS Workshop ensures that students first acquire fundamental concepts before moving on to more advanced and practical aspects. Similarly, Object-Oriented Programming and Object Modeling have distinct learning objectives, which justify their separation.
- Balanced workload and better knowledge retention: While some modules may have a lower individual workload, this structure helps students assimilate concepts more effectively without cognitive overload. The modular approach facilitates structured learning and revision.
- Flexibility in student mobility and specialization: Maintaining separate modules enhances international mobility, allowing students to validate specific competencies without being penalized by large subject groupings. Additionally, it provides students with more flexibility to tailor their learning path according to their professional aspirations.

That said, we recognize the importance of reinforcing interdisciplinary connections. To address this, we are considering a harmonized assessment approach, where, for example, Database and DBMS Workshop could be evaluated through a comprehensive project rather than separate assessments. This approach preserves the existing structure while fostering a more integrated and practical application of acquired skills.

We remain open to further optimizations and will continue to assess the effectiveness of our curriculum structure based on student performance and industry needs.

3.9. Experts' recommendation: the experts recommend to increase the efforts to further internationalize EPI

Actions Taken :

We fully share this ambition, as the experts pointed out in their report: ‘that international recognition is one of EPI's primary goals for the next years’.

With this in mind, we hope to implement and strengthen our strategy by :

- Develop and strengthen the international partnerships already in place with several universities and institutions through double degree agreements, academic exchanges and mobility programmes for our students and teachers. We also hope to set up more partnerships with new institutions in new destinations, both in Europe and in other less traditional destinations.
- Increasing the number of courses offered in English to encourage international students and prepare our students for multicultural environments.
- Encourage participation in international research projects in collaboration with partner institutions, thereby strengthening the global reach of our teaching and research staff. To this end, we have already signed a partnership agreement with UTS university in Sofia, Bulgaria. An ERASMUS research project, guaranteeing the mutual mobility of students and teachers between the two schools as part of collaborative research projects funded by the ERASMUS+ programme is being launched. (see Appendix 10).
- Facilitate student and faculty mobility by providing financial and administrative support for exchanges abroad.
- Developing intercultural initiatives such as international seminars, summer schools and academic events involving foreign experts.

We remain fully committed to pursuing these efforts and identifying new opportunities to strengthen the internationalisation of EPI, in perfect harmony with our development strategy.

4. Criterion 1.4. Admission requirements

4.1. <u>Experts' recommendation</u>: Experts ask EPI to provide additional information on how students who have not already taken the preparatory cycle at EPI have to complete additional
modules so that the engineering cycle modules can be followed without any problems. It should be made clear to what extent graduates of a license can catch up on the content of the preparatory cycle.

<u>Actions Taken</u> :

In response to this request, we would like to point out that an admissions procedure complying with Tunisian regulations is already in place for the engineering cycle. However, following the recommendations made by the ASIIN Accreditation Commission, this procedure has been updated to provide greater clarity and structure (See Appendix 12).

The main objective of this revision is to guarantee fair and structured admission of applicants with a bachelor's degree, while ensuring that they have the necessary prerequisites

to succeed in the engineering cycle. In addition, compensation mechanisms have been incorporated to make up for any shortfalls in prior learning identified during the assessment process.

5. Criterion 1.5. Workload and Credits

5.1 Experts‘ recommendation: the distribution between classroom work and self-studies must also be publicly comprehensible for students

Actions Taken :

In response to the experts' recommendation, we have ensured that the **distribution of workload between classroom sessions and self-study is clearly specified** for all courses. This information has been explicitly detailed in the **module descriptions, the official module handbook, and is publicly available on our website**.

By making this data transparent and easily accessible, we aim to provide students and all stakeholders with a **clear and structured overview of the expected learning commitment**, thus enhancing academic planning and student autonomy.

This initiative reflects our ongoing commitment to **clarity, accessibility, and educational best practices**, ensuring that students can effectively manage their learning journey.

(see Appendix 1, Appendix 4 and Appendix 5).

5.2 Experts‘ recommendation: the experts notice that many modules are quite small in terms of credit points and they worry that this might lead to a high number of exams per semester and consequently to a heavy workload for the students.

Actions Taken :

We acknowledge the experts' concern regarding the potential impact of a high number of small-credit modules on students' workload. As previously explained, our current course structure has been deliberately designed to ensure **progressive skill acquisition, pedagogical coherence, and workload balance**.

However, in response to the recommendation, we are actively considering **the mutualization of assessments for closely related modules**. For example, instead of separate evaluations for ‘Database’ and ‘DBMS Workshop’, we are exploring a **single integrated project-based assessment**. This approach will allow us to **preserve the advantages of modular learning while reducing the number of exams per semester**, thereby alleviating students' workload without compromising the depth of learning.

We remain committed to continuously monitoring and optimizing our program structure to ensure a **well-balanced and effective learning experience for our students**.

6. Criterion 2. Exams : System, Concept and Organisation

6.1 Experts‘ recommendation: Experts urge that more competency-based assessment methods should be used, particularly for the final examination.

Actions Taken :

We appreciate your detailed feedback regarding our assessment methods and acknowledge your concerns regarding the extensive use of multiple-choice tests in final examinations.

At EPI, we have deliberately incorporated multiple-choice tests as part of our assessment strategy, particularly in courses that prepare students for internationally recognized certifications. These certification exams often rely heavily on multiple-choice formats to evaluate candidates' technical knowledge and problem-solving skills under time constraints. By integrating similar formats in our assessments, we aim to familiarize our students with these international standards, increasing their chances of success in obtaining industry-recognized credentials—a recommendation you also highlighted in Criterion 3 (Curriculum).

That said, we fully understand the importance of competency-based assessment methods, particularly in a Master's programme where higher-order cognitive skills must be evaluated. While we already implement alternative assessment forms such as oral exams, presentations, and project-based evaluations, we acknowledge that further balancing our assessment methods—especially for final examinations—would enhance the evaluation of advanced competencies.

In response to your recommendation, we will:

- **Reassess the role of multiple-choice tests**, ensuring they remain relevant to specific courses that align with certification requirements and refuse their use in final examinations.
- **Strengthen competency-based assessments**, such as case studies, problem-solving tasks, and applied projects, particularly in advanced-level courses.
- **Ensure a diversified assessment approach**, maintaining a balance between written tests, practical applications, and oral evaluations to better reflect the learning outcomes.

6.2 Experts‘ recommendation: EPI has to establish formal compensation measures that specify under which conditions and how exams are modified to accommodate students' special needs

Actions Taken :

Based on circular n°41/24 issued by the Tunisian Ministry of Higher Education (See Appendix 13), which sets out the guidelines for managing and supporting students with special needs, the EPI Group has developed its own internal procedure. The aim of this approach is to guarantee an inclusive, equitable and appropriate educational environment, enabling its students to succeed in their academic careers under the best possible conditions. (See Appendix14**)**.

To implement this, we have introduced the following key measures:

- **Extended exam durations** for students who require additional time.
- **Alternative exam formats** (e.g., oral instead of written assessments) where necessary.
- **Accessible exam materials**, including digital and large-print versions for visually impaired students.
- **Dedicated support staff and facilities** to assist students with special needs.

By formalizing these measures, EPI reaffirms its **commitment to academic inclusivity**, ensuring that all students have the necessary support to succeed in their studies under fair and appropriate conditions.

6.3 Experts' recommendation: The experts therefore recommend that EPI Sousse establish guidelines for the completion of the Master's thesis and that students be taught the appropriate standards of academic work and writing. The experts also recommend that the university develop a template with instructions for academic writing and the creation of graphics, citations, etc.

Actions Taken :

In response to the experts' recommendation, EPI Sousse has developed and published a comprehensive **Master's Thesis Preparation Guide** along with a **methodology framework** for thesis completion (refer to appendix 15). These resources are now publicly available on our website to ensure transparency and accessibility for all students and supervisors (https://www.episup.com/en/Internship) .

The guide provides **clear and structured instructions** on:

- The **standards of academic writing**, including research structuring, argumentation, and coherence.
- Proper **citation methods and referencing styles** to ensure academic integrity.
- Guidelines for the **creation of graphics, tables, and figures** following academic best practices.

- **Formatting rules** and thesis submission requirements.

Additionally, EPI has **will integrate academic writing workshops** within the extra activities offered to students, ensuring that students receive **practical training** on research methodology, plagiarism prevention, and scholarly communication.

7. Criterion 3.1. Staff and development

7.1 Experts‘ recommendation: the experts suggest that more measures and support mechanisms should be considered for teachers to carry out research projects and to involve their students

Actions Taken :

This recommendation is in line with our strategy of strengthening research within the EPI.

To this end, we have already initiated several actions:

- Introduction of a bonus scheme to encourage publication in indexed scientific journals. (refer to Appendix 16) taking in account the evaluation for the assessment of teachers (refer to appendix 18).
- Setting up research support mechanisms, in particular a dedicated fund, including internal funding to encourage teachers to develop projects and involve their students.
- Encouraging participation in national and international research projects, in particular through collaboration with recognised universities and research laboratories.
- Development of partnerships with companies and institutions, making it possible to propose applied research topics involving students and teachers.
- Increased recruitment of doctoral-level teaching staff, with an active policy of attracting experienced researchers to join our teaching staff and supervise research projects.
- Creating research seminars and training courses to help our teaching staff develop projects and write scientific publications.

We remain committed to continuing these efforts by putting in place additional measures to strengthen research and student involvement in these activities.

8. Criterion 4.1. Module description

8.1 Experts‘ recommendation: Experts recommend to add information about the teaching methods used in the module and the recommended literature, as they currently only provide web references or useful links. EPI has to ensure that the module descriptions provide information on the workload distribution, including class hours as well as self-study time. As mentioned in chapter 1.3, the module descriptions in Computer Science

also need to be edited and completed in such a way that they reflect the actual content taught, since the current content descriptions do not refer to all the topics covered in the modules. Furthermore, in Electrical Engineering, the modules of the specialisation "Biomedical Instruments" need to be changed so that the module title, the content description and the intended learning outcomes are consistent, as there are discrepancies between these three categories (cf. chapter 1.3).

Actions Taken :

In response to the experts' recommendation, EPI Sousse has undertaken a comprehensive revision of the module descriptions to ensure they provide clear, detailed, and structured information on course content, teaching methods, and workload distribution.

The following actions have been implemented:

- **Teaching methods and workload**: The module descriptions now include **detailed information on the teaching methodologies employed** and a breakdown of the **workload distribution** between class hours and self-study time.
- **Updated bibliography**: The **recommended literature has been revised and updated** to include relevant academic references.
- **Enhanced content descriptions**: The module descriptions for **Computer Science** have been updated to fully **reflect the theoretical concepts covered in the courses**, as mentioned in section 3.5 of this report.
- **Consistency in Electrical Engineering modules**: The modules under the **"Biomedical Instruments" specialization** have been revised to ensure that the **title, content description, and intended learning outcomes are fully aligned**, addressing the discrepancies previously identified (as noted in section 3.1 of this report).

With these improvements, EPI Sousse ensures **greater transparency and alignment between course descriptions, actual teaching practices, and expected learning outcomes**, thereby enhancing the academic experience for all stakeholders.

Refer to appendix 1, appendix 4 and appendix 5.

9. Criterion 4.2. Diploma and Diploma Supplement

9.1 Experts‘ recommendation: EPI has to include the appropriate higher education system in the Diploma Supplement. Furthermore, it also has to be clearly stated that the National Diploma/Master`s degree leads to the acquisition of 300 ECTS credits including the first degree (e.g. by mentioning that students acquire 120 ECTS credits in the preparatory cycle).

They request that the reference to business and management be removed and that the admissions wording is corrected and brought into line with the wording in the self-assessment report.

Finally, the experts recommend that the specialisation be included in the diploma supplement.

Actions Taken :

Following the experts' recommendations, EPI Sousse has revised the Diploma Supplement to ensure compliance with international standards and clarity for all stakeholders. The following improvements have been made (refer to appendix 3):

- **Inclusion of the Tunisian Higher Education System structure**: The Diploma Supplement now clearly presents the **Tunisian higher education framework**, explicitly mentioning the **ECTS credits acquired at each stage**, including the **120 ECTS credits obtained during the preparatory cycle**.
- **Removal of business and management references**: Any references to **business and management** that were not relevant to the engineering curriculum have been removed to maintain consistency with the programme's focus. The **admission criteria have been adjusted** to align with the terminology used in the **Self-Assessment Report**, ensuring coherence across all documents.
- **Specialization explicitly mentioned**: The Diploma Supplement now **includes the student's specialization**, providing more precise academic and professional recognition.

These updates guarantee a **transparent and standardized representation** of our engineering degrees, ensuring compliance with European and international higher education frameworks."

F Summary: Expert recommendations (05.03.2025)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
NED Computer Science	Without requirements	30.09.2031	Euro-Inf®	30.09.2031
NED Electrical Engineering	Without requirements	30.09.2031	EUR-ACE®	30.09.2030
NED Electromechanical Engineering	With requirements for one year	30.09.2031	EUR-ACE®	30.09.2030/ Suspension*

*According to the ENAEE rules, the award of the EUR-ACE® label is suspended if there are subject-specific requirements. The suspension will be lifted when the technical requirements (A1-A3) are fulfilled.

Requirements

For NED Electromechanical Engineering

A 1. (ASIIN 1.3) Increase the content in Embedded Systems and integrate it as a mandatory component of the study programme for all students.

A 2. (ASIIN 1.3) The content of the specialization “Aeronautics” has to be increased (to at least 2 semesters) if the specialization is to be kept. In addition, ensure that the content, the learning outcomes and the title of the specialization are aligned with each other.

A 3. (ASIIN 1.3) The content of the specialization “Automation and Mechatronics” has to be increased (to at least 2 semesters) if kept as specialization. In addition, ensure that the content, the learning outcomes and the title of the specialization are aligned with each other.

Recommendations

For all programmes

E 1. (ASIIN 1.3) It is recommended to combine related modules.

E 2. (ASIIN 1.3) It is recommended to increase the efforts to further internationalize EPI by establishing more international cooperations, conferences and publications as well as exchange programmes, by offering more and better-endowed scholarships and by better communicating the existing offers to the students.

E 3. (ASIIN 2) It is recommended to establish academic guidelines for the execution of the final project/thesis in line with scientific standards and provide students with in-depth training in academic work and writing.

E 4. (ASIII 2) It is recommended to employ more competence oriented assessment methods.

E 5. (ASIIN 3.1) It is recommended to strengthen measures and support mechanisms for teachers to undertake research projects and participate in international conferences.

For NED Electromechanical Engineering and NED Electrical Engineering

E 6. (ASIIN 1.3) It is recommended to provide students with opportunities to prepare for obtaining certificates for industrial controlling in electrical engineering and automation and mechatronics in Electromechanical Engineering

For NED Electrical Engineering

E 7. (ASIIN 1.3) It is recommended to optimise the module titles in the specialisation “Biomedical Instruments” so that they reflect the content and scope of the modules more precisely.

G Comment of the Technical Committees

Technical Committee 02 – Electrical Engineering/Information Technology (07.03.2025)

Assessment and analysis for the award of the ASIIN seal:

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

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

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

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

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
NED Electrical Engineering	Without requirements	30.09.2031	EUR-ACE®	30.09.2030
NED Electromechanical Engineering	With requirements for one year	30.09.2031	EUR-ACE®	30.09.2030/ Suspension*

*According to the ENAEE rules, the award of the EUR-ACE® label is suspended if there are subject-specific requirements. The suspension will be lifted when the technical requirements (A1-A3) are fulfilled.

Technical Committee 04 – Informatics/Computer Science (13.03.2025)

Assessment and analysis for the award of the ASIIN seal:

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

Assessment and analysis for the award of the Euro-Inf® Label:

The Technical Committee deems that the intended learning outcomes of the degree programme do comply with the Subject-Specific Criteria of the Technical Committee 04 – Informatics/Computer Science.

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

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
NED Computer Science	Without requirements	30.09.2031	Euro-Inf®	30.09.2031

H Decision of the Accreditation Commission (25.03.2025)

Assessment and analysis for the award of the ASIIN seal:

The Commission discusses the procedure and generally follows the vote of the experts. They find, however, that one should not specify the specific length of a specialization, since the duration of a specialization in terms of semesters does not necessarily say how much content of the specialization is actually taught in those semesters. They therefore decide to omit the parts in brackets referring to the extension in semesters in requirements A2 and A3 and to focus on the aspect of the expansion of the content of the specialization itself.

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

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

However, as requirements regarding the curriculum have been issued, the award of the EUR-ACE® label for the NED Electromechanical Engineering will be suspended as long as the three requirements have not been fulfilled.

Assessment and analysis for the award of the Euro-Inf® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programme do comply with the Subject-Specific Criteria of the Technical Committee 04 – Informatics/Computer Science.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
NED Computer Science	Without requirements	30.09.2031	Euro-Inf®	30.09.2031

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
NED Electrical Engineering	Without requirements	30.09.2031	EUR-ACE®	Subject to the approval of the ENAEE Administrative Council
NED Electromechanical Engineering	With requirements for one year	30.09.2031	EUR-ACE®	Suspension*

*According to the ENAEE rules, the award of the EUR-ACE® label is suspended if there are subject-specific requirements. The suspension will be lifted when the technical requirements (A1-A3) are fulfilled.

Requirements

For NED Electromechanical Engineering

A 1. (ASIIN 1.3) Increase the content in Embedded Systems and integrate it as a mandatory component of the study programme for all students.

A 2. (ASIIN 1.3) The content of the specialization “Aeronautics” has to be increased if the specialization is to be kept. In addition, ensure that the content, the learning outcomes and the title of the specialization are aligned with each other.

A 3. (ASIIN 1.3) The content of the specialization “Automation and Mechatronics” has to be increased if kept as specialization. In addition, ensure that the content, the learning outcomes and the title of the specialization are aligned with each other.

Recommendations

For all programmes

E 1. (ASIIN 1.3) It is recommended to combine related modules.

E 2. (ASIIN 1.3) It is recommended to increase the efforts to further internationalize EPI by establishing more international cooperations, conferences and publications as well as exchange programmes, by offering more and better-endowed scholarships and by better communicating the existing offers to the students.

E 3. (ASIIN 2) It is recommended to establish academic guidelines for the execution of the final project/thesis in line with scientific standards and provide students with in-depth training in academic work and writing.

E 4. (ASIII 2) It is recommended to employ more competence oriented assessment methods.

E 5. (ASIIN 3.1) It is recommended to strengthen measures and support mechanisms for teachers to undertake research projects and participate in international conferences.

For NED Electromechanical Engineering and NED Electrical Engineering

E 6. (ASIIN 1.3) It is recommended to provide students with opportunities to prepare for obtaining certificates for industrial controlling in electrical engineering and automation and mechatronics in Electromechanical Engineering

For NED Electrical Engineering

E 7. (ASIIN 1.3) It is recommended to optimise the module titles in the specialisation “Biomedical Instruments” so that they reflect the content and scope of the modules more precisely.

Appendix: Programme Learning Outcomes and Curricula

According to Diploma Supplement, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Computer Science:

“The aim of the Computer Engineering training at the École Internationale Supérieure Privée Polytechnique de Sousse (EPI) is to train future engineers capable of taking responsibility for large-scale projects in the areas of “software development”, “software development”. Internet of Things and Robotics”, “Virtual Reality and Game Development”, “Cyber Security and Cryptography”, “Artificial Intelligence and Data Sciences” and “Cloud Computing and Networks”.

The student thus begins his training at the EPI with two semesters of common core, at the end of which he has the possibility of choosing between 6 areas of specialization. The specialty training thus lasts 4 semesters, the last semester being reserved for the end-of-studies project.

The areas of specialization are as follows:

Software Engineering:

Software engineering is a field that encompasses the principles, techniques and methods used to develop reliable, efficient and scalable software. It concerns the entire software development process, from defining requirements to continuous maintenance and improvement, including programming, project management and testing.

It is essential to emphasize that the applications of software engineering are varied and virtually unlimited. They can be designed specifically for the information system of a specific company (web, mobile and desktop), image and video processing, games, applications linked to artificial intelligence, health, or yet to the Internet of Things (IoT). In addition, the development of such applications requires the mastery of multiple skills by the software engineer, such as modeling and object-oriented programming, web development, native

mobile development, hybrid development, design patterns, virtualization and cloud services, software testing, DevOps processes, business intelligence, Machine Learning, Deep Learning, as well as soft skills and interpersonal communication.

Artificial Intelligence:

The Artificial Intelligence and Data Science course offers an in-depth exploration of the concepts, tools and applications of AI and data science. It combines theoretical courses with practical training, emphasizing the acquisition of technical skills and solving real-world problems. Students work on concrete projects throughout the course to apply their knowledge in real-world contexts.

This course aims to provide students with a complete immersion in the fields of Artificial Intelligence (AI) and Data Science. To achieve this, the program is designed to balance theory and practice. Theoretical courses provide a solid foundation in fundamental concepts, while hands-on training allows students to implement these concepts in real-world projects.

Theoretical courses cover a wide range of topics, from the basics of AI and data science to advanced techniques such as machine learning and natural language processing. This provides students with an in- depth understanding of the principles underlying these technologies, as well as the skills needed to apply them effectively.

The practical component of the course is essential to allow students to develop their skills and put them into practice. They are regularly confronted with concrete projects which reflect the challenges encountered in the professional world. This allows them to develop their ability to solve real-world problems using AI and data science techniques, while developing their skills in programming, data analysis and solution design.

By working on these projects, students gain valuable experience that prepares them to enter the workforce with the skills and confidence to succeed in roles related to AI and data science.

The Artificial Intelligence and Data Science pathway offers a balanced combination of theory and practice, allowing students to gain an in-depth understanding of AI and data science concepts and tools, while developing their practical skills at through concrete projects

Cybersecurity:

The Cybersecurity course offers an in-depth exploration of the concepts, tools and applications of IT and network security. It combines theoretical courses with practical training, emphasizing the acquisition of technical skills and solving real-world problems. Students

work on concrete projects throughout the course to apply their knowledge in real-world contexts.

This course aims to provide students with a complete immersion in the areas of digital attacks and intrusions as well as information protection techniques, mechanisms and approaches. To achieve this, the program is designed to balance theory and practice. Theoretical courses provide a solid foundation in fundamental concepts, while hands-on training allows students to implement these concepts in real-world projects.

Theoretical courses cover a wide range of topics, from the basics of security to advanced techniques such as firewall administration and intrusion detection systems. Students gain an in-depth understanding of the principles underlying these technologies, as well as the skills needed to apply them effectively.

The practical component of the course is essential to allow students to develop their skills and put them into practice. They are regularly confronted with concrete projects which reflect the challenges encountered in the professional world. This allows them to develop their ability to solve real-world problems using network and systems security techniques, while developing their skills in advanced networking and systems administration on physical servers or in the Cloud.

By working on these projects, students gain valuable experience that prepares them to enter the job market with the skills and confidence needed to succeed in Security Expert, Information Systems Manager (CISO) roles. or Information Systems Directors (DSI).

The Cybersecurity track offers a balanced combination of theory and practice, allowing students to gain an in-depth understanding of concepts and tools related to advanced network administration, and the administration of information security solutions, while developing their practical skills through concrete projects.

Cloud computing and networks:

The cloud is a collection of hardware, network connections and software that provides sophisticated services that individuals and communities can exploit at will from anywhere in the world

Cloud computing is a changing trend: instead of obtaining computing power by purchasing hardware and software, the consumer uses power made available by one or more providers via the Internet.

The Cloud and Network Engineer is in charge of the deployment, storage, management and migration of data on virtual solutions. A specialist in programming and data centers, he supports companies in their dematerialized digital transformation. This specialization

therefore aims to train engineers specialized in the design, implementation and management of infrastructure and IT solutions based on the Cloud. This results in varied missions: analysis of the data storage system and audit, selection of the most appropriate Cloud services, creation of scalable architectures, etc. All this by relying on technologies like AWS, Microsoft Azure, Google Cloud Platform, etc.

Thanks to training where theoretical aspects are combined with the practical aspects of the profession, students will be able to cunderstand the fundamental concepts of cloud computing, master cloud computing technologies, develop skills in cloud design and architecture, acquire skills in cloud development and deployment, become familiar with security and compliance in the cloud, learn to manage and optimize cloud resources…

IoT and Robotic Programming:

The computer engineer track specializing in Internet of Things (IoT) and robotics programming, is a deep dive into technological areas that are rapidly changing the way we interact with the physical world. This specialized work goes beyond basic computer science concepts and focuses specifically on the design and development of connected systems and smart materials for robotics.

The computer engineer course specializing in IoT & Robotic Programming offers comprehensive training that prepares students to meet the technical and conceptual challenges associated with building intelligent and interconnected computer systems. Through a combination of theoretical learning, practical work and real- world projects, students develop the skills needed to succeed in this ever-changing industry.

This program aims to train versatile and competent IT engineers, capable of responding to the technological challenges arising from the omnipresence of connectivity and increasing automation. Students are prepared to design and deploy innovative solutions suitable for diverse sectors such as manufacturing, healthcare, smart cities and agriculture. Emphasis is placed on developing practical skills, solving complex problems and the ability to quickly adapt to changing technologies.

This course aims to provide students with the knowledge and skills necessary to navigate a world where IoT devices and robots are increasingly present. Engineers from this program will be able to design interconnected computer systems and intelligent robots that meet the specific needs of various industries. They will be able to identify opportunities for innovation and develop appropriate technological solutions, while taking into account performance, security and sustainability requirements.

With a focus on developing practical skills, this path provides students with real-world experience in the design, development and deployment of IoT and robotics solutions. Hands-

on projects and laboratory work allow students to develop a deep understanding of emerging technologies and improve their ability to solve real-world problems. Additionally, by encouraging adaptability and the ability to adjust to rapid changes in the field, this program prepares students to succeed in an ever-changing professional environment.

In summary, this course aims to train highly qualified IT engineers, ready to take on the technological challenges of tomorrow in the fields of IoT and robotics, with an emphasis on practice, innovation and adaptability.

Virtual reality and game engineering:

The Computer Engineer course, specializing in Virtual Reality and Game Engineering, aims to train computer engineers specialized in the design, development and management of innovative systems and applications in the fields of virtual reality (VR), augmented reality (AR) and video games.

The Virtual Reality and Game Engineering engineer plays a key role in the development of innovative and immersive solutions. His responsibilities include designing and modeling 3D environments, developing interactive features, programming game mechanics, performance optimization, testing, and troubleshooting technical issues. He works closely with designers, artists and other team members to create exceptional user experiences.

With this in mind, this course offers students complete and in-depth training in IT, with a particular focus on technologies related to virtual reality and video games. Technical skills acquired include proficiency in programming languages such as C++, C#, Python and Java, as well as gaming frameworks and engines such as Unity, Unreal Engine and Three.js. Students also develop skills in 3D design, animation, artificial intelligence, data processing, IT security and project management."

The following **curriculum** is presented:

Level	**3-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
Inf-TC 3 1 03	Architecture of microprocessor systems and microcontrollers	1,5	2	1,5	
Inf-TC 3 1 04	Advanced operating systems	1,5	2		1,5
Inf-TC 3 1 05	Advanced algorithmic 1	1,5	2	1,5	
Inf-TC3 1 06	Advanced C Programming Workshop	3	4		3
Inf-TC 3 1 07	Computer networks	1,5	2		1,5
Inf-TC 3 1 12	IT security	1,5	2		1,5
Inf-TC 3 1 08	Digital signal acquisition and processing	1,5	2	1,5	
Inf-TC 3 1 09	Data base	3	3	1,5	1,5
Inf-TC 3 1 10	Web development	3	3		3
Inf-TC 3 1 11	Engineering mathematics	1,5	2	1,5	
Inf-TC 3 1 13	Introduction to Artificial Intelligence	1,5	2	1,5	
	Total	**24**	**30**	**24**	

Level	**3-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
Inf-TC 3 2 03	Object Oriented Programming	3	4		3
Inf-TC 3 2 04	Advanced Algorithmics 2	3	3	1,5	1,5
Inf-TC 3 2 05	Preparation for computer network certification	3	3	1,5	1,5
Inf-TC3 2 06	Systems architecture, embedded systems and IoT	3	4	1,5	1,5
Inf-TC 3 2 07	DBMS workshop	1,5	2		1,5
Inf-TC 3 2 08	Advanced web development	3	4		3
Inf-TC 3 2 09	Python Programming	1,5	2		1,5
Inf-TC 3 2 10	Image processing	1,5	2		1,5
Inf-TC 3 2 11	Object modeling	1,5	2	1,5	
	Total	**24**	**30**	**24**	

Specialization: Artificial Intelligence

Level	4-S1				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
Inf-IA 4 1 03	Software Architecture & Design Patterns	1,5	2		1,5
Inf-IA 4 1 04	Virtualization and cloud	3	4	1,5	1,5
Inf-IA 4 1 05	NO SQL Databases	3	4		3
Inf-IA 4 1 06	Data mining	1,5	2		1,5
Inf-IA 4 1 07	Artificial intelligence foundations	3	4	1,5	1,5
Inf-IA 4 1 08	Data analysis	3	3		3
Inf-IA 4 1 09	Python OO	3	3		3
Inf-IA 4 1 10	Data warehouses	1,5	2		1,5
Inf-IA 4 1 11	Integration project (AI project)	1,5	2		1,5
	Total	**24**	**30**	**24**	

Level	4-S2				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
Inf-IA 4 2 03	Agile methodologies	1,5	2	1,5	
Inf-IA 4 2 04	Cloud computing (preparation for the Amazon certificate)	3	3	1,5	1,5
Inf-IA 4 2 05	preparation for HCAI certification	3	3	1,5	1,5
Inf-IA 4 2 06	Machine learning	3	4	1,5	1,5
Inf-IA 4 2 07	Data Science oriented Python	1,5	2		1,5
Inf-IA 4 2 08	Stochastic models	1,5	2		1,5
Inf-IA 4 2 09	PFA Project	1,5	2		1,5
Inf-IA 4 2 10	Computer Vision	1,5	2		1,5
Inf-IA 4 2 11	Big Data I (Hadoop/Mapreduce)	3	4		3
Inf-IA 4 2 12	Azure Certificate	1,5	2		1,5
	Total	**24**	**30**	**24**	

Level	5-S1				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
TSV 5 1 01	Minor 1: ESB certification	1,5	2	1,5	
TSV 5 1 02	Minor 2: IT law	1,5	2	1,5	
Inf-IA 5 1 03	Devops/MLops	1,5	2	1,5	
Inf-IA 5 1 04	Business Intelligence	1,5	2		1,5
Inf-IA 5 1 05	Natural Language Processing (NLP)	3	2	1,5	1,5
Inf-IA 5 1 06	Big Data 2 (Spark)	3	4		3
Inf-IA 5 1 07	Deep learning	3	4		3
Inf-IA 5 1 08	Pattern recognition (image recognition)	1,5	2		1,5
TSV 5 1 04	Minor 4: Finance for engineers	1,5	2	1,5	
Inf-IA 5 1 10	Data visualization	1,5	2		1,5
Inf-IA 5 1 11	Robotics	1,5	2		1,5
TSV 5 1 03	Minor 3: Digital Marketing (MD)	1,5	2		1,5
Inf-IA 5 1 13	Blockchain	1,5	2		1,5
	Total	**24**	**30**	**24**	

Level	5-S2				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-Int 3	Introductory Internship	10	3	/	/
Inf-Int 4	Professional Internship		3	/	/
Inf-Int 5	PFE		24	/	/

Specialization: Cybersecurity

Level	4-S1				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
INF-CYB 4 1 03	Native mobile development 1	1,5	2		1,5
INF-CYB 4 1 04	Data analysis	1,5	2		1,5
INF-CYB 4 1 05	Full stack development (Php, JS, React, Angular, etc.)	1,5	2		1,5
INF-CYB 4 1 06	Integration project (applied to security)	1,5	2		1,5
INF-CYB 4 1 07	Artificial intelligence 1	3	2	1,5	1,5
INF-CYB 4 1 08	Advanced databases (admin + NoSql + PLSQL OO)	1,5	2		1,5
INF-CYB 4 1 09	CyberOps I	1,5	2		1,5
INF-CYB 4 1 10	Cybersecurity Foundations	3	4	1,5	1,5
INF-CYB 4 1 11	Applied cryptography	1,5	2	1,5	
INF-CYB 4 1 12	Network Security I	1,5	2		1,5
INF-CYB 4 1 13	Systems Administration 1	3	4	1,5	1,5
	Total	**24**	**30**	**24**	

Level	4-S2				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
INF-CYB 4 2 03	Cloud Computing Services (Azure Certificat	1,5	2		1,5
INF-CYB 4 2 04	Native mobile development 2	1,5	2		1,5
INF-CYB 4 2 05	Artificial Intelligence 2 (Amazon Certificati	3	2	1,5	1,5
INF-CYB 4 2 06	PFA Scientific Project (applied to security)	1,5	2		1,5
INF-CYB 4 2 07	Linux Services Security (CEH)	3	4		3
INF-CYB 4 2 08	CyberOps II (CISCO Certification)	3	4		3
INF-CYB 4 2 09	Cloud Computing and Virtualization (Amaz	3	4		3
INF-CYB 4 2 10	Systems Administration 2	3	4		3
INF-CYB 4 2 11	Network Security II (CISCO Certification)	1,5	2		1,5
	Total	**24**	**30**	**24**	

Level	**5-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
TSV 5 1 01	Minor 1: ESB certification	1,5	2		1,5
TSV 5 1 03	Minor 3: Digital Marketing (MD)	1,5	2		1,5
TSV 5 1 04	Minor 4: Finance for engineers	1,5	2	1,5	
INF-CYB 5 1 04	Technology Monitoring (DevSecOps, etc.)	3	2	3	
INF-CYB 5 1 05	Information Systems Security Audit	3	4	3	
INF-CYB 5 1 06	Intrusion Detection Systems (IDS)	1,5	2		1,5
INF-CYB 5 1 07	Security of Connected Objects (IoT)	1,5	2		1,5
INF-CYB 5 1 08	Virtual Private Network (VPN)	1,5	2		1,5
INF-CYB 5 1 09	Digital investigation (forensic)	1,5	2		1,5
INF-CYB 5 1 10	Cloud Computing Security	1,5	2	0,75	0,75
INF-CYB 5 1 11	Firewall administration	3	4		3
INF-CYB 5 1 12	Pentesting	3	4		3
	Total	**24**	**30**	**24**	

Level	**5-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-Int 3	Introductory Internship	10	3	/	/
Inf-Int 4	Professional Internship		3	/	/
Inf-Int 5	PFE		24	/	/

Specialization: Cloud Computing

Level	4-S1				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-ICC 4 1 01	The fundamentals of Cloud Computing	3	3	1,5	1,5
Inf-ICC 4 1 02	Management of a Data Center	1,5	2	1,5	0
Inf-ICC 4 1 03	Advanced Database	3	3	1,5	1,5
Inf-ICC 4 1 04	Development of Distributed Applications	3	3	1,5	1,5
Inf-ICC 4 1 05	Introduction to data analysis	1,5	3	0	1,5
Inf-ICC 4 1 06	Network protocol engineering	1,5	3	1,5	0
Inf-ICC 4 1 07	System administration	3	3	0	3
Inf-ICC 4 1 08	Server administration	3	3	1,5	1,5
Inf-ICC 4 1 09	Integration project	1,5	3	0	1,5
FR- ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
	Total	**24**	**30**	**24**	

Level	4-S2				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-ICC 4 2 01	DevOps	4,5	4	1,5	3
Inf-ICC 4 2 02	Cloud Computing Security and Network Auditing	3	4	1,5	1,5
Inf-ICC 4 2 03	Development of web services applications on cloud platforms	3	3	1,5	1,5
Inf-ICC 4 2 04	PFA	1,5	3		1,5
Inf-ICC 4 2 05	Big Data	3	3	1,5	1,5
Inf-ICC 4 2 06	Advanced server administration	3	3	0	3
Inf-ICC 4 2 07	Management of cloud computing infrastructures	1,5	3	1,5	0
Inf-ICC 4 2 08	Cloud services certification (Azure)	1,5	3	0	1,5
FR- ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
	Total	**24**	**30**	**24**	

Level	**5-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-ICC 5 1 01	Agile Methods adapted to Cloud applications	1,5	3	1,5	0
Inf-ICC 5 1 02	SaaS and PaaS operational solutions	1,5	2	1,5	0
Inf-ICC 5 1 03	Development Technologies and DBMS for Cloud Applications	3	3	0	3
Inf-ICC 5 1 04	Administration of Cloud platforms and Web services.	3	3	1,5	1,5
Inf-ICC 5 1 05	Hybrid mobile development of cloud applications	3	3	1,5	1,5
Inf-ICC 5 1 06	Firewall Administration	1,5	3	0	1,5
Inf-ICC 5 1 07	Data Analysis and BI	3	3	1,5	1,5
Inf-ICC 5 1 08	Cloud for IoT	1,5	2	1,5	0
TSV 5 1 01	Minor 1: ESB certification	1,5	2	1,5	0
TSV 5 1 04	Minor 4: Finance for engineers	1,5	2	1,5	0
TSV 5 1 03	Minor 3: Digital Marketing (MD)	1,5	2	0	1,5
TSV 5 1 02	Minor 2: IT law	1,5	2	1,5	0
	Total	**24**	**30**	**24**	

Level	**5-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-Int 3	Introductory Internship	10	3	/	/
Inf-Int 4	Professional Internship		3	/	/
Inf-Int 5	PFE		24	/	/

Specialization: Internet of things and Robotics Programming

Level	**4-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
IoT4.S1.03	Advanced OOP	3	3		3
IoT4.S1.04	Advanced python programming	3	3		3
IoT4.S1.05	Advanced web development (FrameWork)	3	3		3
IoT4.S1.06	Cloud computing and IoT services	1,5	2		1,5
IoT4.S1.07	Databases and Data Storage for IoT	1,5	2		1,5
IoT4.S1.08	Integration project	1,5	2	1,5	
IoT4.S1.09	IoT communication protocols (MQTT, CoAP, LoRa, etc.)	3	4		3
IoT4.S1.10	Security of IoT systems and Cybersecurity	1,5	3	1,5	
IoT4.S1.11	IoT system architecture and design (IoT programming primer)	3	4		3
	Total	**24**	**30**	**24**	

Level	**4-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
IoT4.S2.03	AI and Machine Learning applied to IoT (AIoT)	3	3		3
IoT4.S2.04	Mobile Development and Web Services (React Native)	3	3		3
IoT4.S2.05	PFA Scientific Project (Design of a Connected IoT solution)	3	4	3	
IoT4.S2.06	Advanced IoT Projects (Smart Healthcare, Smart Agricultur, Smart City, Smart Home, Smart Car, etc.)	3	4		3
IoT4.S2.07	Robotics and Cobotics (collaborative robot)	3	3		3
IoT4.S2.08	The fundamentals of PCB (Printed Circuit Board) design	1,5	3		1,5
IoT4.S2.09	Design of smart sensors and actuators for IoT	1,5	2		1,5
IoT4.S2.10	Advanced microcontroller-based programming	3	4		3
	Total	**24**	**30**	**24**	

Level	**5-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
TSV 5 1 01	Minor 1: ESB certification	1,5	2	1,5	
TSV 5 1 02	Minor 2: IT law	1,5	2	1,5	
TSV 5 1 03	Minor 3: Digital Marketing (MD)	1,5	2		1,5
TSV 5 1 04	Minor 4: Finance for engineers	1,5	2	1,5	
IoT5.S1.05	Federated project (agile method)	1,5	2	1,5	
IoT5.S1.06	Computer vision	3	3		3
IoT5.S1.07	Introduction to Industry 4.0	1,5	2	1,5	
IoT5.S1.08	IoT Data Analysis	3	4		3
IoT5.S1.09	IoT and Virtual Reality (VR)	3	4		3
IoT5.S1.10	Long Range Communication Technologies: LoRaWAN/ThingSat	3	4		3
IoT5.S1.11	Graphical programming language (LabView/Node-Red)	3	3		3
	Total	**24**	**30**	**24**	

Level	**5-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-Int 3	Introductory Internship	10	3	/	/
Inf-Int 4	Professional Internship		3	/	/
Inf-Int 5	PFE		24	/	/

Specialization: Virtual Reality and Game Engineering

Level	**4-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
Inf-RV 4 1 03	Integration project	1,5	3	1,5	
Inf-RV 4 1 04	Advanced OOP	3	3		3
Inf-RV 4 1 05	Advanced web development	3	3		3
Inf-RV 4 1 06	Artificial Intelligence and Machine learning applied in Virtual Reality and Gaming	3	3		3
Inf-RV 4 1 07	Advanced databases	1,5	3		1,5
Inf-RV 4 1 08	Big Data	1,5	3		1,5
Inf-RV 4 1 09	Mathematics applied to geometry and 3D modeling	1,5	2	1,5	
Inf-RV 4 1 10	2D and 3D modeling (3dsMax, Blender, etc.)	3	3		3
Inf-RV 4 1 11	Introduction to virtual reality (VR) and augmented reality (AR) technologies	3	3		3
	Total	**24**	**30**	**24**	

Level	**4-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
Inf-RV 4 2 03	PFA Scientific Project	3	3	3	
Inf-RV 4 2 04	Mobile development (Virtual and augment	3	3		3
Inf-RV 4 2 05	cloud computing	1,5	3		1,5
Inf-RV 4 2 06	Video game programming with Unity	3	3		3
Inf-RV 4 2 07	Game Design (level design, design of immersive experiences, scriptwriting)	1,5	3	1,5	
Inf-RV 4 2 08	Team virtual reality project	3	4		3
Inf-RV 4 2 09	Advanced VR programming (movement management, collisions, etc.)	3	4		3
Inf-RV 4 2 10	3D web development	3	3		3
	Total	**24**	**30**	**24**	

Level	**5-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
TSV 5 1 01	Minor 1: ESB certification	1,5	2	1,5	
TSV 5 1 02	Minor 2: IT law	1,5	2	1,5	
TSV 5 1 03	Minor 3: Digital Marketing (MD)	1,5	2		1,5
TSV 5 1 04	Minor 4: Finance for engineers	1,5	2	1,5	
Inf-RV 5 1 05	Project Management and Agile Methodologies	1,5	3		1,5
Inf-RV 5 1 06	Emerging Technologies in VR (eye-tracking, haptics, etc.)	3	3	1,5	1,5
Inf-RV 5 1 07	Gesture interaction and body tracking	3	3	1,5	1,5
Inf-RV 5 1 08	Virtual Reality (VR) Safety	1,5	3	1,5	
Inf-RV 5 1 09	Unreal Engine	3	4		3
Inf-RV 5 1 10	Virtual Reality and IoT	3	3		3
Inf-RV 5 1 11	Sound and Visual Design for VR and AR Experiences	3	3		3
	Total	**24**	**30**	**24**	

Level	**5-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-Int 3	Introductory Internship	10	3	/	/
Inf-Int 4	Professional Internship		3	/	/
Inf-Int 5	PFE		24	/	/

Specialization: Software Engineering

Level	4-S1				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
Inf-GL 4 1 04	Data analysis	1,5	2	0	1,5
Inf-GL 4 1 03	Integration project	1,5	2	1,5	0
Inf-GL 4 1 09	Machine Learning	2,5	2	0,75	1,5
Inf-GL 4 1 05	Software architecture	1,5	2	1,5	0
Inf-GL 4 1 08	Native Mobile Development 1 (Android)	3	4	0	3
Inf-GL 4 1 07	.Net development (C# & ASP.NET)	3	4	0	3
Inf-GL 4 1 11	Advanced object modeling	1,5	2	1,5	0
Inf-GL 4 1 12	Virtualization & Cloud	1,5	2	0	1,5
Inf-GL 4 1 10	Advanced OOP	3	4	0	3
Inf-GL 4 1 06	Advanced databases	2	2	0,75	1,5
	Total	**24**	**30**	**24**	

Level	4-S2				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
FR- ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
Inf-GL 4 2 07	Deep Learning	2	2	0,75	1,5
Inf-GL 4 2 03	PFA Scientific Project	3	3	0	3
Inf-GL 4 2 04	Agile and hybrid methodologies	1,5	2	1,5	0
Inf-GL 4 2 10	UI/UX Design	1,5	2	0	1,5
Inf-GL 4 2 05	Full stack development (React JS)	3	4	0	3
Inf-GL 4 2 08	Java EE (Level 1)	3	4	0	3
Inf-GL 4 2 09	Design Patterns	2,5	3	0,75	1,5
Inf-GL 4 2 12	DevOps (Level 1)	1,5	2	0	1,5
Inf-GL 4 2 06	Native Mobile Development 2 (iOS)	1,5	2	0	1,5
Inf-GL 4 2 11	Cloud Services Certification (AZURE)	1,5	2	1,5	0
	Total	**24**	**30**	**24**	

Level	**5-S1**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
TSV 5 1 01	Minor 1: ESB certification	1,5	2	1,5	0
TSV 5 1 02	Minor 2: IT law	1,5	2	1,5	0
TSV 5 1 03	Minor 3: Digital Marketing (MD)	1,5	2	0	1,5
TSV 5 1 04	Minor 4: Finance for engineers	1,5	2	1,5	0
Inf-GL 5 1 09	Software quality and automated testing	1,5	2	1,5	0
Inf-GL 5 1 06	Business Intelligence (BI)	1,5	2	0	1,5
Inf-GL 5 1 05	Big Data	3	3	0	3
Inf-GL 5 1 07	Cross-Platform Framework (Flutter)	3	3	0	3
Inf-GL 5 1 08	DevOps	1,5	2	0	1,5
Inf-GL 5 1 10	Java EE (SpringBoot)	1,5	2	0	1,5
Inf-GL 5 1 12	Technology Monitoring (IoT)	1,5	2	0	1,5
Inf-GL 5 1 11	GL Seminars (Design Thinking, Cybersecurity, Public Speaking, Gaming & VR, BlockChain, ...)	3	4	3	0
Inf-GL 5 1 13	Deep learning 2 (NLP)	1,5	2	1,5	0
	Total	**24**	**30**	**24**	

Level	**5-S2**				
Coded	**Matter**	**Coef**	**Credit**	**Course/week**	**TP/week**
Inf-Int 3	Introductory Internship	10	3	/	/
Inf-Int 4	Professional Internship		3	/	/
Inf-Int 5	PFE		24	/	/

According to Diploma Supplement, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Electrical Engineering:

Matrix 1: Electrical engineering Common core (two academic years)

Families of skills	Skills	Modules
General skills	Communication, openness to the socio-economic environment, openness to the international, creativity, initiative, autonomy, self-training	English; English; Technical communication; Entrepreneurship; HRM; work law; Traineeship ; EPP; PFA; PFE
Electrical circuit design	Simple electrical circuits, basic laws, dipoles, quadripoles, filters	Electrical circuit
Electrical installation	Electrical equipment, basic diagrams, lighting circuits, remote switches, timers, intercoms, strikers, ...	Electrical schemes, electrical installations
Computer and Industrial Computers	- operating systems and object-oriented programming languages (C ++ and JAVA) - Architecture and programming microprocessors, addressing modes, memories, inputs and outputs - Programmable logic controllers and automated systems	Microprocessors and Assembler Programming, API and Automated Systems

Study and design of electronic circuits	- Basic analog electronics combining rectifying circuits such as diodes and amplification such as transistors, assemblies using operational amplifiers, oscillators and power amplifiers - Electronic Diagram: CAD in Electronics, PCB Design - Digital electronics that processes the numbering system, codes, basic logic functions, combinational logic circuits, sequential logic or scales, counters, down-counters and registers - Power electronics that process power electronics components (Thyristor, Diode Triac), rectifier, single and three phase dimmers. Static converters (chopper, inverter, rectifier, etc.) - Special circuits: DSPs, microcontrollers, programmable circuits and VHDL synthesis and interfaces.	Analogical Electronics 1, Analogical Electronics 2, Combinatorial and sequential logic, CAD, Power electronics 1, Power electronics 2, DSP, interfacing techniques, VHDL synthesis, programmable circuits, micro-controllers
Study of Networks and Electrical Machinery	- - Knowledge of the transformer's mono and three-phase - - Electrical DC machines, generator and motor, starting, torque, speed, runaway - - Synchronous ac electrical machines: Alternator and asynchronous motor - - Asynchronous AC Electric Machines: Motor and Generator - - Knowledge of electrical networks, voltage drop, active power, reactive and apparent.	Electrical Engineering 1, Electrical Engineering 2, Synchronous Machines, Asynchronous

Control of industry processes	- Continuous linear systems, responses, transfer function -Slave systems - Analysis of the enslaved systems: stability, precision, speed - Synthesis of the slave systems: PID correctors - Sampled systems, transformed into z, sampled transmittances - Servo sampling - Analysis of sampled servo systems: stability, accuracy, speed - Synthesis of sampled systems: PID, dominant poems, pole placement - Modeling in the state space - Commandability and Observability - Advanced Control Techniques: Predictive, Robust, Sliding Mode	Automatic 1, Automatic 2, System Analysis and Control.

Matrix 2: Electrical Engineering Option Biomedical Instrumentation

Families of skills	Skills	Modules
General Skills	Basic knowledge in medicine	Physiology and Neurophysiology Biology, Biophysical Anatomy and Atomic and Nuclear Physics
Maintenance of medical equipment	Mastery of the principles of medical devices in medical imaging or radiography including scanners, MRI, gamma camera and X-rays, autoclaves	Equipment maintenance, sterilization safety and standards
Medical Technology	Master the techniques of medical imaging, electronic systems that equip medical devices, medical robotics and telemedicine (E-nuclear health	Medical imaging techniques, electronics and instrumentation, medical robotics, E-health).
Hospital management	Quality of equipment, acquisition of equipment (markets, cost, Qualitology and Computer Aided Maintenance	
	maintenance periodicity	Management
Biomedical Instrumentation Measuring instruments used in maintenance, sensors		Biomedical Instrumentation

Matrix 3: Electrical Engineering Option Embedded systems

Families of skills	Skills	Modules
Theory of Information and Embedded Systems Applications	Introduce advanced image processing techniques, Android programming, its development platform and the specificities of embedded smartphone development, know the basics of source and channel coding on the tools of information theory.	Mobile Development, Artificial and Industrial Vision, Advanced Coding of Information

Digital Systems	Master the VHDL language for the design of CPLDs, FPGAs and ASICs. Introduce SoC design methodologies and their applications based on new generation FPGAs.	Advanced VHDL: Architecture and Simulation Prototyping SOCs on FPGAs
Architecture and Design of Electronic Systems	ARM7TDMI heart-based microcontroller architecture, and more specifically those of the NXP LPC2xxx or STM32 family, intelligent sensor design	ARM Processors and Applications, Smart Sensors, RFID: Radio Frequency Identification
Introduction to embedded systems and real-time systems	Know the architecture and the design of an embedded system under Linux, Translate a given problem in hardware and software solution for an embedded system	Linux for embedded systems Embedded systems: architectures and applications

Matrix 4: Electrical Engineering Option industrial control

Families of skills	**Skills**	**Modules**
Machine control	Master the control techniques of DC and AC electric machines for industrial needs. Use of renewable energies and speed controllers for the control	Control of electrical machinery, Renewable energies and Smart Grids, Variable speed drives
Systems maintenance	Detection of system malfunctions and knowledge of maintenance and maintenance techniques in view of the safety of their operation	Techniques and methods of industrial maintenance, Diagnosis and safety of operation
Control of systems	Piloting techniques for industrial processes including mechatronic systems and intelligent control studies including fuzzy control and neural control	Control of Industrial Systems by PLC, Sensors and Industrial Actuators, Intelligent Controls, Modeling and Control of Mechatronic Systems,

Industrial Process Management	Know the production management methods and methods in planning-scheduling.Respect of the ISO standard	Production Analysis and Management, Quality Management
Internet of Things and Mobile Development	Know the programming in Android, its development platform and the specificities of embedded development on smartphones.	Internet of Things and Mobile Development

The following **curriculum** is presented:

Electrical Engineering : Common Core : S1

Code	Subject	Coef	Credit	Course/week	Practical/week
FR-ABC	French	1,5	2	1,5	0
FR-ABC	English	1,5	2	1,5	0
ELEC 3 103	Electrical Networks	2,25	3	1,5	0,75
ELEC 3 104	Electrical schematics & Installation	3	3	1,5	1,5
ELEC 3 105	Linear Systems 1	3	3	2,25	0,75
ELEC 3 106	Signal processing 1	3	3	2,25	0,75
ELEC 3 107	Discrete component electronics	1,5	3	1,5	0,75
ELEC 3 108	Functions for Digital Electronics	1,5	3	1,5	0,75
ELEC 3 109	Electrical circuits	2,25	3	1,5	0,75
ELEC 3 110	Computer architecture and Linux	1,5	2	1,5	0
ELEC 3 111	Mathematics for engineers	3	3	1,5	0
	Total	24	**30**		

Electrical Engineering : Common Core : S2

Code	Subject	Coef	Credit	Course/week	Practical/week
FR-ABC	French	1,5	2	1,5	0
FR-ABC	English	1,5	2	1,5	0
ELEC 3 203	Direct current machines	3	3	1,5	0.75
ELEC 3 204	Electrical installation LAB	1,5	3	0	1,5
ELEC 3 205	Linear systems 2	1,5	2	1,5	0.75
ELEC 3 206	Signal processing 2	1,5	2	1,5	0,75
ELEC 3 207	Functions & Electronic Systems	3	3	1,5	0,75
ELEC 3 208	Object Oriented Programming C++ & Java	3	3	0	1,5
ELEC 3 209	Microprocessor and microcontroller engineering	3	3	1,5	1,5
ELEC 3 210	CAD	1,5	3	0	3
ELEC 3 211	Probability & Statistics	1,5	2	1,5	0
ELEC 3 212	Numerical analysis	1,5	2	1,5	0
	Total	24	30		

Electrical Engineering : Common Core : S3

Code	Subject	Coef	Credit	Course/week	Practical/week
FR-ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
ELEC 4 103	AC machines	3	3	1.5	1.5
ELEC 4 104	power electronics 1	2,25	3	1,5	0,75
ELEC 4 105	industrial automation and IPA	3	3	1,5	1,5
ELEC 4 106	system analysis and control	2,25	3	1,5	0,75
ELEC 4 107	advanced techniques	1,5	2	1,5	0
ELEC 4 108	Programming and embedded systems engineering	1,5	2	0	1.5
ELEC 4 109	signal transmission	1,5	2	1,5	0
ELEC 4 110	sensors and actuators	1,5	2	1,5	0
ELEC 4 111	programmable circuits	1,5	2	1,5	0
ELEC 4 112	lab view	1,5	2	1,5	0
TV-401	MOS certification	1,5	2	0	1,5
	Total	24	30		

Embedded systems Major : S4

Code	Subject	Coef	Credit	Course/week	Practi-cal/week
FR-ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
ELEC-SE 4 203	Power electronics 2	2,25	3	1,5	0,75
ELEC-SE 4 204	VHDL synthesis and techno-logy	2,25	3	1,5	0,75
ELEC-SE 4 205	DSP : Architecture and pro-gramming	1,5	2	1,5	0
ELEC-SE 4 206	Image processing	3	3	2	1
ELEC-SE 4 207	Interfacing techniques	1,5	2	0	1,5
ELEC-SE 4 208	Embedded systems for IoT 1	1,5	2	1,5	0
ELEC-SE 4 209	Smart Sensors	1,5	2	0.75	0.75
ELEC-SE 4 210	Embedded mobile develop-ment	1,5	2	1,5	0,75
ELEC-SE 4 211	New technologies for process control	1,5	2	0	1,5
ELEC-SE 4 212	Pyton programming for em-bedded systems	1,5	2	0	1,5
TV-402	PFA (end of year project)	3	3	0	2,25
	Total	24	**30**		

Industrial Control Major : S4

Code	Subject	Coef	Credit	Course/week	Practi-cal/week
FR-ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
ELEC-CI 4 203	Power electronics 2	2,25	3	1,5	0,75
ELEC-CI 4 204	VHDL synthesis and techno-logy	2,25	3	1,5	0,75
ELEC-CI 4 205	DSP : Architecture and pro-gramming	1,5	2	1,5	0
ELEC-CI 4 206	Image processing	3	3	2	1
ELEC-CI 4 207	Interfacing techniques	1,5	2	0	1,5
ELEC-CI 4 208	Embedded systems for IoT 1	1,5	2	1,5	0
ELEC-CI 4 209	Robotics	1,5	2	1,5	0
ELEC-CI 4 210	Control and HMI of Industrial Systems	1,5	2	0	1,5
ELEC-CI 4 211	Modeling of electrical machi-nes	1,5	2	1,5	0
ELEC-CI 4 212	Smart Control	1,5	2	1,5	0,75
TV-402	PFA (end of year project)	3	3	0	2,25
	Total	24	**30**		

Biomedical Instrumentation Major : S4

Code	Subject	Coef	Credit	Course/week	Practi-cal/week
FR-ABC	French	1,5	2	1,5	0
ENG-ABC	English	1,5	2	1,5	0
ELEC-IB 4 203	Power electronics 2	2,25	3	1,5	0,75
ELEC-IB 4 204	VHDL synthesis and techno-logy	2,25	3	1,5	0,75
ELEC-IB 4 205	DSP : Architecture and pro-gramming	1,5	2	1,5	0
ELEC-IB 4 206	Image processing	3	3	2	1
ELEC-IB 4 207	Interfacing techniques	1,5	2	0	1,5
ELEC-IB 4 208	Embedded systems for IoT 1	1,5	2	1,5	0
ELEC-IB 4 209	Equipment maintenance 1	1,5	2	1,5	0,75
ELEC-IB 4 211	Sterilization, safety and stan-dards	1.5	2	1,5	0
ELEC-IB 4 212	Biology	1.5	2	1,5	0
ELEC-IB 4 213	Anatomy, Physiology and Neu-rophysiology	1,5	2	1,5	0
TV-402	PFA (end of year project)	3	3	0	2,25

Total	24	**30**	

Embedded systems Major: S5

Code	Subject	Coef	Credit	Course/week	Practical/week
TV-501	GRH	1,5	2	1,5	0
TV-502	Labor law	1,5	2	1,5	0
TV-503	preparation for certification in Entrepreneurship	1,5	2	1,5	0
ELEC-SE 5 101	Embedded systems for IoT 2	1.5	3	1.5	0.75
ELEC-SE 5 102	Artificial and Industrial Vision	1.5	2	1.5	0.75
ELEC-SE 5 103	Embedded systems security	3	3	1.5	0.75
ELEC-SE 5 104	VHDL : architecture and simulation	3	3	1.5	0.75
ELEC-SE 5 105	SOC prototyping on FPGA	1.5	2	1.5	0.75
ELEC-SE 5 106	ARM processors and applications	1.5	2	0	1.5
ELEC-SE 5 107	Embedded Artificial Intelligence	3	3	1.5	0.75
ELEC-SE 5 108	RFID: Radio Frequency Identification	1.5	2	0	1.5
ELEC-SE 5 109	Industry 4.0	1.5	2	0	1.5
ELEC-SE 5 110	Quality management	1.5	2	1.5	0
	Total	24	30		

Industrial Control Major: S5

Coded	Subject	Coef	Credit	Course/ week	Practical / week
TV-501	GRH	1.5	2	1.5	0
TV-502	Labor law	1.5	2	1.5	0
TV-503	preparation for certification in Entrepreneurship	1.5	2	1.5	0
ELEC-CI 5 101	Control of electrical machines	3	3	1.5	0.75
ELEC-CI 5 102	Design office	1.5	2	0	1.5
ELEC-CI 5 103	Industry 4.0	1.5	2	0	1.5
ELEC-CI 5 104	Industrial Maintenance Techniques	3	3	2.25	0
ELEC-CI 5 105	Diagnosis and functional safety .	1.5	2	1.5	0.75
ELEC-CI 5 106	Machine Learning	1.5	3	1.5	0.75
ELEC-CI 5 107	Mod. and Cde des Sys. Mecha	1.5	2	1.5	0.75
ELEC-CI 5 108	Production analysis and management	1.5	2	1.5	0
ELEC-CI 5 109	Renewable Energy and Smart Grids	3	3	1.5	0.75
ELEC-CI 5 110	quality management	1.5	2	1.5	0
	Total	24.00	30		

Biomedical instruments Major: S5

Coded	Subject	Coef	Credit	Course/ week	Practical / week
TV-501	GRH	1.5	2	1.5	0
TV-502	Labor law	1.5	2	1.5	0
TV-503	preparation for certification in Entrepreneurship	1.5	2	1.5	0
EL-IB 5 101	Equipment maintenance 2	3	3	2.25	0
EL-IB 5 102	Medical imaging techniques 2	3	3	2.25	0
EL-IB 5 103	Telemedicine: E-health	3	3	0.75	1.5
EL-IB 5 104	Biomedical instrumentation	3	3	1.5	0.75
EL-IB 5 105	Medical Robotics	1.5	3	1.5	0.75
EL-IB 5 106	Nucl Instrumentation .	1.5	3	1.5	0
EL-IB 5 107	Qualitology and CMAO	1.5	2	1.5	0
EL-IB 5 108	Industry 4.0	1.5	2	1.5	0
EL-IB 5 109	Biophy . and atomic and nuclear physics	1.5	2	0	1.5
	Total	24	30		

5 Electrical Engineering S10

Codes	Teachings	Coef	Cre-dit	Course/week	work/week
Pro- 5 2 01	Introductory Traning	10	3	/	/
Pro- 5 2 02	Traning development		3	/	/
Pro- 5 2 03	PFE		24	/	/
		24	**30**	**18**	**6**

According to Diploma Supplement, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Electromechanical Engineering:

Electromechanics – Option: Mechatronic and automatic

Skill families Skills		**Subject Level**	
Materials engineering	- Characterization of metallic materials; - Development and characterization of polymers; - Heat treatments of metallic materials; - Surface coatings of metallic materials.	1	Materials and structures; Formatting processes
Design of mechanical systems	- Sizing and Design of mechanical systems; - Systems modeling; - Design of structures;	2	MMC; RDM2; Solid mechanics; Vibration mechanics; Electromechanical design office; Mechanical concept ; CAD,
Production of metal parts for welded assemblies And mechanic-	- Production of metal parts by material removal. - Industrialization of parts by shaping the sheets; - Industrialization of mechanically welded assemblies - Manufacturing of parts using unconventional processes.	2	Manufacturing processes ; Metallic structures and welding processes; Manufacturing analyses; Production techniques and CAM;
Choice And sizing of industrial facilities	- Choice and sizing of hydraulic and pneumatic installations; - Analysis of thermal machines; - Design of industrial electrical installations - Control of production energy.	2	Electrical circuit ; Electrical engineering; Thermal; CAD electrical systems; Thermal machines; Modeling and management of electrical networks; Hydraulic and pneumatic systems;
Management And optimization of production systems	- Organization and layout of production stations and lines; - Planning and management of production operations; - Measurement and improvement of production performance; - Management of resources and quality control operations; - Management of resources and maintenance operations - Modeling and digital	1	Organization and Management of Production; ERP and CAPM; Lean Manufacturing; Quality - Certification - Standards; Control and Reliability / CMMS;
Digital mechanics / Digital Engineering	simulation of mechanical behavior;	2	CAD; Production techniques and CAM; Numerical modeling ; IOT

	- Mastery and integration of industrial software; - Reverse engineering		
Electrical engineering	- Knowledge in the field of electrical engineering and electrical networks; - Ability to implement electromechanical energy conversion systems; - Design and production of static electrical energy conversion systems (rectifiers, dimmers, choppers, inverters, etc.)	2	Electrical engineering; Modeling and management of electrical networks; Modeling, identification and monitoring; Machine control.
Automatic	- Modeling and identification of dynamic systems; - Analyzes of continuous-time and discrete-time dynamic systems (precision, speed, stability, etc.); - Design and implementation of regulation solutions; - Synthesis of observers for the control and diagnosis of complex dynamic systems; - Advanced command law synthesis	3	Servicing and regulation ; Programmable controllers; Software for the automatic; Modeling, identification and monitoring.
Design of automated mechanical systems	- Design of automated systems; - Design of control and regulation solutions; - Design of electronic acquisition, control and display cards; - Design of robotic systems; - Analysis of robotic systems.	3	Analog electronic ; Servicing and regulation ; CAD electrical systems; Programmable controllers; robotics and Microcontroller; Analysis of robotic systems; Mechanism theory
General mechatronics	- Identification of the different parts of an automated production system; - Knowledge of communication protocols between control part and operational part; - Knowledge of sensor technology of the main physical sensors; - Design of peripherals and interfacing techniques;	3	General mechatronics; Sensor theory; Software for automation; Programmable controllers; IOT

	- Handling of APIs (Industrial Programmable Automata).		
Signal processing	- Broad knowledge of different types of signals; - Analyzes of signals in analog or digital form; - Mastery of the main common mathematical signal processing functions and their implementation in systems (software or hardware implementation);	2	Signal processing ; Numerical modeling ; Software for automation;
Mathematical And Computer science	- Development of computer programs; - Manipulation of computer networks; - Mastery of conventional and unconventional methods optimization	1	Mathematics the engineer; For Probability and statistics, Certification MOS; IOT;
General skills	Communication in different languages, openness to the socio-economic environment, international openness, creativity, initiative, autonomy, spirit of self-training	2	English ; French ; Communication technique ; MOS certification, Entrepreneurship; HRM; Right to work ; Internship ; PPE; PFA; PFE

Level 1: Basic *Level 2: Intermediate* *Level 3: Advanced*

Electromechanics – Option: Aeronautics

Skill families Skills		**Subject Level**	
Materials engineering - Characterization of metallic materials;	- Development and characterization of polymers; - Heat treatments of metallic materials; - Surface coatings of metallic materials.	1	Materials and structures; Formatting processes
Design of mechanical systems	- Sizing and Design of mechanical systems; - Systems modeling; - Design of structures;	3	MMC; RDM2; Solid mechanics; Vibration mechanics; Electromechanical design office; Mechanical concept ; CAD, Mechanics structures.
Production of metal parts for welded assemblies And mechanic-	- Production of metal parts by material removal. - Industrialization of parts by shaping the sheets; - Industrialization of mechanically welded assemblies - Manufacturing of parts using unconventional processes	2	Manufacturing processes ; Metallic structures and welding processes; Manufacturing analyses; Production techniques and CAM; Electrical circuit ; Electrical engineering;
Choice and sizing of the facilities industrial	- Choice and sizing of hydraulic and pneumatic installations; - Analysis of thermal machines; - Choice and sizing of turbo machines; - Design of industrial electrical installations - Control of production energy.	3	Thermal; CAD electrical systems; Thermal machines; Modeling and management of electrical networks; Pneumatic hydraulic systems; Turbomachinery. And
Management And optimization of production systems	- Organization and layout of production stations and lines; - Planning and management of production operations; - Measurement and improvement of production performance; - Management of resources and quality control operations; - Management of resources and maintenance operations	1	Organization and Management of Production; ERP and CAPM; Lean Manufacturing; Quality - Certification - Standards; Control and Reliability / CMMS;

Digital mechanics / Digital Engineering	- Thermal Modeling; - Mastery and integration of industrial software; - Reverse engineering	2	CAD; Production techniques and CAM; Thermal Modeling; IOT
Electrical engineering	- Knowledge in the field of electrical engineering and electrical networks; - Ability to implement electromechanical energy conversion systems;	2	Electrical engineering; Modeling and management of electrical networks;
Automatic	- Modeling and identification of dynamic systems; - Analyzes of continuous-time and discrete-time dynamic systems (precision, speed, stability); … - Design and implementation of regulation solutions;	2	Servicing and regulation ; Programmable controllers.
Design of automated mechanical systems	- Design of automated systems; - Design of control and regulation solutions; - Design of electronic acquisition, control and display cards; - Design of robotic systems;	2	Analog electronics; Servicing and regulation ; CAD electrical systems; Programmable controllers; robotics and Microcontroller
Signal processing	- Broad knowledge of different types of signals; - Analyzes of signals in analog or digital form; - Mastery of the main radar emissions	2	- Signal processing ; - Radar theory
Aeronautics	- Master avionics tools and software; - Design and study the aerodynamic behavior of the numerous components of the aircraft's turbojet; - Develop calculation or computer software intended for use on board; - Ability to constantly monitor technological developments in your field; - Develop structures capable of reducing fuel consumption, the weight of the aircraft, or even maintenance costs;	3	Aerodynamics; Combustion; Structural mechanics ; Flight mechanics; General avionics; Radar theory; Turbulence; Turbomachines; Aeroacoustics.

	- Develop control devices and test them in real conditions - Understand the main requirements of aeronautical regulations.		
Mathematical And Computer science	- Development of computer programs - Manipulation of computer networks; - Mastery of conventional and unconventional methods optimization	1	Mathematics the engineer; For Probability and statistics, certification MOS, IOT,
General skills	Communication in different languages, openness to the socio-economic environment, international openness, creativity, initiative, autonomy, spirit of self-training	2	English ; French ; Communication technique ; MOS certification; Entrepreneurship; HRM; Right to work ; Internship ; PPE; PFA; PFE

Electromechanics – Option: Industrial Maintenance

Skill families Skills		**Subject Level**	
Materials engineering - Characterization of metallic materials;	- Development and characterization of polymers; - Heat treatments of metallic materials; - Surface coatings of metallic materials.	1	Materials and structures; Formatting processes
Design of mechanical systems	- Sizing and Design of mechanical systems; - Systems modeling; - Design of structures;	2	MMC; RDM2; Solid mechanics; Vibration mechanics; Electromechanical design office; Mechanical concept ; CAD,
Production of metal parts for welded assemblies And mechanic-	- Production of metal parts by material removal. - Industrialization of parts by shaping the sheets; - Industrialization of mechanically welded assemblies - Manufacturing of parts using unconventional processes	2	Manufacturing processes ; Metallic structures and welding processes; Manufacturing analyses; Production techniques and CAM;
Choice And sizing of industrial facilities	- Choice and sizing of hydraulic and pneumatic installations; - Analysis of thermal machines; - Design of industrial electrical installations - Control of production energy.	2	Electrical circuit ; Electrical engineering; Thermal; CAD electrical systems; Thermal machines; Modeling and management of electrical networks; Hydraulic and pneumatic systems;
Management And optimization of production systems	- Organization and layout of production stations and lines; - Planning and management of production operations; - Measurement and improvement of production performance; - Management of resources and quality control operations; - Management of resources and maintenance operations	3	Organization and Management of Production; ERP and CAPM; Lean Manufacturing; Quality - Certification - Standards; Control and Reliability / CMMS; Optimization of production systems

	- Mastery of analysis and production management tools; - Expertise and development of production processes.		
Digital mechanics / Digital Engineering	- Mastery and integration of industrial software; - Reverse engineering	2	CAD; Production techniques and CAM; , thermal modeling, IOT
Electrical engineering	- Knowledge in the field of electrical engineering and electrical networks; - Ability to implement electromechanical energy conversion systems; - Design and production of static electrical energy conversion systems (rectifiers, dimmers, choppers, inverters, etc.)	2	Electrical engineering; Modeling and management of electrical networks; Machine control.
Automatic	- Modeling and identification of dynamic systems; - Analysis of continuous-time and discrete-time dynamic systems (precision, speed, stability); ... - Design and implementation of regulation solutions; - Synthesis of observers for the control and diagnosis of complex dynamic systems;	2	Servicing and regulation ; Programmable controllers; Automatic in real time.
Design of automated mechanical systems	- Design of automated systems; - Design of control and regulation solutions; - Design of electronic acquisition, control and display cards; - Design of robotic systems;	2	Analog electronic ; Servicing and regulation ; CAD electrical systems; Programmable controllers; robotics and microcontroller.
Signal processing	- Broad knowledge of the different types of signals; - Analyzes of signals in analog or digital form;	2	- Signal processing ;
Maintenance And industrial supervision	- Identification of the different parts of an industrial system; - Mastery of data processing techniques and estimation of reliability indicators for the operational safety of an industrial system;	3	Maintenance tools; Repair technique; Non-destructive testing; Safety of industrial installations; Optimization of production systems

	- Knowledge of different approaches to monitoring and diagnosis of industrial processes - Knowledge of the functionalities of industrial supervision systems - Knowledge and mastery of different industrial maintenance techniques and methods - Implementation and management of industrial systems.		
Mathematical And Computer science	- Development of computer programs - Manipulation of computer networks; - Mastery of conventional and unconventional methods optimization	1	Mathematics the engineer; For Probability and statistics, certification MOS; IOT
General skills	Communication in different languages, openness to the socio-economic environment, international openness, creativity, initiative, autonomy, spirit of self-training	2	English ; French ; Communication technique ; MOS certification; Entrepreneurship; HRM; Right to work ; Internship ; PPE; PFA; PFE

The following **curriculum** is presented:

Electromechanical Engineering : Common Core : S5

Code	Subject	Coef	Credit	Course/week	Practical/week
FR-ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
GELM 3 103	Mathematics for engineers	3	3	3	
GELM 3 104	Proba. & Stat.	1,5	2	1,5	
GELM 3 105	Electrical circuits	3	4	1,5	1,5
GELM 3 106	Analog electronics	3	4	1,5	1,5
GELM 3 107	Fluid mechanics	3	3	3	
GELM 3 108	MMC	3	4	3	
GELM 3 109	Materials & Structures	2,25	3	1,5	0,75
GELM 3 110	Thermic	2,25	3	2,25	
	Total	24	**30**		

Electromechanical Engineering : Common Core : S6

Code	Subject	Coef	Credit	Course/week	Practical/week
FR-ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
GELM 3 203	Electrotechnics	2,5	3	1,5	1
GELM 3 204	Signal treatment	2,5	3	1,5	1
GELM 3 205	CAO Electrical Systems	1,5	2		1,5
GELM 3 206	Mechanical design 2	1,5	2	1,5	
GELM 3 207	Certification Preparation CAO1	1,5	2		1,5
GELM 3 208	Mechanical engineering	1,5	2		1,5
GELM 3 209	Manufacturing processes	3	3	1,5	1,5
GELM 3 210	Metal Structures and Welding Processes	1	1		1
GELM 3 211	RDM	2,25	3	2,25	
GELM 3 212	Thermic machines	1,5	2	1,5	
GELM 3 213	Quality - Certification - Standards	2,25	3	2,25	
	Total	24	**30**		

Electromechanical Engineering : Common Core : S7

Code	Subject	Coef	Credit	Course/week	Practical/week
FR-ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
GELM 4 103	MOS Certification	1,5	2		1,5
GELM 4 104	Servicing and regulation	3	3	1,5	1,5
GELM 4 105	Modeling and management of electrical networks	3	3	3	
GELM 4 106	Mechanical design 3	1,5	3	1,5	
GELM 4 107	Certification Preparation CAO2	0,75	3		0,75
GELM 4 108	Solid mechanics	3	3	3	
GELM 4 109	Manufacturing analysis	3	3	1,5	1,5
GELM 4 110	Organization & Production Management	2,25	3	2,25	
GELM 4 101	Control & Reliability/GMAO	3	3	1,5	1,5
	Total	24	**30**	**24**	

Electromechanical Engineering : Common Core : S8

Code	Subject	Coef	Credit	Course/week	Practical/we
FR-ABC	French	1,5	2	1,5	
ENG-ABC	English	1,5	2	1,5	
GELM 4 203	Programmable controllers	3	3	1,5	1,5
GELM 4 204	Robotics and Micro controller	2,25	3	1,5	0,75
GELM 4 205	Sensor theory	1,5	2	1,5	
GELM 4 206	vibrations Mechanics	2,25	3	1,5	0,75
GELM 4 207	Production techniques and CAM	3	3	1,5	1,5
GELM 4 208	Hydraulic and pneumatic systems	3	3	1,5	1,5
GELM 4 209	Lean manufacturing	1,5	2	1,5	
GELM 4 210	ERP & GPAO	1,5	3		1,5
GELM 4 201	Scientific Project PFA	3	4		3
	Total	24	**30**		

Automation and mechatronics Major : S9

Code	Matière	Coef	Credit	Course/week	Practical/week
TV-501	human resources management GRH	1,5	3	1,5	
TV-502	Law of work	1,5	2	1,5	
TV-503	Preparation for certification in Entrep	1,5	2	1,5	
ELM-A&M 5 104	General mechatronics	3	4	1,5	1,5
ELM-A&M 5 105	Numerical modelling	3	3	1,5	1,5
ELM-A&M 5 106	Mechanisms theory	2,25	3	2,25	
ELM-A&M 5 107	Robotic systems analysis	1,5	2	1,5	
ELM-A&M 5 108	Machine control	3	3	1,5	1,5
ELM-A&M 5 109	Software for automation	3	3	1,5	1,5
ELM-A&M 5 110	Modeling, Identification and Monitoring of systems	2,25	3	2,25	
ELM-A&M 5 111	Connected objects (IOT)	1,5	2		1,5
	Total	24	**30**		

Aeronautics Major : S9

Code	**Subject**	**Coef**	**Credit**	**Course/week**	**Practical/week**
TV-501	human resources management GRH	1,5	3	1,5	
TV-502	Law of work	1,5	2	1,5	
TV-503	Preparation for certification in Entrep	1,5	2	1,5	
ELM-Aéro 5 104	Flight mechanics	2,25	2	2,25	
ELM-Aéro 5 105	General Avionics	1,5	2	1,5	
ELM-Aéro 5 106	Radar theory	1,5	2	1,5	
ELM-Aéro 5 107	Aeroacoustics	1,5	2	1,5	
ELM-Aéro 5 108	Aerodynamics	1,5	2	1,5	
ELM-Aéro 5 109	Combustion	2,25	3	1,5	0,75
ELM-Aéro 5 110	Structural mechanics	1,5	2	1,5	
ELM-Aéro 5 111	Thermal modelling	3	3	1,5	1,5
ELM-Aéro 5 112	Turbomachinery & Turbulence	3	3	1,5	1,5
ELM-Aéro 5 113	Connected objects (IOT)	1,5	2		1,5
	Total	24	**30**		

Industrial Maintenance Major : S9

Code	Subject	Coef	Credit	Course/week	Practical/week
TV-501	human resources management GRH	1,5	3	1,5	
TV-502	Law of work	1,5	2	1,5	
TV-503	Preparation for certification in Entrep	1,5	2	1,5	
ELM-MI 5 104	Maintenance tools	2,25	3	2,25	
ELM-MI 5 105	Repair techniques	2,25	3	0,75	1,5
ELM-MI 5 106	Safety of industrial installations	2,25	3	2,25	
ELM-MI 5 107	Optimization of production systems	2,25	3	2,25	
ELM-MI 5 108	Machine control	3	3	1,5	1,5
ELM-MI 5 109	Real-time automatic	3	3	1,5	1,5
ELM-MI 5 110	CND	3	3	1,5	1,5
ELM-MI 5 111	Connected objects (IOT)	1,5	2		1,5
	Total	24	30		

Automation and mechatronics Major : S10

Code	Matière	Coef	Crédit	Cours/semai	TP/semaine
ELM-A&M 5 201	initiation internship	10	3	/	/
ELM-A&M 5 202	Refinement internship		3	/	/
ELM-A&M 5 203	End of Study Project (ESP)		24	/	/

Aeronautics Major : S10

Code	Matière	Coef	Crédit	Cours/semai	TP/semaine
ELM-Aéro 5 201	initiation internship	10	3	/	/
ELM-Aéro 5 202	Refinement internship		3	/	/
ELM-Aéro 5 203	End of Study Project (ESP)		24	/	/

Industrial Maintenance Major : S10

Code	Matière	Coef	Crédit	Cours/semai	TP/semaine
ELM-MI 5 201	initiation internship	10	3	/	/
ELM-MI 5 202	Refinement internship		3	/	/
ELM-MI 5 203	End of Study Project (ESP)		24	/	/