ASIIN Seal & EUR-ACE®

Accreditation Report

National Diploma
Electrical Engineering
Computer Engineering

Provided by
Polytechnic Institute of Advanced Sciences of Sfax (IPSAS)

Version: 07 December 2021

Table of Content

A About the Accreditation Process

Name of the degree program (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Génie éléctromécanique	Electrical Engineering	ASIIN, EUR-ACE®	/	02
Génie Informatique	Computer Engineering	ASIIN, Euro-Inf®	/	04
Date of the contract: 22.12.2020 **Submission of the final version of the self-assessment report:** 01.07.2021 **Date of the onsite visit:** 26./27.07.2021 **Online**				
Peer panel: Prof. Dr. Markus Esch, Saarbrücken University of Applied Sciences Prof. Dr.-Ing. Moustafa Nawito, IU International University of Applied Sciences Prof. Dr.-Ing. Christoph Rappl, Deggendorf Institute of Technology Jürgen F. Schaldach, T-Systems GEI GmbH Carsten Schiffer, Student at RWTH Aachen				
Representative of the ASIIN headquarter: Sophie Schulz				
Responsible decision-making committee: Accreditation Commission				
Criteria used: European Standards and Guidelines as of May 15, 2015				

[1] ASIIN Seal for degree programs; EUR-ACE® Label: European Label for Engineering Programs; 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

ASIIN General Criteria, as of December 10, 2015 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of December 9, 2011 Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018	

B Characteristics of the Degree Programs

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
Electromechanical Engineering	Diplome national d'ingénieur en genie électromécanique/ National Diploma in Electromechanical Engineering	/	7	Full time	/	6 semesters	180 ECTS	Since 2003
Computer Engineering	Diplome national d'ingénieur en genie informatique/ National Diploma in Computer Engineering	/	7	Full time	/	6 semesters	180 ECTS	Since 2002

For the National Diploma in Electromechanical Engineering the institution has presented the following profile in the self-assessment report:

„ Mechanical engineering at IPSAS institute is a pivotal engineering branch that combines engineering physics and mathematics principles with materials science to design, analyse, manufacture, and maintain mechanical systems. It is the branch of engineering that involves the design, production, and operation of machinery.

The general objective of IPSAS training is to train versatile engineers, in the fields of electrical and mechanical engineering, capable of designing, producing and analysing elements and systems of the industrial-economic environment according to a project approach. Further, this is why this training allows the engineer to acquire the knowledge, skills and aptitudes necessary to ensure the operation and maintenance of production equipment in a context of total quality and technological change, intervene at the first operational level, repair the various systems and their various components, work in one or other of the various types of production companies. Furthermore, as part of his work, an electromechanical engineer has the task of designing, producing and analysing any device or tool involving electricity, power electronics and mechanics. Given these points, this is the perfect marriage between mechanical and electrical engineering.

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

The electromechanical engineering professional is therefore an expert in motors, manufacturing devices, vehicles, power transformers, wind turbines, turbines, rolling stock or automatons.

As most of the devices mentioned are used in the industrial sector, the work of the electromechanical engineer has a large component of practicality and field, making it very versatile and diverse.

The studies are done over 3 years, the equivalent of 6 semesters of theoretical and practical studies. The last semester is dedicated to the realization of the end-of-study project, which is a synthesis work during which the student implements all the knowledge and skills acquired during these engineering studies.

Opportunities for electromechanical engineers: The work of electromechanical engineers is omnipresent in our daily life made of electrical, mechanical or electromechanical machines, which we use regularly. In other words, the opportunities and employability of the electro-mechanical engineer are virtually guaranteed in companies in business sectors. “

For the National Diploma in Computer Engineering the institution has presented the following profile in the self-assessment report:

„In the first place, the proposed training provides the students with both technical and managerial skills. In general, it guarantees them a level that qualifies them to master the fundamentals of the profession, while acquiring the qualities of innovation and promoting their ability to adapt and integrate. Equally important, future engineers must be able to work on research and development of the newest computer technology. Also, computer science students learn about the inner workings of computers and the internal software and applications.

Add to this, the main purpose is to provide general and versatile training to prepare potential engineers for a successful engineering career. Moreover, this training must follow and highlight the growing progress of both the digital world and computer science domain that the computer science engineer must face with speed and efficiency. In fact, during his training, he must acquire the capacity for lifelong learning, and must be up to date with all the innovations of the domain.

The graduated engineer must imperatively acquire and learn basic engineering sciences so that he would be absolutely able to identify, analyse and synthesize the variables of a given problem that should be solved. Additionally, he must demonstrate his abilities while using his technical and methodological skills, in order to find out the right solutions, and apply it while taking into account the managerial and economic consequences during his professional daily routines. These skills were acquired gradually throughout the well-detailed, descriptive, precise, and enlightening course during the academic year.

In the long run, the computer engineers will acquire the following skills:

- Ability to synthesize and analyse in detail and intelligently to resolve any type of problems and complication.
- Administration of systems and networks.
- Conception of computer systems.
- Ability to anticipate changes in the Information Technology field.
- Ability to attain good outcome in complex projects while taking into account both new projects complexity and client needs.
- Entrepreneurial and leadership skills and the ability to integrate into an organization, to animate it and to develop it.
- Competence in Information Technology Development.
- Ability to work in an international context: master of one or more foreign languages and cultural openness and as by the end of his academic trainings he would become ready to be endowed by global interpersonal skills engineer.

Further, the computer science engineering is up to date to the national program of the competence’s certification.

In addition to the training / local-industry-needs / gray-matter- export match, the program of the training also follows the state objectives embodied in the national ICT skills certification program launched by the Ministry of Communication Technologies in November 2000 by the creation decree n ° 2000-2827.

The studies are done over 3 years, the equivalent of 6 semesters of theoretical and practical studies. The last semester is dedicated to the realization of the end-of-study project, which is a synthesis work during which the student implements all the knowledge and skills acquired during these engineering studies. Furthermore, the academic content of several courses that may be the subject of a subsequent certification of skills is set according to the training course defined within the framework of the national program. For the most part, we are trying throughout the Computer Engineering training program, to set up a pedagogy, which is adapted to the professional daily routine’s practices, operations and challenges. “

C Peer Report for the ASIIN Seal[4]

1. The Degree Program: Concept, content & implementation

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

Evidence:

- Student guide and IPSAS presentation
- Student handbook per program
- Objective-module-matrix per program
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

The Polytechnic Institute of Advanced Sciences of Sfax (IPSAS) has described program objectives and program learning outcomes for both degree programs. The peers approve that for each program a detailed presentation of learning outcomes and graduates' profiles is given in combination with learning outcome matrices matching the described learning outcomes with the respective modules of the programs. The qualification objectives for both degree programs are anchored in the student handbook, where IPSAS provides an extensive list of the graduates' competencies and skills and – for the Computer Engineering program – also a list of potential employment opportunities for the graduates. The peers miss a precise career profile for the Electromechanical Engineering program. The peers acknowledge that updating the qualification objectives and learning outcomes is a crucial element of IPSAS' quality management, which should guarantee that students are trained in conjunction with the demand of the employment market as well as adapt to technological changes. The learning objectives are therefore regularly evaluated by participants of IPSAS' scientific committee, the teaching staff, students, alumni and related institutional

[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.

stakeholders. The latter include a number of partner companies that work closely with IPSAS, e.g. by teaching courses, planning industrial visits or supervising end of studies projects.

At the end of their studies, graduates of the Computer Engineering program should have acquired extensive problem-solving skills, be able to administrate systems and networks, to design computer systems, and to anticipate changes in the IT field. Moreover, they should have the capability to apply project management methods and leadership skills in order to manage complex and demanding projects. This also includes the ability to integrate into an organization and to work in international teams with cultural differences and the need to use foreign languages. Potential job profiles include database or system administrator, data analyst, designer, developer, tester, or computer security specialist.

Graduates of the Electromechanical Engineering program shall be able to manage complex systems using modelling, optimization and visualization and have the capability to design, implement, test and validate innovative solutions, methods, products, and systems. They should have gained the necessary research skills in order to set up experimental devices and be able to find, evaluate and use relevant information accordingly. The graduates are also supposed to acquire personal and social skills such as communication and (project) management skills, adaptability, the capacity to work in teams, and leadership skills. In addition, they should be able to solve problems of engineering through research and the application of different concepts and methods. Graduates of this program shall find employment in the three main sectors mechanical, electrical and materials engineering.

In general, the peers acknowledge that the objectives have been selected in accordance with the title of the degree programs and thus train both electromechanical engineers and computer engineers. However, they notice that the objectives of the programs are formulated in a rather generic manner, covering rather general competences and always referring to "the engineer" in a very general context, thus showing little focus on the specific programs. Moreover, both programs cover a very wide range of subjects, without students being able to specialize in any direction, be it through electives or specializations. This gives rise to the impression that students receive a generalist rather than an in-depth education. For both degree programs, the peers therefore ask IPSAS to formulate program-specific learning objectives and qualification profiles or at least to highlight the special features of the respective degree. Furthermore, the qualification objectives of both degree programs clearly show a vocational/professional focus and lack any scientific aspect. While the Electrical Engineering program at least mentions that graduates "have the capacity for research or R&D activities" in the list of competences, the qualification objectives of the Computer Engineering program lack any mentioning of scientific competencies of the students. This becomes even more apparent when looking closer at the individual modules, where the objectives and learning outcomes do not cover any research skills or methodological competencies. Thus, the qualification objectives indicate a very high level of applied relevance. The peers, however, emphasize the necessity of students being trained to do scientifically sound work, in particular if they aim at obtaining a degree at master's level. The peers are convinced that due to the lack of scientific and methodological knowledge, the graduates of the two programs will not able to take up appropriate (senior) positions in companies, in particular in direct comparison with graduates of a master's degree of a standard corresponding to EQF level 7. Similarly, the peers do not see the possibility of graduates of the two programs pursuing a research career in the form of a PhD. Given the very broad orientation of the degree programs, which miss specification in the sense of deepening or broadening knowledge, as well as the lack of information on career opportunities and the scientific nature of the degree programs, the peers conclude that the qualification objectives do not correspond to EQF level 7.

The peers also inquire into the employment opportunities for students and find out that employment rates have been decreasing for alumni of both programs. For the Computer Engineering graduates, employment sank from 90% in 2018 to 80% in 2020. Similarly, employability for Electromechanical Engineering graduates decreased from 80% in 2018 to 70% in 2019 and 50% in 2020. During the online audit, the program coordinators state that this is due to two main reasons, the pandemic and the difficult political situation in Tunisia. However, they state that taking into account the ongoing youth unemployment crisis in Tunisia, the prospects for IPSAS graduates are comparatively high. At the same time, the program coordinators question if the stated numbers are correct, as in particular the graduates of the Computer Engineering program do not face any difficulties in finding employment. With regard to the various data, the peers are unsure to what extent the study programs are actually adapted to the labor market and help students to find a job. They therefore ask IPSAS, on the one hand, to check the statistics and adjust them if necessary and, on the other hand, to include or specify the professional profile of graduates in the qualification objectives.

In summary, the peers are of the opinion that although IPSAS has defined qualification objectives for both degree programs, these must be rewritten as they currently do not match EQF level 7 and lack certain aspects, in particular the scientificity of the educational programs and the precise employment opportunities of the graduates but also the precise and program-specific orientation.

Criterion 1.2 Name of the degree program

Evidence:

- Student handbook per program

- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
The expert panel considers the names of the study programs to be adequately reflecting the respective aims, learning outcomes, and curricula as well as the course language (in their original French title).

Criterion 1.3 Curriculum

Evidence:
- Student handbook per program
- Study plan per program
- Module descriptions per program
- Objective-module-matrix per program
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
The curricula of both programs consist of three types of modules: elementary modules (Level 1), intermediate modules (Level 2) and advanced modules (Level 3). The modules of the Electromechanical Engineering program cover the following areas of expertise: materials sciences, mechanical systems design, production and manufacture of mechanical parts, management and optimization of production systems, sizing and optimization of industrial installations, electrical engineering, automatic, design of automated systems, energetics, logistics, mathematics. The modules of the Computer Engineering program cover skills related to the following areas: technical skills, knowledge skills and soft skills.

In the self-assessment report, IPSAS 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, both study programs 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 so-called mini-projects. Here, students develop and research a theme relating to a subject of his or her field of study and capture the findings in a report and/or a presentation. Third, students have to participate in mandatory worker and technician internships in order to gain an understanding of the nature of working in a company of their chosen area. Finally, the end of study project 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. IPSAS presents a list that details, which form of practical training the students receive in which module. The peers are generally satisfied with the practical aspects of the program, although they share some concerns given the equipment used in the laboratories (cf. criterion 4.3).

As already discussed in criterion 1.1, the peers are not convinced, however, that the study programs are at a level that is appropriate for a master's program (EQF Level 7). When reviewing the study plans as well as the module descriptions, they are missing both a deepening and a broadening of the knowledge acquired during the students' previous studies. Unfortunately, the module descriptions are not very informative and hardly address the qualification goals and the contents of the individual modules. As a consequence, the peers cannot be completely sure what exactly is taught in the degree programs, which means that a comprehensive assessment is only possible to a limited extent. The objectives-module matrices submitted by the university are also not very informative in this respect. Nevertheless, the peers find that many of the modules cover only basic competencies rather than broadening or deepening them, which does not do justice to a level EQF 7. Overall, the programs consist of a very large number of very small courses, which means that most of the topics are discussed only superficially, without conveying sufficient technical and scientific knowledge. At the same time, the sequence of courses and the topics chosen do not present a clear learning path. Rather, the curricula appear to be a collection of numerous topics without following a coherent structure. For example, in the Computer Engineering program, students have to take the courses "Web Programming" and "Multimedia processing and design" in the first semester, although these are specific topics that require solid basics and should thus only be covered in higher semesters. The same applies to the modules "Computer architecture" and "Foundations of operating systems". Likewise, the course "Serious game programming" which is scheduled for the second semester covers very specific topics that would be more suitable for an elective course. All in all, the peers get the impression that the program is very technology-driven. For the peers it is also very hard to understand why the program covers four different programming languages (C, C++, Java, Java Script) with different paradigms in the first two semesters alone. They emphasize that the first semesters should focus on the methodology of programming instead of a large number of different languages. Concerning the Electromechanical Engineering program, some inconsistency with regards to the prerequisites is present in the learning plan as well. For example the topics molding and casting are not covered in the course "Manufacturing Technology", although they are needed in the following course "Implementation without removing Material". At the same time, some important key topics are missing in some courses. For example in "Electrical Engineering", which covers AC circuits, there is no mention of capacitors, inductors and power calculations; in "System and Logic Circuit", there is no mention of combinational logic blocks like decoders and multiplexers, or in “Automatic 1”, which is an introduction to systems and control, the topics of signals and Fourier analysis are missing. Additionally, numerous topics are split into two or three courses, whereas the module descriptions show that the contents overlap and/or should be taught all in one course. For example, “Electronics 1” and “Electronics 2” are simply diodes and bipolar transistors spread on two courses, or “Automatic 1” and “Regulations and controls” are simply a typical first course in systems and control. Next to the structural issues, the peers also find that a large part of the courses of both programs cover topics that do not correspond with master’s level requirements. For the Computer Engineering program, these are for example “Alghorithmic & Data Structures”, “Programming workshop C/C++”, “Foundations of operating systems”, “Object oriented programming JAVA”, “Databases”, “Unified Modeling Language UML” or “Dot Net Development”, which are considered as typical bachelor’s degree programs. The same applied to the above mentioned courses in the Electrical Engineering program. In particular, education in the field of control systems seems to be rather week and is considered to be even below bachelor’s level. Only the very basic topics are taught in this field, the core topic “analysis of stability” does not appear in the module descriptions (Hurwitz, Routh, PN-Plan, root locus, Nyquist analysis). Likewise, the topic “design of linear controllers” does not address important design methods (lead/lag compensation in the Bode-Diagram, root-locus design, and algebraic design methods such as pole-placement).

The peers are therefore of the opinion that the curricula of both study programs need to be redesigned in order to meet the requirements of a master's program (EQF 7). This should be done in accordance with the revision of the qualification objectives, as all shortcomings identified there are also reflected in the curricula. This applies not only to the deepening or broadening of subject-specific knowledge, but also to the scientific aspects of the training, because in both study programs students do not learn how to work scientifically or how to use scientific methods. However, the peers stress that it remains unclear whether upgrading the curricula to a higher level is the HEI’s intention, since – as the peers learn from the industry representatives – IPSAS trains graduates that meet the needs of the Tunisian labor market.

Finally, the peers recommend that the language skills of the students and teaching staff be further developed and promoted. As it turned out during the online audit, the proportion of participants being able to communicate in English was very small. However, as students are expected to be able to work in international teams after their studies, and also taking to account that the majority of current technical literature is published in English, the peers highly recommend strengthening the use of English language in the curricula and actively promoting the language proficiency of both teaching staff and students.

Criterion 1.4 Admission requirements

Evidence:

- Student handbook per program
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

The admission requirements and conditions are defined for both study programs in the study guide as well as the respective student handbook. In accordance with the provision of Law No. 2000-73, regulating private higher education in Tunisia, two types of admissions are possible: Admission through the preparatory cycle and direct admission to the study programs (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 programs at IPSAS.

It is also possible to apply directly to the engineering programs. Any student, whether Tunisian or international, is eligible for the study programs if he or she holds a BTS (two-year vocational training), 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 program if they have already achieved the necessary skills and knowledge in their previous degree.

After reviewing the documents, the peers notice that the admission requirements are by no means specific. For example, there do not seem to be any subject-specific prerequisites for admission to the degree programs. If students apply from outside and have not already taken the preparatory cycle at IPSAS, it is not defined what prerequisites these students must bring with them, which means that in theory, a student with previous knowledge in a completely different field could apply for the program and not be rejected.

It is also not regulated how applicants are selected if the capacity is exceeded, how a selection is made here or whether students who have already completed their preparatory course at IPSAS are given preference.

The lack of clear admission requirements also reflects in the fact that many students complain about the contents of the courses being very repetitive. The basic problem lies in the fact that students come from two different backgrounds, i.e. the preparatory cycle and bachelor's programs. The peers learn that 50 % of the modules are on the bachelor's level, which means that those with a bachelor's degree face a lot of repetition while those who completed the preparatory cycle have to make up a lot of content in a limited amount of time.

In summary, the peers urge IPSAS to clearly define the admission requirements, thereby focusing particularly on the professional/technical aspects. It must be clear to the different stakeholders, and in particular the potential applicants, what the specific professional criteria are that must be fulfilled in order to be admitted to a specific master's degree program. The peers consider the thorough revision of the admission criteria to be a fundamental cornerstone in order to successfully redesign the curricula so that they eventually correspond to EQF level 7.

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

In their statement, the IPSAS representatives refer to rewritten learning objectives and redesigned curricula. However, the peers cannot find any rewritten learning objectives, and the curricula were only amended to the extent that the existing modules have been put together into so-called teaching units. The content of the individual courses has not changed. Even more so, the peers notice that the combination of modules into teaching units does not automatically result in a coherent teaching unit. In some cases, topics are combined in a teaching unit that one would never combine within a module.

The peers deem this criterion not fulfilled.

2. The degree program: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Student handbook per program
- Study calendar
- Training plan and practical training descriptions
- Module descriptions per program
- Study plan per program
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

IPSAS is a polytechnic school accredited by the Tunisian Ministry of Higher Education and Scientific Research. Its mission is to train engineers and to provide applied research and technology transfer.

At IPSAS, each student has to undertake a two-year long preparatory cycle before beginning studying his speciality, which in this case are electromechanical engineering and computer engineering. A student is admitted to the preparatory cycle according to the nature of his or her baccalaureate: the technical baccalaureate is oriented towards the Technology preparatory cycle, the baccalaureate in experimental sciences or mathematics is directed either to the preparatory cycle in physics and chemistry or to the preparatory cycle in mathematics and physics. Any student of the preparatory cycle, who has passed his second-year exam, has the right to choose the engineering cycle he prefers (cf. criterion 1.4).

After the preparatory cycle, each study program is spread over five face-to-face semesters during which the engineering students receive the necessary theoretical fundamental knowledge. In addition, the student reinforces and improves his knowledge through practical work, mini-projects, excursions and compulsory internships (s. below). The sixth semesters is mainly devoted to the development of the end of study project that is generally carried out at a company.

By the time of the online audit, the programs offered at IPSAS are designed based on a set of modules that are entirely mandatory. Thus, the programs do not offer any elective courses. IPSAS states that this topic, which hinders the individual specialization of students based on their interest or future career plans, is currently discussed by the teachers and IPSAS management. They are currently planning to take actions in the near future to introduce elective courses. The peers believe this to be a very promising undertaking and support IPSAS in this endeavour.

The peers further notice that the modules are generally very small, encompassing mostly 2 or 3 ECTS-points. As such, some of these modules should be integrated to form one larger, thematically coherent module. They also regard the structure of the modules to be in need of improvement. As already explained under criterion 1.3, not all modules are structured in a manner that allows a smooth transition from fundamental to basic modules to more advanced ones. The peers therefore believe it to be necessary that IPSAS re-designs the curricula for both study programs. In this undertaking, it would also be possible to re-organize the modules so that they appear more coherent and cohesive.

Mobility

The study programs offered at IPSAS attract a considerable share of students from abroad who move to Tunisia for their studies. Thus, many students are already international students and are not interested in further international experiences. Nonetheless, IPSAS offers all students a continuation of their studies at any institution that presents a curriculum identical or similar to the student's study profile at IPSAS. The students have the opportunity to spend a study semester abroad through ERASMUS mobility agreements and through partnerships with foreign institutes. In addition, students can also spend time at other universities or colleges that they choose on their own and will receive support from IPSAS in planning the semester abroad. 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. A combination of both is also possible. Currently though, very few students take the opportunity to spend a semester abroad. The peers ask IPSAS to specify or provide them with the cooperation agreements (ERASMUS) and strongly recommend to improve the opportunities for students to complete a semester or the internship abroad, without any prolongation of their studies. They also urge IPSAS to establish more support for the students planning to conduct a semester abroad.

Criterion 2.2 Work load and credits

Evidence:

- Student handbook per program
- Study plan per program
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

Within the framework of Tunisian regulations, training in engineering cycles is governed by a system based on coefficients and not credits; thus, coefficients are allocated for each module, according to the following regulations:

- A module consisting of 30 working hours, including tutorials will have a coefficient of 2, at most.
- A module consisting of 30 hours of lessons, including tutorials and practical work will have a coefficient of Coef ≥ 2.5.
- For a transverse module, the coefficient is: 1≤ Coef <2

The first year worker internship and the second-year technical internship of engineering studies, although compulsory, are not taken into account by the coefficient. Similarly, personal working time is not taking into consideration. To comply with the international system and accreditation requirements, IPSAS has introduced ECTS credit points, which considers both personal work and the various internships. Here, both internships are given 2 ECTS points. However, this rule applies not only to the conversion into the ECTS system but also to the national credit point system. Accordingly, the workload here must also include both the students' presence and self-learning time, as well as all compulsory parts of the study program.

Generally, both study programs consist of 180 ECTS with each semester covering 30 ECTS. One credit point is equivalent to 25-30 hours of work. Without probation periods or delays, students will thus complete the degree programs in six semesters. Students, who have previously received a License (equivalent to a bachelor's degree) can shorten their study to four semesters. During the audit discussions, the peers learn that around 85% of all students finish their studies on time, while 5% drop out entirely and 10% take one or two semesters longer. The students confirm that the workload is feasible and that there are no structural problems that would hinder finishing on time.

During the online audit, the peers find that credit points are allocated arbitrarily and thus do not reflect the actual workload of the individual courses. The peers get the impression that the IPSAS representatives are struggling to understand the reason behind a credit point system, as they are unable to explain how credit points are allocated to the different courses. The peers clarify that courses with a higher workload (i.e. more teaching and self-study hours) must clearly show a higher number of credits than courses with a lower workload. To do so, IPSAS must establish a credit point system based on the amount of work the students spend on each module, including self-study time as well as all mandatory parts of the curriculum. In addition, a process must be established to systematically monitor the student workload to ensure a just credit point allocation.

Criterion 2.3 Teaching methodology

Evidence:

- Module descriptions per program
- Self-assessment report
- Discussions during the online audit

Discussions during the audit Preliminary assessment and analysis of the peers:
According to the self-assessment report, the teaching methodology includes lectures, practical work, tutorials, field studies, excursions and seminars. They are aimed at achieving the learning outcomes and follow certain models of learning:

- Learning that is centred on the compulsory presence of students during the classes to ensure continuous improvement of the students' achievements
- Cooperative learning, a method of working in small groups that is based upon the heterogeneity of the group, the positive interdependence of the participants as well as their individual responsibilities.
- Problem-based learning, a learning strategy that focuses on problem-solving, aims at encouraging critical thinking and cooperative learning
- Competency-based learning is reflected in tutorials performed at the laboratories where independence, collaboration and active learning is developed while knowledge is acquired
- Project-based learning, a pedagogical approach that involves the interests and motivations of the students, connects theoretical concepts learned in class and their application during mini-projects or graduation projects and offers opportunities for direct interaction between the students.

IPSAS ensures that the staff members are equipped with specific teaching aids they need to conduct their lectures, such as software, educational mini-models, visits to external sites or further education (cf. criterion 4.2).

The peers discuss with the program coordinators and lecturers, which software the students are able to utilize. They learn that each student has access to Python and MATLAB. While these programs are very useful, they nonetheless expect IPSAS to employ more advanced and current software to prepare the students for the demands of the labour market.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

The aim of IPSAS is to ensure the provision of a good educational service for all its students. According to the program coordinators, there are some general support services offered to students. For example, international students are assisted in addressing administrative issues and with finding housing. In terms of academic support, IPSAS teachers offer additional upgrading courses to allow the students to better succeed in their university course as quickly as possible and with good results. The students report that they rely on direct contact with their teachers. In this regard, the small class sizes and many group works are advantageous, allowing students and staff to form stronger relationships. It appears that the relationship between teachers and students is respectful, helpful and esteeming, and that sufficient resources are available to provide students with individual assistance, advice and support. The students confirm that the IPSAS teachers are available for them at any time and for any advice and support, even on a personal level.

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

IPSAS has merged the individual modules into bigger teaching units. However, the peers stress that the combination of modules into teaching units does not automatically result in a coherent teaching unit. In some cases, topics are combined in a teaching unit that one would never combine within a module.

The peers further notice that IPSAS now offers elective courses in both programs. However, they have not been well integrated into the curricula, as none of the compulsory courses have been removed, so that students would have to take the elective courses in addition to all existing compulsory courses. Thus, the additional workload has not been taken into consideration. The peers generally note that the workload has not been taken into account in the revision of the curricula. It is still unclear how the workload is calculated and how credit points are allocated to the individual modules. When looking at the workload of the individual modules, the peers note a range from 22 h/CP to 41 h/CP.

3. Exams: System, concept and organization

Criterion 3 Exams: System, concept and organization

Evidence:

- Student guide and IPSAS presentation
- Student handbook per program
- Study calendar
- Exam regulations (exams regulation book)
- Module descriptions per program
- Example of exam schedules

Preliminary assessment and analysis of the peers:

At IPSAS, assessment is conducted according to the regulations defined in the exams regulation book. The assessment system at IPSAS has two purposes: a formative and a summative purpose. The formative assessments are used by the lecturer to continuously monitor the progress of achieving the course objectives and usually take place in the middle 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 summative assessments are used to display whether the course objectives have been met at the end of each semester. The panel as well as the students welcome the continuous learning assessment as it not only allows a close monitoring of the students' learning progress but also encourages students' motivation throughout the semester. By way of helping students to consciously assess their actual state of knowledge, the assessment procedure at the same time contributes to an adequate exam preparation.

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 lecturers confirm in the audit discussions. All final exams take place within a certain timeframe at the end of each semester. This timeframe (exam weeks) is communicated at the beginning of each academic year. Before each exam week, IPSAS carries out a revision period of 10 to 15 days for students to prepare intensively for their final exams. At least seven days prior to the exam weeks, a detailed schedule is published that informs about the exact time and date when each exam takes place. The peers confirm that rules have been defined for disability compensation measures, illness and other mitigating circumstances. However, the peers emphasize that the examination regulations do not specify what happens if an exam is not passed, i.e. when and how often it can be retaken, and therefore urge IPSAS to define rules for re-sit examinations in a binding fashion.

Shortly before the online visit, the peers were provided with a selection of exams and final projects to check. The peers note that the only form of examination is the traditional written exam, which is very unusual in a master's program and, more importantly, limits competence-oriented testing. At the same time, and as a consequence of the fact that large parts of the curriculum do not correspond to EQF level 7, the requirements and standards of most of the exams presented do not reach master's level either. Although the peers generally get a better impression of the final theses presented, as most of them cover demanding topics, they lack a scientific and research-oriented approach and instead focus almost entirely on practical application.

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

With its statement, IPSAS provides several additional sample exams in order to give the peers better insight into the overall level of the exams. The peers thank IPSAS for this effort, but see themselves confirmed that the requirements of the exams do not meet EQF 7 standard.

4. Resources

Criterion 4.1 Staff

Evidence:

- Staff handbook
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

IPSAS has 150 lecturers, 30 of whom are permanent, and 120 of whom are temporary staff. The temporary staff members are either university teachers, who also work at a different university in Tunisia, or industrialists with several years of both industrial and educational experience. IPSAS' teachers include university professors, lecturers, assistant professors and assistants or engineers. Assistants must hold a Master's degree, while assistant professors and professors must hold a PhD.

IPSAS provides a list of all staff involved in the two study programs as well as their respective CVs. In the Electromechanical Engineering program, there are 14 permanent and 25 temporary teachers. All but one permanent and the majority of the temporary teachers hold PhDs. In the Computer Engineering program, there are 10 permanent teachers and 17 temporary teachers. Of the 10 permanent ones, 6 hold a PhD and two are currently in the process of obtaining a PhD. Most of the temporary staff members, besides from the professional engineers, also hold PhDs.

Teachers, whether permanent or temporary, are recruited based on professional and educational experience, scientific knowledge, reputation and the correspondence to the profile of the module that needs to be taught. IPSAS has recently established a monitoring process that allows students to evaluate the lecturers at the end of each class (cf. criterion 6)

The peers learn that temporary teachers are bound by contract to finish the module they have started in order to ensure that students can finish the course (and the exam) without disruptions. However, most temporary teachers, despite their title, tend to stay at IPSAS for a very long time, mostly for eight to nine years, thus guaranteeing a consistent teaching of the modules and the curriculum. The peers thus can confirm that, despite the unusual low number of permanent staff members, all lecturers are taking their profession serious, tend to spend a long time at IPSAS and are highly qualified given their previous backgrounds in teaching or in the industry.

Overall, the peers get the impression that the staff seems to have the right skill set in order to meet the teaching demands requested to ensure high quality teaching and training for the students of the two programs. During the audit they acknowledge that the workload is evenly distributed and that, for example, temporary teachers are only allowed to teach up to six hours a week at IPSAS given their professorship at another university as well. As such, the peers do not identify major risks potentially impeding a responsible execution of the services offered to students. However, they emphasize that the assessment of the teaching staff involved in the programs was only possible to a limited extent, as the staff handbook provided is not informative and lacks essential information, in particular the academic background, the involvement in current and previous research projects and important publications. The peers therefore ask IPSAS to rewrite and complete the staff handbook.

Criterion 4.2 Staff development

Evidence:

- Training plan
- Self-assessment report
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

According to the program coordinators, private higher education institutions in Tunisia are not authorized to conduct research or create research units, to provide training in research or to supervise theses. In response to this situation, all private schools in Tunisia, including IPSAS, have implemented cooperation and exchange programs in the field of research with some public and foreign laboratories, mostly at other universities or in some industries. Given this limitation, only 10 out of all 150 teachers at IPSAS are currently conducting research and develop recognized research activities through publications. However, with regard to the practical orientation of the HEI and the degree programs and the fact that the majority of the teaching staff has a PhD, the peers do not consider this to be a problem. In addition, IPSAS lists all institutes with which there is cooperation in terms of laboratories, which convinces the peers.

With regard to didactical training, the peers gather the impression that there are no opportunities offered for the teaching staff. Neither the documents nor the discussions during the audit gave any indication that IPSAS has established further training offers for its staff members, something the peers deem to be absolutely necessary, especially since IPSAS also recruits a large share of staff members from the industry who have little prior experience in teaching.

Criterion 4.3 Funds and equipment

Evidence:

- Practical center description and costs
- Live tour through the laboratories during the online audit

Preliminary assessment and analysis of the peers:

As a private institution, IPSAS depends fully on its own resources, as it does not receive financial support from the Tunisian government. IPSAS is therefore funded mostly through tuition fees and projects with industry partners.

In the self-assessment report, IPSAS gives an overview of its four different buildings and the available learning spaces. Moreover, they list information on the center of practical work, which accommodates the institution's laboratories where the students carry out the practical assignments. The peers learn that IPSAS is constantly striving to improve its laboratory equipment, although the different stakeholders emphasize that the current equipment is sufficient in order to carry out the programs adequately. Any lack of material is compensated by agreements with other public or private institutions. The students consider the labs to be satisfactory and confirm that they get access to some laboratories with the help of their teachers also beyond the regular classes.

Due to the ongoing Covid-19 pandemic, it is not possible for the peer panel to travel to Tunisia and visit IPSAS in person. During the online audit, IPSAS therefore conducts a live tour through the most important facilities. Unfortunately, the peers get only limited insight into the HEI's premises and equipment due to communication issues and technical difficulties. Yet, what they can see from laboratories is that, while the equipment might be up to date and adequate for teaching purposes, it is not sufficient for research activities. Students reaching a master's level in higher education should be able to design, develop, and eventually build and test systems in the field of mechanics, electronics or mechatronics. The peers, however, are not convinced that the labs are adequately equipped for that purpose.

Overall, the peers doubt that IPSAS has the capacities and capabilities to implement master's degree programs accordingly. However, taking into account that both the inspection of the premises in the form of a live tour as well as the different discussion rounds in general suffered from poor communication and might thus have caused considerable misunderstandings, the peers request a follow-up visit to take place on-site in order to carry out several discussions once again and to inspect IPSAS' facilities in person. The safety precautions and regulations in the labs should be thoroughly reviewed during this follow-up visit.

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

The peers thank IPSAS for sending a revised staff handbook. However, they notice that it is still incomplete and inconsistent. It also remains unclear how many lecturers are available for the engineering programs, as different information have been provided in different documents.

The peers deem this criterion not fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions per program

Preliminary assessment and analysis of the peers:

IPSAS presents module descriptions for nearly all modules offered in both study programs, except for the practical courses/internships and final projects. The peers notice that while all necessary categories are included, the module descriptions nonetheless are very unspecific and do not offer an overview of the qualification goals, the taught contents nor the teaching methods. As a teaching method, for example, the module descriptions nearly always list "attendance", which does not refer to the actual teaching methodology used. As for the learning outcomes, some are kept very short and unspecific while others are so detailed that the peers find it hard to believe that all the mentioned objectives can really be taught, especially given the low ECTS (and thus workload) of most modules. Similarly, the module contents are also very unspecific by either being too short or too detailed. It is also striking that many modules, for example "Electrotechnics" or "Physical Metallurgy", require extensive previous knowledge, where in most cases it remains completely unclear where the students are supposed to have acquired them, as they are obviously not covered in any of the preceding modules.

The peers ask IPSAS to standardise the module descriptions and to describe all essential categories precisely so that students as well as external stakeholders can get a detailed overview of the study programs, also on the website and in English. In addition, the module descriptions should also indicate which modules adhere to a EQF Level 7. In line with the requested redesigning of the curriculum, the module descriptions must obviously be completely revised and re-written as well.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Copy of diploma for each degree programme
- Copy of transcript of record for each degree programme
- Copy of diploma supplements for each degree programme.

Preliminary assessment and analysis of the peers:

Upon graduation, students of both degree programs are handed a diploma, a transcript of records as well as a diploma supplement, which entail all necessary information. IPSAS provides examples of all these documents.

Criterion 5.3 Relevant rules

Evidence:

- Ministry authorization of both degree programs
- Exam regulation
- IPSAS quality policy
- IPSAS quality assurance plan
- Student guide
- Student handbook per program

Preliminary assessment and analysis of the peers:

The peers confirm that most rights and duties of both the university and the students are defined and binding, for example in the student guide, the quality policy, or the student handbooks. In addition, many regulations stem directly from the ministry and are thus authorized accordingly. However, as has been mentioned in various chapters throughout this report, some relevant rules are missing, regarding for example re-sit examinations or admission requirements. In addition, not all information available to the peers are also available to the students, such as the module descriptions. Thus, the peers urge IPSAS to ensure that all relevant rules, regulation and information are available to the students.

An English version of the website of both study programs exists in theory, yet when opening it, no content is available. Given that IPSAS plans on extending their international visibility, the peers recommend to publish English versions of all relevant regulations and information on the website as well.

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

With its statement, IPSAS has handed in revised module descriptions. However, the peers highlight that the revision of module descriptions should only be done once the curricula have actually been redesigned.

The peers deem this criterion not fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- IPSAS quality policy
- IPSAS quality assurance plan
- IPSAS process mapping

Preliminary assessment and analysis of the peers:

According to the self-assessment report and its supporting documents, IPSAS' quality management was newly implemented just prior to the certification of the organization as complying with the requirements of ISO 21001 (International Standard of Quality Management System Requirements for Training and Education Organisation). The role of the quality management process is to establish and implement methods for monitoring the satisfaction of relevant stakeholders (students, teachers, industry, parents), analyze the data resulting from the assessment carried out, report to the management on the condition of the system and the results of the analysis, and finally to suggest actions to correct non-conformities and opportunities for improvement.

Regarding the two study programs at hand, the advisory committee and the evaluations undertaken are of particular importance. The advisory committee holds a scientific advisory role for the program and guides the continuous improvement of the program. Industrial representatives are part of this committee and have the opportunity to bring in their expertise as well as the current demands of the labour market.

IPSAS has decided that all study programs be revised every three years, beginning in the 2020/2021 academic year. Future program reviews should take into account several key points, among them the proposals made by students and alumni. The census of student opinions through questionnaires is a recently installed tool as in the past, student notifications and claims were made verbally. The peers thus understand that the culture of student involvement is not yet fully established in all degree programs.

During the discussion with the students as well as the teachers, the peers learn that currently, not all modules are evaluated and even if surveys take place, they are not analysed and never discussed with the students. While they acknowledge that the current quality system at IPSAS has only been recently established, the peers nonetheless notice that this system until now exists mainly in theory and so far has not been set out in practice. The peers thus urge IPSAS to implement their quality management. In particular, the evaluation results must be analysed and concrete measures must be derived from them.

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

With its statement, IPSAS provides sample evaluation sheets as well as evaluation analyses. The peers thank IPSAS for the additional information. Yet, it remains unclear how the quality assurance system works in practice.

The peers deem this criterion not fulfilled.

D Additional Documents

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

D 1. Duly completed and revised staff handbooks
D 2. Evaluation forms (questionnaires) as templates
D 3. Cooperation agreements with international universities
D 4. Filled-in exams exams for both programs
D 5. Final projects for both programs

E Comment of the Higher Education Institution (03.11.2021)

The institution provided an extensive/ statement as well as the following additional documents:

D 1. Evaluation form (questionnaires) as templates
D 2. Filled-out exams for both study programmes
D 3. Final projects for both study programmes
D 4. Cooperation agreements with international universities
D 5. Revised and completed staff handbooks

The following quotes the comment of the institution:

CRITERION 1.1 OBJECTIVES AND LEARNING OUTCOMES OF A DEGREE PROGRAMMES
"The IPSAS team thanks the peers for their profound comment. The program specific learning objectives and qualification profiles were revised and reformulated. In the new updated version, they highlight the special features of the 4 engineering degrees delivered by IPSAS. Furthermore, we want to notice that the generic impression given by the previous formulation if the programs objectives were eliminated. This was mainly done by adding, for the 4 engineering degrees delivered by IPSAS, new elective specialization modules in the fourth and fifth semesters. Moreover, a mini-project module was added, for the 4 engineering degrees delivered by IPSAS, in semester 4 in order to give the engineering student the opportunity to develop his/her career plan and take the chance to enlarge his research skills and specialize in specific engineering topics.

The IPSAS team totally agrees that the initially submitted document doesn't reflect well the research skills and methodological/scientific knowledge/competencies. This was mainly due to the French engineering culture that makes research in opposition with engineering fields. However, the 4 IPSAS engineering curricula are full of engineering modules with deep and advanced scientific topics permitting to IPSAS graduates to continue in research career (more than 4 alumni are finishing their PhD thesis soon). Moreover, in the new revised version, the 4 IPSAS engineering curricula were reformulated toclearly show the specialisation aspects. This was also enhanced by the added elective courses and mini projects that offer to the IPSAS engineering students deepening and broadening scientific knowledge. The freedom of choice of the topics will offer to IPSAS graduates a real opportunity to forge their professional/research career project.

The IPSAS team recognizes that the given statistics are somewhat confusing.

In fact, these employment indicators were calculated in December 2020 and, unfortunately, didn't reflect the time to first recruitment: therefore 90% of 2018 batch graduates were hired during the two years 2018-2020, which was not the case of 2020 batch. The employment indicators were recalculated by considering the time of the first recruitment after 6 months of their graduation. This gives the bellow statistics:

	2018	2019	2020
Computer engineering	76%	79%	80%
Electromechanical engineering	76%	74%	77%
Industrial engineering	77%	77%	79%
Civil engineering	70%	74%	75%

CRITERION 1.3 – CURRICULUM

The IPSAS team thanks the peers for their valuable comments concerning the curriculum. The study programs of the 4 engineering degrees delivered by IPSAS were redesigned. This was done in accordance with the revision ofthe qualification objectives. By adding, for the 4 engineering degrees delivered by IPSAS, new elective specialization modules in the 4th and 5th semesters as well as a mini-project modulein semester 4, the IPSAS engineering student will have the opportunity to develop his/her career plan and take the chance to enlarge his research skills and specialize in specific engineering topics. The freedom of choice of the topics will offer to IPSAS graduates a real opportunity to forge their professional/research career project. The 4 IPSAS engineering curricula are now full of engineering modules with deep and advanced scientific topics permitting to IPSAS graduates to continue in research career (more than 4 alumni are finishing their PhD thesis soon). Finally, the IPSAS team notices that considering the professional/technical skills required by the industry representativesis not in contradiction with the high and deep scientific/research dimension offered by IPSAS curricula. In fact, most stakeholders' requirements are about soft skills (communication, entrepreneurship, innovation, project management, etc.) which concerns mainly some specific modules offered in each semester.

A new module of English certification is now offered for all IPSAS engineer for preparation for TOEIC, TOEFL, and BEC certification. BEC Exams are produced by Cambridge English. The purpose of this test is to assess English in a business context. This test includes 3 levels which are BEC preliminary, BEC Vantage and BEC higher. It is designed for those individuals who are willing to prepare for business course. The BEC exam may take place in the premises of the IPSAS but totally controlled by the examiners of the British Council: preparing exams, supervising, collecting copies for grading. Finally, IPSAS teaching staff is encouraged to pass these certifications.

CRITERION 1.4 – ADMISSION REQUIREMENTS

The IPSAS team recognizes that the selection procedures were not detailed in the previous submitted documents.

The applied selection procedures are as follows:

- For engineering preparatory cycle, coming from IPSAS or from other preparatory institutions: the admission is conditioned by the examination of the applicant submission. This is achieved, depending on the applicant specialty, by the corresponding department committee. The acceptance criteria are mainly based on the overall applicant grades in mathematics and physics, as well as in language modules (English + French).
- In specific cases, the department committee may require a face-to-face interview with the applicant. In the last 2 years and during the COVID-19 pandemic, the face-to-face interviews were replaced by Visio-conference sessions. This is always the case for international students.
- For bachelor level, coming from IPSAS or from other higher education institutions: the admission is conditioned by the examination of the applicant submission. This is achieved, depending on the applicant specialty, by the corresponding department committee. The acceptance criteria are mainly based on the overall applicant grades in mathematics and specialty modules, as well as in language modules (English + French).

The IPSAS team recognizes that some courses may be considered as repetitive or as of bachelor’s level. This was mainly due to the following causes:

- The Tunisian legislation obliges engineering institutions to accept in the first year of their engineering programs students coming from engineering preparatory cycle(2 years after baccalaureate) and also coming from bachelor level (3 years after baccalaureate).
- The engineering preparatory cycle is more concentrated on deep scientific knowledge of physical phenomena as well as fundamental advanced mathematical topics.
- The technological bachelor level is, as in all international programs, more concentrated on basic and professional courses.

For this reason, semester 1 of the 4 IPSAS engineering curricula is dedicated to the knowledge homogenisation of the different IPSAS new students. This, naturally, gives the impression that several 1st year courses are on the bachelor level. The IPSAS team wants also to gently recall that masters curricula take only 2 years; so dedicating the 1st engineering year to put all IPSAS new students at the same level of scientific knowledge independently of their previous different background. The IPSAS team hopes that, as previously detailed in the given responses to peers'comments inCriterion 1.1, it is clear that the programs of the 2nd and the 3rd engineering years are with no bachelor level redundancy, and that they are of international master level.

The IPSAS team has detailed in the previous responses the admission requirements and clearly discussed the issue of bachelor/master levels by showing that the engineering curricula is of 3 years duration, and so constituted by a 1st homogenisation year + 2 specialisation years with deep scientific/research knowledge. The IPSAS team notices that considering the professional/technical skills required by the different stakeholders is not in contradiction with the high and deep scientific/research dimension offered by IPSAS curricula. In fact, moststakeholders' requirements are about soft skills (communication, entrepreneurship, innovation, project management, etc.) which concerns mainly some specific modules offered in each semester. The IPSAS team hopes that the new redesigned curriculahighlight better the correspondence between EQF level 7 requirements and IPSAS engineering offer.

CRITERION 2.1 – STRUCTURE AND MODULES

The IPSAS team has redesigned tall he modules structure in order to meet with the peers suggestions and recommendations (see annexed documents):

• elective courses were added,
• modules were grouped on larger thematically coherent ones of 6 ECTS,
• the module structures were improved.

CRITERION 2.2 – WORK LOAD AND CREDITS

The IPSAS team revised the credit points system in order to better reflect the actual workload of the individual courses (see new redesigned curricula). Moreover, the ISO 21001 QMS contains a process for monitoring the student workload to ensure a just credit point allocation.

CRITERION 2.3 – TEACHING METHODOLOGY

The IPSAS team wants to clarify that IPSAS engineering students have access to several software facilities through the IPSAS Digital Center. Matlab and Python are only examples of the software available for students. One can list several others such as CAO software, AutoCad, Programming Tools, Web and mobile programming tools, etc.

CRITERION 3 – EXAMS

The IPSAS team wants to clarify the following examination regulations procedures:

- Monitoring attendance is the responsibility of teachers and the Student Affairs Office. When the percentage of absence of the student in a course exceeds 20% of the hourly volume allotted in the study plan, the student is barred from writing the course's semester exam.
- Any absence from a test or supervised duty is sanctioned by a grade of "zero" regardless of the reason for the absence. Nevertheless, the relevant teacher may, if deemed appropriate, give the student a chance to repeat the test or the assignment.
- As for the end-of-semester exams, any absence is sanctioned by the grade "zero" in a systematic way without any possibility to retake the exam.
- It should be noted in this regard that the Student Affairs Office accepts no justification of absence (medical certificates, etc.)
- The student has the right to take the examination of the non-passed exams in a catch-up session, organized 1 week after the principal examination session deliberation.

The IPSAS team wants to clarify that learning assessments take the form of continuous reviews for each subject encompassing the different grades obtained (supervised tests, practical work, mini-projects, projects, end-of-semester exams, and, possibly, an oral presentation mark). This permits competence-oriented testing of IPSAS engineering students' skills. It is important to notice that, contrary to what was understood by the peers, several courses provide research-oriented assignments for engineering students.

CRITERION 4.1 – STAFF

IPSAS team thanks the peers for their valuable comments concerning staff issues. IPSAS team has rewritten and completed the staff handbook (annexed to this report) taking into account on the peers suggestions and recommendations.

CRITERION 4.2 – STAFF DEVELOPMENT

IPSAS team precises that only 10 out of 150 IPSASfaculty members provided their publications records in the previous staff handbook. By conducting an exhaustive verification, it was noticed that only 80 from the 150 IPSAS staff are teaching at the engineering cycles. Moreover, 32 IPSAS faculty members have publications in international indexed conferences and journals as detailed in the new version of the staff handbook (annexed to this report).

Concerning staff members coming from industry, IPSAS team recognises that some of them may have little prior experience in teaching. However, these professionals have a wide technological knowledge and experience that IPSAS team judges to be very useful to share with IPSAS graduates. Finally, even if the number of these professional is somewhat high, their intervention is very limited in terms of number of hours taught by each professional.

CRITERION 4.3 – FUNDING AND EQUIPMENT

IPSAS team agrees with the peers that the previous report missed to show the importance of IPSAS technological/research platform (IPSAS-TRP and spontaneously called IPSAS center) for research activities. IPSAS team notices that several graduation projects (constituted mainly by research activities) are using IPSAS-TRP facilities. Furthermore, several agreements were signed with Sfax University laboratories offering to their masters and PhD students access to the research facilities of IPSAS-TRP.

CRITERION 5.1 – MODULE DESCRIPTION

The IPSAS team recognises that the previous submitted module descriptions luck specificity and do not offer an overview of qualification goals as well as specific details about teaching contents and methods.

The new redesigned and rewritten curricula take into account all peers concerns.

The module descriptions were standardised, and all essential categories were described (ECTS, teaching methods, learning outcomes, etc.) This will offer to students as well as external stakeholders a detailed overview of the study programs.

The IPSAS team insists that all the modules of the 2 last years of the 4 IPSAS engineering programs (2nd and 3rd engineering years) adhere to a EQF level 7.

As an example that justifies this adhesion, an agreement was signed since 2012 with the University Jean Monnet, Saint-Etienne, France, to offer an equivalence of their master in industrial engineering with IPSAS industrial engineering diploma. This is a clear proof that IPSAS engineering curricula adhere to EQF level 7 master's degree.

CRITERION 5.3 – RELEVANT RULES

The IPAS team agrees with the peers that some relevant information is missing on the website. Now that the new rewritten and redesigned curricula are ready, the IPSAS team commits to update soon IPSAS website, in French and English versions; and so, ensuring that all relevant rules, regulation and information are publicly available.

CRITERION 6 – QUALITY MANAGEMENT

IPSAS team notices that mostly all the modules of the last university year 2020-2021 were evaluated. The luck of the evaluation analysis was corrected, and the analysis results will be annexed to this report. The evaluation analysis was furthermore discussed in the different department committees as well as at the scientific council of IPSAS. Several concrete measures were derived from the evaluation results; this was documented in IPSAS scientific council minutes.

Concerning the results of the surveys, weremindyouthatwe have sent a 36-page report whichwas about an evaluation of the institution by teachers and students and whichincludes the results of the global satisfaction study about the courses concerned in the accreditation we tried to summarize the results of the questionnaires , so that it would be easier and clearer for auditors to read it. IPSAS presents the result of the survey in an annex.

F Summary: Peer recommendations (12.11.2021)

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

Degree Programme	**ASIIN-seal**	**Subject-specific label**	**Maximum duration of accreditaiton**
National Diploma Computer Engineering	Suspension for max. 18 months	Euro-Inf®	Suspension for max. 18 months
National Diploma Electromechanical Engineering	Suspension for max. 18 months	EUR-ACE®	Suspension for max. 18 months

Prerequisites

V 1. (ASIIN 1.1) Draft the educational objective so that they describe the academic, subject-specific and professional classification of the qualifications gained in the programs while adhering to EQF 7.

V 2. (ASIIN 1.3; 2.1) Redesign the programs, especially their scientific focus, to ensure that they adhere to EQF 7 and that the module concepts follows a clear structure and learning path. Consequently, completely revised module descriptions must be provided.

V 3. (ASIIN 1.4) Define technical admission requirements that reflect the subject-specific focus of the different study programs.

V 4. An on-site inspection must be carried out in order to have renewed discussions and to inspect the equipment.

For the Electromechanical Engineering program

V 5. (ASIIN 4.3) Provide equipment that allows the implementation of the study programs at master's level, i.e. labs with product development and research capabilities.

Requirements

A 1. (ASIIN 1.3) Ensure that students learn methods of scientific work.

A 2. (ASIIN 2.2) All compulsory parts of the curriculum must be credited.

A 3. (ASIIN 2.1) A credit point system based on the amount of work the students spend on each module (workload) must be implemented. In addition, a process must be established to systematically monitor the student workload to ensure a just credit point allocation.

A 4. (ASIIN 3; 5.3) It must be guaranteed that exams can be retaken, especially in case of illness or mitigating circumstances.

A 5. (ASIIN 3) In addition to written examinations, alternative forms of examination must also be offered in order to ensure competence orientation and alignment to EQF Level 7.

A 6. (ASIIN 4.2) Offer opportunities for didactical training of teachers.

A 7. (ASIIN 2.3, 4.3) Provide modern software.

A 8. (ASIIN 4.3) The laboratories must adhere to international safety standards.

A 9. (ASIIN 5.1) The module descriptions must be expanded according to the aspects listed in the report and indicate a level corresponding to EQF 7.

A 10. (ASIIN 5.3) Make all information concerning the degree available to the students in the language of the program.

A 11. (ASIIN 6) The quality management system outlined must be actively implemented. In particular, the evaluation results must be analyzed and concrete measures derived.

Recommendations

E 1. (ASIIN 1.3) It is recommended to enhance the English skills of both students and teachers and to strengthen the use of English language in the curricula.

E 2. (ASIIN 2.1) It is recommended to improve the mobility opportunities for students to complete a period of vocational practice or a stay at a different higher education institution without any prolongation of the studies

E 3. (ASIIN 2.1) It is recommended to integrate elective modules in the curricula of all programs.

E 4. (ASIIN 5.3) It is recommended to set up an English website and to publish all relevant information in English.

G Comment of the Technical Committees

Technical Committee 02 – Electrical Engineering/Information Technology (22.11.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and finds it hard to understand why the peer group suggests a suspension of the procedure. In the opinion of the Technical Committee, the identified deficiencies of the programs and the institution as a whole are so serious that the prerequisites and requirements formulated by the experts cannot be met within the specified time. For the technical committee, it also remains questionable whether, in view of the structural and legal obstacles in the Tunisian system, it is at all in the interest and at the discretion of the university to fulfill the requirements and thus to improve the quality of the study programs accordingly. The Technical Committee therefore recommends refusing the accreditation application.

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 not 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**	**EUR-ACE®**	**Maximum duration of accreditation**
National Diploma Electromechanical Engineering	Refusal	Refusal	/

Technical Committee 04 – Informatics/Computer Science (26.11.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and cannot follow the argumentation for a suspension of the procedure. In the opinion of the Technical Committee, the identified weaknesses of the programs and the institution as a whole are so serious that the prerequisites and requirements formulated by the experts cannot be met within the specified time. For the technical committee, it also remains questionable whether, in view of the structural and legal obstacles in the Tunisian system, it is at all in the interest and at the discretion of the university to fulfill the requirements and thus to improve the quality of the study programs accordingly. The Technical Committee therefore recommends refusing the accreditation application.

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

The Technical Committee deems that the intended learning outcomes of the degree programmes do not comply with the engineering specific parts of 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**	**Euro-Inf®**	**Maximum duration of accreditation**
National Diploma Computer Engineering	Refusal	Refusal	/

H Decision of the Accreditation Commission (07.12.2021)

Assessment and analysis for the award of the ASIIN seal:

The Accreditation Commission discusses the procedure intensively, especially with regard to the many serious deficiencies. They find that many of these deficiencies are due to structural framework conditions of the type of higher education institution, for example the low proportion of permanent teaching staff, the lack of laboratory equipment especially for research, as well as the lack of EQF 7 level. The Accreditation Commission does not see how the higher education institution can remedy these deficiencies in 18 months (the period of suspension of the procedure) and therefore votes to refuse accreditation for both study programmes.

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

The Accreditation Commission deems that the intended learning outcomes of the degree programme do not comply with the engineering specific parts of the Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

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 not 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**	**EUR-ACE®**	**Maximum duration of accreditation**
National Diploma Computer Engineering	Refusal	Refusal	/

Degree Programme	**ASIIN seal**	**Euro-Inf®**	**Maximum duration of accreditation**
National Diploma Electromechanical Engineering	Refusal	Refusal	/

Appendix: Programme Learning Outcomes and Curricula

According to the student handbook, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Electromechanical Engineering degree program:

The skills needed to carry out the activities of the "electromechanical" engineer profession can be presented under three categories:

Basic skills

Engineers must be able to :

- analyse and synthesise complex electromechanical systems,
- mobilise scientific and technical resources,
- mastering computer methods and tools and modelling,
- have the capacity for research or R&D activities and be open to collaborative work.

Specific skills

Other skills are more specific to the electromechanical field. Engineers must be able to :

- design, implement, test and validate innovative solutions, methods, products, systems and services
- have the ability to find relevant information, evaluate it and exploit it,
- have the ability to take into account the economic dimension, respect for quality, competitiveness and productivity, commercial requirements, economic intelligence.

Common skills

Certain skills are common to the engineering professions and more particularly applicable to "electromechanical" engineers who must be able to have

- the ability to work in an international context: mastery of one or more foreign languages and associated cultural openness,
- the ability to take into account environmental issues, particularly by applying the principles of sustainable development
- the ability to integrate into professional life, to become part of an organisation, to lead it and to develop it: exercise of responsibility, spirit of cooperation, ability to

work in an international context: mastery of one or more foreign languages and associated cultural openness
- teamwork, commitment and leadership, project management, project management, communication with specialists and non-specialists alike.

Behavioural skills

- ability to take into account the issues of workplace relations, ethics, responsibility, safety and health at work
- ability to take into account the challenges and needs of society,
- autonomy, decision-making capacity, organisational skills.

The following **curriculum** is presented:

Electromechanical Engineering First Year

Idnt	CTSE	Intitulé	CI	TP	CI+TP	T,per	T		Coef	E		GM
Course Id			L	PW	L+PW	Self pr,	T	ECTS		E	Subject	
Mth IN	MGEM11.01	Mathématique pour Ingénieur	30	0	30	25	55	2	2	CC+E	Mathematics for Engineers	GM1-1
Rop	MGEM12.18	Recherche Opérationnelle	24	0	24	25	49	2	1,5	CC+E	Operational research	GM1-1
Droit	MGEM12.22	Statistique et probabilités	24	0	24	24	48	2	1,5	CC+E	Statistics and Probability	GM1-1
Total GM1-1			78	0	78	74	152	6	5			
Thrmo	MGEM11.05	Thermodynamique	24	15	39	40	79	3	2,5	CC+E	Thermodynamics	GM1-2
Trachal	MGEM12.13	Transfert de chaleur	30	15	45	40	85	3	2,5	CC+E	Heat transfer	GM1-2
MF	MGEM12.14	Mécaniques des fluides	30	15	45	40	85	3	2	CC+E	Fluid mechanics	GM1-2
Total GM1-2			84	45	129	120	249	9	7			
TF	MGEM11.04	Technologie de fabrication	30	15	45	40	85	3	2,5	CC+E	Manufacturing technology	GM1-3
Info	MGEM11.08	Infographie (conception assisté par ordinateur)	0	51	51	30	81	3	1,5	CC	computer-aided design	GM1-3
TRP I	MGEM12.11	Transmission de Puissance et de Mouvement I	30	15	45	50	95	3,5	2,5	CC+E	Transmission of Power and Movement I	GM1-3
Total GM1-3			60	81	141	120	261	9,5	6,5			
Con Méc	MGEM11.02	Conception mécanique	30	15	45	50	95	3,5	2,5	CC+E	Mechanical Design	GM1-3
RDM	MGEM11.03	Résistance des matériaux	30	15	45	50	95	3,5	2,5	CC+E	Strength of materials	GM1-4
MMC	MGEM12.12	Mécanique des Milieux Continus	30	0	30	30	60	2	2	CC+E	Continuous Media Mechanics	GM1-4
Total GM1-4			90	30	120	130	250	9	7			
SCL	MGEM11.06	Système et circuit logique	30	15	45	40	85	3	2,5	CC+E	System and logic circuit	GM1-5
	MGEM12.17	Automatique I +II(Analyse des systèmes dynamiques et continus)	45	15	60	25	85	3	2,5	CC+E	(Analyse des systèmes dynamiques et continus)	GM1-5
Mini Pro	MGEM12.19	Mini projet	0	30	30	25	55	2	1,5	CC	Mini-project	GM1-5
Total GM1-5			75	60	135	90	225	8	6,5			
Elec	MGEM11.07	Electronique I (Electronique analogique)	30	15	45	40	85	3	2,5	CC+E	Electronics I	GM1-6
Mach Ele I	MGEM12.15	Machines électriques (Machine à courant continu et moteur pas à pas)	30	15	45	40	85	3	2,5	CC+E	Electric machine	GM1-6
Electro Tech	MGEM12.16	Electrotechnique	30	15	45	40	85	3	2,5	CC+E	Electrical engineering	GM1-6
Total GM1-6			90	45	135	120	255	9	7,5			
Dr T	MGEM11.09	Droit de travail	24	0	24	20	44	2	1,5	CC+E	Labour law	GM1-7
Tech Com	MGEM11.10	Techniques de Communication	24	0	24	20	44	2	1,5	CC+E	Communication techniques	GM1-7
Ang	MGEM12.20	Anglais I	24	0	24	30	54	2	1,5	CC+E	English I for SpecificPurposes	GM1-7
CreEnt	MGEM12.21	Création de l'entreprise	24	0	24	24	48	1,5	1,5	CC+E	Statistics and Probability	GM1-7
Total GM1-7			96	0	96	94	190	7,5	6			
Total GEM1			411	216	627	554	1181	58	49			

Electromechanical Engineering Second Year

Idnt		Intitulé	CI	TP	CI+TP	T.per	T		Coef	E		GM
Course Id			L	PW	L+PW	Self pr.	T	ECTS		E	Subject	
Mach Ele II	MGEM21.29	Machines électriques II (Machines électriques à courant alternatif)	36	15	51	34	85	3	2,5	CC+E	Electrical machines II (AC Electrical Machines)	GM2-1
Sch Elc	MGEM21.30	Schémas électriques (Schéma et protection électriques)	24	15	39	30	69	2	2	CC+E	Electrical diagrams (Electrical diagrams and protection)	GM2-1
Elec Pui II	MGEM22.42	Electronique de puissance I	30	15	45	40	85	3	2,5	CC+E	Power electronics I	GM2-1
Electo II	MGEM22.44	Electronique II (Electronique analogique)	30	15	45	40	85	3	2,5	CC+E	Electronics II (Analogue Electronics)	GM2-1
Total GM2-1			120	60	180	144	324	11	9,5			
MOSEM	MGEM21.24	Mise en œuvre sans enlèvement de matière	30	30	60	30	90	3	2,5	CC+E	Processing without material removal	GM2-2
Pro F	MGEM22.38	Processus de fabrication	30	0	30	30	60	2	1,5	CC+E	Manufacturing process	GM2-2
Mécato	MGEM22.41	Mécatronique	24	0	24	30	54	2	2	CC+E	Mechatronics	GM2-2
Total GM2-2			84	30	114	90	204	7	6			
CS	MGEM21.25	Calcul des structures	30	0	30	40	70	2,5	2	CC+E	Structural Analysis	GM2-3
Mét Phy	MGEM21.26	Métallurgie Physique	27	0	27	30	57	2	1,5	CC+E	Physical Metallurgy	GM2-3
MTM	MGEM22.37	Métallurgie et traitement des métaux	30	12	42	40	82	3	2	CC+E	Metallurgy and metal processing	GM2-3
CND	MGEM22.40	Contrôle destructif et non destructif des métaux	24	15	39	30	69	2	2	CC+E	Destructive and non-destructive testing of metals	GM2-3
Total GM2-3			111	27	138	140	278	9,5	7,5			
An Num	MGEM21.32	Analyse numérique	24	0	24	40	64	2,5	1,5	CC+E	Numerical analysis	GM2-4
ADM	MGEM22.39	Analyse dynamique des machines	30	12	42	40	82	3	2	CC+E	Dynamic analysis of machines	GM2-4
Mini Pro	MGEM22.46	Mini projet	0	30	30	30	60	2	1	R	Mini-project	GM2-4
Total GM2-4			54	42	96	110	206	7,5	4,5			
Mec Vib	MGEM21.27	Mécanique vibratoire	30	15	45	40	85	3	2	CC+E	Mechanical Vibration	GM2-5
TRP II	MGEM22.36	Transmission de puissance et de mouvement II	30	15	45	45	90	3,5	2,5	CC+E	Power and motion transmission II	GM2-5
Diag M	MGEM22.43	Diagnostique et maintenance	21	9	30	30	60	2	2	CC+E	Diagnosis and maintenance	GM2-5
Total GM2-5			81	39	120	115	235	8,5	6,5			
Auto Pro	MGEM21.31	Automates programmables	30	15	45	50	95	3,5	2,5	CC+E	Programmable Logic Controllers	GM2-6
Rob	MGEM21.28	Robotique (Initiation au Robotique)	24	0	24	25	49	2	1,5	CC+E	Robotics (Introduction to Robotics)	GM2-6
MCN	MGEM22.45	Programmation des machines-outils commande numérique	30	24	54	40	94	3,5	2,5	CC+E	Programming of NC machine tools	GM2-6
Total GM2-6			84	39	123	115	238	9	6,5			
AngII	MGEM21.33	Anglais II	24	0	24	35	59	2	1,5	CC+E	English II	GM2-7
Tech Com	MGEM21.34	Techniques de communication	24	0	24	20	44	1,5	1,5	CC+E	Communication techniques	GM2-7
Info I	MGEM21.35	Informatique I	0	30	30	25	55	2	1,5	CC	Computer science I	GM2-7
Total GM2-7			48	30	78	80	158	5,5	4,5			
Total GEM2			582	267	849	794	1643	58	45			

Electromechanical Engineering Third Year

Idnt		Intitulé	CI	TP	CI+TP	T.per	T		Coef	E		GM
Course Id			L	PW	L+PW	Self pr.	T	ECTS		E	Subject	
GP	MGEM31.48	Gestion de production	24	0	24	30	54	2	1,5	CC+E	Production management	GM3-1
GestPrj	MGEM31.57	Gestion de projet	24	0	24	30	54	2	1,5	CC+E	Project management	GM3-1
GMAO	MGEM31.58	Gestion de la maintenance assistée par ordinateur	21	12	33	20	53	2	2	CC+E	Computer-assisted maintenance management	GM3-1
Total GM3-1			69	12	81	80	161	6	5			
Mother	MGEM31.49	Moteur thermique	30	0	30	30	60	2	2	CC+E	Thermal engine	GM3-2
Hyd Ind	MGEM31.51	Hydraulique Industrielle	30	0	30	30	60	2	1,5	CC+E	Industrial hydraulics	GM3-2
EngRnv	MGEM31.59	Energies renouvelables	30	0	30	30	60	2	2	CC+E	Renewable energies	GM3-2
Total GM3-2			90	0	90	90	180	6	5,5			
CRI	MGEM31.53	Conception des robots industriels	24	0	24	20	44	1,5	1,5	CC+E	Design of industrial robots	GM3-3
MISE	MGEM31.55	Mesure et instrumentation des systèmes électriques	24	12	36	25	61	2	2,5	CC+E	Measurement and instrumentation of electrical systems	GM3-3
Rg Co	MGEM31.56	Régulations et contrôles	24	12	36	25	61	2	2,5	CC+E	Regulations and controls	GM3-3
Total GM3-3			72	24	96	70	166	5,5	6,5			
MCS	MGEM31.50	Modélisation et calcul des structures	0	24	24	20	44	1,5	1	CC	Modeling and calculation of structures	GM3-4
TSM	MGEM31.54	Tenue en service des matériaux	27	0	27	20	47	1,5	2	CC+E	Serviceability of materials	GM3-4
MSSP	MGEM31.62	Modélisation et Simulation des Systèmes de Production	24	9	33	30	63	2	2	CC+E	Modeling and Simulation of production systems	GM3-4
MSSP	MGEM31.63 OP1	Modélisation du comportement des matériaux	24	9	33	20	61	2	2	CC+E	Modeling and Simulation of production systems	GM3-4
Méc éla	MGEM31.63 OP2	Mécanique et élaboration des matériaux composites	24	9	33	20	61	2	2	CC+E	Modeling and Simulation of production systems	GM3-4
Total GM3-4			75	42	117	90	215	7	7			
MangR	MGEM31.52	managment r&d	30	0	30	20	50	2	2	CC+E	RESEARCH METHODOLOGY	GM3-5
CDP	MGEM31.60	Conception et démarche d'un projet	0	24	24	20	44	1,5	1	CC	Design and process of a project	GM3-5
INd4	MGEM31.61	industrie 4,0	30		30	20	50	2	2	CC+E	Industry 4.0 Advanced Operator	GM3-5
Total GM3-5			60	24	84	60	144	5,5	5			
		Total GEM 3:	366	102	468	390	866	30	29			

According to the student handbook, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Computer Engineering degree program:

- Ability to synthesize and analyze in detail and intelligently the problems to be solved
- Administration of systems and networks.
- Conception of computer systems.
- Ability to anticipate changes in the IT field.
- Ability to succeed in complex projects while taking into account both new projects complexity and client needs.
- Entrepreneurial and leadership skills and the ability to integrate into an organization, to animate it and to develop it.
- Competence in IT development.
- Ability to work in an international context: master of one or more foreign languages and cultural openness.

The following **curriculum** is presented:

First Year

Semester I

Computer Engineering

Course Id	Code	Teaching Unit	L	PW	L+PW	Self pr.	T	COEF	ECTS	E	Contents
■ Compulsory courses											
	GM1.1	Fundamental & Applied Mathematics 1	60	0	60	80	140	3	5	CC+E	Mathematics for engineer Numerical analysis
	GM1.2	System Architecture 1	63	27	90	90	180	5	8	CC+E	Logic systems and circuits Computer architecture Foundations of operating systems
	GM1.3	Algorithms & Programming Fundamentals 1	54	27	81	80	161	4	6	CC+E	Object Oriented Programming with C++ Alghorithms & Data Structures
	GM1.4	Web & Multimedia & Networks 1	57	45	102	110	212	6	9	CC+E	Introduction to computer networks (CCNA1) Multimedia Systems Web Computing
	GM1.5	Communication & Engineering Culture 1	42	0	42	40	82	2	2	CC+E	English TOEIC I introduction to the management of business information systems
		Total:	276	99	375	400	775	20	30		

First Year

Semester II

Computer Engineering

Course Id	Code	Teaching Unit							E	Content
Course Id	Code		L	PW	L+PW	Self pr.	T		ECTS	E	Subject

■ **Compulsory courses**

Course Id	Code	Teaching Unit	L	PW	L+PW	Self pr.	T		ECTS	E	Subject
	GM2.1	Fundamental & Applied Mathematics 2	42	12	54	50	104	2.5	4	CC+E	Probabilty Operational research and optimization
	GM2.2	System Architecture 2	63	48	111	105	216	6	8	CC+E	Linux enviroment (LPI 101) System programming Databases
	GM2.3	Algorithms & Programming Fundamentals 2	60	36	96	130	226	5.5	9	CC+E	Competitive programming Language theory and compilation Object Oriented Programming with JAVA
	GM2.4	Web & Multimedia & Networks 2	39	21	60	50	110	4	5	CC+E	Serious games Network administration (CCNA2)
	GM2.5	Communication & Engineering Culture 2	42	0	42	20	62	2	2	CC+E	English TOEIC II Communication techniques I
		Total:	246	117	363	355	718	20	28		

■**Stage Ouvrier** **Practical work or additional courses**

1.2.13	MGINF12.25	Stage ouvrier	-	60	60	-	60	-	2	-	Worker internship
		Total Semestre :	246	177	423	355	778	20	30	-	
		Total (Année/Year):	522	276	798	755	1553	40	60	-	

Second Year

Semester I

Computer Engineering

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T	COEF		E	
Course Id	Code		L	PW	L+PW	Self pr.	T		ECTS	E	Contents

■ **Compulsory courses**

Course Id	Code	Teaching Unit	L	PW	L+PW	Self pr.	T		ECTS	E	Contents
	GM3.1	Applied Mathematics	75	9	84	90	174	4	7	CC+E	Advanced operational reserach Statistics tools for engineer Numerical Reciepes with Python
	GM3.2	Advanced Information Systems	72	30	102	130	232	6	9	CC+E	Distributed Systems Databases management system LINUX system administration (LPI-102)
	GM3.3	Software Engineering & Development	60	24	84	80	164	4	6	CC+E	Distributed Component Development: WEB (JSP, Servlet, JSTL) Fundamentals of Software Engineering
	GM3.4	Web & Mobile Computing	36	27	63	90	153	4	6	CC+E	Servers Administration and Programming Mobile Computing
	GM3.5	Communication & Engineering Culture 3	42	0	42	20	62	2	2	CC+E	Accounting for engineer Soft skills and communication techniques
		Total:	285	90	375	411	786	20	30		

Semester II

Computer Engineering

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T	COEF		E	
Course Id	Code		L	PW	L+PW	Self pr.	T		ECTS	E	Subject

■ **Compulsory courses**

	GM4.1	Business Intelligence	69	42	111	120	231	6	9	CC+E	ERP Development and Intégration ODOO
											Datawarehouse
											Artificial Intelligence & Data Mining
	GM4.2	Advanced Web Computing	63	36	99	110	209	6	8	CC+E	Web services and platforms
											Server virtualization
											Front-End Web Framework
	GM4.3	Advanced Software Development	84	42	126	120	246	6	9	CC+E	JEE Architecture
											Dot Net Architecture
											Software architecture and design pattern
	GM4.4	Communication & Engineering Culture 4	42	0	42	15	57	2	2	CC+E	English TOEIC III
											Computer law and intellectual property
					21	42					PFA
		Total:	258	120	378	371	749	20	28		

■ **Optional Courses (Choose 1)**

EUROPEAN CREDIT TRANSFER SYSTEM (ECTS) INFOTMATION PACKAGE

	GM4.5	Optional Courses	21	0	21	9	30	1	1	CC+E	Advanced topics in Software Engineering
			21	0	21	9	30	1	1	CC+E	Advanced topics in Artificial Intelligence
			21	0	21	9	30	1	1	CC+E	Advanced topics in Cloud Computing
			21	0	21	9	30	1	1	CC+E	Advanced topics in Information Systems
		Total:	258	120	378	371	749	20	28		

■ **Stage ingénieur** **Practical work or additional courses**

2.2.13	MGINF22.49	Stage technician	-	60	60	-	60	-	2		Technician internship
		Total Semestre/ Semester) :	258	180	438	371	809	20	30		
		Total (Année/Year):	543	270	813	782	1595	40	60		

Third year

Semester I

Computer Engineering

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T	COEF		E	
Course Id	Code		L	PW	L+PW	Self pr.	T		ECTS	E	Content
■ Compulsory courses											
	GM5.1	Data Science & Engineering	42	18	60	100	160	4	6	CC+E	Business Intelligence Data Science
	GM5.2	Advanced Software Engineering	102	54	156	170	326	8	12	CC+E	Software quality and performance engineering Software engineering and agile development DotNet advanced development Development of distributed business components
	GM5.3	Industry 4.0	48	60	108	100	208	6	8	CC+E	Distributed application integration and tutored projects Big Data Internet of things (IOT)
	GM5.4	Entreprise & Project Management	42	9	51	50	101	2	4	CC+E	Business plan Project Management
		Total:	234	141	375	420	795	20	30		

■ Optional Courses (Choose 1)

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T	COEF	ECTS	E	Content
	GM4.5	Optional Courses	21	0	21	9	30	1	1	CC+E	Advanced topics in Software Maintenance
			21	0	21	9	30	1	1	CC+E	Advanced topics in Deep Learning
			21	0	21	9	30	1	1	CC+E	Advanced topics in Edge Computing
			21	0	21	9	30	1	1	CC+E	Advanced topics in NoSQL Databases
		Total:	258	120	378	371	749	20	28		

Third year

Semester II

Computer Engineering

Idnt	CTSE	Intitulé	CI	TP	CI+ TP	T.per	T	COEF		E	
Course Id	Code		L	PW	L+PW	Self pr.	T		ECTS	E	Subject
■ Compulsory courses											
3.2	MGINF32.61	Stage de fin d'études	0	450	450	450	900	0	30	R	
		Total Semestre/ Semester) :	0	450	450	450	900	0	30		
		Total (Année/Year):	234	591	825	852	1677	22	60		