ASIIN Seal & European Labels

Accreditation Report

National Diploma in Engineering
Electromechanical Engineering
Electrical Engineering
Informatics Engineering

Provided by
EPI: Higher International and Private Institute of Engineers, Sousse

Version: 20 September 2019

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Diplôme National d'Ingénieur en Génie Informatique	National Computer Science Engineering Diploma	ASIIN, Euro-Inf® Label	-	04
Diplôme National d'Ingénieur en Génie Electrique	National Electrical Engineering Diploma	ASIIN, EUR-ACE® Label	-	02
Diplôme National d'Ingénieur en Génie Electromécanique	National Electromechanical Engineering Diploma	ASIIN, EUR-ACE® Label	-	02
Date of the contract: 27.03.2019 **Submission of the final version of the self-assessment report:** 05.06.2019 **Date of the onsite visit:** 17.-18.07.2019 **at: Sousse, Tunisia**				
Peer panel: Prof. Dr. Madhukar Chandra, Technical University Chemnitz; Prof. Dr. Bettina Harriehausen-Mühlbauer, University of Applied Sciences Darmstadt; Dr. Diedrich Baumgarten, Volkswagen AG				
Representative of the ASIIN headquarter: Dr. Martin Foerster				

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

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

Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria, as of 10.03.2015 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering as of 09.12.2011 and Technical Committee 04 – Informatics as of 29.03.2018	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) First time of offer
Informatics Engineering	National Diploma	Software Engineering; Systems and Networks Engineering	7	Full time	ESIEA France	6 Semester	180 ECTS	09/11/2011
Electrical Engineering	National Diploma	Embedded Networks and Systems; Biomedical Instrumentation; Industrial Control	7	Full time	ESIEA France	6 Semester	180 ECTS	22/10/2012
Electromechanical Engineering	National Diploma	Automatic and Mechatronics; Aeronautics; Industrial maintenance;	7	Full time	-	6 Semester	180 ECTS	08/09/2011

For the National Diploma in Informatics Engineering the institution has presented the following profile in the Presentation of the EPI Group:

„The areas covered by this field are particularly extensive, ranging from computer (software engineering, architecture of computer systems, computer networks, security) to telecommunications (signal processing, mobile radio, satellite transmissions, optical transmissions) and through the electronics (microprocessors, integrated circuits, signal processors), Internet and Multimedia. Numerous companies are interested in graduates in Computer Engineering: There may be “specialized” firms (IT consulting firms, manufacturers of software and computer equipments, as well as the equipments for the aerospace industry, radar, car radios, mobile phones, telecom companies and multimedia) as well as companies

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

which are not directly related to the sectors of (banking, insurance, motor car, pharmaceutical) for which networks, electronics, communications, information, etc., play an increasingly important role."

For the National Diploma in Electrical Engineering the institution has presented the following profile in the Presentation of the EPI Group:

„In this field of study, the EPI-Polytech aims to train high level engineers to design, manage and control electronic modules as well as systems in their hardware and software dimension. The training always gives a significant place to analogue electronics, an area that remains indispensable in many applications. An important part of the lessons is also devoted to digital electronics, embedded systems, automation, for radiocommunication systems and to signal and image processing. This training covers a variety of fields such as electronics and microelectronics, telecommunications equipments, computers and multimedia, mechatronics, automotive, railway and shipbuilding industry, aeronautics, biomedical instrumentation."

For the National Diploma in Electromechanical Engineering the institution has presented the following profile in the Presentation of the EPI Group:

„In Electromechanical Engineering, EPI-Polytech provides versatile training for multi-skilled engineers who are able to analyze, design and optimize industrial systems operating in the fields of electrical engineering and mechanical engineering. This training shall include information on the essential concepts of mechanical engineering (material sciences, computer aided design, thermodynamics, fluid mechanics, machine components, dynamic vibration, mechanical manufacturing, aeronautics, industrial production, etc.) and those of electrical engineering (measurement techniques, circuits and electrical and electronic components, signals and ways to treat them, modeling of devices and functions and simulating their behavior on computers, etc.)."

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report
- Annex 3: Obejctive module matrices
- On-site discussions

Preliminary assessment and analysis of the peers:
For the degree programmes under review the HEI presents an extensive description of learning outcomes in the annex of the self-assessment report (SAR). This description is accompanied by learning module matrices for each programme, matching learning objectives, modules and the ASIIN Subject-Specific Criteria (SSC). The presented descriptions are very comprehensive, which is generally considered helpful by the peers. However, they point out that a concise description of the learning outcomes, achieved competencies and possible job opportunities should be made accessible to all stakeholders via the programmes' websites. The same concise description should also be included within the Diploma Supplement (of which there is none yet) in order to provide graduates with an official short presentation of their respective degree programme to facilitate application processes around the world.

Based on the material presented in the SAR, the peers learn that the programme in Informatics Engineering aims at enabling students to apprehend, analyse and solve complex problems in the field of Informatics, to deepen their scientific qualification in academic research as well as to prepare them for leadership tasks in their future jobs. Students shall be made aware of legal, social, and security issue in the Informatics field and be able to

[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.

work in intercultural contexts. Over the course of the programme, students have to choose one out of two specializations: Software Engineering and Systems and Networks. Graduates of the Software Engineering specialization are supposed to enhance their skills in programming and coding, working with complex algorithms and mastering different programming languages such as C, C++, Java, Python, etc.). They should be capable of managing and directing the management of data base systems, guarantee their coherence, quality, security and accessibility, and possess advanced skills in the development of mobile web applications. In the specialization Systems and Networks, graduates shall gain competencies in systems' and networks' administration as well as in implementing security solutions following up-to-date norms and standards. After the completion of the degree programme, graduates will be able to find jobs and higher positions in the broad variety of the informatics sector without difficulties.

In the Electrical Engineering programme students shall be enabled to understand and analyse complex problems in the field of electrical engineering and to develop individual solutions. In order to prepare the students for the tasks of higher positions in industry and companies the programme further emphasizes the development of skills in the socio-economic sector including modules oriented toward entrepreneurship throughout the curriculum. After the first two years, students specialize in either Embedded Networks and Systems or Biomedical Engineering, or Industrial Control. Apart from the special competencies acquired, the graduates should possess in-depth knowledge of engineering methods and tools, identification and solution of problems, data collection and interpretation as well as the use of computer tools. They are supposed to develop leadership and project management skills, an awareness of legal and social responsibilities of the field and the capability to work in intercultural and interdisciplinary contexts.

In the Electromechanical Engineering programme graduates should gain in-depth knowledge of the engineering fundamentals as well as the areas electricity and mechanics. Therefore, graduates should master the necessary tools of production and development of electromechanical systems, become acquainted with the techniques of prevention and maintenance, possess an acute awareness of the ethical dimension of their professional activities and become capable of individually understanding complex problems, analysing them and presenting creative solutions to a scientific audience. Further, graduates should have developed leadership and project management skills that allow them to take on higher positions in any company within the electrical engineering sector. To further specialize the students for their professional life, they can choose between three specializations: Automatics and Mechatronics, Aeronautics and Industrial Maintenance.

The peers analyse the described learning outcomes and agree that they are overall in line with the expectations of the European Framework Level 7 (equivalent to Master degree

programmes) as well as the respective Subject-Specific Criteria of the ASIIN Technical Committees 02 – Electrical Engineering and 04 – Informatics. Furthermore, they largely comply with the standards and criteria of the EUR-ACE Label in the case of the Electrical Engineering and Electromechanical Engineering programmes and the Euro-Inf-Label in the case of the Informatics Engineering programme. Nevertheless, the peers also point out that the description of the learning outcomes does not make any specific reference to the scientific qualification of the students, such as the continuation of their academic work on a more advance level such as a PhD programme. As will be discussed in later sections of this report, the peers understand that the primary focus of the programmes lies on the professional and practical qualification of the students and less on the academic field. Despite the fact that such an approach is considered understandable given the economic background of the country, the peers emphasize that in order to fully meet the standards of EQF, ASIIN, EUR-ACE and Euro-Inf a clear dedication to the scientific development of the students must be outlined in the programmes' learning outcomes.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the peers:
The panel considers the names of the study programmes to be adequately reflecting the respective aims, learning outcomes and curricula.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Annex 3: Objective module matrices
- Annex 4: Study plans
- Annex 4: Module Descriptions
- On-site discussions

Preliminary assessment and analysis of the peers:
The panel reviewed the curricula of the study programmes under consideration in order to identify whether the available modules can achieve the described learning objectives. Course descriptions as well as matrices matching the general learning objectives and the module contents were also presented for a detailed analysis.

From the discussions on-site the peers learned that the students in Tunisia can choose between different paths of Higher Education. To start their education three different options exist: they can either study a Bachelor's programme or an undergraduate License programme (equivalent to the pre-Bologna French education system), or they can enter a Preparatory cycle. While the first two alternatives last three years, the preparatory cycle lasts only two years but restricts the students in their further choices of subjects when it comes to continuing their education. The programmes under review offer the degree of National Diploma that is open to all graduates of any of the previously outlined alternatives, its degree being equivalent to the EQF 7 (Master) level. Thus, all students of the programmes have already completed a basic education in Natural Sciences and Mathematics, in the case of the preparatory cycle already with a strong focus on the following Diploma programme. As, theoretically, the Diploma comprises five years (either including a preparatory cycle or a license), the study programmes under review officially begin in the third year. Due to the different educational backgrounds, all three programmes envisage a Common Core period of either one or two years conveying basic knowledge in the respective fields and ensuring equal fundamental skills among all students before diverging into different specializations the students can choose between.

In the Informatics Engineering programme all students have one common core year with courses in basic informatics subjects as well as Mathematics. A languages module including courses in French and English accompanies the subject-specific modules. Furthermore, all students prepare a Mini Project of 2 ECTS credits that includes an introduction to academics research, analysis and presentation skills. After the first year, students choose between the options Software Engineering and Systems and Networks Engineering. The Software specialization puts a stronger focus on the programming and development with modules referring to Advanced Programming and Mobile and Web Development while the Systems and Networks specialization includes modules in Hybrid Development, Cloud and Networks. Both specializations comprise modules on Artificial Intelligence as well as Personal Development. The fourth study year also includes a Traineeship of 6 ECTS credits for all students. During the final year, Software Engineers take modules on ERP & Security, Data Science and Advanced Development while Systems and Networks Engineers study Networks & Technologies, Administration & Security and Programming & Data. Again, both groups pass a module on Personal Development. The programmes are completed by a 30-

credit end-of-study-project equivalent to a Master thesis but split up into a traineeship and a 14-weeks-period of writing. The peers agree that the programme is designed according to international standards and includes all relevant aspects of modern Informatics. In addition, aspects of non-technical education and soft skills are adequately represented in the curriculum.

In the Electrical Engineering programme the common core courses stretch over the third and fourth year before students choose between the specializations Embedded Networks and Systems, Biomedical Instrumentation and Industrial Control. The common cores comprise the fundamentals in Electrical Engineering and Mathematics but also basics in Signals and Systems and Computer Systems. As with the other programme, students take ten credits in languages. In the second common year modules on Power Electronics, Electrical Systems, Automatic, Signals and Languages follow. The first two years also include a Mini Project and a module in non-technical skills such as Entrepreneurship and Labour Law and Engineering Ethics. In the specializations during the final year the students take modules according to the respective focus before the programme is equally concluded by an end-of-study-project as the Informatics Engineering programme. The peers analyse the curriculum and agree, that all aspects of basic education in Electrical Engineering are included. Furthermore, the three specializations offered are well chosen and refer to current needs of the labour market. However, in order to increase the international compatibility of the programme, the curriculum should also include aspects in High Frequency Engineering, Antennas and Microwaves and Electromagnetics. Discussions on-site revealed that these topics are either not covered at all or touched only slightly by some existing courses. While the peers understand that it may proof difficult to include everything at the same time, they do recommend ensuring that all students have at least gained some basic knowledge in the three named fields.

In Electromechanical Engineering the students also attend two years of common core courses before specializing either in Automatic and Mechatronics, Aeronautics or Industrial Maintenance. The first two years lay the fundamentals in Mechanical Engineering, Mathematics, Electronics, Design & Manufacturing as well as Automatic & Robotics. In addition, students take language classes in French and English and courses in non-technical skills such as Entrepreneurship and Communication Techniques. In the fifth and final year, the students have to take two modules out of their respective specialization, accompanied by a module in entrepreneurship, Labour Law and Human Resources Management. Eventually, the programme is concluded with an end-of-study-project of 30 credits. The peers consent that the programme is up-to-date and includes all required fundamentals of the subject as well as meaningful specializations in areas that offer job opportunities in the region

and beyond. In addition, the curriculum provides basic skills in management and soft skills on an adequate level.

During the discussions on-site the peers learned that apart from the presented curricula all students in each of the programmes have to pass two internships of at least one month each during the summer holidays. For each internship a report has to be filed which makes them an official and mandatory part of the programmes. The peers outline, that according to the regulations of the European Area of Higher Education everything that is a mandatory part of the curriculum needs to be awarded ECTS credits and thus has to be reflected in the total workload of the students. This is currently not the case. The peers appreciate, that the students are encouraged to conduct internships during their holidays in order to improve their job opportunities, yet they emphasize that if these internships are mandatory they have to be officially included in the curricula and the module handbooks and awarded the respective number of credits. Apart from this issue and the outlined deficiencies in Electrical Engineering, the peers approve of the curricula and confirm that they are designed in a way that serves achieving the previously outlined learning outcomes of the programmes.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Annex 3: Objective module matrices
- Annex 11: Admission process
- Annex 12: Admission requirements
- On-site discussions

Preliminary assessment and analysis of the peers:
From the information provided the peers understand that admission to EPI and the respective programmes is generally based on the grade of the previous Higher Education, notwithstanding the different types of educational options. A ranking is established based on a certain calculation in which the average final grade is valued four times, the best grade of either Mathematics or Physics, or Engineering, or Computer Science is also valued four times and the best grade of French or English is valued two times. Based on this ranking, interviews are carried out by the respective departments to assess the motivation of the applicant. After the completion of the assessment process, applicants are classified in a

point-based system with students reaching 100 points and less being considered “lowly ranked” and students achieving more than 160 points amount to “grand classified”. As was outlined before, the previous type of education in Tunisia may restrict the options of further education. Thus, in the case of the preparatory cycle, students are pre-determined to continue their education either in the field of Computer Science or in the field of Engineering while the License or Bachelor’s degree allows the students to choose more freely between different subjects. The discussion with the students showed that they feel well informed about the admission process and that all information required is available online. Consequently, the peers consider the process to be transparent and adequate in order to select the best students for the respective programmes.

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

The peers appreciate that with the comment of the HEI the description of the learning outcomes, achieved competencies and possible job opportunities were reviewed and published on the programmes’ website. A short and adequate description has already been included in the newly designed Diploma Supplements for each programme. The peers only recommend that the same short description of learning outcomes presented in the Diploma Supplement should also be put on the website in order to provide visitors with concise information about the programmes.

Furthermore, the HEI announces that in the field Electrical Engineering and Electromechanical Engineering three new modules shall be introduced, covering the fields of High Frequency Engineering, Antennas and Microwaves and Electromagnetics. A ministry approval for these new modules is hoped to be obtained by 2020-21. The peers support the HEI in this endeavour and welcomes the taken initiative.

Concerning the mandatory summer internships, the HEI outlines that the workload of these internships is actually covered by the End-of-Study Project. Of the 30 ECTS credits awarded three refer to each of the two previous internships which have to be completed before the final project can be started. The study plans were revised in order to transparently communicate this distribution of workload accordingly and have been uploaded to the website. The peers consider this approach to be acceptable and consequently consider this criterion to be fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report
- Annex 4: Study plans
- Annex 4: Module Descriptions
- Annex 15: Mobility Requirement Report
- Annex 17: Credits validation records and process
- Annex 19: Statistics about international mobility and process
- On-site discussions

Preliminary assessment and analysis of the peers:
The study programmes under review are divided into modules, which comprise a sum of teaching and learning. The panel found the structure of the modules in general to be adequate and manageable.

The programmes do not offer any elective options for the students but only the necessity to choose between the outlined specializations. In the context of three-year programmes the peers consider these options to be quite adequate. Most modules comprise practical elements and project works; besides, the programmes also include the Mini Project in the first study years, internships during the summer holidays as well as a longer internship as part of the final project at the end of the programmes. Consequently, the peers see that the programmes are closely connected to the needs of the industry and prepare the students well for their further professional career. This was also confirmed by the students, who appreciate the highly practical approaches at EPI; apparently, this has to be understood in strong contrast to the public universities in Tunisia, that are traditionally focused on theoretical work, with little or no reference to the practical needs of the market.

Internationalization is of growing importance in Tunisian higher education as a whole and at EPI especially. Here, the high value of internationalization is already referred to in the name of the University as International Institute of Engineers. Measured against this agenda the current options for international mobility are still limited. Traditionally, EPI and Tunisian Higher Education maintain strong links with French Universities, for one because

of the common French language and also because of the comparable system of higher education with the degrees License and Diploma. The peers understand that in this regard some good working co-operations have been established and that the University as well as the Departments do much to promote opportunities of mobility. For example, every year a small number of the best students is selected for a scholarship to study a year in France and two double degrees with renowned French Universities have also been established. Nevertheless, the peers also understand that it is the strategic outline of the University to diversify the existing international options and they learn from the students that this would be highly appreciated. Many students would like to spend some time in English-speaking countries or in Germany or Scandinavia. The University management declared that in order to facilitate such mobility a new language centre is currently under constructions where especially German is going to be offered; a co-operation with the local Goethe-Institute is also in planning. The peers can only support these initiatives and recommend to expand the existing bilateral agreements with international universities beyond France. Apart from these restrictions, the peers understand that credit transfer and the recognition of credits gained at foreign universities is possible and regulated at EPI. These regulations are known to the students, transparently accessible and in line with the Lisbon-convention.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Report
- Annex 4: Study plans
- Annex 4: Module Descriptions
- On-site discussions

Preliminary assessment and analysis of the peers:

All modules in the programmes are assigned ECTS credits. Every semester comprises 30 credits while each credit is valued 30 working hours. The modules usually consist of three courses relating to one overarching topic and are thus compiled in a meaningful structure. Feedback concerning the workload is collected through the course evaluation survey at the end of the study year and adaptions are made if necessary. The discussion with the students showed that the workload is generally well reflected by the number of credits awarded and more or less equally divided through the study years and programme. The only exception are the two mandatory internships that have been previously discussed. These are not awarded any credits despite the fact that they form a compulsory part of the

curricula. Apart from this aspect, the peers consider the workload to be manageable and transparent.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Report
- Annex 23: Sheet of permanent teachers pedagogical evaluation
- Annex 24: Pedagogical training sheets
- On-site discussions

Preliminary assessment and analysis of the peers:
From the presented material as well as the discussions on-site it becomes apparent that the pedagogical skills and adequate teaching methodology are highly valued at EPI and in the programmes under review. Evaluation of pedagogical skills and methods are frequently performed and workshops and trainings offered to the teaching staff.

As was already pointed out, the teaching methodology in the programmes is strongly attached to practical approaches and the students' ability to find adequate jobs after the completion of the programmes. In the sometimes difficult economic environment of the country the fact that the majority of the graduates in all programmes finds employment shortly after graduation supports this approach. Teaching is usually done in the form of lectures, seminars and workshops with many courses comprising theoretical as well as practical elements. The peers further appreciate that the programmes are partly taught by teaching staff that is not full-time employed at the University but only offers one or two courses with a specific professional background. In the Electrical Engineering specialization of Biomedical Engineering, for example, the University has several co-operation agreements with partners from local hospitals and specialists from these fields offer courses in the programme. Consequently, the teaching methodology is considered up-to-date and adequate in order to convey the contents envisaged by the programmes.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Audit discussions

Preliminary assessment and analysis of the peers:
The peers get a comprehensive impression of the offers related to support and assistance of the students at EPI. Being a private University student groups are small and limited in size and the well-being of the students is very much looked after. In a, compared to public Universities, comprehensive learning and working environment on campus the students enjoy the best opportunities to pursue their projects, and the teaching staff is always open to support if requested. During the discussion with the students, they confirmed that they felt greatly supported and supervised. Apart from the subject-specific support, the University also offers several other ways of assistance: the international office supports international mobility wishes and industry fairs offer the opportunity to get into contact with university partners and prospective employers. The university also offers financial support in the form of scholarships. In conclusion, the peers have no doubt that sufficient support and assistance is given to the students, thus ensuring their best possible success.

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

The peers consider this criterion to be largely fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Annex 4: Module Descriptions
- Annex 31: Exam process
- Annex 32: Second Exam correction process
- Annex 33: Exam rules
- Annex 34: Exams Calendar
- On-site discussions

Preliminary assessment and analysis of the peers:

All course content within the reviewed study programmes is examined. The examination type is defined in the module descriptions for most modules, but in any case are made known to the course participants at an adequate time during the study year. Examination types are selected based on their competence orientation and may include written exams, oral exams, presentations and project work, either alone or in teams. All examinations are held during the two-week examination period at the end of the semester; the dates of the period are communicated at the beginning of the academic year. The distribution of the exams within the period is only announced two weeks before the end of the semester but the schedule is usually maintained throughout the years and the students confirm that they are well informed about the exams' schedule. For all exams a re-sit exam is also scheduled at a later stage of the holidays, allowing students to repeat failed exams immediately after the first attempt and before the beginning of the next semester. If students fail a second time they have to repeat the entire module, after another failure they are dismissed form the programme.

The peers review a number of exams and final project works and come to the conclusion, that these are not yet on an academic level comparable to the European Qualification Framework (EQF) 7. From the discussions on site they understand that the final project – although valued at 30 credits and covering a time period of six months – is mostly spent in a company internship, where students work on assigned projects usually selected by the company. Thus, the trainees are fully involved in the company production cycle and have increased opportunities to find employment there or in similar enterprises after the completion of the programme. This approach is relatively new to Tunisia and an attractive asset for the private Universities such as EPI in comparison to the public HEIs. Nevertheless, the peers emphasize that a programme on EQF Level 7 requires each student to undertake an individual scientific research work in which a problem is thoroughly analysed according to modern research approaches and a creative solution is presented. Reviewing the projects the peers realized that these are merely – and also considered to be – reports of the projects carried out in the companies. These reports, with very few exceptions, neither include a thorough bibliography nor a problem analysis but are of a solely descriptive nature. In order to comply with the standards of ASIIN as well as the EUR-ACE or Euro-Inf Labels, it will be necessary to enhance the level of these works. The academic requirements a student needs to fulfil should be outlined in short but precise form in the respective module description. Furthermore, a short handbook or introduction should be designed, outlining the requested form, structure and scientific standards of such a thesis. The peers underline that this development needs not be at the cost of the practical orientation of the programmes. Instead, fostering the students' capacities of individual scientific research and

creative problem-solving will both benefit the employers in Tunisia as well as increase the graduates' job opportunities around the world.

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

In its comment on the report the HEI agrees with the peers' assessment of the scientific level of the final projects although some already do include aspects of scientific research. The programme coordinators announce that the importance of scientific analysis will be stressed and made mandatory for all final projects in the future through a newly developed guideline which is attached to the presented comment. In addition, the guideline will be made accessible online in the near future. Based on the guideline the peers agree that this will contribute to the improvement of the scientific research skills of the students and that the criterion has consequently been fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Annex 36: Lists of teachers
- Annex 39: Teachers resumés
- On-site discussions

Preliminary assessment and analysis of the peers:

In the self-assessment report the university presents data about the number and overall qualification of staff for the respective programmes and during the discussion on site, the peers gain a good impression of the quality of the teaching personnel. Based on legal requirements, teaching staff must at least have a qualification on Master level and it is recommended that 50% of the staff members should hold a PhD degree. University-wide, this number is almost achieved but may vary from programme to programme. For example, in Electrical Engineering the teaching staff consists of 100% PhD-holders. Since EPI is a private University it does not follow the hierarchy of public Universities in Tunisia. Full professorships are not awarded, the only difference between the staff members is their salary based on the individual teaching load as well as the qualification and performance. In total, the

staff is composed of full-time staff members solely employed by EPI and of part-time staff that is recruited either among the staff of the public HEIs or among industry partners as has been described for the case of Biomedical Engineering. The peers learn that for the moment the available staff is sufficient to take care of the programmes and to ensure the small classes. However, EPI has been and still is rapidly growing and new staff members are constantly sought after. In the next year alone the Engineering College wants to hire 15 new staff members which may prove increasingly difficult given the high level of required qualification and the significant brain-drain the country is suffering from. Nonetheless, the peers conclude that the teaching staff is well qualified and quantitatively sufficient in order to sustain the programmes under review.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Report
- Annex 23: Sheet of permanent teachers pedagogical evaluation
- Annex 24: Pedagogical training sheets
- On-site discussions

Preliminary assessment and analysis of the peers:
It was already mentioned that the pedagogical skills of the teaching staff are highly valued at EPI and that constant training and support is offered to the staff members for improvement. If the student evaluations should reveal deficiencies in didactical and pedagogical skills, the Head of Department will approach the respective staff member and recommend special training or workshops. Apart from these measures, international guests are regularly invited to share their expertise with the local staff. Besides the pedagogical development, the University stresses the significance of research in order to keep their programmes up-to-date. The staff members confirm that the workload allows them sufficient time for research and that publications and research projects would be rewarded by an increase in their salary. Nevertheless, the peers gain the impression that the scale of research could still be increased and that the research infrastructure could be enhanced. They also learn that the staff members would appreciate if the University provided financial resources for the participation in international conferences; in addition, also support in taking students to conferences would be seen as a great benefit. Furthermore, support of research in the form of spare time such as sabbaticals of six to twelve months are not yet known at EPI and may be beneficial to increase the research output. Despite these remarks,

the peers gain the impression that the staff members are active in research, if time and money allows, but that they were not provided a comprehensive list of the staff's publications. It is requested that such a list should be compiled and presented in the aftermath of the visit.

Criterion 4.3 Funds and equipment

Evidence:

- Self-assessment Report
- Annex 9: Pertnership agreements
- Annex 16: Laboratories lists and Equipment
- On-site discussions
- Site visit

Preliminary assessment and analysis of the peers:
During the on-site visit, the peers were able to gain a comprehensive impression of the facilities and laboratories at the Engineering College. Being a completely private institution, EPI is funded solely by tuition fees and donations from private enterprises as no government support is provided to sustain the institution. The laboratories on-site are considered to be adequate for the conveyance of the programmes' fundamentals. In the case of Informatics Engineering the equipment is also developed enough to allow for further research and projects on the academic level envisaged by the programmes. For the other two programmes, the peers learned from the discussions that it is not common for private Universities in Tunisia to possess laboratories on their own at all. In order to perform the practical works the Departments conclude contracts with either public Universities or private companies that own the required equipment. For the respective courses, the students then gather at EPI and are transported in a bus shuttle to the locality where the equipment is. Although this seems quite unusual to the peers they could see that this procedure is well established and working and that the students are content with this arrangement. Consequently, in order to fully assess the equipment of the two critical programmes, the peers ask the HEI to compile a list where for each external laboratory the respective equipment is documented and a photographic evidence is provided. Additionally it would be appreciated if a documentation of the experiments performed in these labs could be presented as was the case in the laboratories on-site. The peers approve of these papers that outline in some detail the experiments and students' tasks. While the peers understand that, espe-

cially in Electrical Engineering, the equipment is rather expensive, they support the University in its endeavour to continuously develop its own laboratories. They learn from the HEI management that a new building is already under construction where more labs will be located. The peers expect that this will contribute significantly to the independence of the programmes from external factors and that it will further enable students as well as staff to work on their research projects at any time.

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

Along with the comment the HEI presented lists of publications and research activities of the teaching staff as well as documentation about the external laboratories which are being used in the context of the programmes under review. The peers appreciate that at EPI the opportunities for research shall be further increased and they support the HEI management in this project. Based on the provided photos of the external labs the peers consider the criterion to be largely fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-Assessment Report
- Annex 4: Module Descriptions
- On-site discussions

Preliminary assessment and analysis of the peers:

The peers appreciate that the module descriptions were presented beforehand with the self-assessment report in English translation. From the discussion with the students it also became apparent that at the beginning of each course students receive detailed information about the respective content, learning outcomes, examinations, workload distribution and grading. The review of the descriptions showed that some, especially in the Informatics Engineering programme, were quite comprehensive while others, mostly in Electrical Engineering and Electromechanical Engineering lacked certain information.

In conclusion, the peers see the need to make sure that all modules that are awarded ECTS credits (including internships and the final projects) have module descriptions that provide

information about the person responsible for the module, the learning outcomes, the content, the distribution of workload, the awarded number of credits, the type of examination, the relative distribution of grading among the student cohort and recommended literature. This complete set of information should be made available on the website for all stakeholders. The peers again point out that in the case of the final project the module description should make explicit to what degree practical work, literature research and critical analysis are part of the thesis.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Annex 42: Graduation certificate, Diploma, Transcript of records

Preliminary assessment and analysis of the peers:
From the presented documents the peers gather that at the graduation every student is awarded a Diploma and a transcript of records listing the modules and individual grades. However, the EPI does not yet award a Diploma Supplement as required by ASIIN. At the completion of the degree programme, all graduates should be provided a Diploma Supplement that contains a concise description of the programme's learning outcomes (compare also criterion 1.1), the list of modules and individual module grades of the student, the relative grade of the comparable graduates' cohort as well as information regarding the Tunisian system of higher education. Such a Diploma Supplement will increase the international comparability of the graduates and facilitate the employment process as employers receive a complete set of information together with the applicant's Diploma.

Criterion 5.3 Relevant rules

Evidence:

- Annex 29: Internal Rules
- Annex 33: Exams Rules

Preliminary assessment and analysis of the peers:
From the documents provided and the discussions during the on-site visit, the peers learned that EPI follows a policy of transparent and open rules and regulations. All required rules and regulations are made accessible to students at any time online. The discussion

with the students confirmed that they feel well-informed about regulations and comfortable about the access to any information about their degree programmes.

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

The module handbook for the programmes under review has been updated and uploaded to the website in the aftermath of the site-visit. Along with the comments, the HEI also provided Diploma Supplements for each of the programmes that comply with international standards. However, the Diploma Supplements are available in French language only. While this is generally acceptable, the peers recommend to also provide an English translation of the Diploma Supplement so that students may apply with this document for any job anywhere in the world. In addition, the document could offer more precise information in some aspects. The description of the graduates' skills and competencies still offers room for some improvement. In conclusion, the peers consider the criterion to be largely fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Annex: 6: Statistics of insertion rate
- Annex 8: Meeting minutes of modifications of study plans
- Annex 13: Statistics about students
- Annex 20: Evaluation of Studies Questionnaire
- Annex 21: Results Studies evaluation by Students
- Annex 22: Responsible of Department Process
- Annex 37: Teachers satisfaction questionnaire
- Annex 44: Satisfaction Questionnaires

Preliminary assessment and analysis of the peers:

From the documents presented and from the discussions during the on-site visit the peers gain a positive impression of the quality management procedures that are in place at EPI and for the programmes under review.

Since EPI is a private University funded exclusively by the fees paid by the students the reliance on students' feedback and the necessity to ensure and improve the employability of the graduates are of major importance to the coordinators. Each course is being evaluated constantly through different surveys by teachers and students. Further surveys are carried out gathering statistics about graduates and alumni. The discussion with the students revealed that those in charge are always eager and open for feedback aside from the official evaluations and that students have the impression that their comments are taken into consideration with regard to the further improvement of the programmes. This becomes explicit in the constant curricular revision process that is performed under participation of students and industry partners. The industry representatives confirm in the discussion that the University is eager to receive feedback about new developments and trends and the employability of their graduates. That this process is fruitful and effective becomes visible in the high percentage of graduates that find employment immediately after graduation. Concerning the internal feedback loops the results of the course evaluations are centrally assessed and analysed before they are communicated to the Head of Department. He would then be responsible to initiate any measures if problems or needs for improvement have been detected. The results of the quality of the teaching staff are outlined in detail and categorized based on a traffic light system; those staff members that are graded 30 percent and below are marked red, better ones in yellow and green. A summary of this grading is also made accessible to the students. In case the satisfaction of the students with staff members is in the red light zone, the Head of Departments will contact the respective teacher, discuss the issue and propose solutions. If no improvement can be achieved over a longer period of time, the staff member will be dismissed. Although the teaching staff does not usually discuss the results with the students in class, the Head of Department is obliged to communicate any measures taken because of survey results transparently to the students. Thus, the peers agree that the quality management circles at EPI are well established and work under participation of all stakeholders.

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

The peers consider the criterion to be 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. List of Publications of staff members~~
~~D 2. List of external laboratories with equipment (at best with pictures) and handouts describing the performed experiments~~

E Comment of the Higher Education Institution (22.08.2019)

The following quotes the comment of the institution:

„ Criterion 1.1

- Page 7:

The description of the learning outcomes, achieved competencies and possible job opportunities will be available on the website by Tuesday 27 of august. The corresponding links will be then sent to you.

The same description will be included within the diploma supplement as will be discussed further in this report.

- Page 9:

The outcomes of all programmes have been tuned to raise the skills and the scientific qualification of the students, such as the possible continuation of their academic work on postgraduate levels. As stated above, the updated matrices of module objectives will be available on the website by Tuesday 27 of august.

Criterion 1.3

- Page 11:

We agree with your suggestion to add three modules to Electrical Engineering Program. These modules which are the high frequency Engineering, The antennas and micro waves and the Electromagnetic field will be discussed in the department and three commissions will be formed to define the appropriate programmes which will be sent at the same time to you and to our high Education ministry for approval before integrating these modules since the academic year 2020 - 2021. Till that time we will organize conferences and seminars during the academic year 2019-2020 in these themes. We will also identify the practical work tools to be acquired on time.

- Page 12 :

According to the appendix 18 sent to you with the SAR, the internships are already considered with the end of study project ESP. In fact the final mark of the ESP is counted as follows: 10% initial internship + 10% Professional internship + 80% ESP. And regarding this the 30 credits allocated to the ESP are in fact detailed as 3 credits for each internship and 24

for the final ESP. The study plans with these details were updated and will be available on the website by Tuesday 27 of august.

Criterion 2.2

- page 15: The only exception are the two mandatory internships that have been previously discussed. These are not awarded any credits despite the fact that they form a compulsory part of the curricula. Apart from this aspect, the peers consider the workload to be manageable and transparent.

This point has been already discussed above.

Criterion 3

- page 17:

Even though some of the end of study projects (ESP) prepared at EPI contain a scientific part, this consideration will be generalized for all ESP in the future through a new developed guide. The ESP guide is annexed to this report. It will be also available for students and teachers on the website by Tuesday 27 of august.

Annex 1: ESP Guide French version

Criterion 4.2

- Page 20:

As you have mentioned above, our staff members are active in research. The list of their publications, annexed to this report, confirm this. However, most of them have prepared their PhD within public research structures and will no longer be able to continue in such way. Therefore, at EPI, and according to your recommendation, we decided to offer more facilities and opportunities to them to still active in the research field. This will be done through the extension of the existing EPI-R&D structure to a research lab : EPI-LIT : Laboratory of Innovative Technologies the description of which is provided in an annex to this.

Annex 2: List of publications Computer engineering teachers

Annex 3: List of publications Electrical engineering teachers

Annex 4: List of publications Electromechanical engineering teachers

Annex 5: EPI-LIT laboratory creation

Criterion 4.3

- Page 21:

Please find in annex photos of the external laboratories and the descriptions of the experiments our students do in these labs.

Annex 6 External Labs equipment

Criterion 5.1

- Page 21:

The handbook of modules description for each program was updated according to your recommendations. The handbooks will be available on the website by 27 of august.

Criterion 5.2

- Page 22:

The diploma supplement has been implemented at EPI for each program. Please find attached examples of it. All graduated students for academic year 2018-2019 were informed they can get it upon demand. For the next years, it will be delivered automatically.

Annex 7 Computer Diploma supplement

Annex 8 Electrical Diploma supplement

Annex 9 Electromechanical Diploma supplement”

F Summary: Peer recommendations (23.08.2019)

Taking into account the additional information and the comments 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
Diploma in Electro-mechanical Engi-neering	Without require-ments	EUR-ACE	30.09.2024
Diploma in Electrical Engineering	Without require-ments	EUR-ACE	30.09.2024
Diploma in Infor-matics Engineering	Without require-ments	Euro-Inf	30.09.2024

Recommendations

For all degree programmes

E 1. (ASIIN 4.2) It is recommended to enhance the research opportunities for staff members.

E 2. (ASIIN 2.1) It is recommended to further expand the international co-operations and mobility options.

E 3. (ASIIN 5.2) It is recommends to provide Diploma Supplements not only in French but also in English translation. Furthermore, the information provided in the Diploma Supplement concerning the graduates' skills and competencies could be enhanced.

For the Bachelor programmes in Electrical Engineering and Electromechanical Engineering

E 4. (ASIIN 1.3) It is recommended to include aspects in High Frequency Engineering, Antennas and Microwaves, and Electromagnetics into the curriculum of Electrical Engineering.

E 5. (ASIIN 4.3) It is recommended to constantly further develop the laboratory equipment in order to increase the independency from external institutions.

G Comment of the Technical Committees

Technical Committee 02- Electrical Engineering (09.09.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure. It agrees with the recommended resolution indicating minor editorial corrections.

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

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committee 02.

The Technical Committee 02- Electrical Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Diploma in Electro-mechanical Engineering	Without requirements	EUR-ACE	30.09.2024
Diploma in Electrical Engineering	Without requirements	EUR-ACE	30.09.2024
Diploma in Informatics Engineering	Without requirements	Euro-Inf	30.09.2024

Technical Committee 04- Informatics (12.09.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and agrees with the positive assessment of the peers.

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

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

The Technical Committee 04- Informatics recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Diploma in Electro-mechanical Engineering	Without requirements	EUR-ACE	30.09.2024
Diploma in Electrical Engineering	Without requirements	EUR-ACE	30.09.2024
Diploma in Informatics Engineering	Without requirements	Euro-Inf	30.09.2024

Recommendations

For all degree programmes

E 1. (ASIIN 4.2) It is recommended to enhance the research opportunities for staff members.

E 2. (ASIIN 2.1) It is recommended to further expand the international co-operations and mobility options.

E 3. (ASIIN 5.2) It is recommended to provide Diploma Supplements not only in French but also in English translation. Furthermore, the information provided in the Diploma Supplement concerning the graduates' skills and competencies should be enhanced. (FA 02)

For the Bachelor programmes in Electrical Engineering and Electromechanical Engineering

E 4. (ASIIN 1.3) It is recommended to include aspects ~~in~~ of High Frequency Engineering, Antennas and Microwaves, and Electromagnetics into the curriculum of the Electrical Engineering programme. (FA 02)

E 5. (ASIIN 4.3) It is recommended to constantly further develop the laboratory equipment in order to increase the independency from external institutions.

H Decision of the Accreditation Commission (20.09.2019)

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

The Accreditation Committee discusses the procedure and agrees with the positive assessment of the peers and the Technical Committees.

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

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

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

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

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Diploma in Electro-mechanical Engineering	With requirements for one year	EUR-ACE	30.09.2024
Diploma in Electrical Engineering	With requirements for one year	EUR-ACE	30.09.2024
Diploma in Informatics Engineering	With requirements for one year	Euro-Inf	30.09.2024

Recommendations

For all degree programmes

E 1. (ASIIN 4.2) It is recommended to enhance the research opportunities for staff members.

E 2. (ASIIN 2.1) It is recommended to further expand the international co-operations and mobility options.

E 3. (ASIIN 5.2) It is recommended to provide Diploma Supplements not only in French but also in English translation. Furthermore, the information provided in the Diploma Supplement concerning the graduates' skills and competencies should be enhanced.

For the Bachelor programmes in Electrical Engineering and Electromechanical Engineering

E 4. (ASIIN 1.3) It is recommended to include aspects of High Frequency Engineering, Antennas and Microwaves, and Electromagnetics into the curriculum of the Electrical Engineering programme.

E 5. (ASIIN 4.3) It is recommended to constantly further develop the laboratory equipment in order to increase the independency from external institutions.

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Informatics Engineering:

Formation : **Computer Science Engineering**

PrivateSchool of Engineering (EPI)

The formation in computer engineering refreshes a set of advices to orientation and perfection :

- The total number of members : 8
- The representants of the economic world 'number:3
- The frequency of meetings : 2up to 4 in a semester

1. Job references :

The purpose of the formation in computer engineering in EPI is to build the future engineers in a way to become able to handleprojects in the fields of software development , administration and network security. The orientation in computer engineering is about two options :

- **Software Engineering :**The purpose of this option is to formengineersthat are able to conseive and construct software solutions that are innovativeincluding the needs of the entreprise. Throughouttheir formation, the engineerslearn the transverse competencesrelated to the commend of a project in computer science, job competences as well as the deepmethodologies in the software engineering such as: Project management IT ; Methodologies of development (Agile, SCRUM, RUP, etc...) ; Web and mobile Development ; components engineering, software architecture and modals; Interractionof Man and machines, user experienceand the information visualisationand the Analysis of the big data volume.
- **Systems and network engineering :**This option enablesengineers to contribute to the wellfunctioning and to improving computer systems. Their mission consists of managing the computer means, assumingthe surveillanceof a network and the information'ssecurity. Theybringatechnical assistance to the groups of production or studyand to the users to optimise the treatments and the computer systems. The systems have to alsoprovide a permanent technologicalsafetyin order to anticipate the bigevolutions of systems and networks and in the samepurpose ; to keepregular relations with

1

software constructors and editors. The journeyof «Networks and systems Engineering » is a complete programmethatallowsengineers to conceive, position, configurateand to guarantee the maintenance of entreprises networksand to administrate networks and implementsecurity solutions, depending on the norms and standards.

- In the field of formations and training « computer engineers » in Tunisia, the EPI offerismarked by :
- Itsapproprietness to the companies' needs ;
- Its orientation towards the professional practice ;
- The higheramount of supervision ;

2. Competences :

The EPI formation enablesstudents to apprehend the complexproblemsthatwillbetheir future missions. This formation ischaracterised by the imbricating a basic scientific formation,itis a formation thatisspecialised in the computer engineering fields and the transverse formation. It is open to entreprises includingoriented modules towards the project management, conferencesvisits, twointernships of twomonths in an entreprise in the 3rd and 4th years and a final project in the 5th year. .

3. The basic competences :

- Ability to mobilise the resources of a large field of fondamental sciences
- Knowledge and comprehension of a scientific and technicalfield of te speciality
- Mastery of the methods and tools of the engineer : identification and resolutionof problems, even the unfamiliar and the non defined, collecte and data interpretation, use of computer tools, analysis and conception of complexsystems, experimentation.
- Ability to beintegrated in an organisation, engagement and leadership, management of projets.
- ConsideringEconomic and industrialissues:competitiveness and productivity, innovation, intellectual and industrialproperties, respect of quality and securityprocedures.
- Ability to work in an international context, mastery of manyforeignlanguages, cultural openness .

a. The competences of the software engineering

- **Software engineering :** Based on the conception and the modelling of the future application, the engineer of the engineering software specialityhas to have the analysiscompetence of the user needs to accomplish the specificationsbeforeimplementing the suggested solutions. Competence in the mastery of developing cycles of SIlean. Not forgetting the most important statements : Conception, implementation, tests, documentation and maintenance.
- **Programmation :** programmation is at the veryheart of the software engineering job (production of code linesfollowing the functional and technicalspecifications). An essential competence in the resolution of problems, the advancedalgorithm, the complexityof algorithmsand the mastery of differentlanguages of programmation (C, C++, Java, C#, Python, etc.)
- **Data base conception :** a conception in the conception and administration of data base. The engineerconceive manages and directs the management of data base systems; itguaranteescoherence, quality, the security and permanent accessibility of information.
- **Web and mobile development :** A competencethatcanbedefined in two main types of realization: Coding a websiteand conceiving a downloadable mobile application on a smartphone. It implies a hugerigor, a listeningability and a comprehension as well as a continuous adaptation to technologyevolutions and client needs.

b. The competences of the engineering speciality : systems and network :

- **Administration of systems :** Competencein the systems' administration insuring the functioning and exploitation of one or manymaterials or softwares (tools, networks, data base, messages, etc.) of the entreprise or a company .keepingcoherence, the accessibility of information.
- **Network administartion :** Competencesin the administration of entreprises' networks in all the fields, in the PME, the big entreprises, the administrations, telecommunicationcompanies, lthe SSII.With the analysiscapacity, to

configurate and implementing a materialistic and software of an entreprise network following the associateduseful topologies. Large understanding of the basic network components and theirprinciples and theircharacteristics.

- **Networks security and audit** : implementingsecurity solutions followingthe normsand standards. Insuringsecurity, safety and the permanence of systems, information networks and communication at the level of a set or a particular system. A technical dimension necessitates a diagnisisbeforesuggestingsecurityprocedures.This diagnosisenables the entreprise direction to beconscious of the security gaps as well as the decisions.

The following **curriculum** is presented:

3rd Year - Common Core

Module	Subject	C/TD (per week)	TP(per week)	Coef	Credit	Credit Module
	Mathematics for Engineering 1	1,5	0	1,5	3	
	Mathematics for Engineering 2	1,5	1,5	3	3	8
Math.	Inferential statistics	1,5	0	1,5	2	
	Complexity of algorithms and graphs	3	0	3	3	
	Programmation C	0	3	3	3	9
Algo. and programmation	Advanced Algorithms	3	0	3	3	
	Object-oriented programming	1,5	3	4,5	5	
	Advanced Web Development	0	3	3	4	13
Object and Web programming	Web Development & Multimedia	0	3	3	4	
	SGBD	1,5	1,5	3	3	6
Databases	Databases	1,5	1,5	3	3	
	Network technology	1,5	1,5	3	3	
	Network fundamentals	1,5	1,5	3	3	9
Systems and Networks	Advanced operating systems	1,5	1,5	3	3	
	Compilation	1,5	1,5	3	3	5
Architecture and compilation	Synthesis and numerical functions	1,5	0	1,5	2	
	French 1	1,5	0	1,5	2	
	French 2	1,5	0	1,5	2	
	English 1	1,5	0	1,5	2	10
	English 2	1,5	0	1,5	2	
Langages	Mini Project	0	1.5	1.5	2	
	TOTAL	**28,5**	**24**	**52.5**	**60**	**60**
	TOTAL in percent	**54%**	**46%**			

4th Year - Software Engineering

Module	Subject	C/TD	TP	Coef	Credit	Credit Module
	Software engineering	1,5	0,75	2,25	2	10
	Object Modeling Language (UML)	3	0,75	3,75	4	
	Software Architecture & Design Patterns	0	1,5	1,5	2	
GL	Agile and Hybrid Methodologies	1,5	0	1,5	2	
	Operational Research and Optimization	1,5	0	1,5	2	5
IA	Artificial intelligence	1,5	1,5	3	3	
	Java EE	0	3	3	3	11
	Development .Net (C#)	**0**	**3**	3	3	
Advanced Programming	Advanced OO programming	1,5	3	4,5	5	
	Hybrid Mobile Development (Angular)	0	3	3	3	6
Mobile Development	Native mobile development 1 (Android)	0	3	3	3	
	Web Development Frameworks	0	3	3	3	5
Web Development	Event programming (Symfony)	0	1,5	1,5	2	
	Distributed Systems	1,5	0	1,5	2	7
	Advanced Systems and Architectures	1,5	0	1,5	2	
Advanced systems	Database Administration	1,5	1,5	3	3	
	Communication techniques	1,5	0	1,5	2	6
	Personal development	1,5	0	1,5	2	
Personnal Development	entrepreneurship	1,5	0	1,5	2	
	English 3	1,5	0	1,5	2	4
Langages	English 4	1,5	0	1,5	2	
Traineeship	PFA	0	3	3	6	6
	TOTAL	**16,5**	**25,5**	**42**	**60**	**60**
	TOTAL in percent	**39%**	**61%**	**100%**		

4th year - Systems and Networks Engineering

Module	Subject	C/TD	TP	Coef	Credit	Credit Module
	Software engineering	1,5	0,75	2,25	2	6
GL	Object Modeling Language (UML)	3	0,75	3,75	4	
	Artificial Intelligence	1,5	1,5	3	3	5
IA	Operational Research and Optimization	1,5	0	1,5	2	
	Programming Frameworks 1	0	3	3	3	8
Programming	Advanced OO programming	1,5	3	4,5	5	
	Hybrid mobile development (Angular)	0	3	3	3	5
Hybrid development	Event programming (Symfony)	0	1,5	1,5	2	
	Systems Administration	0	3	3	3	6
Cloud	Virtualisation & Cloud Computing	1,5	1,5	3	3	
	Distributed Systems	1,5	0	1,5	2	7
	Advanced Systems and Architectures	1,5	0	1,5	2	
Advanced sysems	Database Administration	1,5	1,5	3	3	
	Wireless networks	1,5	0	1,5	2	7
	Preparation for CCNA Part 1	1,5	1,5	3	3	
networks	Protocols engineering	1,5	0	1,5	2	
	Communication techniques	1,5	0	1,5	2	6
	Personal development	1,5	0	1,5	2	
Personal Development	Entrepreneurship	1,5	0	1,5	2	
	English 3	1,5	0	1,5	2	4
Langages	English 4	1,5	0	1,5	2	
Traineeship	PFA	0	3	3	6	6
	TOTAL	**27**	**24**	**51**	**60**	**60**
	TOTAL in percent	**53%**	**47%**	**100%**		

5th Year - Software Engineering

Module	Subject	C/TD	TP	Coef	Credit	Credit Module
Advanced Development	Advanced user interfaces	0	1,5	1,5	2	7
	Advanced .NET Development (ASP MVC)	0	1,5	1,5	2	
	Native mobile development 2 (iOS)	0	3	3	3	
ERP & Security	ERP & CRM	0	1,5	1,5	2	8
	Information Systems Security	1,5	1,5	3	3	
	SOA and Cloud	0,75	1,5	2,25	3	
Data Science	Big Data	1,5	1,5	3	3	9
	Business Intelligence	1,5	1,5	3	3	
	technological watch	0,75	1,5	2,25	3	
Personal Development	Labor Law and Engineering Ethics	1,5	0	1,5	2	6
	Finance for engineers	1,5	0	1,5	2	
	Team animation and leadership	1,5	0	1,5	2	
Traineeship	End of Study Project			10	30	30
	TOTAL	**10,5**	**15**	**35,5**	**60**	**60**
	TOTAL in percent	**41%**	**59%**	**100%**		

5th year - Systems and Networks Engineering

Module	Subject	C/TD	TP	Coef	Credit	Credit Module
Networks & Technologies	Networks new generations	1,5	0	1,5	2	7
	networks and access technologies	0	1,5	1,5	2	
	Preparation for CCNA Part 2	1,5	1,5	3	3	
Administration & security	Evaluation of performances	0	1,5	1,5	2	8
	Network Services Administration	0	3	3	3	
	Network Security and Audit	1,5	1,5	3	3	
Programming& Big Data	Big Data	1,5	1,5	3	3	8
	Programming Frameworks 2	0	3	3	3	
	technological watch	0	1,5	1,5	2	
Personal Development	Labor Law and Engineering Ethics	1,5	0	1,5	2	7
	Finance for engineers	1,5	0	1,5	2	
	Team animation and leadership	1,5	0	1,5	3	
Traineeship	End of Study Project			10	30	30
	TOTAL	**9**	**13,5**	**32,5**	**60**	**60**
	TOTAL in percent	**40%**	**60%**	**100%**		

According to the Self-Assessment Report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Electrical Engineering:

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

• The Systems Analysis and Architecture Laboratory (LAAS), Toulouse - France.

• The Franche-Comté Institute Electronique Mécanique Thermique et Optique - Science and Technology, FEMTO-ST, UMR 6174, Besançon - France.

• Research Center in Acquisition and Treatment of Image for Health (CREATIS), CNRS Unit UMR 5220 - INSERM U1206 - University Lyon 1 - INSA Lyon - Jean Monnet University Saint-Etienne - France

• ESIEA: School of Engineers of Paris - France

• Embedded Systems and Electronics Research Institute IRSEEM, EA 4353, ESIGELEC, Rouen - France.

• MONS University in Belgium

Among the industrial groups that the EPI-Polytec electrical engineer can integrate, we quote:

• Electronic, professional and consumer systems, embedded systems, integrated circuit design,

• Information technology, telecommunications equipment, network operators.

• Biomedical instrumentation: The maintenance of medical instruments including autoclaves, scanners, ultrasounds, ...

• Medical robotics and e-health

• The automobile, aeronautics and electric traction.

• Textile industries

Repositories of skills

The Electrical Engineering Department of EPI-Polytec provides engineering training in Electrical Engineering which enables engineering students to grasp the complex problems that will constitute their future missions. This training is characterized by the imbrication of a basic scientific training, a specialized training in the fields of Electrical Engineering and cross-training. The training offered collaborates with the socio-economic sector by including modules oriented towards entrepreneurship, visits of industrial companies and dedicated industrial conferences, two internships of one month in company in 3rd and 4th year and a project of end of 5th year industrial studies. Thus the training provided is divided into three phases:

The first is a common core course that lasts two years and is reserved for the acquisition of theoretical and practical knowledge and skills in the fields of Analog and Digital Electronics, Electronics Embedded Systems, Power Electronics , Electrotechnics, Automation, Automation, Industrial Computing and Telecommunications.

The second is a specialization phase that lasts one semester and where the student is oriented to one of the following three options:

- Embedded networks and systems

- Biomedical instrumentation

- Industrial control

The third phase is the preparation of a graduation project generally of an industrial nature

- **Basic skills**

• Knowledge and mastery of engineering methods and tools: identification and problem solving, data collection and interpretation, use of computer tools, analysis and design of complex systems, experimentation.

• Ability to integrate into an organization, commitment and leadership, project management and organization of events.

• Knowledge of company management procedures, including legal texts, etc.

• Taking into account industrial, economic and professional issues: competitiveness and productivity, innovation, intellectual and industrial property, compliance with quality procedures, safety.

• Openness to foreign countries: mastering foreign languages, economic training, knowledge of exchange protocols with foreign countries.

The skills of the specialty Electrical Engineering

Electrical engineering and power electronics

The student is supposed to acquire knowledge about alternating current, three-phase systems, AC / AC conversion via single-phase and three-phase transformers, DC electrical machines constitution, principle of operation, generator operation and operation as a motor, the synchronous machine and its operation in motor and alternator for the production of electricity. Finally the operation of the asynchronous machine in motor and generator as well as some specific asynchronous motors. The study of electrical networks and machines is accompanied by components of diagrams and electrical installations and starting of electric motors.

Power electronics will have the mission of activating the control of electrical machines through the synthesis of static converters (chopper, inverter, dimmer, rectifier and transformer) and the design of control and power circuits. These circuits based on power components can be useful for the exploitation of renewable energies of the solar, wind, etc. type.

Electronics

The goal is to acquire the skills in analog and digital electronics in order to have the ability to analyze, design and implement electronic circuits for dedicated applications. To satisfy this the student is required to understand the operation and to use the linear and non-linear components (diodes, transistors) in the electronic circuits as well as the actual operational amplifiers and the different types of filters and the different oscillator structures. In addition, he is also required to have knowledge of integrated circuit manufacturing technologies including TTL technology and CMOS technology. He must know about programmable circuits such as memories and complex programmable circuits. In the numerical part, it is necessary to master the combinational and sequential logical functions and circuits as well as the embedded circuits of the SOC, FPGA type, the ARAM processors and the VHDL synthesis for the design of CPLDs, FPGAs and ASICs.

Automatic and informatic industrial

Students must acquire certain skills in analysis and synthesis of continuous industrial processes in order to satisfy certain performances in terms of accuracy, speed, stability, robustness, etc. on the behavior of these processes. These achievements will aim to design and implement the best control strategy with digital or analog systems. The control of continuous systems is combined with the ability to analyze, design and implement logical systems consisting of discrete electronic components, specific electronic circuits, programmable electronic components, PLCs (Programmable Logic Controllers) and their programming tools. Finally, the combination of continuous and discrete systems leads to so-called hybrid systems or discrete events that must be analyzed, designed and implemented their order. This component works with electronics for control circuit design and power electronics for power circuits.

Signal and Image Processing

In addition to applications related to the processing and transmission of information, the signal and image processing are of direct use in Biomedical Engineering, one of the options of our Electrical Engineering training. Thus the student will acquire skills related to the acquisition, analysis and processing of the signal, in analog form or in digital form. Mastery of the main usual mathematical functions of signal processing such as power, energy, spectrum, spectral density, correlation, sampling and modulation as well as transmission in both the analog domain and the digital domain. For the image the candidate will have to master two aspects the first one is interested in the image in a general way and

concerns the digital images in vectorial or matrix form where one is interested in the filtering, the enhancement and the restoration , segmentation, ... The second aspect concerns the medical image that touches the X-ray and the scanner.

OPTIONS

Biomedical Instrumentation

The future engineer Electrical Engineering option biomedical instrumentation will know general information about biology, anatomy, neurophysiology and physiology, biophysics and atomic and nuclear physics and combine the knowledge acquired in common core to master knowledge about to biomedical engineering. Thus he will have to know the principles and methods of choosing a medical device as well as the management and safety standards of medical equipment. He will have to master the maintenance of the electronic circuits of the various medical equipments such as the X-ray systems, the scanners, the MRI and the gamma cameras as well as the apparatuses of laboratory and automatons in the departments of biochemistry, hematology, biology etc. ... He will also be able to analyze medical imaging systems such as scintigraphy and gamma cameras, ultrasound and ultrasound and magnetic resonance imaging. It must be able to develop innovative technological care solutions by applying information and communication technologies (ICT) to all health-related activities. He must master the concepts of E-health, M-Health and telemedicine. He is required to become familiar with the electronics of nuclear equipment, including Cobalt units60, linear accelerators and clinical dosimetry systems. The candidate will have extensive training in medical robotics including handling and micromanipulation in medical settings as well as safety, assistance with manipulation, rehabilitation, movement and surgical robotics.

Embedded systems

The future engineer Electrical Engineering option Embedded systems will have extensive knowledge in mobile development through the knowledge of Android programming, its development platform and the specificities of smartphone embedded development, the conception of artificial vision systems, Advanced coding information, advanced VHDL synthesis for the design of CPLDs, FPGAs and ASICs, SoC design methodologies and their applications based on new generations of programmable FPGA circuits, ARM processors and applications, sensors intelligent architectures and applications of embedded systems and Radio Frequency Identification (RFID) systems.

Industrial Control

The future engineer Electrical Engineering option industrial control will be able to design the control strategy of any industrial system including electrical machines and mechatronic systems and using the latest techniques and tools by developing mobile applications dedicated to the supervision of industrial systems. Thus it will have to master tools such as industrial sensors and actuators, variable speed drives, classical and intelligent control strategies, Programmable Logic Controllers (PLC), diagnostic and safety methods of operation as well as industrial maintenance techniques. In addition, he is required to know the sources of energy used in order of the systems in particular the renewable energies (Aeolian, solar, ..) and the smartsgrids. Knowledge is complemented by training in production analysis and management for scheduling and scheduling in addition to the required quality management skills to provide a simple and practical answer to the requirements of the ISO standard.

The following **curriculum** is presented:

3rd yearEngineerElectrical Engineering

Subjects	Courses	TP	Coefficient	Credit
Electrotechnical 1	22,5	12	3	3
Electrotechnical 2	22,5	12	3	3
electricalschemes	21	18	3	3
Electrical installation and equipment	09	21	2	2
Total Module:ElectricalSystems	**75**	**63**	**11**	**11**
Automatic 1	22,5	12	3	3
Automatic 2	22,5	12	3	3
Signal processing 1	22,5	12	3	3
Signal processing 2	21	09	2	2
Total Module:Signals and Systems	**88,5**	**45**	**11**	**11**
Analogue electronics 1	22,5	12	3	3
Analogue electronics 2	22,5	12	3	3
Combinatorial and sequentiallogic	22,5	12	3	3
Electrical circuits	21	12	3	2
Total Module:ElectronicDevices	**88,5**	**48**	**12**	**11**
Operating system	21	12	3	3
C ++ Object OrientedProgramming	21	09	2	2
Microprocessor and assemblerprogramming	21	15	3	3
CAO	0	21	2	2
Total Module: Computer Systems	**63**	**66**	**10**	**10**
Probability and statistics	21	0	2	2
Mathematics for the engineer	39	0	3	3
Numericalanalysis	21	0	2	2
Total Module:Mathematics	**81**	**0**	**7**	**7**
English 1	21	0	2	2
French 1	21	0	2	2
English 2	21	0	2	2
French 2	21	0	2	2
Mini Project	0	21	2	2
Total Module : Langages	**84**	**21**	**10**	**10**
Total	**480**	**243**	**61**	**60**

4th yearEngineerElectrical Engineering

Subjects	Courses	TP	Coefficient	Credit
Synchronous machines	30	0	2	2
Asynchronous machines	21	12	3	2
Power electronics 1	22,5	12	3	2
Power electronics 2	21	12	3	2
Total Module:ElectricalSystems	**94,5**	**36**	**11**	**8**
Industrial automation and API	22,5	12	3	3
SystemsAnalysis and Control	21	09	2	2
microcontrollers	21	12	3	2
robotics	21	0	2	2
Total Module:Automatic	**85,5**	**33**	**10**	**9**
Object OrientedProgramming (JAVA)	21	09	2	2
Operationalresearch	21	0	2	2
PFA	0	33	3	3
Total Module : Info	**42**	**42**	**7**	**7**
Image processing	21	12	3	3
Signal transmission	21	09	2	2
Interfacing techniques	21	12	3	3
Instrumentation and sensors	21	09	2	2
Total Module : Signals	**84**	**42**	**10**	**10**
Integrated circuit technology	21	0	2	2
Programmable circuits	21	0	2	2
DSP: Architecture and Programming	21	12	3	3
Technology and VHDL synthesis	21	12	3	3
Total Module: Electronics	**84**	**24**	**10**	**10**
Communication techniques 1	21	0	2	2
Communication techniques 2	21	0	2	2
English 3	21	0	2	2
English 4	21	0	2	2
Total Module : Langages	**84**	**0**	**8**	**8**
Entrepreneurship 1	21	0	2	2
Entrepreneurship 2	21	0	2	2
Labor Law and Engineering Ethics	21	0	2	2
HRM	21	0	2	2
Total Module : Entrepreneurship	**84**	**0**	**8**	**8**
Total	**558**	**177**	**64**	**60**

5th yearElectricalEngineering: Embedded Networks and Systems Option
Semester 1

Subjects	Courses	TP	Coefficient	Credit
Mobile development	12	21	2	3
Artificial and Industrial Vision	21	21	3	3
Advanced coding of information	21	21	3	3
Total Module: Theory of Information and Embedded Systems Applications	**53**	**63**	**8**	**9**
Advanced VHDL: Architecture and Simulation	12	21	2	3
PrototypingSOCs on FPGAs	21	21	3	3
Total Module: Digital Systems	**33**	**42**	**5**	**6**
ARM processors and applications	21	21	3	3
Smart sensors	12	21	2	2
RFID: Radio Frequency Identification	21	12	2	2
Total Module: Architecture and Design of ElectronicSystems	**54**	**54**	**7**	**7**
Linux for embeddedsystems	21	21	3	3
Embedded systems: architectures and applications	21	21	3	3
Total Module: Introduction to Embedded Systems and Real Time Systems	**42**	**42**	**6**	**6**
Total Module:Quality Management	**21**	**0**	**1,5**	**2**
Total	**203**	**201**	**27.5**	**30**

5th yearElectricalEngineering: Embedded Networks and Systems Option
Semester 2

Subjects	Courses	TP	Coefficient	Credit
End of study Project			10	30

5th yearElectricalEngineer: Option Biomedical Instrumentation
Semester 1

Subjects	Courses	TP	Coefficien	Credits
Equipment maintenance	42	21	4,5	4
Biomedical instrumentation	21	21	3	3
MedicalRobotics	21	21	3	3
Sterilization, safety and standards	21	0	1,5	2
Total Module : Instrumentation	**105**	**63**	**12**	**12**
E-Health	42	21	4,5	3
Medical imaging techniques	42	21	4,5	4
Electronics and nuclear instrumentation	21	21	3	3
Qualitology and Computer Aided Maintenance Management	21	0	1,5	2
Total Module:Medical Technologies	**126**	**63**	**13,5**	**12**
Anatomy, Physiology and Neurophysiology	21	0	1,5	2
Biophysics and atomic and nuclearphysics	21	0	1,5	2
Biology	21	0	1,5	2
Total Module:Medical Sciences	**63**	**0**	**4,5**	**6**
Total	**294**	**126**	**30**	**30**

5th yearElectricalEngineer: Option Biomedical Instrumentation
Semester 2

Subjects	Courses	TP	Coefficien	Credits
End of study Project			10	30

5th yearElectricalEngineering:Industrial Control Option
Semester 1

Subjects	Courses	TP	Coefficient	Credit
Control of electrical machines	21	18	3	3
Renewable Energies and Smart Grids	21	18	3	3
Speed variators	21	18	3	3
Total Module: Machine Control	**63**	**54**	**9**	**9**
Techniques and methods of industrial maintenance	21	12	2	2
Diagnosis and safety of operation	21	12	2	2
Total Module: System Maintenance	**42**	**24**	**4**	**4**
Control of industrial systems by API	21	18	3	3
Modeling and control of mechatronicsystems	21	12	2	2
Smart controls	21	12	2	2
IndustrialSensors and Actuators	21	9	2	2
Total Module:Systems Control	**84**	**51**	**9**	**9**
Analysis and management of production	21	9	2	2
quality management	21	0	1,5	2
Total Module:IndustrialProcess Management	**42**	**9**	**3,5**	**4**
Total Module: Internet of Things and Mobile Development	**21**	**18**	**3**	**4**
Total	**252**	**156**	**28.5**	**30**

5th yearElectricalEngineering:Industrial Control Option
Semester 2

Subjects	Courses	TP	Coefficient	Credit
End of study Project			10	30

According to the Self-Assessment Report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Electromechanical Engineering:

Electromechanic Engineering

In The international multi-disciplinary school EPI, the electromechanics engineer acquires a formation that includes the fondamental aspects, the recent up dates and insights to electricity and mechanics.

It guarantees the conception and the testing of equipments in diverse fields such as ; energy, aeronautics,production, computer science, biomedicals, robotics etc...

The fields of implicating the polyvalent engineer covers a large set of professional activities :

- Mastery of the necessary tools of production and the development of the electromechanic system.
- Leading the projects that integrate the realization, analysis of systems in the economic and industrial areas.
- Managing and mobilising the humain resources and the average materials.
- Compulsory possession of a set of technical, economic , social knowledge...
- Therefore, the engineer is invited to :
- Estimate the manufacturing costs,
- Control of manufacturing, assembling, the checkingand the maintenance of products.
- To watch the assembling of prototypes and the manufacturing, the testing and installation of of devices in the purpose of reaching a high quality of manufacturing.
- To write up the evaluation guide of the functioning and the maintenance des installations.

Controlling whether the product is up to the security norms and the quality as well as the technical specifications.

Competences : What are the competences needed and developed through the formation ?

The electromechanic engineering departement in EPI focuses on a multi-disciplinary formation of engineers in the fields of mechanics and electrics. The objective here is the aquisition and the mastery of the theoretical knowledge as well as the practicle.

After a solid basic formation in the electromechanic engineering acquired during the four first semesters, the students choose between three fields :

- Automatics and mechatronics .
- Aeronautics.
- Industrial Maintenance.

After finishing a semester of his chosen field of studies, the student masters his formation a final personal project during a semester in the industry.

With the basic formation competences (Mathematics, computer science, Language, HR management, Entrepreneurship, human rights, ...), we find the the competences in the mechanic fields (Mechanics of fluids, Mechanics of solids, mechanics of continuous fields, Materials and structures, Materials Resistance, Mechanics of vibrations, Thermals, Thermal machines , Mechanic Conception, CAC, Metallic Structures and soldering procedures, Techniques of production andTMNC, Hydraulic and pneumatic Systems, ...); the electrics (electricity circuits, Electrotechnics, Automatics, Signal treatment, Robotics and micro controller, machines command , ...) and the industrial (Quality - Certification – Norms, Organization and management of Production, ERP / CAPM, Lean manufacturing, Control andreliability/CAPM, maintenance tools, safety of the industrial installation,...).

The basic competences :

- Mastery of an application approach of a set of concepts and techniques of applied science.
- Mastery of an application approach that is based on the notions of the fondamental sciences that are important in engineering
- Mastery of the conception procedures of equipments and procedures.
- Developing the intellectual abilities linked to research and innovation, knowledge of the the techniques of prevention and maintenance
- manifestation of the professional ethics and communication;
- ability to show creativity and being innovative;
- Awarness of the impact of technology;
- acquisition of the basic skills in the manipulation of equipments
- ability to be integrated in an organisation, engagement and leadership, management of projets.

- Ability to work in an international context : mastery of many foreign languages, economic formation, cultural openness.

The competences of the electromechanics engineering

Mechanics

Study competences, in the dimensioning and choice of machines devices , industrial installations and products. Conception of architecture, the mechanical assembling of a systemand the continuity of its realization. Manufacturing prototypes, resolution of technical problems proceeding with computer simulations.

Electrics

Competences in the field of Electrics, Electronics in the basic methods for analysis, the conception, the simulation, the command and diagnosisof electrical systems. Capacity of modelling a multi-physical systemintegrating actuators' sensors and their commands. Capacity to choose and implement the best strategy of command with analogic and digital systems. Capacity of defining and optimising the command in terms of precision, rapidity, stability, robustness, etc. Capacity of analysis, conception, implementinglogical systems constituted by electronic components , specific electronic circuits, industrial computerised systems, Programmable industrial Automatons.

The industrial :

Animation of the collective work, planing and organisingthe production systems, assuringthe quality of management, maintenance of the liability and the safety of industrial equipements, animation of Workshops and assembling the certification files.

The following **curriculum** is presented:

3rd year

Modules	Subjects	Codes	Semester1 courses	Semester1 TP	Semester1 Coef	Semester 2 Courses	Semester 2 TP	Semester 2 Coef	Credit module
Math	Mathematics for the engineer	GELM 3 17	3		3				3
	Proba. & Stat.	GELM 3 19	1,5		1,5				2
Mechanical 1	Materials & Structures	GELM 3 12	1,5	0,75	2,25				3
	Fluid mechanics	GELM 3 11	3		3				3
	MMC	GELM 3 28	3		3				3
	Thermal 1	GELM 3 20	1,5		1,5				2
Electric 1	Algorithms and C programming	GELM 3 10	1,5	0,75	2,25				3
	Electrical circuits	GELM 3 12	1,5	1,5	3				3
	electrotechnical	GELM 3 13	1,5	1,5	3				3
Transversal 1	English 1	GELM 3 16	1,5		1,5				2
	French 1	GELM 3 14	1,5		1,5				2
Mechanical 2	Thermal 2	GELM 3 20				1,5		1,5	2
	Mechanical study office	GELM 3 27					1,5	1,5	2
	RDM 2	GELM 3 21				3		3	3
Design & Manufacturing1	Manufacturing processes	GELM 3 25				1,5	1,5	3	3
	CAD1	GELM 3					1,5	1,5	2
	Mechanical design 2	GELM 3 18				1,5		1,5	2
	Metal structures and welding processes	GELM 4 27					1,5	1,5	2
Electronics 1	Analog electronic	GELM 3 31				1,5	1,5	3	3
	Signal processing	GELM 3 22				1,5	0,75	2,25	3
Industrialisation1	Quality - Certification - Standards	GELM 3 30				2,25		2,25	3
	PPE	GELM 3 26					1,5	1,5	2
Transversal 2	English 2	GELM 3 29				1,5		1,5	2
	French 2	GELM 3 23				1,5		1,5	2
		Tot.	21	4,5	25,5	15,75	9,75	25,5	60

4th year

Modules	Subjects	Codes	Semester1 Courses	Semester1 TP	Semester1 Coef	Semester 2 Courses	Semester 2 TP	Semester 2 Coef	Credit module
Automatic & Elec. Syst.	Servoing and regulation	GELM 4 11	1,5	1,5	3				3
	CAD Electrical Systems	GELM 4 13		1,5	1,5				2
	Modeling and management of electrical networks	GELM 4 16	3		3				3
Design & Manufacturing2	Manufacturing analysis	GELM 4 29	1,5	1,5	3				3
	CAD2	GELM 4		0,75	0,75				2
	Mechanical design 3	GELM 3 24	1,5		1,5				2
Mechanical 3	Mechanics of solids	GELM 4 17	3		3				3
	Thermal machines	GELM 4 20	1,5		1,5				2
Industrialisation2	Organization and Production Management	GELM 4 18	2,25		2,25				3
	Control and reliability / CAMM	GELM 4 14	1,5	1,5	3				3
Transversal 3	English 3	GELM 4 15	1,5		1,5				2
	Communication techniques 1	GELM 4 19	1,5		1,5				2
Automatic & Robotics	Programmable controllers	GELM 4 22				1,5	1,5	3	3
	Robotics and Micro controller	GELM 4 23				1,5	1,5	3	3
Mechanical 4	Mechanical vibration	GELM 4 26				3		3	3
	Hydraulic and pneumatic systems	GELM 4 25				1,5	1,5	3	3
	Production techniques and CAF	GELM 4 31				1,5	1,5	3	3
Industrialisation3	Lean manufacturing	GELM 4				1,5		1,5	2
	ERP et GPAO	GELM 4					1,5	1,5	2
	PFA	GELM 4 28					3	3	4
Transversal 4	Communication techniques 2	GELM 4 30				1,5		1,5	2
	English 4	GELM 4 24				1,5		1,5	2
	entrepreneurship	GELM 4 33				1,5		1,5	3
		Tot.	18,75	6,75	25,5	15	10,5	25,5	60

5 EM Option: Automatic and Mechatronics

					Semester 1			Semester 2			
Modules	**Subjects**	**Codes**			**Courses**	**TP**	**Coef**	**Courses**	**TP**	**Coef**	**Credit module**
Mechatronic elements	General Mechatronics	IEAM	5	19	1,5	1,5	3				**3**
	sensor theory	IEAM	5	20	1,5		1,5				**2**
	Analysis of robotic systems	IEAM	5	13	1,5		1,5				**3**
	Theory of mechanisms	IEAM	5	16	3		3				**3**
Automation & Controls	Numerical modeling	IEAM	5	10	1,5	1,5	3				**3**
	Software for the automatic	IEAM	5	15	1,5	1,5	3				**3**
	Modeling, Identification and Monitoring	IEAM	5	12	3		3				**3**
	Machine control	GELM	4	32	1,5	1,5	3				**3**
Transversal 5	entrepreneurship	IEAM	5	11	1,5		1,5				**3**
	HRM	IEAM	5	14	1,5		1,5				**2**
	Labor law	IEAM	5	22	1,5		1,5				**2**
Industrialisation4	End of study Project	IEAM	6	30						10	**30**
			Tot.		19,5	6	25,5			10	60

5 EM Option: aeronautics

					Semester 1			Semester2			
Modules	**Subjects**	**Codes**			**Courses**	**TP**	**Coef**	**Courses**	**TP**	**Coef**	**Credit module**
Elements of Aeronautics	Flight mechanics	AERO	5	12	3		3				**3**
	General Avionics	AERO	5	20	1,5		1,5				**2**
	Aerodynamic	AERO	5	16	1,5		1,5				**2**
	Theory of radars	AERO	5	21	1,5		1,5				**2**
	aeroacoustics	AERO	5	17	1,5		1,5				**2**
Aero mechanics	Turbulence	AERO	5	18	1,5		1,5				**2**
	Combustion	AERO	5	19	1,5	1,5	3				**3**
	turbomachinery	AERO	5	13	1,5	1,5	3				**2**
	Thermal modeling	AERO	5	10	1,5	1,5	3				**3**
	Structural mechanics	AERO	5	15	1,5		1,5				**2**
Transversal 5	entrepreneurship	AERO	5	11	1,5		1,5				**3**
	HRM	AERO	5	14	1,5		1,5				**2**
	Labor law	AERO	5	22	1,5		1,5				**2**
Industrialisation4	End of study Project	AERO	6	30						10	**30**
			Tot.		21	4,5	25,5			10	60

5 EM Option : Industrial maintenance

					Semester 1			Semester 2			
Modules	**Subjects**	**Codes**			Courses	TP	Coef	Courses	TP	Coef	Credit module
Elements of Mechanical Maintenance	Maintenance tools	GEMI	5	19	3		3				**3**
	Repair techniques	GEMI	5	12	1,5	1,5	3				**4**
	NDC	GEMI	5	10	1,5	1,5	3				**3**
	Optimization of production systems	GEMI	5	15	3		3				**3**
Elements of electrical Maintenance	machine control	GEMI	5	18	1,5	1,5	3				**3**
	Safety of industrial installations	GEMI	5	13	3		3				**4**
	Automatic in real time	GEMI	5	16	1,5	1,5	3				**3**
Transversal 5	entrepreneurship	GEMI	5	11	1,5		1,5				**3**
	HRM	GEMI	5	14	1,5		1,5				**2**
	Labor law	GEMI	5	22	1,5		1,5				**2**
Industrialisation 4	End of study Project	GEMI	6	30						10	**30**
			Tot.		19,5	6	25,5				60