



ASIIN Seal & European Labels

Accreditation Report

Bachelor's Degree Programmes

Mechanical Engineering

Industrial Electronics and Automation Engineering

Master's Degree Programme

Industrial Engineering

Provided by

Universitat de Lleida (University of Lleida), Spain

Table of Content

A About the Accreditation Process.....	3
B Characteristics of the Degree Programmes	5
C Peer Report for the ASIIN Seal	7
1. The Degree Programme: Concept, content & implementation	7
2. The degree programme: structures, methods and implementation.....	14
3. Exams: System, concept and organisation.....	17
4. Resources	19
5. Transparency and documentation.....	22
6. Quality management: quality assessment and development	25
D Additional Documents	27
E Comment of the Higher Education Institution.....	28
F Summary: Peer recommendations (19.02.2016)	42
G Comment of the Technical Committees	43
Technical Committee 01 – Mechanical and Process Engineering (16.03.2016).....	43
Technical Committee 02 – Electrical Engineering and Information Technology (18.03.2016)	44
Technical Committee 06 – Industrial Engineering (18.03.2016).....	45
H Decision of the Accreditation Commission (08.04.2016)	46
Appendix: Programme Learning Outcomes and Curricula	48

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
grau en Enginyeria Mecànica (grado en Ingeniería Mecánica)	Bachelor Mechanical Engineering	ASIIN, EUR-ACE® Label	n/a	01
grau en Enginyeria Electrònica Industrial i Automàtica (grado en Ingeniería Electrónica Industrial y Automática)	Bachelor Industrial Electronics and Automation Engineering	ASIIN, EUR-ACE® Label	n/a	02
Màster en Enginyeria Industrial (Máster en Ingeniería Industrial)	Master Industrial Engineering	ASIIN, EUR-ACE® Label	n/a	01, 02, 06
Note: The accreditation process was jointly implemented by AQU Catalunya (Catalan University Quality Assurance Agency) and ASIIN. The programmes applied also for the mandatory regional accreditation of AQU Catalunya.				
Date of the contract: 21.09.2015 (contract signed with AQU Catalunya)				
Submission of the final version of the self-assessment report: 07.10.2015				
Date of the onsite visit: 16-17 November 2015				
at: University of Lleida, Polytechnic School, Lleida				
Peer panel:				
Prof. Dr. Arno Bitzer, TH Köln – University of Applied Sciences;				
Miquel Darnés Cirera, Association of Technical Industrial Engineers of Barcelona;				
Adrià Garcia Falcó, student, BarcelonaTech (UPC);				

¹ ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes

² TC: Technical Committee for the following subject areas: TC 01 – Mechanical Engineering/Process Engineering; TC 02 – Electrical Engineering/Information Technology); TC 06 – Industrial Engineering

<p>Prof. Dr. Roberto Leidhold, Otto-von-Guericke-University Magdeburg; Prof. Dr. Hans-Rainer Ludwig, Frankfurt University of Applied Sciences; Prof. Juana Mayo Núñez, University of Sevilla</p>	
<p>Representative of the ASIIN headquarter: Dipl.-Kulturw. Jana Möhren Representative of AQU Catalunya headquarter: Concepción Herruzo</p>	
<p>Responsible decision-making committee: Accreditation Commission for Degree Programmes</p>	
<p>Criteria used: European Standards and Guidelines as of May 2015 ASIIN General Criteria, as of 26.06.2015 Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering and Process Engineering as of 09.12.2011 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering and Information Technology as of 09.12.2011</p>	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor Mechanical Engineering	grau en Enginyeria Mecànica (Bachelor in Mechanical Engineering)	<ul style="list-style-type: none"> • Sustainable construction • Services • Mechatronics 	6	Full time	Yes, optionally with NOVIA UAS, Finland	8 Semesters	240 ECTS	Annually, 2010/11
Bachelor Industrial Electronics and Automation Engineering	grau en Enginyeria Electrònica Industrial i Automàtica (Bachelor in Industrial Electronics and Automation Engineering)	<ul style="list-style-type: none"> • Systems Integration • Programming and Communications • Mechatronics 	6	Full time	no	8 Semesters	240 ECTS	Annually, 2010/11
Master Industrial Engineering	Màster en Enginyeria Industrial (Master in Industrial Engineering)	<ul style="list-style-type: none"> • Energetic systems • Mechanical systems • Control systems 	7	Full time	no	4 Semesters	120 ECTS	Annually, 2014/15

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

„The bachelor's degree in Mechanical Engineering gives access to master's degrees within the industrial engineering field upon previous admission by the body in charge of the master programme. A bachelor's degree in Mechanical Engineering from the EPS⁴ will provide students with the flexibility and adaptability needed in the engineering profession, and an ability to face a range of practical and theoretical challenges. The general objective of the new degree in Mechanical Engineering is to provide graduates with a quality European education and training that is based on the theories, techniques and the technologies applicable to the profession of technical industrial engineer.“

³ EQF = The European Qualifications Framework for lifelong learning

⁴ EPS = Escola Politècnica Superior (Higher Polytechnic School)

For the Bachelor's degree programme in Industrial Electronics and Automation Engineering the institution has presented the following profile on the website:

“The bachelor's degree course in Industrial Electronics and Automation Engineering will enable graduates to obtain a training background oriented towards professional work.

The main objective of the degree in Industrial Electronics and Automation Engineering is to train industrial engineers to work in the field of industrial electronics, control systems and industrial automation. Another objective is to provide professional training in the skills and attitudes necessary for adapting to new challenges and facing a variety of problems in the industrial fields or any type of company and administration.”

For the Master's degree programme in Industrial Engineering the institution has presented the following profile on the website:

„The master's degree in Industrial Engineering delivered in face-to-face modality, offers graduates a polyvalent formation according to the attributions associated with the profession of an industrial engineer. Additionally, this master's course with solid scientific and technological background enables graduates to develop RDI activities.

The professional master's degree in Industrial Engineering according to Order CIN/311/2009 of 9 February entitles graduates to practice professionally as industrial engineers. “

C Peer Report for the ASIIN Seal⁵

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Websites of the programmes: <http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Appendices to self-evaluation report indicating survey results, process descriptions of social partner involvement, etc (e.g. 102EPS-MuestraEncuestas, 102EPS-AgentesSociales, 141(GEEIA, GEM, MEInd)_InformacionEstudiantes, 547EPS_EncuentrosEPS-Empresa, 547_EPS_Asociaciones)
- Objectives-Matrix for each programme (competences-modules, competences-ASIIN SSC)
- Boletín Oficial del Estado (Official State Gazette), as of 18.02.2009
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The Polytechnic School of the University of Lleida has defined objectives and competences for each of the programmes under review. These are aligned with the university or School-wide requirements for so-called strategic competences and transversal competences which must be included in all programmes. Furthermore, the subject areas of the programmes are part of requirements set by the national Ministry of Science and Innovation for Bachelor and Master programmes leading to an official degree allowing graduates to exercise a regulated profession. The latter is the case for the so-called “technical industrial engineer” at Bachelor and “industrial engineer” at Master level accordingly.

⁵ 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.

The panel was impressed with the clear matching between the programme objectives and programme content as well as the level of transparency. All objectives and alignment tables – aligning modules to competences – were published on the respective programme’s websites. Generally, the panel commended the School for its use of electronic resources. From these transparent descriptions the level of the programmes the panel found to be in full compliance with the minimum standards of the EQF levels 6 for bachelor’s graduates and level 7 for master’s graduates respectively.

Additionally, the university had aligned the programme objectives with the subject-specific criteria of ASIIN and the EUR-ACE learning outcomes. With respect to the Bachelor’s degree Mechanical Engineering, the panel found that competences in the area of knowledge and understanding were reflected by the expected capability of students to apply mathematical principles, as well as those in general natural sciences. Furthermore students are expected to master general engineering principles and computer systems. In terms of engineering analysis, the panel found an overlap between the ASIIN standards and the expected learning outcomes in the field of problem solving and decision-making capacities, including those taking into account legal, social and ethical aspects. Students shall also be enabled to apply engineering methodologies in a number of fields such as thermodynamics, fluid mechanics, material technology, electric circuits and electronics, automation and control, production technology, machine design and quality control or environmental technologies. Engineering design capabilities are reflected by the expected competences in computer-aided design, the capability to design process and machines. Students shall be in a position to design control systems, climate control installations as well as energy systems. Investigation skills are linked to the capabilities in the engineering areas covered by the programme. Practical engineering capacities are reflected by the expectation that students shall be enabled to work under pressure and with incomplete information as well as to organize their own work. Furthermore, students shall acquire practical skills during the mandatory internship and during the practical sessions related to the different fields of engineering covered by the programme. Students are also expected to acquire a number of transversal and transferable competences which include oral expression and foreign language competences as well as team working skills or the capacity to deal with new circumstances and transmit and process information.

For the Bachelor’s degree Electrical Engineering and Automation, the panel took note that the majority of intended competences are identical to the mechanical engineering programme as they are stipulated by governmental and university regulations (see also below, criterion 1.3). Differences are therefore mainly found in the area of engineering design which is to be acquired through specific technical competences. The panel thus found knowledge and understanding reflected in the expected competence of graduates

in abstraction, synthesis and logical thinking as well as in general mathematical and engineering foundations. Engineering analysis was considered to be included in students expected knowledge and skills in a number of engineering areas such as thermodynamics, fluid mechanics, electric circuits and machines and electronics as well as material or environmental technologies. With regard to engineering design, students shall acquire those in applied electrotechnics, analogue and digital applications, power engineering, system design, robotics and automation. At the same time, students are expected to gain practical competences in these fields while also acquiring practical team work and project management as well as personal organizational skills. With regard to investigation, the panel considered this to be covered in the knowledge and skills of different engineering areas covered by the programme as well as students' skills in seeking and processing information, carrying out experiments and solving engineering problems in different situations. Transferable skills are an important part of the intended competence profile in a way that students are expected to acquire foreign language and general ICT skills, respect human rights and apply legal, ethical and social principles in their work. They shall also acquire team work and communication skills and appreciate the need for continuous learning.

The panel remarked, however, that some of the objectives mentioned on the website were not in fact reflected in the curriculum. In particular, they pointed out that the capability to *design* microchips was not part of the curricular content. The university confirmed that students were imparted the theory of microchips and trained to work with them but not actually design them.

With regard to the Master's degree programme Industrial Engineering, the panel extensively discussed the name of the programme with the university (see below, criterion 1.2). It was established that – despite the name – the programme was not meant to concur with the objectives of the criteria of the Technical Committee Industrial Engineering. The profile of the Master is a transversal one, deepening the competences of graduates from different Bachelor programmes in the area of technical industrial engineering, in particular mechanical and electrical engineering. The panel acknowledged that the profile of the Master was appreciated by students, graduates and employers during the discussions. Based on the specific direction of the Master, the panel found engineering competences in the fields stipulated by the EUR-ACE Framework Standards. Knowledge and understanding was aligned to the expected deepened knowledge in a number of engineering fields and to the intended competences in developing original designs and applications in a research context. Students' ability to apply problem solving methods as well as to project, calculate and design products and processes was found to be in line with engineering analysis. In terms of engineering design, students shall conceive and implement projects with new solutions and design energy systems, machines, chemical processes, energy

sources, installations, industrial plants and structures. The ability to integrate knowledge work with incomplete information while taking into account social, legal and ethical aspects was found to be aligned with investigation skills as were the intended competences in strategic planning and carrying out research. Practical skills in project management and leadership, planning and (human) resource management were to be acquired and linked to the different engineering fields. With regard to transferable competences, students shall acquire financial and economic knowledge, foreign language, ICT and communication skills.

Generally, the panel acknowledged that students were taught to learn principles and methods to be able to transfer them to real working tasks and working environments. The panel also understood that transversal skills played an important role in the programme design. In particular the stakeholders from the industry had put an emphasis on such skills which they found to be essential when dealing with students during the internships and the immersion phase into real jobs. The panel gained the impression that stakeholders, in particular students and the industry as well as the local engineering associations, were in close personal contact with the teaching staff members. Additionally, formal provisions ensured that stakeholders are regularly involved in the quality development and assurance procedures (see further criterion 6).

Criterion 1.2 Name of the degree programme

Evidence:

- Websites of the programmes: <http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The panel analysed the names of the Bachelor's programmes in light of the programmes' objectives and content and concluded that all conformed to each other. The name of the Master programme – both in English and Spanish – was subject to discussion. The panel learned that the use of the term “industrial engineer” in Spain differs from the use in the rest of the world. In Spain, the name or corresponding degree does not indicate that a programme is placed in the field of engineering and management. The latter is often used as synonym for industrial engineering in other parts of the world and programmes in the field focus on an integration of engineering and business subjects. Such programmes in Spain would be called organisational engineering (*ingeniería en organización industrial*). However, the panel understood that the programme at hand did not aim in such a direc-

tion but that the industrial engineer is a regulated professional title with signing powers. It therefore expands on the signing rights acquired by the Bachelor programmes in all sub-fields of mechanical and electrical engineering. While the panel fully understood that the name was thus pre-defined by legal stipulations in Spain, it would still cause confusion elsewhere (not least as the term industrial engineer in Latin America is used in the sense of engineering and management). This difference thus needs to be clearly communicated at least in the English language documentation of the programme.

Criterion 1.3 Curriculum

Evidence:

- Module descriptions (*guía docente*) on websites of the programmes:
<http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Boletín Oficial del Estado (Official State Gazette), as of 18.02.2009
- Objectives-Matrix for each programme (competences-modules, competences-ASIIN SSC)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

When analysing the curriculum of the Bachelor programmes at hand, the panel took note that the first three years are widely prescribed by the official gazette for degrees leading to the regulated profession of technical industrial engineer. The gazette contains prescriptions for the 168 ECTS in terms of capacities in general sciences, general engineering as well as specifics for the chosen field (i.e. mechanical or electrical engineering). The panel considered the curriculum to match the intended objectives to a high degree.

Nevertheless, they discussed the design of the specialisations in the form of electives with the university. For example, with regard to the Bachelor in Mechanical Engineering, the panel considered that, on the one hand, some of the subject areas were rather related to mechanical or civil than electrical engineering, in particular mechatronics and sustainable building facilities. On the other hand, the panel noted that typical specializations such as automotive or production technology were not provided. The panel acknowledged the intention of the university to use these specialisations to cover areas in the field of engineering that is not the main focus of the programme itself, but which are relevant to the needs of the local and regional industry or target emerging fields (e.g. energy or agricultural and food engineering) while at the same time preparing for the broadening of skills in the Master. Additionally, the fact that Bachelor graduates are officially entitled to sign

projects in several areas outside the programme core area made it necessary to acquaint students with these areas. For each specialisation area ten places are offered, except for Mechatronics which can be chosen in both degrees. The students with the best grades in the previous years have the first choice but are guided by teaching staff in their selection.

The respective gazette for Master's degrees leading to the professional title of industrial engineer stipulates, which skills have to be acquired within 45 ECTS within the Master programme. The panel thus understood that the Master degree in line with the defined objectives included content aimed at deepening and broadening students engineering competences both in the subject area of their Bachelor as well as complementary fields. Graduates receive a professional title allowing them to sign all engineering projects in technical branches. Despite the fact that the programme does not have objectives in engineering and management, a number of modules are aimed at fostering general management skills.

The panel appreciated that final projects are either implemented in the frame of real projects in cooperation with industry or are more research-oriented. Project management related skills are imparted in the module Technical Office which contains theoretical input about project management and legislation as well as a practical technical project.

Criterion 1.4 Admission requirements

Evidence:

- Admission requirements on websites of programmes:
<http://www.graumechanica.udl.cat/ca/futurs-estudiants/acces-admissio.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/futurs-estudiants/acces-admissio.html>; <http://www.masterindustrial.udl.cat/en/futurs-estudiants/acces-admissio.html>
- Regulations on the website
http://www.eps.udl.cat/info_acad/normatives/normatives.html
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (Annex1_DossierIndicadorsTitulacions)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The admission requirements are published on the website and thereby accessible for all potential students or other stakeholders. The panel acknowledged that university level rules and regulations formally stipulate the admission requirements and process. They pointed out that these formal documents were only available in Catalan, not in Spanish

(except for two *Normativas*) or English. In light of transparency for international students, the panel would find translations of *formal* documents advisable (see further criterion 5.3) but was satisfied with the level of information available for future students in three languages on the respective programme websites.

For the Bachelor programmes the expected PAU score (the average mark of the final high school exam applied for admission to all universities in Spain, or GPA) and available enrolment places determined the admission. In the Bachelor programmes, around 15-20% of incoming students had a professional or vocational background rather than a general entrance qualification for higher education (*bachillerato*) and were found to often struggle with the modules in mathematics and physics in the first semester. The panel lauded that the university offered additional courses in these subjects in order to facilitate these students' progression in the early phase of studies. Furthermore, the corresponding modules are offered again in the second semester for the students who have failed the final exams.

With regard to the Master, as it builds up consecutively on both Bachelor programmes under review, the admission requirements were considered to be suitable. Namely, students have to have completed a degree entitling them to carry out the profession of technical industrial engineer (as is the case of the Bachelor's offered by the School). Students with other Bachelor degrees would have to take complementary academic modules. These would be reviewed and decided upon on a case-by-case basis by a designated committee. The panel learned that some Master students had completed their Bachelor at other universities but typically held a technical industrial engineering degree. Overall, the panel considered the admission process to work in a satisfactory manner.

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

The panel appreciates the information about the possibility for Master degree students to participate in student mobility with Cranfield University. As the university has stated that this does not lead to an actual double degree, no changes to the panel's analysis are needed.

The panel took positive note that the university had clarified the intended objective of the Bachelor Electrical Engineering and Automation of enabling students to design applications with microchips and made this transparent on the website.

In a similar manner, the panel acknowledged that the university had added a clarification to the website that the name of the Master programme could be understood in different manners outside of Spain. They nevertheless considered it essential that this information

would be similar transmitted to other information material provided to stakeholders such as future students or employers. More specifically, a corresponding translation should be included in the Diploma Supplement.

With regard to the recognition of externally achieved competences, the panel had been under the impression that the rules of the university were in line with the Lisbon Convention. However, with the additional information provided in the statement of the university, the panel now questioned whether this was the case as the university now seemed to apply credit limits. While this was not formally in contradiction to the Lisbon Convention, it was found to be in contrast to the spirit of the Lisbon Convention and the panel urged the university to re-consider this policy.

Overall, the panel considered criterion 1 to be fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Study plans and module descriptions on websites of the programmes:
<http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (Annex1_DossierIndicadorsTitulacions)
- Academic regulations:
http://www.udl.cat/export/sites/UdL/udl/norma/Ordenacio_academica/Normativa_Academica_de_grado_15-16_castellano_pag._web-3_xmodif_CG_20.6.2015x.pdf
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The structure of all degree programmes is clearly presented on the programme websites. In the view of the panel, the structure and layout of the programme and of the individual modules (*asignaturas*) are straightforward and sensible. All programmes include elective modules as described above (see criterion 1.3). The panel acknowledged that students should ideally choose one full block containing three modules in one subject area in order

to deepen their knowledge in the corresponding field. Alternatively, they can choose the first module of each block in order to broaden their knowledge. The peers also positively noted that students are provided with sufficient information about the electives at the end of the third year.

The Bachelor degree programmes include a mandatory internship of two months full time or four months part time. The panel learned that the university was the first in Catalonia to implement such mandatory internships. They were satisfied with the support provided to students in finding suitable companies, for example through collaboration with the local engineering association, as well as with the mechanisms foreseen to ensure the adequacy of the placements offered. The students have to prepare a report which has to be signed by the company supervisor who also writes an additional report about the student's performance. Students then have to present their report to university teaching staff. Furthermore, since the internship is scheduled for the first semester of the last year, students are encouraged to make use of the internship as preparation for their Bachelor thesis which can be written in collaboration with a company. Similarly to the selection of elective areas, the students with the highest grades in the previous studies are allowed to choose the companies first. To this regard, the School provides a list with suitable placement opportunities.

The recognition of externally acquired competences is regulated at university, not at School level. It is stipulated in the Academic Rules of the university, published on the website. The panel considered these regulations to be in line with the expectations of the Lisbon Convention.

Criterion 2.2 Work load and credits

Evidence:

- Module descriptions on websites of the programmes:
<http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (Annex1_DossierIndicadorsTitulacions)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

From the feedback of students and graduates, the panel learned that the workload overall corresponded to the related ECTS credits. While minor deviations existed for some

modules or depending on individual students' personal areas of weakness, in particular in mathematics or physics, the total workload of all semesters was found to be adequate. Generally, the panel noted that students were aware of the expected workload for modules and practicals based on the information in the module description and oral explanations from staff.

The review team also considered that the number of students who complete their studies during the regularly foreseen period (*tasa de rendimiento*) has improved during the last years and falls within expectations. Student workload is also part of the regular module evaluations by students at the end of the semester.

Criterion 2.3 Teaching methodology

Evidence:

- Module descriptions on websites of the programmes:
<http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Section 6.1 of self-evaluation report
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (Anex1_DossierIndicadorsTitulacions)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

All programmes include different teaching methods, in particular lectures, seminars and labs. The panel ascertained that many staff members include interactive elements in the lectures whenever student numbers allow for this. Overall, the small size of the School and number of students allow for a high degree of interaction between staff members and students, a fact which is positively commented by all stakeholders involved. The coordination between lecturers, included the coordination between lecture and related lab content, is also considered manageable without formal guidance due to the small size. Staff members confirmed that they are aware of the topics of previous modules and that they arranged their own content accordingly in order to avoid overlap. The panel appreciated that staff organize around thematic areas within which they hold regular teaching coordination meetings.

The panel discussed the teaching language with students and teaching staff and understood that the teaching language is in all cases made known before the start of the semester and upon agreement between students and teacher. Since the number of English

taught modules has increased during the past years, international students can be guaranteed that at least 60 credits are offered in English. The panel acknowledged that this development was in line with the programmes' intention to enable students to work in international teams and to think globally.

Criterion 2.4 Support and assistance

Evidence:

- Annex to self-evaluation report about mentoring system (e.g. 513EPS_NESTOR)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The support and assistance of students was considered one of the strong points of the programmes. The panel gained the impression that close relations exist between students and teachers. They also positively acknowledged that teaching staff was very accessible for students' requests.

In addition to the direct contact, an institutional mentoring system (NESTOR) is in place. While the panel noted that the name itself was not known to all stakeholders, the mentoring programme itself was appreciated.

Employers and graduates also demonstrated a high level of satisfaction with the support provided and the relations with staff and students.

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

The panel appreciated the information about the support of students in the perceived difficult modules as well as the mentoring system as it confirmed their understanding of the situation based on the self-evaluation report and discussions during the onsite visit. The panel pointed out that information about the teaching language always has to be clear in advance and in a written documentation, not orally, if students have joined the courses.

The panel considered criterion 2 to be fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Module descriptions on websites of the programmes:
<http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>
- Regulations on the website
http://www.eps.udl.cat/info_acad/normatives/normatives.html
- Assessment regulations:
http://www.eps.udl.cat/info_acad/normatives/avaluacio.html
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (An-nex1_DossierIndicadorsTitulacions)
- Exemplary course documentation, exams, final thesis
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The panel analysed the exam system and the exam methodology in use. Two exam periods are in place per semester, a week of mid-term exams and a two week period at the end of the semester. Make up exams are offered two weeks after the regular exam period. Students who fail the recovery exam will have to wait until the corresponding module is offered again. The panel took note that students found the information about the exam schedules to be sufficiently transparent.

Furthermore, the contribution of different types of exams, i.e. midterm and final exams, tests, practicals, papers etc., to the module grade was transparently described in the module descriptions. The grading system was also found to be adequate, fair and transparent by the panel. The Bachelor programmes contain minimum requirements for the number of modules which students have to pass during the first year in order to be allowed to continue with their studies, namely at least 12 ECTS of the mandatory modules. Students are also required to complete the first year within no more than two years. The panel considered these regulations sensible to ensure smooth progress of students but also to safeguard those with a high risk of dropping out.

With regard to the exam forms in use, the panel acknowledged that these are generally aligned to the intended learning outcomes. While a majority of exams is written, other forms such as practical and oral exams or presentations are also used. In particular where students have to work in teams they normally have to present their results of their work in the form of reports and presentations.

During the visit, the panel analysed a number of exam papers and gained the impression that, in general, the academic level appears to be adequate. Regarding the project work, some of the projects were related to energy topics in houses and commercial installations, such as factory plants. Others were related to more typical subjects of Mechanical Engineering, for example some realistic project work on a motorcycle design in the context of a competition. Within the master's course, the master theses were considered by the panel to be related to the research issues of the department.

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

The statement from the university regarding the rules and regulations stipulated in the *Marco Academico* confirmed the impression of the panel gained from the documentation and discussions that criterion 3 was fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Information about teaching staff on website <http://www.graumechanica.udl.cat/en/pla-formatiu/professorat.html>, <http://www.grauelectronicaiautomatica.udl.cat/en/pla-formatiu/professorat.html>, <http://www.masterindustrial.udl.cat/en/pla-formatiu/professorat.html>
- CVs of teaching staff and overview of research projects and publications (*received after the visit*)
- Information about allocation of teaching staff to modules (e.g. 411(nom) PDAsigProf; 412EPS_Profesorado, 413EPS_ProfColaborador)
- Information about modules taught in English (406EPS_AsignaturasIngles)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

While the CVs of staff members and comprehensive information about research activities had not been available before the site visit, the panel gained an impression of the staff qualifications as well as lecturers research activities during the discussions. This information was completed subsequently. The panel inferred that the overall composition of the teaching staff team was adequate. They also concluded that staff members are induced to implement research activities by contract. However, due to rising numbers of students

and correlated needs for teaching, not all lecturers found it easy to set aside sufficient time for research. Nevertheless, it was confirmed that research results were linked to lower teaching hours. The review panel also learned that the School coming from a tradition in the field of informatics had significantly enlarged its staff base in engineering during the past years. But the panel noted as well that the School suffers from some political restrictions by the government in developing the personal resources consequently (limited number of *catedráticos*).

The field of electrical engineering – as the newest subject area – was the one with the smallest numbers of teaching staff with an own degree in the field. Consequently, the panel took note that in the Bachelor Electrical Engineering and Automation a significant number of modules was taught by either lecturers from other faculties or from industry. By means of example, the modules in mechatronics are taught by staff with an academic background in agricultural or Industrial engineering. Similarly, the School seems to have not been able to assign staff members to all modules in the field (Control and Robotics System Design, System Integration 2 and 3). Nevertheless, the panel was convinced that mechanisms were in place to contract part time lecturers from the industry when needed. They agreed with the staff members that such lecturers could provide valuable expertise, in particular as the number of staff members who had gained significant industry experience was found to be limited. However, the panel also learned that due to the financial situation (see further below, criterion 4.3), the number of full-time positions for associate or full professors had not increased in the past years.

Criterion 4.2 Staff development

Evidence:

- Overview of participation of staff members in training courses
- Information about further education offer
<http://www.ice.udl.cat/upu/contingut.php?subseccio=index>
- Section 4.3 of self-evaluation report
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

Further development for teaching staff lies within the responsibility of the Continuous Education Center (*Instituto de Ciencias de la Educación-Centro de Formación Continua*) of the university. Lecturers of the School have participated in courses dedicated to new teaching methodology, ICT, didactics and research and innovation, for example. The panel was satisfied that staff members were aware and made ample use of the offer. In total, 45 professors of the Polytechnic School attended training courses in 2013/2014. Never-

theless, the internal promotion paths to full professorship had been frozen during the past due to financial restrictions. As these created incentives for research and development opportunities, the panel considered this to be an area for improvement.

Criterion 4.3 Funds and equipment

Evidence:

- Sections 5.2, 5.3 of self-evaluation report
- Information about budget (531UdL_Presupuesto2015)
- Information about infrastructure/equipment (521MEInf_RecursosMatrials, 521GEI_RecursosMatrials; 522UdIntSatRec; 523EPS_ActLaboratorios; 524EPS_ActBiblio)
- Information on mobility options (544EPS_PlanInternEPS; SER 5.1)
- Results from satisfaction surveys of facilities (library etc.)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The panel considered the learning environment and campus facilities, such as buildings and the library, to be of high quality and noted a very positive atmosphere. The laboratory equipment was found to be basic but adequate and could be updated in order to better reflect latest developments in the industry. Nevertheless, the panel took into account confirmations from all stakeholders that improvements had been made during the past three years.

With regard to the financial resources available, the panel acknowledged that the School budget had been reduced since the financial crisis with consequences in particular on staff (see above, criterion 4.2). This reduced income was to be compensated by student fees and public student grant programmes. As the panel understood that no further deductions of the budget were expected, they pointed out that staff promotion should be resumed.

Cooperation with the local and regional industry as well as with local engineering associations seemed to be working on a well-established basis and the panel gained the impression that in particular the involvement through the internships contributed to a continuous exchange. The fact that a number of lecturers from other faculties contributed to the programmes under review did not cause organisational problems. Students confirmed that lecturers from other faculties, including those at other locations, were easily accessible in case of problems or questions.

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

The statement of the university regarding the qualification and composition of the teaching staff as well as their possibilities to conduct research activities and the information regarding the funding and equipment situation supported the impression of the panel from the discussions. The panel valued that the university and the School were already in an improvement process.

With regard to the involvement of the teaching staff with previous industry experience, the panel fully appreciated the involvement of part-time lecturers who are actually professionals currently working in the industry. However, the panel would consider it also useful for the future and further development of the School that full-time professors are required to have industry working experience and not only have followed purely academic careers.

Concerning the background of staff members in the field of electrical engineering and taking into account the new evidence, the panel confirmed that the staff members with a different degree than the one they are teaching are doing research in subjects strongly related with their teaching subjects. The panel therefore found the statement of the university to be convincing. The panel also noted that the new module descriptions published now on the website also name the assigned teaching staff for all modules (including Control and Robotics System Design, System Integration 2 and 3).

Overall, the panel considered the criterion to be fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions (*guía docente*) on websites of the programmes:
<http://www.graumechanica.udl.cat/en/index.html>;
<http://www.grauelectronicaiautomatica.udl.cat/en/index.html>;
<http://www.masterindustrial.udl.cat/en/index.html>

Preliminary assessment and analysis of the peers:

As mentioned previously, the panel commended the level of public information including the fact that module descriptions were principally available in three languages, namely Catalan, Spanish (Castilian) and English. The module descriptions generally included all elements necessary to allow stakeholders, in particular students, to gain full information

about a module's objectives and content, its link to the programme objectives as well as work load, teaching methodology, exam requirements, literature and teaching staff. However, when analysing the descriptions in detail, the panel detected a number of inconsistencies between the different language versions. In some cases, the module descriptions were not complete in all three versions or the module descriptions on the Spanish website effectively contained content in Catalan (for example, Mechatronics 3). The panel also noted that, for example, the descriptions of modules 133 and 129 were nearly identical in the Spanish version whereas some modules had names in Castilian but description in Catalan. Generally, the panel noted that differences existed in terms of content, level of details, bibliography, languages. They also took note that prerequisites in terms of ideal competences to have been acquired before starting a module were not included in the descriptions. While the panel noted that such information was usually helpful to provide students with a means of orientation in planning their schedule, they also took into account that in the case of the programmes under review, the study path was largely prescribed. Nevertheless, the panel pointed out that it might be helpful to designate the responsibility of coordination to a specific person within the staff.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Model of Diploma Supplement for each programme (151EPS_SET)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

A sample Diploma Supplement was provided for each programme under review. The panel acknowledged that the samples complied with the model used in Spain and contained – in three languages – all but one element foreseen by the European standards about the programme, the awarding institution and the individual student's performance as well as the grading system. However, the Diploma Supplements did not contain a section with the competence profile of the graduate in terms of learning outcomes in addition to the mere list of modules. The panel noted that this section was recommended by the European model and useful for external stakeholders to be able to grasp the knowledge, skills and competences linked to programme. Additionally, they pointed out that as language of instruction only Spanish and Catalan were mentioned, not English.

Criterion 5.3 Relevant rules

Evidence:

Regulations on website:

http://www.eps.udl.cat/info_acad/normatives/normatives.html,

<http://www.graumechanica.udl.cat/en/normativa/index.html>,
<http://www.grauelectronicaiautomatica.udl.cat/en/normativa/index.html>,
<http://www.masterindustrial.udl.cat/en/normativa/index.html>

Discussions during onsite visit

Preliminary assessment and analysis of the peers:

While the panel acknowledged that all rules and regulations governing a student's life-cycle, i.e. admission, progression and graduation, were available on the university and the School website respectively, they pointed out that the majority was only available in Catalan. Only the progression rules (*Normativa de Permanencia*) and the academic rules (*Normativa Academica*) for Bachelor degrees were available in Spanish (*castellano*) – though not in English. In some cases, automatic translations into English existed but these seemed to be incomplete or unintelligible (for example, continuity rules on the School website). In light of the desired internationalisation and the number of non-Catalan speaking students, the panel would find it useful to make all relevant rules available in other languages for information purposes, even when the Catalan version would remain legally binding.

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

Concerning the module descriptions, the panel was impressed with the quick improvements made by the School, in particular with regard to the example cases mentioned. They considered that a significant improvement had been made. However, the panel did not see any information on pre-requisites in random samples. They also considered that a complete quality check of all module descriptions in three languages could not have done in such a short period. To this extent, the panel encouraged the university to remain committed to keep them up to date and improve them continuously with respect to the content (e.g. prerequisites) and the way they are presented (unified terminology, format, what comes in each field, etc.). The assignment of a coordinator was considered to be an important step in this direction.

Concerning the inclusion of the competence profile of the graduate in terms of learning outcomes in the Diploma Supplement, the panel noted that this was indeed foreseen in the new model provided by the Ministry. The panel assumed that the School would adapt this new model accordingly for the degree programmes under review.

The panel appreciated that the most important documents regarding the student life cycle, more specifically progression and admission rules, had been newly translated and provided in three languages on the website.

With the above mentioned exception, the panel found criterion 5 to be fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Information about quality assurance on website:
http://www.eps.udl.cat/info_sobre/Qualitat/Garantia_de_Qualitat.html
- Quality Management Handbook:
https://cv.udl.es/access/content/group/ofqualitat/as/3_1_SISTEMA_DE_QUALITAT_Manual_de_Qualitat_i_Procediments/Manuals%20de%20Qualitat/SGIQ%20EP_S_V_1_1-1.pdf
- Appendices to self-evaluation report: results about employer and student surveys, internship surveys, collection of opinions, improvement plans (e.g. 102EPS-MuestraEncuestas-GAT, 141(nom)_InformacionEstudiantes, 142EPS_OrganizacionPTE, 142EPS_InformePracticas, 321UdL_EstOpinio, 331UdL_PG03, 351EPS_ISSGIC, 351EPS_AcuerdosMejoraCentro)
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (Anex1_DossierIndicadorsTitulacions)
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The internal quality management system (*Sistema de Garantía Interna de la Calidad (SGIC)*) of the university has been put in place and positively evaluated by the national Spanish agency (positive AUDIT). The objectives, procedures and responsibilities are laid down in the quality management handbook both on university and on School level. Statistical data about students' progression and performance is collected in the university-wide DATA system. At the end of each semester, students' evaluations of the courses and lecturers are implemented, complemented by graduates and employers surveys. Based on an analysis of the statistics and survey results, the School drafts annual monitoring reports for each programme which include tasks for improvement. The implementation of these is governed by the Quality Monitoring Committee. The panel appreciated that regular follow-up of the quality activities was in place. On the one hand, students were informed about the results of the surveys, and on the other hand, the responsible man-

agement of the faculty followed up on the evaluation of staff members when necessary. The dean would talk to the staff members with the lowest results while awarding those with the highest. Additionally, the aggregated results of surveys and statistics were published on the website. Overall, the panel confirmed a high level of satisfaction and involvement of all stakeholders.

Students participated in the responsible quality commissions on a basis of parity.

In addition to the formal and systematic quality assurance mechanisms, the panel commended that the close relation between students and teachers contributed to an atmosphere of confidence. The panel positively acknowledged that individual teachers implemented additional quality assurance methods in addition to the system-wide activities in order to provide direct improvements during the semester.

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

As the university made no comments regarding this criterion, the panel confirmed its preliminary analysis that it was fully met.

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:

Not applicable

E Comment of the Higher Education Institution

The academic authorities of the Polytechnic School want to thank the peer panel about the efforts carried out in order to make a transparent and objective assessment of our studies and the resources that we have available to deploy it. We want to highlight that the whole accreditation process is being a very enriching experience for us, which will help us not only to improve the present but also to project a better future for our Polytechnic School. We consider very positive all the inputs received from the panel, because they have shown us our weaknesses, which we will face according to a continuous improvement methodology, and also made us aware of our strengths, which we must maintain and improve.

In reference to the specific points on the "preliminary assessment and analysis" provided in the Accreditation Report, we would like to provide the following suggestions so that they can be considered in the final evaluation.

In page 5, in table B, we would like to comment that the school also offers a double master degree with Cranfield University (United Kingdom), see all the information on the link below <http://www.masterindustrial.udl.cat/en/mobilitat/index.html>

This is not a joint degree in the sense that students who can benefit from this opportunity are awarded with two different degrees by the two institutions. Concerning the students from University of Lleida going to Cranfield University, they can enhance their education also by going to this prestigious university at UK (top 5 ranked in UK). We would like to point out that Cranfield University establishes a selection procedure to guarantee that only students with best competences can follow this double master. Our students can obtain both master degrees by taking 60 ECTS in our school at University of Lleida and 60 ECTS at Cranfield University that are recognized afterwards.

In page 9 of the report, it is stated that "The panel remarked, however, that some of the objectives mentioned on the website were not in fact reflected in the curriculum. In particular, they pointed out that the capability to *design* microchips was not part of the curricular content. The university confirmed that students were imparted the theory of microchips and trained to work with them but not actually design them."

As the evaluation committee pointed out in its onsite visit, theory of microchips is imparted in several subjects such as Digital Electronics or Analogic Electronics. Moreover, the students use and work with microchips in the modules of the 4th course. The sentence that tried to show that fact in the website was "Design of electronic circuits, micro-

chips and domotic systems." which is ambiguous in the sense that it looks like the students will have the ability to "design microchips" when we really want to say that they will have the ability to "design applications with microchips". The website has been modified accordingly, see <http://www.grauelectronicaiautomatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

In pages 10 and 11, criterion 1.2, the panel asks about the use of the term "industrial engineer" in Spain and in the context of the Master's degree. They state that it differs from the use in the rest of the world. This is also commented in the last paragraph of page 9 and the second paragraph of page 12.

As the panel states in page 11, the term "industrial engineer" in Spain refers to a regulated professional title with signing powers, and the name is pre-defined by legal stipulations in Spain (see the document "*Orden CIN 311-2009 - BOE-A-2009-2740*" in the link https://www.boe.es/diario_boe/txt.php?id=BOE-A-2009-2740 and the official web page of the Industrial Engineers Association <http://www.eic.cat/qui-som/institucio/collegi>). The Master is therefore oriented to deepen and broaden students engineering competences both in the subject area of their Bachelor as well as complementary fields, as the panel mentions. Moreover, although the main focus of the Master is not management skills, there is a significant part of the program addressing such issues (up to 24 ECTS).

However, as the panel states, it is also true that this name could cause confusion elsewhere and that this difference needs to be clearly communicated at least in the English language documentation of the programme. To avoid such misunderstanding, the following clarification has been included in the web page of the Master, both in the English and Spanish versions:

(English version - <http://www.masterindustrial.udl.cat/en/index.html>)

IMPORTANT: Notice that the term "Industrial Engineer" in Spain differs from its use in the rest of the world. The profession of Industrial Engineer in Spain is a regulated professional title with signing powers focused to broaden engineering competences in different fields. It differs in concept, knowledge, and skills from the "Industrial Engineering" degree of many other countries, more focussed in engineering and management. These degrees in Spain are referred to as "Industrial Organization" (Organización Industrial).

(Spanish version - <http://www.masterindustrial.udl.cat/es/index.html>)

IMPORTANTE: Cabe destacar que el nombre de "Ingeniero Industrial" en España difiere del uso del mismo en el resto del mundo. La profesión de "Ingeniero Industrial" en España es una profesión regulada con capacidad de firma de proyectos, encaminada a ampliar las competencias ingenieriles en diferentes campos. Difiere en concepto, conocimientos y

habilidades del título de “Ingeniero Industrial” de otros países, más enfocado a la gestión. Este tipo de titulaciones en España se denominan “Organización Industrial”.

In the last paragraph of page 11, the panel points out that our specialisations of the Bachelor in Mechanical Engineering are adapted to the needs of the industry and target emerging fields (such as energy, environment, sustainability and mechatronics). From our point of view, this is one of the strong points in our programme as it enhances the competences of our graduates. These topics were launched from the close collaboration between our school and the industrial partners.

In the last paragraph of page 12, the peer panel states that “The admission requirements are published on the website and thereby accessible for all potential students or other stakeholders. The panel acknowledged that university level rules and regulations formally stipulate the admission requirements and process. They pointed out that these formal documents were only available in Catalan, not in Spanish (except for two *Normativas*) or English. In light of transparency for international students, the panel would find translations of *formal* documents advisable (see further criterion 5.3) but was satisfied with the level of information available for future students in three languages on the respective programme websites.” Also in page 23, the following assessment is written “While the panel acknowledged that all rules and regulations governing a student’s life-cycle, i.e. admission, progression and graduation, were available on the university and the School website respectively, they pointed out that the majority was only available in Catalan. Only the progression rules (*Normativa de Permanencia*) and the academic rules (*Normativa Académica*) for Bachelor degrees were available in Spanish (*castellano*) – though not in English. In some cases, automatic translations into English existed but these seemed to be incomplete or unintelligible (for example, continuity rules on the School website). In light of the desired internationalisation and the number of non-Catalan speaking students, the panel would find it useful to make all relevant rules available in other languages for information purposes, even when the Catalan version would remain legally binding.”

First, we would like to recall the following comment from the peer panel written in page 16, “The panel discussed the teaching language with students and teaching staff and understood that the teaching language is in all cases made known before the start of the semester and upon agreement between students and teacher. Since the number of English taught modules has increased during the past years, international students can be guaranteed that at least 60 credits are offered in English to allow an exchange student spend a full academic year in our Polytechnic School. The panel acknowledged that this development was in line with the programmes’ intention to enable students to work in international teams and to think globally.”

We remark that one of the strong points of our school is the support and assistance provided to students and thus, the language is not a problem in any situation as the information gets directly to the student. As it is written in the report, the panel learnt that diversity of languages causes no flaw in students' performance.

The regulations mentioned by the panel do not directly depend on the school but on the university. We have formally asked the translations of these and other regulations to Spanish and English in order that the rules governing student's life-cycle can be available in the three languages: Catalan, Spanish and English. The unit of academic regulations has translated these regulations and they appear in the web page of the school in Catalan, in Spanish and in English, see the following links.

- Enrolment rules:

http://www.eps.udl.cat/info_acad/normatives/matricula.html (Bachelor and Master levels).

- Progression rules:

http://www.eps.udl.cat/info_acad/normatives/permanencia.html (Bachelor and Master levels).

At the Master's level, there are some specific regulations on admission procedures which are already translated. We have updated the webpage accordingly, see:

<http://www.masterindustrial.udl.cat/en/futurs-estudiants/acces-admissio.html>

<http://www.masterindustrial.udl.cat/en/futurs-estudiants/calendari-preinscripcio-matricula.html>

In the last paragraph of page 14, the report states that "The recognition of externally acquired competences is regulated at university, not at School level. It is stipulated in the Academic Rules of the university, published on the website. The panel considered these regulations to be in line with the expectations of the Lisbon Convention."

In principle, this recognition is regulated in article 6, paragraphs 2 and 3 of *Real Decreto 861/2010, BOE 3 de julio de 2010* (see the document in the link <https://www.boe.es/buscar/doc.php?id=BOE-A-2010-10542>). Thereafter, in the regulation documents about bachelor and master degrees the quantity of credits, at maximum, that can be recognized as professional experience must be stated for each programme. This maximum cannot exceed 15% of the ECTS of the programme. Thus, from July 2010, we have stated the following upper bounds for the number of credits that can be recognized:

Bachelor Mechanical Engineering: 36ECTS

Bachelor Industrial Electronics and Automation Engineering: 36ECTS.

Master Industrial Engineering: 18ECTS,

Bachelor Computer Engineering: 36ECTS,

Master Informatics Engineering: 13.5ECTS,

Bachelor Architectural Technology: 36ECTS.

Besides, the regulation “Normativa Académica” of the University of Lleida, establishes in its point 8.2 the documentation to be submitted in order to apply for this recognition (see the links:

http://www.udl.cat/export/sites/UdL/udl/norma/Ordenacio_academica/Normativa_Academica_de_grado_15-16_castellano_pag.web-3_xmodif_CG_20.6.2015x.pdf and

http://www.udl.cat/export/sites/UdL/udl/norma/Ordenacio_academica/normes_15-16_castella_master_pag.web-1xmodif_CG30.6.15x.pdf).

This recognition is carried out at School level by a case-by-case analysis of the documentation.

We take into account the paragraph “From the feedback of students and graduates, the panel learned that the workload overall corresponded to the related ECTS credits. While minor deviations existed for some modules or depending on individual students’ personal areas of weakness, in particular in mathematics or physics, the total workload of all semesters was found to be adequate” of page 15.

We would like to remark that we have implemented several resources for the students to overcome their difficulties. We offer students pre-courses in mathematics and physics for future bachelor in order to equalize the levels of knowledge and, thereby, to ensure that all the students are able to follow the first year modules of mathematics and physics (see http://www.eps.udl.cat/info_per/CursZeroMatematiques.html and http://www.eps.udl.cat/info_per/CursZeroFisica.html).

Additionally, when the staff resources allow it, some of the first semester courses are repeated in the second semester in order to offer another examination opportunity together with teaching support for students who need it. For instance, in the present course 2015/16, this option has been implemented for the modules “Cálculo” and “Física” of first course and “Métodos numéricos” and “Teoría de Mecanismos” of second course of the

Bachelor's Degree Programmes of Mechanical Engineering and Industrial Electronics and Automation Engineering. The following link is the documentation sent to all the students with the information about these courses in the current academic year 2015/16:

http://www.eps.udl.cat/export/sites/EpsNou/docs/secretaria/matricula/actual/oferta_as_signatures/planou/Docencia-repetida-2n-Q.pdf

We would also like to point out that all the modules are graded on a continuous assessment basis and there are re-sit exams programmed in a separate week to avoid peaks in the work load. There is a program of mentoring (called NESTOR) and the relationship between students and teaching staff is close and easy.

We take into account the following comment in one of the last paragraphs of page 16, namely "In addition to the direct contact, an institutional mentoring system (NESTOR) is in place. While the panel noted that the name itself was not known to all stakeholders, the mentoring programme itself was appreciated."

Traditionally, the name of the mentoring program was PAT (*Plan de Acción Tutorial*) and the name has recently changed to NESTOR. Thus, both tutors and organizers of this program are still not used to the new name and use the previous one. This does not change the fact that this program is up-to-date. A tutor is assigned to each student who enters the University of Lleida. Students, upon request, can enjoy this particular and individual attention whenever needed. The meeting with the tutor can be done personally or by email and students have the opportunity to do so individually or by group. The tutors are usually teachers from the first years in order to be closer and accessible to new students. The tutor does not change over the years of stay of the student at the University. Thus, the tasks of tutors are rotating and involve all teachers in the EPS. In the joint evidence EPS_Gruposytutores15-16.pdf, there is the list of students corresponding to each tutor together with the date of the presentation of the current academic course 2015/16. More than the 75% of students assisted to this presentation in the present year.

We would also like to mention that a host program is also held. On the first day of the academic year and for all new students, a group of activities to present the school (classrooms, staff, how to access to the virtual campus ...) is provided (see the link:

<http://eps.blogs.udl.cat/2015/09/15/acollidaeps2015/>).

In page 17, criterion 3, we would like to complement the panel analysis with a couple of remarks, in which we take into account the requirements for this criterion stated in the

document General Criteria for the Accreditation of Degree Programmes - ASIIN Quality Seal.

First, there are two regulations, specific to our school, which have a positive impact on the results of qualifications: curricular qualification and the “Marco Académico de la EPS”. The main objective of the curricular qualification for grades is to give information on the level of knowledge acquired by the student, based on global criteria and compensation. In this way it is intended to allow a student to complete their studies within a reasonable time. The application of this process has improved academic indicators such as: the graduation rate, drop-out rate and efficiency rate. The “Marco Académico de la EPS” is a document which organizes general teaching and examination activities (see the link http://www.eps.udl.cat/info_acad/normatives/MarcAcademicEPS.html). On July 2014 we approved the latest version resulting from improving previous versions that dated from the 2009/10 academic year. Among others, this document establishes bases for fixing the academic calendar and how to sequence the various assessment activities, such as delivering written practical tests and exams. This document establishes the number of assessment activities and their weight in the final grade of a module. Thus, continuous assessment for all grades in our school has become a standard without an overflowing on the workload of each student.

On the other hand, we would also like to point out that we have defined rules for re-sits (also established in “Marco Académico de la EPS”) and disability compensation measures, illness or other mitigated circumstances are solved on a case-by-case analysis, upon documental justification, by the teacher responsible of the module.

In this sense, the University of Lleida has a program, called *UdLxTothom* see <http://www.udl.cat/serveis/seu/UdLxtothom.html>, with the aim of promoting higher education and participation of people who have disabilities in our university. At the level of the school, we put required resources to facilitate tackling teaching and assessment activities.

One of the last paragraphs of page 18 is that “Regarding the project work, some of the projects were related to energy topics in houses and commercial installations, such as factory plants. Others were related to more typical subjects of Mechanical Engineering, for example some realistic project work on a motorcycle design in the context of a competition. Within the master's course, the master theses were considered by the panel to be related to the research issues of the department.”

We would like to mention that some of the project works, both in the bachelor level and the master level, are made in collaboration with an industrial partner. This option is encouraged by the school so that students can benefit from both a theoretical and a practi-

cal point of view. In most of the cases, this project work comes from the internship of the student in the company. Note that the implementation of mandatory internships and final project are totally independent and assessment activities never match. In many cases the student performs the internship and the project work in different semesters.

We include here a small list of illustrative examples:

Student: José Rabal Noguera

Degree: Bachelor in Mechanical Engineering

Title of the project: "Introducción de mejoras productivas en la sección de semielaborados mediante la planificación y organización de la producción."

Director: Juan R. Sánchez Tabuenca and Margarita Moltó Aribau

Industrial partner: RIGUAL SA

Student: Miquel Puigvert Rubio

Degree: Master in Industrial Engineering

Title of the project: Project Management; Methodology and application.

Director: Rosa M. Florensa Guiu

Industrial partner: ALTRAN UK

Student: Miquel A. Fernández Oms

Degree: Bachelor in Mechanical Engineering

Title of the project: "Projecte d'instal·lació d'un sistema de caldera de biomassa i captadors solars tèrmics per a la climatització d'una piscina coberta al Club Natació Lleida".

Director: Daniel Chemisana and Joan Ignasi Rosell

Industrial partner: Club Natació Lleida

Student: Jordi Gené Mola

Degree: Master in Industrial Engineering

Title of the project: "Disseny d'un remolc auto-descarregable"

Director: Miquel Nogués Aymamí

Industrial partner: Tallers Gili 98 S.L.

In page 19, criterion 4, of the report the following sentences are written "The panel inferred that the overall composition of the teaching staff team was adequate. They also concluded that staff members are induced to implement research activities by contract. However, due to rising numbers of students and correlated needs for teaching, not all lecturers found it easy to set aside sufficient time for research. Nevertheless, it was confirmed that research results were linked to lower teaching hours." Also in page 20 "the internal promotion paths to full professorship had been frozen during the past due to financial restrictions. As these created incentives for research and development opportunities, the panel considered this to be an area for improvement."

We would like to note that it can always be difficult to find time for research due to the urgency of teaching activities. However, some of the benefits that had lapsed due to the financial situation have been resumed. In particular, in a very recent meeting (November 25th, 2015) of the Government Council of the University of Lleida, a regulation for full-time professors to apply for sabbatical periods has been approved (see the link http://www.udl.cat/export/sites/UdL/udl/norma/Personal_academic/Normativa_de_Periodes_Sabxtics_xCG_25-11-2015x.pdf). It is also remarkable that any lecturer at the school who decided to make a research stage in another university has enjoyed the possibility of changing the teaching duties schedule, with the support of the academic authorities in order to ensure the students benefit and keep the teaching quality.

The university of Lleida has deployed several actions in order to promote the scientific research and to help balancing the teaching duties with research activities for all the teaching staff (see the following link from the university management – in Catalan - http://www.udl.cat/export/sites/UdL/recerca/convoca/docs/Normativa_dels_Programes_de_promocix_i_consolidacix_de_la_recerca_per_WEB_ppal.pdf

See also:

http://convocatories.udl.cat/cgi-bin/veurereg.cgi?G_USCODI=62028&G_ENTORN=CEMA&IDNC=201601191334400&G_LLI_STA=cerca&G_CODI=0822)

In the same page 19, the peer panel states that “But the panel noted as well that the School suffers from some political restrictions by the government in developing the personal resources consequently (limited number of *catedráticos*)” and also below “However, the panel also learned that due to the financial situation (see further below, criterion 4.3), the number of full-time positions for associate or full professors had not increased in the past years.” In the same regard, in page 21, “As the panel understood that no further deductions of the budget were expected, they pointed out that staff promotion should be resumed.”

Even though these sentences are true, we would like to note that these problems are being subsequently corrected by the Spanish Government. Several regulations which blocked staff promotion have been repealed and, thus, several of our teaching staff will benefit from their merited promotion very soon.

In the last paragraph of page 19, the report states that the degree of the staff is in many cases different from the degree where they teach. In this regard, it is important to mention that a big percentage of the teaching staff are industrial engineers (MSc) and a MSc in industrial engineering, as indicated previously, involves all the degree specializations in its curriculum (Electronic, electric, mechanic, management, etc.). This fact ensures the industrial engineer staff to be adequate in both degrees as they have the necessary specializations. In addition, the rest of the staff who are not industrial engineers is teaching subjects directly related to their research activities. As an illustrative example, some staff professors teaching in mechatronics (A. Escolà and J. Pomar) are not industrial engineers (agronomic engineers in this case); however, they present top research in applied mechatronics as it can be seen in their website:

<http://www.grap.udl.cat/en/publications/index.html>

In page 19 the panel state that “the number of staff members who had gained significant industry experience was found to be limited.”

Although this is correct when considering the full-time staff members only, one must consider the role of part-time staff. Most of part-time staff are professionals from the engineering sector working in the industry, which teach specific subjects related to their expertise and professional work. The combination of both academic (full-time staff members) and professional (part-time staff members) lecturers provided the students with a complete view of the engineering field. The academic staff is more focused in basic knowledge and research, while professional staff is more oriented to applied knowledge in industry. Moreover, as the panel states in page 21, the fact that these professional staff is not based at the School (does not have a permanent office, but a shared one) “*does not*

cause organizational problems”, and “are easily accessible in case of problems or questions”.

In terms of distribution, professional staff is usually assigned to higher courses, where applied knowledge is the main focus. On the other hand, academic staff is more focused in basic and research oriented subjects. In the following Table the rations of academic and professional staff and their assigned ECTS are presented for the different degrees:

	Academic	Professional
Bachelor in Mechanical Engineering	33 (67.3%) 172.1 ECTS (75.7%)	16 (32.7%) 55.1 ECTS (24.3%)
Bachelor in Industrial Electronics and Automation Engineering	34 (64.2%) 278.6 ECTS (73.1%)	19 (35.8%) 102.5 ECTS (26.9%)
Master in Industrial Engineering	25 (71.4%) 95.6 ECTS (70.9%)	10 (28.6%) 393.3 (29.1%)

In page 21, the report contains the following commentary. “The laboratory equipment was found to be basic but adequate and could be updated in order to better reflect latest developments in the industry.”

The school periodically allocates resources for upgrading the laboratories. In particular, and since the academic year 2011/12, the school launches an annual call to improve the laboratories and to adapt them to the degrees offered. Every teacher who has an initiative in this sense, consensual with the module coordinator and the degree coordinator, makes a request that is sent to the director of the school by the degree coordinator.

In this sense, in the present academic year, the University of Lleida has launched a call to improve teaching facilities for the following four years with a budget of one million euros. There are several proposals of the school which fit in this call and we expect to capture the financial support needed to make them real. In the joint document (UdL_CG151216.pdf), there is the official description of this call is (in Catalan).

In page 22, criterion 5.1, the panel raises several issues on module descriptions.

Referring to Module descriptions, the panel commended the level of public information. Despite of this, the panel found some "formal" inconsistencies in terms of content, level of details, bibliography, languages. In this regard the panel recommended designating the responsibility of coordination to a specific person within the staff in order to deal with these "formal" inconsistencies. We want to point out that we have indeed a responsible of this task for each degree, which is the coordinator. The degree coordinator periodically reviews all public information including the module descriptions ("guia acadèmica").

However, since the only person who has access to the module guide is the lecturer in charge of this subject, not the coordinator, it makes difficult to deal with the unification and update of this specific information at the same time and with the same precision.

We are aware that this is a point that we must improve and actually we are going to start a process of revision of the module guides, taking into account the "example sheet for module description" provided in the document General Criteria for the Accreditation of Degree Programmes - ASIIN Quality Seal, so that the information will be displayed to the public in a form as uniform as possible.

Finally we would like to remark that these "formal" inconsistencies only affect few subjects but they do not affect the quality of the contents.

On the other hand, the reviewers point out that the prerequisites in terms of ideal competences to have been acquired before starting a module were not included in the descriptions. The academic regulation compels students to register for the subjects increasingly (one student cannot enroll in a third course subject if he has not already enrolled all second course subjects). Hence, prerequisite competences will be already achieved by students. However, we share the panel's opinion that a brief description on previous key competences would be of interest, especially for visiting students. In this sense, we have also asked to our teaching staff to review these documents in order to include this information.

You can find all the module guides on the corresponding websites:

<http://www.graumechanica.udl.cat/en/pla-formatiu/pla-estudis-guies-docents.html>

<http://www.grauelectronicaiautomatca.udl.cat/en/pla-formatiu/pla-estudis-guies-docents.html>

<http://www.masterindustrial.udl.cat/en/pla-formatiu/pla-estudis-guies-docents.html>

We will also convene all the teaching staff to a coordination meeting in order to work on a revision of the Module Description Documents.

In page 22, the peer panel states the following particular flaws in some description modules: “In some cases, the module descriptions were not complete in all three versions or the module descriptions on the Spanish website effectively contained content in Catalan (for example, Mechatronics 3). The panel also noted that, for example, the descriptions of modules 133 and 129 were nearly identical in the Spanish version whereas some modules had names in Spanish but description in Catalan.”

We have contacted the teachers responsible for each of the modules and the three module descriptions have been corrected and updated.

Mechatronics 3: <http://guiadocent.udl.cat/pdf/en/102138>

Module 133: <http://guiadocent.udl.cat/pdf/en/102133>

Module 129: <http://guiadocent.udl.cat/pdf/en/102129>

In page 22, criterion 5.2, the peer panel states that “A sample Diploma Supplement was provided for each programme under review. The panel acknowledged that the samples complied with the model used in Spain and contained – in three languages – all but one element foreseen by the European standards about the programme, the awarding institution and the individual student’s performance as well as the grading system. However, the Diploma Supplements did not contain a section with the competence profile of the graduate in terms of learning outcomes in addition to the mere list of modules. The panel noted that this section was recommended by the European model and useful for external stakeholders to be able to grasp the knowledge, skills and competences linked to programme. Additionally, they pointed out that as language of instruction only Spanish and Catalan were mentioned, not English.”

The University of Lleida is one of the first universities in Spain giving the students the Diploma Supplement, which we denote by SET. This document, for the bachelor and the master official degrees, has to follow the ministry regulations, see the document *RD 22/2015, BOE de 7 de febrero de 2015* in the link https://www.boe.es/diario_boe/txt.php?id=BOE-A-2015-1158. At the moment, in the school we are about to receive the new version of this document for some bachelor and master students. We will be giving this SET to all the students as far as we receive them from the central unit of diploma expedition at the university. The description of this new version can be found in the following links:

Spanish and English: <https://www.boe.es/buscar/pdf/2015/BOE-A-2015-1158-consolidado.pdf>

Catalan and English: https://www.boe.es/boe_catalan/dias/2015/02/07/pdfs/BOE-A-2015-1158-C.pdf

The ANNEX 1 of these documents contains the model for the SET where it is stated that *“This Diploma Supplement follows the model developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the supplement is to provide sufficient independent data to improve the international transparency and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.) it is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended.”*

As it can be seen in the model of ANNEX 1, this new version of the SET will contain all the information required and all the issues raised by the panel are fulfilled.

We include the following two documents:

EPS_Gruposytutores15-16.pdf

List of groups of tutoring, with the corresponding students and date of the presentation session, of the current academic year 2015/16.

UdL_CG151216.pdf (In Catalan)

Call of financial support for the improvement of the teaching facilities at the University Level. The text is in Catalan as it is an internal call.

F Summary: Peer recommendations (19.02.2016)

Taking into account the additional information and the comments given by the university, 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 accreditation
Bachelor Mechanical Engineering	Without requirements	EUR-ACE®	30.09.2021
Bachelor Industrial Electronics and Automation Engineering	Without requirements	EUR-ACE®	30.09.2021
Master Industrial Engineering	With requirements	EUR-ACE®	30.09.2021

Requirements

For the Master

- A 1. (ASIIN 1.1, 1.2) Ensure that the English language documentation, in particular the Diploma Supplement, makes transparent that the programme differs from what is commonly understood as industrial engineering (as engineering and management).

Recommendations

For all programmes

- E 1. (ASIIN 5.1) The University is encouraged to continuously improve the quality and consistency between all language versions as well as completeness of information of the module descriptions.

For the Bachelor Industrial Electronics and Automation Engineering

- E 2. (ASIIN 4.1) It is recommended to continue increasing the number of teaching staff with preliminary industrial experience and specific expertise in the field of electrical engineering.

G Comment of the Technical Committees

Technical Committee 01 – Mechanical and Process Engineering (16.03.2016)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses recommendation number 2 which indicates that the number of staff members with practical working experiences and specific expertise in the field of electrical engineering should be increased. However, the members of the Committee wonder how the teaching and learning can be implemented successfully if these competences seem to be lacking for most staff members. The Technical Committee sees the quality of teaching and learning hampered if only few staff members have practical working experiences or specific knowledge in the field of electrical engineering. Hence, the Technical Committee suggests changing this recommendation into a requirement.

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 01.

The Technical Committee 01 – Mechanical and Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Bachelor Mechanical Engineering	Without requirements	EUR-ACE®	30.09.2021
Master Industrial Engineering	With requirements	EUR-ACE®	30.09.2021

Requirements

For the Master

- A 1. (ASIIN 1.1, 1.2) Ensure that the English language documentation, in particular the Diploma Supplement, makes transparent that the programme differs from what is commonly understood as industrial engineering (as engineering and management.

For the Bachelor Industrial Electronics and Automation Engineering

A 2. The University has to present a concept which outlines how and when the number of lecturers with practical working experiences and specific knowledge in the field of « Electrical Engineering » will be increased.

Recommendations

For all programmes

E 1. (ASIIN 5.1) The University is encouraged to continuously improve the quality and consistency between all language versions as well as completeness of information of the module descriptions.

Technical Committee 02 – Electrical Engineering and Information Technology (18.03.2016)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee fully agrees with the peers assessment and recommended resolution without any changes.

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

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

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

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Bachelor Industrial Electronics and Automation Engineering	Without requirements	EUR-ACE®	30.09.2021
Master Industrial Engineering	With requirements	EUR-ACE®	30.09.2021

Technical Committee 06 – Industrial Engineering (18.03.2016)

Assessment and analysis for the award of the ASIIN seal:

The technical committee discusses the procedure. As the study program at hand differs from what is commonly understood as “Industrial Engineering” the technical committee 06 declares itself as not competent for a content related assessment. Nevertheless it thinks that the English documentation should make transparent that in fact a mechanical engineering program is offered. Therefore the technical committee supports the relevant requirement 1.

H Decision of the Accreditation Commission (08.04.2016)

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

The Accreditation Commission discussed the programmes. In particular, the commission discussed the suitability and availability of teaching staff in the field of electrical engineering. The Commission decided to follow the assessment of the panel and the Technical Committee Electrical Engineering and Information Technology and considered that the composition of staff was sufficient but recommended to enhance it in terms of specific expertise.

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

The Accreditation Commission deemed that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committees 01 and 02.

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

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Bachelor Mechanical Engineering	Without requirements	EUR-ACE®	30.09.2021
Bachelor Industrial Electronics and Automation Engineering	Without requirements	EUR-ACE®	30.09.2021
Master Industrial Engineering	With requirements	EUR-ACE®	30.09.2021

Requirement

For the Master

- A 1. (ASIIN 1.1, 1.2) Ensure that the English language documentation, in particular the Diploma Supplement, makes transparent that the programme differs from what is commonly understood as industrial engineering (as engineering and management.

Recommendations

For all programmes

- E 1. (ASIIN 5.1) The University is encouraged to continuously improve the quality and consistency between all language versions as well as completeness of information of the module descriptions.

For the Bachelor Industrial Electronics and Automation Engineering

- E 2. (ASIIN 4.1) It is recommended to continue increasing the number of teaching staff with preliminary industrial experience and specific expertise in the field of electrical engineering.

Appendix: Programme Learning Outcomes and Curricula

According to the website of the Polytechnic School of the University of Lleida the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Mechanical Engineering:

The degree in Mechanical Engineering provides graduates with access to professional opportunities in:

- Construction, assembling and maintenance of any kind of engines or industrial plants in the mechanical field.
- Designs and tests of new products or machine elements with CAD programmes.
- Studies of finite elements using CAE programmes, simulations and manufacturing special pieces and prototypes.
- Robot programming and obtaining numerical control programmes with CAM systems.
- Taking part in the fields of management, organization, planning, quality and environment and in the commercial area of companies related with these kinds of activities.
- Work in the public administration, teaching, research and technology transfer.
- Free professional practice (project development, technical studies, legalization, etc.).

The following **curriculum** is presented:

1st COURSE (60 credits)				
Code	Subject	Type	Semester	Credits
102101	Calculus	FB	1	9
102104	Physics 1	FB	1	6
102107	Chemistry	FB	1	6
102106	Graphic Expression 1	FB	1	9
102100	Linear Algebra	FB	2	6
102105	Physics 2	FB	2	6
102108	Business Management	B	2	6

102109	Computer Science Basics	FB	2	6
102113	Materials Science	FB	2	6

2nd COURSE (60 credits)

Code	Subject	Type	Semester	Credits
102102	Numerical Methods	B	1	6
102110	Theory of Mechanisms	B	1	6
102111	Thermal Engineering 1	B	1	6
102116	Electrical Engineering Basics	B	1	6
102118	Environmental Technologies and Sustainability	B	1	6
102103	Statistical Methods	B	2	6
102112	Fluid Mechanics	FB	2	6
102114	Electronic Engineering Basics	B	2	6
102115	Industrial Automation	FB	2	6
102305	Elasticity and Strength of Materials 1		2	6

3rd CURSE (60 crédits)

Code	Subject	Type	Semester	Credits
102117	Production Management	B	1	6
102301	Thermodynamics Engineering 2	B	1	6
102303	Theory of Machines	B	1	6
102306	Elasticity and Strength of Materials II	B	1	6
102308	Materials for Mechanic Manufacturing	B	1	6
102302	Fluids Engineering	B	2	6
102304	Calculus and Machine Design	B	2	6
102307	Theory of Structures and Industrial Construction	B	2	6
102309	Manufacturing Technologies	B	2	6
102310	Graphic Expression II	O	2	6

4rt COURSE (60 credits)

Code	Subject	Type	Semester	Credits
102314	Internship	B	1	15
102119	Technical Projects	O	1	6
	Optative 1	O	1	6
	Optative 2	B	2	6

	Optative 3	B	2	6
102315	Bachelor Thesis	O	2	15
	University activities (Cross-curricular Subject)	O	2	6

Optative subjects

Sustainable construction:

- Sustainable Construction 1
- Sustainable Construction 2
- Sustainable Construction 3

Services:

- Services 1
- Services 2
- Services 3

Mechatronics:

- Mechatronics 1
- Mechatronics 2
- Mechatronics 3

According to the website of the Polytechnic School of the University of Lleida the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Industrial Electronics and Automation Engineering:

The degree in Industrial Electronics and Automation Engineering allows a graduate to obtain management, organization and planning positions in a number of areas. In technical terms it enables them to carry out studies, analysis and design of technological systems in the field of electronics and control.

This professional profile allows the following professional opportunities:

- Technical and managing positions in companies within the industrial field and services.
- Technical, commercial, management and leading positions in all sectors where electronics and automation engines interfere.
- Management, organization, planning, quality and environment in the companies related with this kind of activities.
- Public administration, teaching and innovation.

- Development of control systems and factory automatization, robotic devices and artificial vision systems.
- Design of electronic circuits, domotic systems and design of applications with microchips.
- Studies of renewable energies, sustainability and environment.
- Analysis and development of electrical and electronic circuits, control techniques and industrial automatization.
- Carrying out and implementation of projects in the area of industrial IT, instrumentation and monitoring.
- Design, construction and supervision of control systems, analogue electronics, digital power.

The following **curriculum** is presented:

1st COURSE (60 ECTS)					
Code	Subject	Type	Semester	Credits	
102104	Physics 1	FB	1	6	
102101	Calculus	FB	1	9	
102106	Graphic Expression 1	FB	1	9	
102107	Chemistry	FB	1	6	
102105	Physics 2	FB	2	6	
102100	Linear Algebra	FB	2	6	
102108	Business Management	B	2	6	
102109	Computer Science Basics	FB	2	6	
102113	Materials Science	FB	2	6	

2nd COURSE (60 ECTS)					
Code	Subject	Type	Semester	Credits	
102102	Numerical Methods	B	1	6	
102110	Theory of Mechanisms	B	1	6	
102111	Thermal Engineering 1	B	1	6	
102116	Electrical Engineering Basics	B	1	6	
102118	Environmental Technologies and Sustainability	B	1	6	
102103	Statistical Methods	B	2	6	
102112	Fluid Mechanics	FB	2	6	

2nd COURSE (60 ECTS)

Code	Subject	Type	Semester	Credits
102114	Electronic Engineering Basics	B	2	6
102115	Industrial Automation	FB	2	6
102128	Circuit Theory	B	2	6

3rd COURSE (60 ECTS)

Code	Subject	Type	Semester	Credits
102117	Production Management	B	1	6
102120	Digital Electronics	B	1	6
102121	Signals and Systems	B	1	6
102124	Basics of the Control Theory	B	1	6
102123	Analogue Electronics	B	1	6
102122	Power Electronics	B	2	6
102125	Discrete Processes	B	2	6
102126	Industrial Instrumentation	B	2	6
102127	Control and Robotics System Design	B	2	6
102129	Industrial Computing	O	2	6

4th COURSE (60 ECTS)

Code	Subject	Type	Semester	Credits
102139	Internship	B	1	15
102119	Technical Projects	O	1	6
	Optative 1	O	1	6
101434	Cross-Curricular Subject	B	1	6
102140	Bachelor Thesis	B	2	15
	Optative 2	O	2	6
	Optative 3	O	2	6

Optative subjects

- 102130 - Systems Integration 1
- 102131 - Systems Integration 2
- 102132 - Systems Integration 3

- 102133 - Programming and Communications 1
- 102134 - Programming and Communications 2
- 102135 - Programming and Communications 3
- 102136 - Mechatronics 1
- 102137 - Mechatronics 2
- 102138 - Mechatronics 3

According to the website of the Polytechnic School of the University of Lleida the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme:

- Having a solid scientific and technological knowledge on: mathematical, analytical and numerical methods in engineering, electrical engineering, energetic engineering, chemical engineering, mechanical engineering, mechanics of continuous media, industrial electronics, automation, manufacturing, materials, quantitative methods of management, industrial computing, urban planning, infrastructures, etc.
- Projecting, calculating and designing products, processes, installations and plants.
- Directing, planning and supervising multidisciplinary teams.
- Conducting research, development and innovation of products, processes and methods.
- Carrying out strategic planning and applying it to construction, production, quality and environmental management systems.
- Managing technically and economically projects, installations, plants, companies and technology centres.
- Capacity to perform general direction, technical direction and the direction of RDI projects in plants, companies and technology centres.
- Applying acquired knowledge and solving problems in new and little known environments in wider and multidisciplinary contexts
- Capacity to integrate knowledge and face the complexity of making judgments on the basis of information which being incomplete or limited includes reflections about social and ethical responsibilities.
- Capacity to communicate conclusions clearly and concisely, underlying knowledge and reasons to a specialised and non-specialised audience.
- Having learning abilities which allow students to continue studying in a self-directed and autonomous manner.
- Knowledge, comprehension and capacity to apply the necessary legislation for the professional practice of an industrial engineer.

The following **curriculum** is presented:

FIRST COURSE (60 credits)

Code	Subject	Module	Semester	Credits
14520	Generation and Distribution of Energy	I	1	6
14523	Unit Operations of Chemical Processes	I	1	6
14526	Electrical Installations and HVAC Systems	II	1	6
14530	Industrial organization 1	III	1	6
	Optional 1	IV	1	6
14521	Advanced Manufacture Systems	I	2	6
14522	Machine Design and Testing 1	I	2	6
14528	Industrial Structures 1	II	2	6
14531	Industrial Organization 2	III	2	6
	Optional 2	IV	2	6

SECOND COURSE (60 credits)

Code	Subject	Module	Semester	Credits
14354	Thermal and Hydraulic Machines	I	1	6
14355	Electronics and Control Systems Design	I	1	6
14357	Control, Certifications and Auditing	II	1	6
14359	Business Administration	III	1	6
14362	Project and Human Resource Management	III	1	6
	Optional 3	IV	2	6
	Optional 4	IV	2	6
14370	Master Thesis	V	2	18

Optional Subjects

- 14535 - Structural and Mechanic Analysis
- 14534 - Thermohydraulics
- 14536 - Systems Engineering
- 14537 - Feedback Control
- Energetic systems
 - 14538 - Electric machinery in industry
 - 14540 - Analysis of industrial thermal equipment
- Mechanical systems

- 14539 - Design of metal structures (not offered)
 - 14541 - CAE studies of machinery (not offered)
- Control systems
 - 14542 - Industrial Instrumentation
 - 14543 - Dynamic and control systems
- 14368 - Mobility I
- 14369 - Mobility II