ASIIN Seal & European Labels

Accreditation Report

Master's Degree Programs
Industrial Engineering
Informatics Engineering

Provided by
Universitat de Lleida (UdL)

Version: 18 March 2022

Table of Content

A About the Accreditation Process

Name of the degree program (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Máster en Ingeniería Industrial (MEIND)	Master's degree in Industrial Engineering	ASIIN, EUR-ACE®	08.04.2016 – 30.09.2021, ASIIN	06
Máster en Ingeniería Informática (MEINF)	Master's degree in Informatics Engineering	ASIIN, Euro-Inf®	08.04.2016 – 30.09.2021, ASIIN	04
Date of the contract: 17.05.2021 **Submission of the final version of the self-assessment report:** 25.12.2021 **Date of the onsite visit:** 14-16 February 2022 **at:** Universidad de Lleida				
Peer panel: Prof. Dr. Jörg Desel, FernUniversität Hagen Prof. Dr. Eduardo Vendrell Vidal, Universitat Politècnica de València Prof. Dr. Christian Brauweiler, University of Applied Sciences Zwickau Axel Haas, German Association for Engineering Management Antoni Mestre Gascón, Universitat Politècnica de València				
Representative of the ASIIN headquarter: Sophie Schulz				
Responsible decision-making committee: Accreditation Commission				
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 10, 2015				

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

[2] TC: Technical Committee for the following subject areas: TC 04 - Informatics/Computer Science; TC 06 - Engineering and Management, Economics.

Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018 Subject-Specific Criteria of Technical Committee 06 – Engineering and Management, Economics as of September 20, 2019	

- Various kinds of well working collaboration
- Very satisfied stakeholders
- Dual degree works very well in practice and is very attractive for all stakeholders

Room for improvement

- Improve their web presence (includes better advertisement and presentation of the benefits of this university)
- The actual workload of the final thesis in informatics should be evaluated
- As an extra plus: engage more in interdisciplinary collaboration between the two programs
- Academic level

B Characteristics of the Degree Programs

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/ Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Industrial Engineering	Master of Science, M.Sc.	/	7	Full time / part time	/	4 semesters	120 ECTS	Per year, 2014-15
Informatics Engineering	Master of Science, M.Sc.	• Enterprise Resource Planning Systems • Big Data Analytics • Video Game Development • Enterprise Integrated Projects	7	Full time / part time	/	3 semesters	90 ECTS	Per year, 2011-12

For the master's degree program Industrial Engineering, the institution has presented the following profile on the website:

„The Master in Industrial Engineering at the University of Lleida enables the profession of industrial engineer to be exercised. The Master also equips our students with the skills, aptitudes and attitudes necessary to direct and make innovative projects in the area of industrial engineering a reality, essential today for both local, national and international companies.

The modality of delivery of the Master in Industrial Engineering studies is face-to-face, even so, a design of the schedules and training activities aimed at students who cannot attend classes regularly together with personalized attention make it easier for you to follow the classes and your own learning process, making it possible to combine your studies with other activities in the world of work.

All this, we will do with a team of motivated teachers to help you in the learning process; with a curriculum that emphasizes practical and innovative aspects, and that offers you the opportunity to work for a few months in an industrial company.

Duration of the master's degree: 120 ECTS (2 academic years).“

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

For the master's degree program Informatics Engineering, the institution has presented the following profile on the website:

„The Master in Computer Engineering is a professional master's degree that provides our students with the competencies and skills to practice the profession of Computer Engineer.

The Master in Computer Engineering brings you in a totally practical way to the most innovative methodologies and technologies in the different areas of computer science, at the same time that it will prepare you to integrate into large computer projects as well as direct, coordinate and plan them.

Likewise, the training complements of the Master provide our students with solid scientific and technological foundations that enable them to carry out R + D + I activities. The modality of delivery of the studies of the Master in Computer Engineering is face-to-face, even so, a design of the schedules and training activities aimed at students who cannot attend classes regularly together with personalized attention make it easier for you to follow up the classes and your own learning process, making it possible to combine your studies with other activities in the world of work.

All this, we will do with a team of motivated teachers to help you in the learning process; with a curriculum that emphasizes practical and innovative aspects, and that offers you the opportunity to work for a few months in a computer company.“

C Peer Report for the ASIIN Seal[4]

1. The Degree Program: Concept, content & implementation

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

Evidence:

- Website per program
- Objective-matrix per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
In Spain, bachelor's and master's degrees are regulated by Royal Decree. In addition, the Spanish government establishes specific rules for the degrees of the so-called "regulated professions", as is the case for engineering degrees. These professions have specific legislation that defines the skills graduates must have acquired at the end of their studies.

The Polytechnic School has described and published program objectives and program learning outcomes for both degree programs under review. The peers approve that for each program a detailed presentation of learning outcomes and graduates' profiles is given in combination with learning outcome matrices matching the described learning outcomes with the respective modules of the programs. The informative websites contain brief but explicit descriptions of the programs objectives, clearly stating the professional fields and specializations of the offered degree programs as well as program particularities. The peers acknowledge that the learning outcomes and corresponding curricula were developed jointly not only with university representatives but also with externals stakeholders, in particular industries and alumni, in order to adapt the profiles of the graduates according to the needs of the industry. Moreover, the School has aligned the program objectives with the subject-specific criteria of ASIIN and the EUR-ACE® standards.

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

Regarding the Industrial Engineering program, the panel learns that the profile of the program is a transversal one, deepening the competences of graduates from different bachelor's degree programs in the area of technical industrial engineering, in particular mechanical and electrical engineering. Based on the specific direction of the program, the panel finds engineering competences in the fields stipulated by the EUR-ACE Framework Standards. Knowledge and understanding is 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 is in line with engineering analysis.

Concerning the Informatics Engineering program, the panel discusses with the program coordinators the professional orientation of the program and to which extent theoretical and research oriented aspects are included. The program coordinators point out that they established and maintain close relationships with regional companies in order to meet the labor market requirements for graduates. Therefore, the offered specializations as well as transversal and transferable competences such as project and team work or English language skills played a key role in the development of learning objectives and the design of the curriculum. Nevertheless, the school with its four research groups and their relatively high research activities in cooperation with local companies fosters research activities by including theoretical parts and by offering work placements in one of the research groups as an elective within the program.

In summary, the objectives and learning outcomes of the degree programs are clear, plausible and cover all aspects that can be expected from a program in the respective field. The peers learn that the graduates of both programs are much sought after in the labor market. The representatives of industry emphasize the high quality of the graduates and students as well as graduates are highly satisfied with and well aware of their very good job perspectives. In summary, the peers confirm that the programs adequately reflect level 7 of the European Qualification Framework (EQF). The program objectives and learning outcomes aim at the acquisition of specific competences and are well-anchored, binding and easily accessible to all stakeholders.

Criterion 1.2 Name of the degree program

Evidence:

- Website per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The peers learn that the titles of the engineering degree programs are strictly regulated by national regulation, leaving no room for maneuver. Overall, they consider the names of the study programs to be adequately reflecting the respective aims, learning outcomes, and curricula.

Regarding the Industrial Engineering program, it should be noted that the title differs from its use in the rest of the world. The "Industrial Engineer" is a regulated profession in Spain, and professionals are authorized to sign projects. In addition, it aims at expanding engineering skills in different fields. It differs in concept, knowledge and skills from the title of "Industrial Engineer" in other countries, which focus rather on management.

Criterion 1.3 Curriculum

Evidence:

- Website per program
- Study plans per program
- Objectives-matrix per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The curricula of both study programs under consideration are reviewed by the panel in order to identify whether the described program objectives and learning outcomes can be achieved by the available modules. Course descriptions as well as overviews and objectives matrices matching the general learning objectives and the module contents were provided for a thorough analysis. In the self-assessment report, the university gives a detailed overview of how the competences acquired with the presented curricula match the individual EUR-ACE or Euro-Inf learning outcomes, respectively. A detailed curricular overview of each study program can be found in the appendix of this document.

The Industrial Engineering program comprises two academic years (four semesters) during which the students acquire 120 ECTS in total, of which 78 ECTS are core/compulsory subjects, and 24 ECTS elective subjects. Among the elective subjects, 12 ECTS correspond to levelling courses according to the access degree of each student, while the remaining 12 are grouped into five blocks of various topics. Finally, 18 ECTS are allocated for the final project. The panel understands that the program is in line with the defined objectives and includes content aimed at deepening and broadening students engineering competences both in the subject area of their previous education (bachelor's) 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 program does not have objectives in engineering and management, several modules aim at fostering general management skills.

The Informatics Engineering program comprises three semesters during which the students acquire 90 ECTS. 12 ECTS are allocated for the final project. Although the program and the competence profile have not changed over the accreditation period, the content of the subjects has been adjusted to the reality of the market and to the fast technological and scientific progress. Thus, new electives are offered that focus on cutting-edge topics such as Data Science and Big Data, which the peers welcome. Students of this program can between the four specialties: Enterprise Resource Planning Systems, Big Data Analytics, Video Game Development, and Enterprise Integrated Projects. The panel notes a clear matching of the overall objectives and intended learning outcomes with curricular contents stated in the module descriptions.

All in all, the peers have a very good impression of the curricula of both programs. By thoroughly analyzing the module descriptions and following the discussions during the on-site visit, the peers state that the programs are coherent, well structured and cover the essential topics in the respective field, enabling also an individual profile building through various elective courses. The panel especially commends the dual training possibility for all full-time students. In cooperation with selected partner companies students complete a paid internship and certain parts of the chosen specialization are conducted in the respective company as well. During academic periods, students will combine their training by developing tasks in the company (4 hours daily) and taking classes at the university (4 hours daily) in the afternoon. Special training plans developed for each student by the school ensure the achievement of the intended learning outcomes in order to obtain the degree. The peers are happy to learn that the dual training works very well in practice and that it is very attractive for all stakeholders (and particularly students from abroad).

Criterion 1.4 Admission requirements

Evidence:

- Website per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

The admission requirements are published on the website and are thereby accessible for all potential students or other stakeholders. The panel acknowledges that university level rules and regulations formally stipulate the admission requirements and process.

The Industrial Engineering program builds up consecutively on all bachelor's program offered at the School, which means that applicants have to have completed a degree entitling them to carry out the profession of technical industrial engineer (as is the case for all bachelor's programs offered by the School). Students with other bachelor's 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 peers learn that since the program trains for a regulated profession, it is nearly impossible for foreign students to be accepted, as the strict regulations by the government usually open the degree only for those who have completed a bachelor's degree at a Spanish university. The peers welcome that, in order to overcome this situation, double international degree programs have been established so that students can obtain a Spanish degree, which provides access to the master's degree program.

For the Informatics Engineering program, an undergraduate degree in the disciplines of Computer Engineering or Technical Computer Engineering is required. Students without a bachelor's degree in (Technical) Computer Engineering may also access the master's program, if they take additional or pre-modules in order to obtain the missing key competences in Computer Engineering. These would be reviewed and decided upon on a case-by-case basis by a designated committee.

In summary, the auditors find the terms of admission to be binding and transparent. They conclude that the admission requirements fully ensure that the programs can be implemented without any delays or without decreasing the overall level due to extremely different backgrounds.

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

[…]

2. The degree program: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Module descriptions per program
- Study regulations per program
- Self-assessment report

- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
After analyzing the module descriptions and the curricula, the peers confirm that both degree programs are divided into modules and that each module is a sum of coherent teaching and learning units. The curricula are designed so that students acquire 30 ECTS per semester. The peers appreciate the clearly presented structure of the degree programs on their websites and consider the layout of the programs and the individual modules useful in order to achieve the overall intended learning outcomes. Both programs include specialization options and various elective courses, which allow students to develop an individual profile and to arrange their syllabus accordingly. The students are satisfied with the range of specializations and electives.

The two programs prepare the students well for their later professional life by different means: Generally, the projects for the final thesis are usually directly related to practical issues of professional life and can be undertaken at a university research group, a company or a foreign university. There are voluntary internships and very good relations with local and international enterprises. The School has established and maintained relationships with many future employers that offer paid internships and trainee programs. Both employers and students seem very satisfied with such possibilities. Within both programs, several projects, lab works and other practical exercises are included in the curricula.

The School has built up a good network of international cooperation so that students are given the opportunity to do an exchange, double degree or international internship in order to broaden their horizon and to define a more specific focus of study. The peers learn that the number of students taking such international opportunities is rather low in the master's program, as most students go abroad during the bachelor's, which the peers find plausible. However, the peers are happy to hear that several students are currently doing a double degree with the Institut Teknologi Bandung (ITB) in Indonesia. They also welcome that the number of foreign students studying at UdL as regular students (not exchange students) has increased in recent years.

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

Criterion 2.2 Workload and credits

Evidence:

- Module descriptions per program

- Study plans per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The university applies the European Credit Transfer System (ECTS) for the allocation of credit points per module. The allocation of ECTS credits to the lectures, practical sessions and self-study periods of the modules appears plausible. The workload documentation clearly states the teaching load distribution between lectures and independent student work and is made transparent in the module descriptions. The defined practice of continuous assessment further described under criterion 3 avoids structure-related peaks in the workload and enables students to complete the degree without exceeding the regular course duration. The peers very much welcome that the schedules are closely aligned with students' needs. As most students work during the day (be it because of the dual degree or because of other side jobs), all classes take place in the afternoon/evening.

From the feedback of students and graduates, the panel learns that the workload overall corresponds to the related ECTS credits. Generally, the panel notes that students are aware of the expected workload based on the information in the module descriptions and oral explanations from staff.

The panel acknowledges that the estimated time budgets are reassessed in the frame of student surveys at the end of each module. The students confirm that measures would be taken if an inadequate high workload was identified. The progression and completion rates of both programs do not indicate any significant deviations from the expected times.

Overall, the peers believe the overall workload to be adequate and manageable. The only thing they would like to point out is the workload assigned to the final thesis of the Informatics Engineering program. By the time of the on-site visit, only 12 ECTS are allocated for the thesis (while 18 ECTS in Industrial Engineering), although the scope of the thesis is similar to that of other, usual theses in Europe, which often comprise 30 ECTS. The reviewers would therefore appreciate if the actual workload of the final thesis could be reviewed again.

Criterion 2.3 Teaching methodology

Evidence:

- Self-assessment report
- Module descriptions per program
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The peers learn that teachers involved in the two programs under review apply a wide range of teaching methodologies and various student-centered learning methods. The panel ascertains that many staff members include interactive elements in their classes whenever student numbers allow so, for example flipped classroom, reflective teaching and the use of case studies. Over the last few years, the School has been focusing on Project-Based Learning (PBL) as an integral, core methodology of its programs. The peers acknowledge that this methodology serves as a good preparation for the students' subsequent professional life, as they are expected to apply their knowledge in a concrete way to solve a real practical case and to integrate the subjects in the resolution of a larger project. 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 peers consider the teaching methodology employed in the degree programs to be diverse, interactive and to show a healthy mixture between traditional and modern/alternative methods. They are well adapted to the aims and conditions of the individual courses and suitable to support the students in achieving the intended learning outcomes.

Criterion 2.4 Support and assistance

Evidence:

- Information provided about the mentoring system "NESTOR"
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The support and assistance of students is considered a very strong point of the programs and the School as a whole. The panel welcomes the close, friendly and trustful relationship between students and teaching staff. They also positively acknowledge that teaching staff was very accessible and helpful for students' requests, also outside the designated weekly opening hours. All lecturers seem very engaged and motivated to ensure a good implementation of the programs.

In addition to the direct contact, an institutional mentoring system (NESTOR) is in place, which is highly appreciated by the different stakeholders.

Employers and graduates also demonstrate 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:

[…]

3. Exams: System, concept and organization

Criterion 3 Exams: System, concept and organization

Evidence:

- Study regulations
- Academic regulations
- Module descriptions per program
- Sample exams, projects, and final theses
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
For the examination of the students' achievement, each course determines course objectives to support the achievement of the program learning outcomes of the respective program. Accordingly, each course must assess whether all defined learning outcomes stated in the module description have been achieved. For this purpose, the School utilizes various types of examination.

Each course-content in the reviewed study programs is reflected in exams, which take place in the form of continuous assessment, as they are divided into subject-specific assignments, mid-term examinations, and final examinations. In each course, at least two assignments, a mid-term and a final examination are employed, as specified by the national regulations. There are different assessment methods in the programs, such as written exams, projects, lab works, assignments, presentations/oral examinations, experiments or case studies.

The final course grade is calculated based on the score of these individual assessments, whereby the lecturer determines the ratio between them in accordance with the academic regulations. All guidelines relevant for the exams as well as the forms of examination and the composition of the final grade must be determined by June, i.e. before the semester starts, and cannot be changed afterwards. At the first meeting of a course, the students are informed about what exactly is required to pass the module and about how the final grade is determined.

The panel as well as the students welcome the above-described kind of continuous learning assessment as it allows a close monitoring of the students' learning progress and encourages students' motivation throughout the semester. By way of helping students to consciously assess their actual state of knowledge, the assessment procedure at the same time contributes to an adequate exam preparation. The organization of exams guarantees examinations that avoid delay to students' progressions. The relevant rules for examination and evaluation criteria are transparently put into a legal framework, as both students and lecturers confirm. The date and time of the exams are announced in due time in the academic calendar. Possibilities to re-sit exams are considered adequate in terms of a study progression without undue delay – confirmed by the students during the visit.

During the on-site visit, the peers are provided with a selection of exams and final theses to check. They confirm that these represent an adequate level of knowledge as required by the EQF level 7. Nevertheless, they would like to point out that when reviewing the final theses, it is noticeable that they are very practice-oriented and tailored to the expertise of the companies. Even if the cooperation with companies in the context of the thesis is generally welcomed, the peers emphasize that the academic level and the scientific claim should be the focus in the theses.

In conclusion, the peers note that all relevant examination regulations are in place and well communicated in a transparent way. The forms of examination are oriented toward the envisaged learning outcomes of the respective courses, and the workload is distributed in an acceptable way.

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

[…]

4. Resources

Criterion 4.1 Staff

Evidence:

- Staff overview (including teaching, research projects, and publications)
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
On the basis of the qualification profiles of the participating teaching staff, the experts determine that the curricula of the study programs are covered by well-qualified staff. The Industrial Engineering program is implemented by 34 teaching staff members by the time of the on-site visit, of which 23 hold a PhD (7 are professors). Similarly, 33 teaching staff members are involved in the Informatics Engineering program, of which 21 hold a PhD (5 are professors). The regular staff members are supported by adjunct lecturers and external experts, who are mostly professionals from companies the School collaborates with. The teaching load of the individual staff is highly dependent on other responsibilities, in particular research and administrative tasks.

The peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programs. The auditors are impressed by the excellent and open-minded atmosphere among the students and the staff members. Both confirm that in case of questions or problems, there is always an academic advisor available to solve the issues together with the student. The academic staff is supported by the administrative and technical employees at department, faculty, and university level.

Criterion 4.2 Staff development

Evidence:

- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
In the self-assessment report, the School provides a comprehensive list of resources and activities linked to staff development, in particular teaching and research activities. Each year, the University Teacher Training Service offers a training plan for the teachers with the aim of improving the activity of university teaching staff as a whole, taking into account that it includes teaching and tutorial action but also research and management. Teachers can also receive a wide range of support from the Unit of Support and Advice for Teaching Activity, which is responsible for advising and supporting the university's face-to-face and online teaching-learning processes. This unit promotes teaching innovation processes and the use of information and communication technologies in face-to-face and non-face-to-face teaching-learning processes, with the aim of achieving high levels of pedagogical quality. During the on-site visit, the peers learn that teaching is evaluated every five years on a voluntary basis, i.e. when the teacher applies for it. According to the program coordinators and teachers, this serves as a strong incentive for the teachers to do good teaching and to

encourage them to regularly participate in didactical training. The university also announces an annual call for innovative teaching methodologies. Next to didactical training services, UdL also has a wide range of funding and support programs for teachers to enhance their scientific and research skills.

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

Criterion 4.3 Funds and equipment

Evidence:

- Self-assessment report
- Discussions during the on-site visit
- Inspection of laboratories and other facilities during the on-site visit

Preliminary assessment and analysis of the peers:
The University of Lleida is one of seven Catalan public universities that receive funding from the regional government. The Catalan government annually sets the public prices for university studies and thus the basic source of income for public universities. In the self-assessment report, the School gives a detailed overview of its infrastructure and the available learning spaces, labs, libraries as well as software and licenses.

Spanish universities have been facing economic restrictions since the global economic crisis of 2008. Compared to the EU average (which is 1.27 %), Catalonia devotes only 0.715 % of its GDP to universities. The School has coped with this situation mainly through collaborations with the industry and by aiming at increasing the number of its students (also from abroad). The peers get the impression that the financial resources are overall sufficient in order to implement the study programs successfully. Cooperation with the local and regional industry seems to be working on a well-established basis and the fostering of the dual training has strengthened collaborations with industry once more.

During the on-site visit, the peers inspect different facilities of the School, such as laboratories, classrooms, lecture halls and also central facilities, such as the library. The peers confirm that the resources for teaching and learning, in particular classrooms, computer rooms, laboratories and the library are well maintained and adhere to high international standards. The premises are spacious and offer ample opportunities for the professional and individual development of students and teachers. The students confirm that they are provided with all relevant software and are given easy access to rooms and equipment.

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

[…]

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions per program

Preliminary assessment and analysis of the peers:
The module descriptions are published on each program's website in English, Catalan and Spanish, so that students and stakeholders can access them at any time.

After studying the module descriptions, the peers confirm that they generally include all necessary information about the persons responsible for each module, the teaching methods and work load, the credit points awarded, the intended learning outcomes, the applicability, the admission and examination requirements, and the forms of assessment as well as details explaining how the final grade is calculated. However, when analyzing the descriptions in detail, one can find several small inconsistencies between the different language versions and also depending on the document (module descriptions on the website vs. those provided to the peers or anchored in other documents). In some cases, the module descriptions are not always identical, although the inconsistencies relate mostly to formal or language issues rather than content. The peers therefore encourage the School to improve the quality and consistency of the module descriptions and to review them on a regular basis.

Another point that stands out when looking closely at the module descriptions is that the learning outcomes of the individual modules are often described with "to know/knowledge" or "be capable/capacity", which do not indicate competencies acquired at master's level. The peers therefore recommend adapting the learning outcomes more closely to the intended level, as classified by Bloom's taxonomy.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample graduation certificate per program
- Sample diploma supplement per program

- Sample transcript of records per program

Preliminary assessment and analysis of the peers:
With the successful completion of their studies, the students receive a graduation certificate, a transcript of records, and a diploma supplement. The diploma supplements are trilingual (Catalan, Spanish and English) and contain all relevant information on the student's qualifications profile and individual performance as well as the classification of the degree program with regard to its applicable education system.

Criterion 5.3 Relevant rules

Evidence:

- UdL academic regulations (including admission regulations)
- Study regulations per program
- Regulations for assessment and grading

Preliminary assessment and analysis of the peers:
The peers confirm that the rights and duties of both the university and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence are available to all relevant stakeholders. The panel points out that many of the documents are only available in Catalan, though the most important regulations (academic regulations, study and examination regulations) are also available in English. In light of the desired internationalization and the number of foreign students, it would be useful to make all relevant rules available in English for information purposes, even when the Catalan version would remain legally binding.

The students confirm that they receive all relevant course materials and information at the beginning of each semester and generally commend the high level of transparency.

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

[…]

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Presentation of the internal quality assurance system
- Improvement plans
- Examples of follow-up reports of the internal quality assurance system
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
From the self-assessment report, it becomes obvious that the university has a multi-faceted quality management system that aims at a constant development and improvement of the procedures, the programs and all individual stakeholders. The university applies both external and internal quality assurance. The external quality assurance is implemented by the Catalan accreditation agency AQU and international accreditation, while UdL's internal quality assurance is managed mainly on faculty level.

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 program, which include tasks for improvement. The implementation of these is governed by the Quality Monitoring Committee. The panel appreciates that regular follow-up of the quality activities is in place. On the one hand, students are informed about the results of the surveys, and on the other hand, the responsible management of the School follows up on the evaluation of staff members when necessary. Additionally, the aggregated results of surveys and statistics are also published on the website.

Next to the official surveys, there are also rather informal instruments that students use in order to give feedback. For example, each class elects a student representative who meets with the teachers on a regular basis (normally once a semester). Students and teachers alike also value the direct, bilateral feedback that students frequently make use of, which is often more meaningful than formal surveys. Overall, the panel commends that the close relation between students and teachers contributes to an atmosphere of confidence.

Summarizing, the peers are convinced that the university has a well-functioning quality management system, which includes a broad range of instruments and ensure a constant revision and improvement of the study programs. As a concluding remark, the peers would like to point out that the School should keep on improving its web presence. The School has a lot to offer for its students and employees, and it should therefore better advertise its services and benefits over other universities. This also includes its achievements in research and innovation. Such measures could also attract more prospective students.

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

[…]

D Additional Documents

Not required.

E Comment of the Higher Education Institution (08.03.2022)

The university refrains from commenting as it fully agrees with the report.

F Summary: Peer recommendations (04.03.2022)

The peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Program	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ma Industrial Engineering	Without requirements	30.09.2029	EUR-ACE®	Depending on the decision of the ENAEE Administrative Council
Ma Informatics Engineering	Without requirements	30.09.2029	Euro-Inf®	30.09.2029

Recommendations

E 1. (ASIIN 5.2) The School is encouraged to continuously improve the quality and consistency between all (language) versions of the module descriptions.

E 2. (ASIIN 5.2) It is recommended to adapt the learning outcomes more closely to Bloom's taxonomy.

G Comment of the Technical Committees

Technical Committee 04 – Informatics/Computer Science (08.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the decision of the peers without any changes.

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

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

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

Degree Program	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ma Informatics Engineering	Without requirements	30.09.2029	Euro-Inf®	30.09.2029

Recommendations

E 1. (ASIIN 5.2) The School is encouraged to continuously improve the quality and consistency between all (language) versions of the module descriptions.

E 2. (ASIIN 5.2) It is recommended to adapt the learning outcomes more closely to Bloom's taxonomy.

Technical Committee 06 – Engineering and Management, Economics (10.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the decision of the peers 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 program do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 06 – Engineering and Management, Economics.

The Technical Committee 06 – Engineering and Management, Economics recommends the award of the seals as follows:

Degree Program	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ma Industrial Engineering	Without requirements	30.09.2029	EUR-ACE®	Depending on the decision of the ENAEE Administrative Council

Recommendations

E 1. (ASIIN 5.2) The School is encouraged to continuously improve the quality and consistency between all (language) versions of the module descriptions.

E 2. (ASIIN 5.2) It is recommended to adapt the learning outcomes more closely to Bloom's taxonomy.

H Decision of the Accreditation Commission (18.03.2022)

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

The Accreditation Commission discusses the procedure and follows the decision of the peers and the Technical Committees without any changes.

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

The Accreditation Commission deems that the intended learning outcomes of the degree program do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 06 – Engineering and Management, Economics.

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

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

The Accreditation Commission decides to award the following seals:

Degree Program	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ma Informatics Engineering	Without requirements	30.09.2029	Euro-Inf®	30.09.2029

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**
Ma Industrial Engineering	Without requirements	30.09.2029

The Accreditation Commission recommends the award of the seals as follows:

Degree Programme	EUR-ACE Label	Maximum duration of accreditation
Ma Industrial Engineering	Without requirements	Depending on the decision of the ENAEE Administrative Council

Recommendations

E 1. (ASIIN 5.2) The School is encouraged to continuously improve the quality and consistency between all (language) versions of the module descriptions.

E 2. (ASIIN 5.2) It is recommended to adapt the learning outcomes more closely to Bloom's taxonomy.

Appendix: Program Learning Outcomes and Curricula

According to the program website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the master's degree program Industrial Engineering:

Basic competences set in Royal decree 861/2010 and Order CIN/311/2009

CB1 To possess and understand knowledge that provides a base or opportunity to be original in the development and/or application of ideas, often in a research context.

CB2 To be able to apply the knowledge gained and to solve problems in new environments in wider contexts (or multidisciplinary) related with the area of study.

CB3 To be able to integrate knowledge and face complexity in order to make judgements from an information that, being incomplete or limited, it would include issues of social and ethical responsibilities directly related to the application of this knowledge and judgements.

CB4 To be able to communicate conclusions –and knowledge and reasons that support them– to either specialized or not specialised publics in a clear way and without ambiguities.

CB5 To possess the skills to continue learning self-directed and freelance.

General competences set in ORDEN CIN/311/2009 and EPS criteri

CG1 Capacity of planning and organizing the personal work.

CG2 Capacity to consider the socioeconomic context as well as the sustainability criteria in the engineering solutions.

CG3 Capacity to convey information, ideas, problems and solutions both to a specialised and no specialised public.

CG4 Capacity to conceive, design and implement projects and/or provide new solutions, using the tools that the engineering offers.

CG5 To be motivated for the quality and the steady improvement.

CG6 To have suitable knowledge of the scientific and technological issues of: mathematical, analytical and numerical methods in engineering, electrical engineering, energetic engineering, chemical engineering, mechanical engineering, mechanics of continuous means, industrial electronics, automation, manufacture, material, quantitative methods of management, industrial computing, urbanism, infrastructures, etc.

CG7 To project, calculate and design products, processes, installations and plants.

CG8 To direct, schedule and supervise multidisciplinary teams.

CG9 To do research, development and innovation in products, processes and methods.

CG10 To make strategic planning and apply it to construction, production and quality systems and to environmental management.

CG11 To manage both technically and economically projects, installations, plants, companies and technological centres.

CG12 To be able to execute functions of general management, technical management and management of R&D projects in plants, companies and technological centres.

CG13 Knowledge, understanding and capacity to apply the necessary legislation in order to practice the profession of Industrial Engineer.

Specific competences set in ORDEN CIN/311/2009

CE1 Knowledge and capacity for the analysis and design of systems of generation, transportation and distribution of electrical energy.
CE2 Knowledge and capacity to project, calculate and design integrated manufacturing systems.
CE3 Capacity for the design and testing of machines.
CE4 Capacity for the analysis and design of chemical processes.
CE5 Knowledge and capacity for the design and analysis of heat engines, hydraulic machines and installations of heat and industrial refrigeration.
CE6 Knowledge and capacities that allow to understand, analyse, exploit and manage the different energy sources.
CE7 Capacity to design electronic and industrial instrumentation systems.
CE8 Capacity to design and project automated production and advanced process control systems.
CE9 Capacity for the design, construction and exploitation of industrial plants.
CE10 Knowledge on construction, building, installations, infrastructures and urbanism in the field of the industrial engineering.
CE11 Knowledge and capacities for the calculation and design of structures.
CE12 Knowledge and capacities to project and design electrical and fluid installations, illumination, heating, ventilation and air conditioning, energetic efficiency, acoustic, communications, domotics, and intelligent buildings and security installations.
CE13 Knowledge on methods and techniques of transportation and industrial maintenance services.
CE14 Knowledge and skills to carry out verification and control of installations, processes and products.
CE15 Knowledge and skills to carry out certifications, audits, verifications, essays and reports.
CE16 Knowledge and skills to organise and manage companies.
CE17 Knowledge, strategy and planning applied to different organisational structures.
CE18 Knowledge of mercantile and labour laws.
CE19 Knowledge of financial and costs accountancy.
CE20 Knowledge of information systems for management, industrial organisation, production and logistical systems and management of quality systems.
CE21 Capacities for work organization and management of human resources. Knowledge on prevention of labour risks.

CE22 Knowledge and skills on integrated management projects.
CE23 Capacity for research development and technological innovation management.
CE24 Execution, presentation and defence, once all the credits of the syllabus are obtained, an original work carried out individually in front of a university court, consisting of an integral project of Industrial Engineering of professional nature in which the competences are synthesized.

Cross-disciplinary competences approved by the Plenary Commission of the Degrees of Industrial Engineering, Computer Engineering and Building Engineering, gathered in June 16th, 2008.

CT1 Appropriate skills in oral and written language.
CT2 Command of a foreign language.
CT3 Mastering ICT's.
CT4 To respect the fundamental rights of equality between men and women, the promotion of the Human Rights and the principles of a culture of peace and democratic values.

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**
14524	**Thermal and Hydraulic Machines**	**I**	**1**	**6**
14525	**Electronics and Control Systems Design**	**I**	**1**	**6**
14527	Control, Certifications and Auditing	II	1	6
14529	Business Administration	III	1	6
14532	Project and Human Resource Management	III	1	6
	Optional 3	IV	2	6
	Optional 4	IV	2	6
14533	Master Thesis	V	2	18

Optional Subjects

- Directed Optional (Optional 1)
  - 14535 - Structural and Mechanical Analysis
  - 14536 - Systems Engineering
- Directed Optional (Optional 2)
  - 14534 - Thermohydraulics
  - 14537 - Feedback Control
- Energetic systems (Optional 3 and 4)
  - 14538 - Electric machinery in industry
  - 14540 - Analysis of industrial thermal equipment
- Mechanical systems (Optional 3 and 4)
  - 14539 - Design of metal structures
  - 14541 - CAE studies of machinery

- Control systems (Optional 3 and 4)
  - 14542 - Industrial Instrumentation (not offered)
  - 14543 - Dynamic and control systems (not offered)

- Enterprise projects (Optional 3 and 4)
  - 14546 - Enterprise projects I
  - 14547 - Enterprise projects II

- Mobility (Optional 3 and 4)
  - 14544 - Mobility I
  - 14545 - Mobility II

According to the program website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the master's degree program Informatics Engineering:

General Competences that the students have to acquire according to Resolution June 8th, 2009, of the General Office of Universities.

CG1. Capacity to project, calculate and design products, processes and installations in all fields of Computer Engineering.

CG2. Capacity to manage computing systems works and installations, in compliance with current regulations, and assure quality service.

CG3. Capacity to manage, plan and supervise multidisciplinary teams.

CG4. Capacity to mathematically model, calculate and simulate in technological companies and engineering centres, particularly with regard to research, development and innovation tasks in all fields related to computer engineering.

CG5. Capacity to elaborate, strategically plan, manage, coordinate and technically and economically manage projects in all fields of computer engineering following quality and environmental criteria.

CG6. Capacity to work as general directors, technical directors and research, development and innovation project directors in computer engineering companies and technology centres.

CG7. Capacity to implement and manage computer equipment manufacturing processes, guaranteeing personal and material safety, the final quality of products and their homologation.

CG8. Capacity to apply the knowledge acquired for solving problems in new and unfamiliar situations within broader and more multidisciplinary contexts, and to be capable of integrating this knowledge.

CG9. Capacity to understand and apply ethical responsibility, legislation and professional ethics in computer engineering activities.

CG10. Capacities to apply economic principles, manage human resources and projects, and comply with computer legislation, regulation and normalization.

Strategic Competences of UdL according to the "Plan Director de la Docencia" approved by the Council of Government of UdL on July 10th, 2007.

UdL1. Appropriate skills in oral and written language.

UdL2. Command of a foreign language.

UdL3. Mastering ICT's.

UdL4. To respect the fundamental rights of equality between men and women, the promotion of the Human Rights and the principles of a culture of peace and democratic values.

Cross-disciplinary Competences approved by the Plenary Commission of the Degrees of Industrial Engineering, Computer Engineering and Building Engineering, gathered on June 16th, 2008

EPS1. Capacity of planning and organizing the personal work.

EPS2. Capacity to consider the socioeconomic context as well as the sustainability criteria in engineering solutions.

EPS3. Capacity to convey information, ideas, problems and solutions to both a specialized and no specialized public.

EPS4. Capacity to conceive, design and implement projects and/or contribute to new solutions, using engineering tools.

EPS5. To be motivated for the quality and steady improvement.

Basic Competences that the students have to acquire according to the real ordinance 861/2010, Annex I section 3.3.
CB1. Possess knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context.
CB2. That the students can apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
CB3. Students are able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
CB4. Students can communicate their conclusions -and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.
CB5. Students should possess learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.

Specific competences that the students have to acquire according to Resolution June 8th, 2009, of the General Office of Universities
CE1. Capacity for the integration of technologies, applications and computer engineering systems, in general and in wider and multidisciplinary contexts.
CE2. Capacity for the strategic planning, preparation, direction, coordination, and technical and economic management in the fields of the computer engineering in: systems, applications, services, networks, infrastructures or computer installations and centres or factories of software development, complying with the suitable fulfilment of the quality criteria and multidisciplinary working environments.
CE3. Capacity for the direction of research, development and innovation projects, in companies and technological centres, with guarantee of security for people and resources, the final quality of the products and his certification.
CE4. Capacity to model, design, define the architecture, implant, manage, operate, administer and keep applications, networks, systems, services and computer contents.
CE5. Capacity to understand and know how to apply the operation and organisation of the Internet, the technologies and new generation network protocols, the models of components, middleware software and services.
CE6. Capacity to ensure, manage, audit and certify the quality of the developments, processes, systems, services, applications and computer products.
CE7. Capacity to design, develop, manage and evaluate mechanisms to certificate and guarantee the security in the treatment and access to the information in a processing or distributed local system.
CE8. Capacity to analyse the information needs that arise and to carry out all the stages of the process of construction of an information system.
CE9. Capacity to design and evaluate operating systems and servers, and applications and systems based on distributed computing.
CE10. Capacity to understand and apply advanced knowledge in high-performance computing and numerical or computational methods to problems of engineering.
CE11. Capacity to design and develop systems, applications and computer services in embedded and ubiquitous systems.

CE12. Capacity to apply mathematical, statistical and artificial intelligence methods, design and develop applications, services, intelligent systems and systems based on knowledge.
CE13. Capacity to use and develop methodologies, methods, techniques, specific use programmes, rules and graphic computation standards.
CE14. Capacities to conceptualise, design, develop and evaluate the person-computer interaction of products, systems, applications and computer services.
CE15. Capacity for the creation and exploitation of virtual surroundings, and for the creation, management and distribution of multimedia contents.
CE16. Capacity to develop an original and individual project, and to present and defend it in front of a university court once all the other subjects of the syllabus have been passed. It has to be a project within the computer sciences and of professional nature in which all the competences learned are synthesised.

The following **curriculum** is presented:

FIRST COURSE (60 ECTS)				
Code	**Course**	**Module**	**Semester**	**ECTS**
103081	**IT Project Management**	**I**	**1**	**7.5**
103086	**ICT Project: Development and Implementation**	**II**	**1**	**9**
103085	Computer Graphics and Multimedia	II	1	4.5
103054	Intelligent Systems	II	1	4.5
103056	Embedded and Ubiquitous Systems	II	1	4.5
103084	High Performance Computing	II	2	4.5
103082	Technological Business Management and Entrepreneurship	I	2	6
103087	ICT Project: Communication Services and Security	II	2	9
103083	Evaluation Techniques and Usability Testing	II	2	4.5

BIG DATA ANALYTICS SPECIALITY (On-site)				
103088	Massive Data processing	III	2	6
ENTERPRISE RESOURCE PLANNING SYSTEMS SPECIALITY (Dual)				
103094	Business Vision in ERP Systems	III	2	6
ENTERPRISE INTEGRATED PROJECTS (Dual)				
103105	Enterprise Integrated Projects 1	III	2	6
MOBILITY IN COMPUTER TECHNOLOGIES				
103097	Mobility 1	III	2	6

SECOND COURSE (30 ECTS)				
Code	**Course**	**Module**	**Semester**	**ECTS**
103075	Master Thesis	V	1	12
	Optional Subjects Module	IV	1	6
	BIG DATA ANALYTICS SPECIALITY (On-site)			
103089	Data Mining	III	1	6
103090	Big Data Project	III	1	6
	ENTERPRISE RESOURCE PLANNING SYSTEMS SPECIALITY (Dual)			
103095	Management and Functional Areas in ERP Systems	III	1	6
103096	Business Process Integration with ERP Systems	III	1	6
	ENTERPRISE INTEGRATED PROJECTS (Dual)			
103106	Enterprise Integrated Projects 2	III	1	6
103107	Enterprise Integrated Projects 3	III	1	6

MOBILITY IN COMPUTER TECHNOLOGIES

103098	Mobility 2	III	1	6
103099	Mobility 3	III	1	6

Optional Subjects Module

Option 1: Informatics Technology

- 103089 Data Mining
- 103093 Mobile Game Developing for High Performance Platforms
- 103104 Trending Topics in Computer Science (only in dual training)

Option 2: Practices in Companies

- 103101 Work Placement in a Company

Option 3: Work Placement in a Research Group

- 103102 Research

Option 4: Mobility

- 103100 Mobility 4