



# **ASIIN Seal & European Labels**

## **Accreditation Report**

**Bachelor's Degree Programme**  
***Computer Engineering***

**Master's Degree Programme**  
***Informatics Engineering***

Provided by  
**Universitat de Lleida (University of Lleida), Spain**

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## A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for <sup>1</sup>	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) <sup>2</sup>
Grau en Enginyeria Informàtica (grado en Ingeniería Informática)	Bachelor Computer Engineering	ASIIN, Euro-Inf® Label,	n/a	04
Màster Enginyeria Informàtica (Máster Universitario en Ingeniería Informática)	Master Informatics Engineering	ASIIN, Euro-Inf® Label,	n/a	04
<p><b>Date of the contract:</b> 21.09.2015 (contract signed with AQU Catalunya)</p> <p><b>Submission of the final version of the self-assessment report:</b> 07.10.2015</p> <p><b>Date of the onsite visit:</b> 11-12 November 2015</p> <p><b>at:</b> University of Lleida, Polytechnic School, Lleida</p>				
<p><b>Peer panel:</b></p> <p>Prof. Dr. H. Peter Gumm, Universität Marburg</p> <p>Prof. Dr. Carsten Vogt, Technische Hochschule Köln</p> <p><b>Panel members nominated by AQU Catalunya:</b></p> <p>Isidro Ramos, Universitat Politècnica de Valencia</p> <p>Fèlix Sánchez Puchol, SEIDOR SBS</p> <p>Adrià Julià, Student Universitat de Girona</p>				
<p><b>Representative of the ASIIN headquarter:</b> M.A. Madlen Schweiger</p> <p>Representative of AQU Catalunya headquarter: Concepción Herruzo</p>				

<sup>1</sup> ASIIN Seal for degree programmes; Euro-Inf®: Label European Label for Informatics

<sup>2</sup> TC 04 – Informatics/Computer Science

<b>Responsible decision-making committee:</b> Accreditation Commission for Degree Programmes	
<b>Criteria used:</b>  European Standards and Guidelines as of May 2015  ASIIN General Criteria, as of 26.06.2015  Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of 12.09.2011	
<b>Note:</b>  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.	

## B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF <sup>3</sup>	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor in Computer Engineering	Grau en Enginyeria Informàtica (Grado en Ingeniería Informática)	<ul style="list-style-type: none"> <li>• Computing</li> <li>• Software Engineering and</li> <li>• Information Technologies</li> </ul>	6	Full time	n.a	8 Semesters	240 ECTS	Annually, 2010/11
Master Informatics Engineering	Màster Enginyeria Informàtica (Máster Universitario en Ingeniería Informática)	<ul style="list-style-type: none"> <li>• Big Data Analytics</li> <li>• Video Game Development</li> <li>• Enterprise Resource Planning Systems</li> </ul>	7	Full time and dual training	Yes, optionally with Instituto Teknologi Bandung (ITB), Indonesia	3 Semesters	90 ECTS	Annually, 2011/12

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

“The bachelor's degree in Computer Engineering qualifies a student to pursue the regulated profession of Technical Computer Engineer and taking the master's degree in Computer Engineering, enables him/her to pursue the regulated profession of Computer Engineer. Graduates in Computer Engineering are fully prepared to study, design and install computer networks, projects of system engineering and industrial computing, projects of software engineering and systems of information application.

Apart from teaching and research the most common professional activities of a graduate in Computer Engineering are:

- Executive posts (obtaining the master's degree in Computer Engineering): director of information systems, director of development, director of production and exploitation or IT manager.

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<sup>3</sup> EQF = The European Qualifications Framework for lifelong learning

- Management positions: intermediate technical staff, project manager, functional analyst, area manager, consultant, database architect, quality, methodology and organization manager or system architect.
- Technical posts: database administrator, networks and systems manager or microgrids manager.”

For the Master’s degree programme Informatics Engineering the institution has presented the following profile on the website:

“The professional Master’s Degree in Informatics Engineering provides students with the competencies and skills needed for practising professionally as a computer engineer. The Master’s Degree introduces students to the vast array of innovating methodologies and technologies of computer science and prepares them to integrate this knowledge in highly practical ways. Students will have the opportunity to create, coordinate and plan computing projects. Additionally, the training components of the master ground students in a solid scientific and technologic basis for developing RDI activities.”

## C Peer Report for the ASIIN Seal<sup>4</sup>

### 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:
  - Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
  - Ma Informatics Engineering: <http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
- Appendices to self-evaluation report indicating survey results, process descriptions of social partner involvement, etc (e.g. 102EPS-MuestraEncuestas, 102EPS-AgentesSociales, 141GEI\_InformacionEstudiantes, 141MEI\_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 learning objectives for the different degree programmes under review. 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 very informative websites contain a brief but explicit description of the programmes objectives, clearly stating the professional fields and spe-

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<sup>4</sup> 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.

cializations of the offered degree programmes as well as programme particularities. From these transparent descriptions the level of the programmes can be clearly deduced, being in full compliance with the minimum standards of the EQF levels 6 for Bachelor's graduates and level 7 for Master's graduates respectively. In general, the panel was impressed and welcomed the published information on the respective programme websites.

Furthermore, the Polytechnic School presented the programme objectives associated with ASIIN subject-specific criteria as defined by the Technical Committees 04 – Informatics and, as a consequence, with the Euro-Inf® framework criteria. With respect to the Bachelor's degree Computer Engineering, the panel approved that competences of the scientific foundations necessary for informatics, in particular the mathematical, logical, statistical, and physical tools are imparted in the respective modules. Additionally, students are expected to acquire a fundamental understanding of central concepts such as algorithms, data structures, problem solving patterns as well as a basic understanding of the composition and functioning of computers and key informatics systems which leads to the understanding of the principles of complex informatics systems and enables them to contribute to the solution of complex informatics problems. The panel discussed whether theoretical informatics (especially formal languages and automata) were integrated in the Bachelor's programme objectives and intended learning outcomes. The panel learned that the National Ministry of Science and Innovation does not require theoretical informatics as a mandatory module of the core curriculum but in the specialization Computing. Therefore, the Polytechnic School included a few selected aspects of theoretical informatics in the mandatory second year module "Algorithms and Complexity" and the mandatory module "Computational Models and Complexity" of the specialization Computing addresses in detail theoretical informatics. This implies that only those graduates who have chosen the specialization Computing will acquire fundamental knowledge and competences in theoretical informatics. The ASIIN Subject-Specific Criteria for Informatics which are aligned to the Euro-Inf Framework Standards<sup>5</sup> require all graduates from undergraduate computer science degrees to gain fundamental knowledge and competencies in theoretical informatics which is considered one of the core subjects of the discipline. The panel takes the national regulations into account which stipulated the intended learning outcomes mostly; however, as the acquisition of fundamental knowledge and competences in theoretical informatics does not contradict with the national regulations the panel sees scope for action on behalf of the School.

In terms of transversal and transferable competences, which include awareness of legal aspects of informatics and its effects on society as well as ethical questions and security

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<sup>5</sup> Cf. [www.eqanie.eu](http://www.eqanie.eu)



problems connected with the application of information processing systems, the panel determined that the defined learning outcomes and the designed curriculum meets the ASIIN standards. Furthermore, students shall acquire practical skills during the mandatory internship and the practical sessions related to the different fields of computer science covered by the programme. Additionally, students are also expected to acquire a number of further social competences which include oral expression and foreign language competences as well as team working skills or the capacity to be aware of and understand international and global developments in information technology and their possible effects on business and society.

With regards to the Master's degree programme Informatics Engineering, the panel discussed with the school the professional orientation of the programme and to which extent theoretical and research oriented aspects are included. The Polytechnic School pointed out that they established and maintain close relationships with regional companies in order to meet the labour market requirements for graduates. Therefore, the possible specializations such as Big Data Analytics, Video Game Development and Enterprise Resource Planning Systems 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 the 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 programme. The panel confirmed that it is very demanding to manage the balancing act between preparing graduate students to conduct research and at the same time preparing them for the labour market. However, the panel came to the conclusion that the Master's degree programme Informatics Engineering enables graduates to equally work in professional or scientific areas of informatics, especially with a view to enabling them to pursue the Spanish model of "Industrial Doctoral Programmes" carried out in cooperation with the industry.

The panel gained the impression that stakeholders, in particular students and the local industry, were in close personal contact with the teaching staff members. Additionally, university-wide regulations ensured that stakeholders are regularly involved in the formulating and further developing of objectives and learning outcomes managed by the quality development and assurance system.

### Criterion 1.2 Name of the degree programme

#### Evidence:

- Websites of the programmes:

Learning objectives – Ba Computer Engineering:

<http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

Learning objectives - Ma Informatics Engineering (published):

<http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

- Diploma Supplement for each of the degree programmes
- Learning objectives according to the SER (self-evaluation report)

#### Preliminary assessment and analysis of the peers:

The panel considered the titles of the degree programmes to adequately reflect the intended objectives and learning outcomes. They also found it to be in line with common international usage. The Bachelor programme Computer Engineering is taught in Catalan, Spanish and English depending on the language skills of the respective student cohort. The teaching material of the subjects in the Master programme Informatics Engineering is given in English and the language of instruction is mainly English; however, compulsory subjects might be taught in Catalan and Spanish depending on the language skills of the respective student cohort as well. The panel commended that the language policy is clearly explained on the programme website.

### Criterion 1.3 Curriculum

#### Evidence:

- Websites of the programmes:

Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

- Ma Informatics Engineering:

<http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

<http://www.masterinformatica.udl.cat/en/pla-formatiu/FormacioDual/FormacioDual.html>

- 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:**

In general, the Polytechnic School offers well-structured degree programmes in accordance with the national regulations of the Ministry of Science and Innovation. Consequently, the school has limited options to modify the curriculum as substantial parts of it are regulated by the government.

The curricular content for both programmes under review was assessed with regard to its contribution to the programme objectives, also in light of the ASIIN Subject-Specific Criteria, and the level of education.

The first two years of the Bachelor's programme **Computer Engineering** introduce the scientific foundations as well as core topics of the discipline of computer science to the students in order to gain fundamental understanding of central concepts and methods of the discipline. As already described in the criterion 1.1 the panel missed the impartation of fundamental knowledge and competencies in theoretical informatics especially formal languages and automata in the early stage of the curriculum. Moreover, the panel discussed with the programme coordinators why the programming language C is taught in the first semester and then changed to Java in the second semester of the first year. The decision was taken for the purpose of a subject related learning objective at a later stage of the curriculum and due to the fact that potential employers want students to know Java. The panel understood the school's argumentation annotating that this practice might be quite challenging for the students. At the end of the second year, one of the three specializations offered - Computing, Software Engineering or Information Technologies – will be chosen by the students. The most popular specialization Software Engineering includes a project with a large element of software engineering. The panel learned that this software engineering project will be developed over the course of three mandatory modules, namely "Process Models", "Quality Management and Improvement" and "Requirements Engineering". While the panel understood that students work in teams but are graded on an individual basis, it still remained unclear how the individual parts of the overarching project are carried out. Also, the module descriptions are unclear with regard to the organization of the software project. The panel asked the school to clarify how each of the project parts in the separate modules contributes to the overarching software project by receiving more details about the content, the ETCS credits contributed by the individual modules to the project and the overall organization that generates a project from the individual modules.

As participating in projects is one of the main elements in the everyday working life of computer scientists and projects with elements of software engineering are state-of-the-

art in undergraduate computer science programmes, the panel additionally would like to know whether the other specializations or modules taught in the first / second year include projects based on substantial competencies in the field of programming and software engineering considering that 90% of the students work in software related fields after graduation.

With regard to the Master's degree programme Informatics Engineering the panel noted a clear matching of the overall objectives and intended learning outcomes with curricular contents stated in the module descriptions. However, some module descriptions of the second year electives weren't published and should be made available on the programme website, too (see criterion 5.1). The panel especially commended the dual training possibility for international 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. Irrespective of whether or not students take the dual training track, the school encourages students to write their thesis in cooperation with companies and offers support to students accordingly.

#### **Criterion 1.4 Admission requirements**

##### **Evidence:**

- Admission requirements on websites of programmes:  
<http://www.grauinformatica.udl.cat/en/futurs-estudiants/acces-admissio.html>;  
<http://www.masterinformatica.udl.cat/en/futurs-estudiants/acces-admissio.html>
- Regulations on the website  
[http://www.eps.udl.cat/info\\_acad/normatives/normatives.html](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 (An-nex1\_DossierIndicadorsTitulacions)
- Discussions during onsite visit

##### **Preliminary assessment and analysis of the peers:**

The admission regulations are stipulated in the official document called "Academic Regulations" for Bachelor's and Master's programmes which contains all relevant information on assessment, enrolment, specific admission rules for certain target groups (prospective students with professional experience, foreign students, older students, students from

other universities, etc.), and specific admission rules for people with special educational needs. In addition to these university-wide regulations the Polytechnic School can define programme specific admission criteria.

As to the Bachelor's programme in Computer Engineering, no further specific admission criteria have been defined besides 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. The panel analysed the effect of the admission requirements on the programme implementation and acknowledged that the Polytechnic School offers students pre-courses in mathematics and physics for future bachelor in order to equalize the levels of knowledge and, thereby, to ensure that especially students with a vocational training background are able to follow the first year modules. Consequently, together with other implemented measures (e.g. continuous assessment and re-exam rules (criterion 3), tutors, information sessions, relationship to professors (criterion 2.4)) derived from the analysis of the collected data the drop-out rates could be significantly reduced over the last years. The drop-out rates were considered by the panel as normal for such traditionally highly competitive and demanding programmes.

For the Master programme Informatics Engineering specific admission criteria are defined and presented on the programme website. The programme requires an undergraduate degree in the disciplines of Computer Engineering, Technical Computer Engineering or Chemical Engineering. The panel does, however, not quite understand how a degree in Chemical Engineering could qualify for the admission to an Informatics Engineering master program. A clarification of this aspect is needed. Those students who have a bachelor degree without a computer engineering background may also access the Master programme. However, the school requires those students to 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. According to the panel's opinion the admission requirements fully ensure that the programme can be implemented without any delays or without decreasing the overall level due to extremely different backgrounds.

In terms of language requirements – as the programmes are partly taught in English – the peers understood that Bachelor students must have a B1 level certificate (CEFR) and Master students a B2 level certificate (CEFR). While this practice was considered adequate, it had not been completely transparent from the written and web-based information available.

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

1.1 / 1.3

The peers acknowledge the school's effort to teach a variety of programming languages, to address questions of complexity and logic in selected modules, some mandatory, such as Algorithms and Data structures, some voluntary, such as Artificial Intelligence or Computational logic. However, it remains unclear whether each Bachelor graduate will have been exposed to a coherent overview of the fundamental theoretical concepts of the discipline, which include the correspondence of languages with machines, their capabilities and their bounds, a discussion of the limits to algorithmic solutions (computability) or their feasibility (NP-Completeness). A module addressing these subjects early on in the curriculum, would form a base from which later modules could draw, such as e.g. Artificial Intelligence, Computational Logic, or Compiler Construction.

Regarding the discussed change in Programming languages from C/C++ in "Intro Programming I" to Java in "Intro Programming II", the University's response might indicate a misunderstanding of the panel's suggestion. The peers absolutely agree, that students should be exposed to, and actively use several programming languages representing different computing methodologies, during the course of their education. The panel's reservation is mostly a didactical one. If students begin with C/C++, then are introduced to new concepts, such as object orientation, genericity, and data structures in the following term, while at the same time switching to a new language, it is to be expected that this switch takes away time and mental resources that could possibly be better spent on understanding and deepening the mentioned new concepts and making "Intro Programming I and II" a more coherent endeavour. The panel welcomes the university's response indicating that they will rethink this matter.

Design and development of a software-project in a team of students, with distributed roles and covering the phases of a professional software construction, ought to be a mandatory part of a Bachelor's education. Such a project cannot be replaced by weekly homework exercises or "mini-projects", whether solved individually or in a team.

After explanation of the teaching colleagues, the peers gained the insight, that such a project is indeed part of the curriculum, but only for students majoring in "Software Engineering". It is supported by three modules "Requirements Engineering", "Process Models" and "Quality Management and Improvement", focusing on a joint project. Unfortunately, the coherence of these three modules, achieved by accompanying one and the same project was not visible to the peers and to outsiders from the module descriptions. The monitum of the peers does therefore not concern the project and the three courses

that focus on that project – on the contrary if the coordination of the three courses with the project works as described by the teaching staff, it appears to be a very good didactical method. However, the fact that the mentioned three modules focus on one and the same project, and therefore should be taken at the same time should be made clear in the module description. It remains open, what happens, if a student is not able to take all the three mentioned modules at the same time. It appears that he/she will then have to be involved only partly in each of several projects.

1.4. The peers understood that graduates from Chemical Engineering undergraduate programmes are not allowed to enrol in the Informatics Engineering Master program. It was a misunderstanding by the peers, due to the denomination of the Agreement of the University Council which regulates the competences of the programs both on computer engineering and also on chemical engineering.

The peers acknowledged that the websites of the degree programmes had been updated regarding the English language requirements. Furthermore, the peers appreciated that the information on the latter is sent twice a year by e-mail to all the bachelor students.

The panel considered this criterion to be partly 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:  
Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>  
Ma Informatics Engineering:  
<http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>  
<http://www.masterinformatica.udl.cat/en/pla-formatiu/FormacioDual/FormacioDual.html>
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (An-nex1\_DossierIndicadorsTitulacions)

- Academic regulations:  
<http://www.udl.cat/udl/norma/ordenaci-.html>  
[http://www.eps.udl.cat/info\\_acad/normatives/permanencia.html](http://www.eps.udl.cat/info_acad/normatives/permanencia.html)  
[http://www.eps.udl.cat/info\\_acad/normatives/avaluacio.html](http://www.eps.udl.cat/info_acad/normatives/avaluacio.html)
- Information on mobility options (544EPS\_PlanInternEPS; SER 5.1)
- Discussions during onsite visit

**Preliminary assessment and analysis of the peers:**

The panel welcomed the clearly presented structure of both degree programmes on the websites and considered the layout of the programme and the individual modules as useful in order to achieve the overall intended learning outcomes. Both programmes include specialization options with a fixed curriculum as described above (see criterion 1.3) which allows students to define an individual focus and course of study. The panel positively noted that students are provided with sufficient information about the specialization options in both programmes.

The Bachelor's degree programme Computer Engineering includes 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 industry, as well as with the mechanisms designated 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. Additionally, students mentioned that they are aware of the possibility to do an internship in foreign countries by applying for financial funding via the European Leonardo programme.

In the Master's degree programme Informatics Engineering students are given the opportunity to do a double degree with the Instituto Teknologi Bandung (ITB) in Indonesia in order to broaden their horizon and to define a more specific focus of study. Nevertheless, the panel would welcome fostering international cooperation with partner universities also for the undergraduate degree and appreciates the internationalization strategy of the Polytechnic School.

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:  
Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
- Ma Informatics Engineering:  
<http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (An-nex1\_DossierIndicadorsTitulacions)
- Discussions during onsite visit

#### **Preliminary assessment and analysis of the peers:**

The allocation of ECTS credits to the lectures, practical sessions and self-study periods of the modules appeared plausible. The workload documentation clearly states the teaching load distribution between lectures and independent student work and is made transparent in the module descriptions to the students. The defined practice of continuous assessment further described in the criterion 3 avoids structure-related peaks in the work load and enables students to complete the degree without exceeding the regular course duration.

The panel acknowledged that the estimated time budgets are reassessed in the frame of student surveys at the end of each module and the programme coordinators and students stated that measures would be implemented if a too high workload was discovered, as it has been recently the case in one module of the Master programme. Additionally, the progression and completion rates of both programmes did not indicate any significant deviations from the expected times. From the feedback of students and graduates, the panel learned that minor deviations existed for some modules (e.g. networks and physics); however, the overall workload corresponded to the related ECTS credits.

### Criterion 2.3 Teaching methodology

#### Evidence:

- Chapter 6.1 in SER
- Module descriptions on websites of the programmes:
  - Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
  - Ma Informatics Engineering: <http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
- Statistics about student number, progression, completion, efficiency rates, grades as well as student feedback about modules and teaching staff (An-nex1\_DossierIndicadorsTitulacions)
- Discussions during onsite visit

#### Preliminary assessment and analysis of the peers:

The teaching staff of the school uses a range of educational methods and training tools which reflect the good practices of teaching in computer engineering programmes by involving lab work, case studies, smaller teamwork-projects, presentations (as well at conferences and in companies), reading, analysis and problem solving tasks into the every day's teaching activities. Projects are conducted in several modules in the Bachelor and Master programme as well as the Bachelor and Master thesis are intended to familiarise students with independent academic research and writing. Overall, the panel considered the teaching methods used for implementing the didactical concept as appropriate and the ratio of contact hours to self-study time seems to support the achievement of the intended learning objectives.

### Criterion 2.4 Support and assistance

#### Evidence:

- SER
- Discussions on-site with lecturers, students and graduates
- the HEI's website: <http://www.grauinformatica.udl.cat/en/futurs-estudiants/per-que-estudiar.html> (Access: 28.11.2015)

#### Preliminary assessment and analysis of the peers:

The relation between lecturers and students was considered to be one of the strong points of the programmes. The panel recognized that lecturers were found to be always

accessible and helpful for students, also outside of the designated weekly opening hours. All lecturers were engaged and motivated to ensure a good implementation of the programme.

As mentioned above (criterion 1.4), the Polytechnic School offers students pre-courses in mathematics and physics in order to equalize the levels of knowledge and, therefore, ensure that especially students with a vocational training background are able to follow the first year modules. The wide range of support and service initiatives taken by the Polytechnic School positively influences the study success of the students. With regard to providing information and help to the students, all course descriptions and schedules of the Bachelor programme Computer Engineering and most of the Master programme Informatics Engineering (see criterion 5.1) were made available on the School's website and the students felt very well informed by having regular information sessions at the end of each study year. Furthermore, orientation weeks for Spanish as well as international students and tutoring and supervising activities with assigned responsible teaching staff members provides a solid base for good integration of young students into the academic life and ensure a meaningful composition of individual course schedules.

As internships are mandatory, the Polytechnic School established a wide range of corporate relations helping students to find suitable placements. The employability of the School's graduates is rather high also thanks to a variety of networking activities organized by the school itself. Moreover, students feel very well informed about the study abroad options, however students still hesitate to study abroad even though the possibilities are clearly stated in the curriculums, gained competences are recognized and the school seems very supportive.

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

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. Furthermore, the peers positively acknowledged that the Polytechnic School is working on two future joint degree programmes for the Bachelor and Master programmes in Informatics. Additionally, the peers welcomed the activities in order to promote study abroad opportunities.

Overall, the panel considered criterion 2 to be fulfilled.

### 3. Exams: System, concept and organisation

<b>Criterion 3 Exams: System, concept and organisation</b>
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**Evidence:**

- Module descriptions on websites of the programmes:
  - Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
- Ma Informatics Engineering:
  - <http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>
- Regulations on the website
  - [http://www.eps.udl.cat/info\\_acad/normatives/normatives.html](http://www.eps.udl.cat/info_acad/normatives/normatives.html)
- Assessment regulations:
  - [http://www.eps.udl.cat/info\\_acad/normatives/avaluacio.html](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 (Annex1\_DossierIndicadorsTitulacions)
- Exemplary course documentation, exams, final thesis
- Discussions during onsite visit

**Preliminary assessment and analysis of the peers:**

The examination practice in place is clearly and transparently described in the syllabi, including the examination forms, the weighting of the examination parts as well as the calculation of the final grade. The examination forms include, depending on the subject and the expected module learning outcomes, the theoretical and practical solving of computer science problems, case studies, lab works, experiments etc. and are in their concept and variety fully satisfactory. Oral examinations do occur in the form of presentations (in project works, for instance) and as part of the Bachelor and Master thesis. The panel welcomed this assessment method as it tests practically whether students are able to present computer engineering tasks in a professional manner.

The university management defined the practice of continuous assessment as the mandatory examination form which leads to the general examination rule that each module has at least three examination parts and none of them should weight more than 50% of the final grade. Summarizing, the concept of examination consists of a mix of mid-term examinations, final examinations and subject-specific assignments. The panel appreciated this

kind of continuous learning assessment as it allows a close monitoring of the students' learning progress and encourage students' learning throughout the semester. By way of helping students to consciously assess their actual state of knowledge, the assessment procedure at the same time contributes to an adequate exam preparation.

The organization of the exams guarantees examinations that accompany study and avoids delay to student's progressions. The relevant rules for examination and evaluation criteria are transparently put into a legal framework, as both students and lecturers confirmed in the audit discussions. The date and time of the exams are announced in due time in the Academic calendar of the university. 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 and after the visit, the panel analyzed a number of theses and exam papers and gained the impression that, in general, the academic level appears was adequate.

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

The panel appreciated the further explanations from the Polytechnic School and found criterion 3 to be fulfilled.

## 4. Resources

<b>Criterion 4.1 Staff</b>
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**Evidence:**

- CVs of the staff members
- Information about teaching staff on website  
<http://www.masterinformatica.udl.cat/en/pla-formatiu/professorat.html>,  
<http://www.grauinformatica.udl.cat/en/pla-formatiu/professorat.html>
- Information about allocation of teaching staff to modules (e.g. 411GEInf\_PDAssigPro1314; 411MEInf\_PDAssigPro1314; 412EPS\_Profesorado, 413EPS\_ProfColaborador)
- Information about administrative staff (441GEI-PAS; 441MEIInformatica\_PAS)
- Information about modules taught in English (406EPS\_AsignaturasIngles)

- Information about research activities (405EPS\_PublicacionesDocentes.pdf; 545EPS\_Investigacion1015; Tabla\_datos\_investigacion\_INFORMATICA)
- Discussions during onsite visit

**Preliminary assessment and analysis of the peers:**

The panel gained an impression of the staff qualifications as well as lecturers research activities during the discussions since the CVs of staff members and comprehensive information about research activities had not been available before the site visit. This information was later complemented. The detailed analysis of the staff capacities showed convincingly that the staffing is quantitatively as well as qualitatively sufficient and adequate for the successful implementation of the programmes. The panel learned that 70% are full-time professor with an average teaching load of 20 ECTS per academic year and that professors are deeply involved in the management and administration of the programmes and the School. Research activities are agreed by contract, but not all lecturers found it easy to set aside sufficient time for research. In theory it is possible to take sabbaticals, however, as the budgets were decreasing university-wide, no sabbaticals were taken over the last years. Nevertheless, it was confirmed that research results were linked to lower teaching hours and teaching staff intends to increase their research funds by applying for national or EU projects. Regardless of the difficult economic situation, the panel encouraged the School to work towards providing professors with more support (e.g. in order to prepare national / EU proposals) in conducting research and furthermore with the possibility to do sabbaticals.

<b>Criterion 4.2 Staff development</b>
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**Evidence:**

- Overview of participation of staff members in training courses (e.g. 432EPSFormDocentRebPDI1314)
- SER (chapter 4.2)
- Overview of participation at congresses (404EPS\_CongresoDocencia)
- Information about further education offer  
<http://www.ice.udl.cat/upu/contingut.php?subseccio=index>
- Discussions during onsite visit

**Preliminary assessment and analysis of the peers:**

The Institute for Education Sciences of the University of Lleida (ICE-CFC) offers training courses for teaching staff who wish to further develop their professional and teaching

skills. The Polytechnic School actively supports and encourages their teaching staff to attend the training offers and develops plans for staff development every academic year. The focus lies on lecturing aspects (e.g. improvement of didactical competencies, introduction to new teaching methods), research development (e.g. patent management, development of spin-offs), management skills as well as English language courses. In total, 45 professors of the Polytechnic School attended training courses in 2013/2014. As particularly helpful and positive the courses on web based and project based learning as well as on application and management of European projects were mentioned.

All in all, the panel considered the measures taken for staff development as adequate and beneficial for the programmes implementation.

#### **Criterion 4.3 Funds and equipment**

##### **Evidence:**

- SER (chapter 4, 5.3)
- Information about infrastructure/equipment (521MEInf\_RecursosMatrials; 521GEI\_RecursosMatrials; 522UdIntSatRec; 523EPS\_ActLaboratorios; 524EPS\_ActBiblio)
- Information about budget (531UdL\_Presupuesto2015; Resumen Financiación Investigación\_EPS)
- 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 discussed the financial perspectives of the Polytechnic School taking into account the fact that the Catalan Administration (Generalitat de Catalunya) since 2011 significantly reduced the financing of the public universities which shall be compensated by student fees and public student grant programmes. At the same time, in the recent past (2013/14) the number of students has been smaller than the number of places offered. The school is confident to avoid future potential funding problems by increasing the student numbers in the Bachelor and especially the Master programme and by trying to rise third-party-funding. While 60% of the Bachelor and most of the Master students are from Lleida and its surroundings, the long-term strategy in order to increase the student numbers includes local cooperation with schools as well as international cooperations with Latin-American universities.

In order to foster international cooperations the university developed an internationalization strategy which includes the establishment of double degree programmes with foreign universities and the development of joint research activities.

Another positive aspect about resources is the strong link between the teaching activities and industry. Firstly, there are many research projects conducted by the professors of the school in cooperation with industry. Secondly, several potentially employing enterprises are actively involved in the development of curricula and intended learning outcomes. Thirdly, an innovative programme of joint PhD supervision by industrial companies and the school are in place and supported by the Administration of Catalonia. Finally, there is a school-specific initiative supporting the development of student start-ups and spin-offs. The panel considered the relation between the employers/the industry and the school to be excellent.

The panel confirmed that the resources for teaching and learning, in particular classrooms, computer rooms, laboratories and library were considered to be sufficiently well maintained. In particular, they appreciated that students had access to the hard- and software in the labs around the clock when requested. They also confirmed that access to the necessary software resources and library access was possible also from their private computers.

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

The panel appreciated that the regulation for full-time professors to apply for sabbatical periods has been approved by the Government Council of the University of Lleida. It is positively noted that the University of Lleida promotes the scientific research and helps balancing the teaching duties with research activities. The panel still encouraged the university to continue supporting teaching staff in conducting research.

The peers assessed this criterion to be fulfilled.

## 5. Transparency and documentation

<b>Criterion 5.1 Module descriptions</b>
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**Evidence:**

- Module descriptions on websites of the programmes:



Ba Computer Engineering: <http://www.grauinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

- Ma Informatics Engineering:

<http://www.masterinformatica.udl.cat/en/pla-formatiu/objectius-competencies.html>

- Discussions during onsite visit

#### **Preliminary assessment and analysis of the peers:**

The panel analysed the module descriptions and noticed that in both programmes some module descriptions show different languages of instruction used at the same time (e.g. Catalan, Spanish and English). The panel learned during the audit discussions with the programme coordinators and students that the language of instruction is decided at the first day of class and depends on the assigned lecturer by the department and the student cohort itself. Accordingly, the school responds to the different language skills of their respective student cohorts and wants to make sure that especially foreign students may follow the modules.

The module descriptions show the overall ECTS credits given per module, but several modules additionally assign „Theoretical credits“ and „Practical Credits“ which seems unclear. The school explained that they would like to give an idea to the students how many hours they will spend on theoretical lecture and practical laboratory work. Furthermore, the panel indicated that the competency-based prerequisites in all module descriptions were missing and the literature information is sometimes extensive, which might lead to difficulties to determine the most relevant bibliography for each module. With regard to the prerequisites the panel deemed them as useful for students (especially visiting students). However as the programmes offer a fixed curriculum and the modules are built on each other students will know the required competencies for each module. The panel suggested checking all module descriptions for completeness and consistency. Nevertheless, the panel considered the module descriptions to be generally very informative and complete. It was positively noted that all module descriptions of the Bachelor's degree programme Computer Engineering were published on the website, though the module descriptions of the second year electives (e.g. 103089 Data Mining, 103092 Mobile Game Developing, 103095 Management and Functional Areas in ERP systems, 103104 Trending Topics in Computer Science etc.) of the Master's degree programme Informatics Engineering need to be published on the programme website as well.

### Criterion 5.2 Diploma and Diploma Supplement

#### Evidence:

- Model of Diploma Supplement for each programme
- Discussions during onsite visit

#### Preliminary assessment and analysis of the peers:

The Diploma Supplement does not fully comply with European standards. The Diploma Supplement should contain (e.g. in the section of “programme requirements” (4.2)) information about the competence profile of the graduates/programme in terms of learning outcomes (as recommended by the European model). Additionally, the Diploma Supplements for the degree programmes are missing the third language of instruction English.

### Criterion 5.3 Relevant rules

#### Evidence:

- Regulations on website:
- Ba Computer Engineering:  
<http://www.grauinformatica.udl.cat/en/normativa/index.html>
- Ma Informatics Engineering:  
<http://www.masterindustrial.udl.cat/en/normativa/index.html>
- Discussions during onsite visit

#### Preliminary assessment and analysis of the peers:

It can be stated that all study-relevant regulations have been made available. These regulations seem to include all the necessary information about the admission, course and completion of the degree. However, the panel recommended to provide all regulations for the student life-cycle in Spanish and/or English for information purposes, particularly in the light of the fact that some of the students have no command of the official language Catalan and the languages of instruction in the Bachelor’s and Master’s programme are Catalan, Spanish and English.

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

The peers understood that the information system which the University of Lleida uses to generate the published module descriptions only allows to generate module descriptions for modules offered in the current academic year. Since the second year electives of the mentioned Master programme will be first offered in the academic year 2016/2017, they

cannot be generated using this system at the present moment. However, the Polytechnic School made available a general description of the specialisation modules at the website. The peers highly appreciated it and strongly recommended maintaining this practice with regard to the transparency for the stakeholders.

The peers positively noticed that all regulations for the student life-cycle are published in Spanish and English on the schools website.

The peers upheld their requirement that consistency between all language versions as well as completeness of information of the module descriptions should be ensured.

Furthermore, the Diploma Supplement should contain information about the competence profile of the respective programmes in terms of learning outcomes.

The panel considered this criterion to be partly 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](http://www.eps.udl.cat/info_sobre/Qualitat/Garantia_de_Qualitat.html)
- Appendices to self-evaluation report: results about employer and student surveys, internship surveys, collection of opinions, improvement plans (e.g. 102EPS-MuestraEncuestas-GEI; 141GEI\_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\_GEInf, Anex1\_DossierIndicadorsTitulacions\_MEInf\_0)
- Discussions during onsite visit

#### Preliminary assessment and analysis of the peers:

First steps towards the system of quality assurance have been taken since 2007, established first as a process map and then developed to a system. The Quality Assurance System was successfully implemented since, and the processes are documented in the quali-

ty manual which was certified by AQU Catalunya in 2009. The panel deemed it to be mature and to incorporate all the relevant processes for the successful programme implementation and development. In particular, the discussion with lecturers, programme coordinators and students showed that the results of regular module evaluations, were effectively analyzed in annual meetings, steps for improvements were taken if necessary and discussed with the lecturers by identifying further improvements for teachers with lower results or awarding prizes to those with the highest results. Furthermore, the results were communicated to the students. Equally, students are represented in the responsible committees which conduct the annual monitoring reports sent to AQU Catalunya. Other stakeholders e.g. employers take part in the quality assurance process as well. The current specializations students may choose in Bachelor's and Master's programme were developed in consultation with the local employers and accordingly tailored to the labour market needs.

The outcomes and all measures derived are published on the universities website and made known to anyone involved in the process.

**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 Summary: Peer recommendations (09.02.2016)

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
Ba Computer Engineering	With requirements	Euro-Inf®	30.09.2021
Ma Informatics Engineering	With requirements	Euro-Inf®	30.09.2021

### Requirements

#### For all programmes

- A 1. (ASIIN 5.2) The Diploma Supplement should contain information about the competence profile of the programme in terms of learning outcomes (as recommended by the European model).
- A 2. (ASIIN 5.1) Consistency between all language versions as well as completeness of information of the module descriptions should be ensured.

#### For the Bachelor

- A 3. (ASIIN 1.1, 1.3) Fundamental knowledge in the fundamental theoretical principles of Computer Science should be part of the education in the early stage of the curriculum as a mandatory module, irrespective of the chosen specialization.
- A 4. (ASIIN 1.1, 1.3) A software project should be included as mandatory module regardless of the chosen specialization in order to ensure that all students acquire competences in the field of programming and software engineering.
- A 5. (ASIIN 1.1, 1.3) Within the specialization "Software Engineering" the project jointly developed in the three modules "Process Models", "Quality Management and Improvement" and "Requirements Engineering" should be clearer documented in the respective module descriptions.

## Recommendations

### For all programmes

- E 1. (ASIIN 4.1) It is recommended to further support teaching staff in conducting research.

## F Comment of the Technical Committees 04-Informatics/Computer Science (15.03.2016)

### *Assessment and analysis for the award of the ASIIN seal:*

The Technical committee follows the assessment of the peers and applies just a minor linguistic change to requirement A 3.

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

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

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

<b>Degree Programme</b>	<b>ASIIN-seal</b>	<b>Subject-specific label</b>	<b>Maximum duration of accreditation</b>
Ba Computer Engineering	With requirements	Euro-Inf®	30.09.2021
Ma Informatics Engineering	With requirements	Euro-Inf®	30.09.2021

## Requirements

### For all programmes

- A 1. (ASIIN 5.2) The Diploma Supplement should contain information about the competence profile of the programme in terms of learning outcomes (as recommended by the European model).

- A 2. (ASIIN 5.1) Consistency between all language versions as well as completeness of information of the module descriptions should be ensured.

**For the Bachelor**

- A 3. (ASIIN 1.1, 1.3) Fundamental knowledge of the theoretical principles of Computer Science should be part of the education in the early stage of the curriculum as a mandatory module, irrespective of the chosen specialization.
- A 4. (ASIIN 1.1, 1.3) A software project should be included as mandatory module regardless of the chosen specialization in order to ensure that all students acquire competences in the field of programming and software engineering.
- A 5. (ASIIN 1.1, 1.3) Within the specialization “Software Engineering” the project jointly developed in the three modules “Process Models“, “Quality Management and Improvement” and “Requirements Engineering” should be clearer documented in the respective module descriptions.

**Recommendations**

**For all programmes**

- E 1. (ASIIN 4.1) It is recommended to further support teaching staff in conducting research.



## **G 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. Despite the editorial changes it follows the assessment of the peer panel and the technical committees.

*Assessment and analysis for the award of the Euro-Inf<sup>®</sup> Label:*

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

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

<b>Degree Programme</b>	<b>ASIIN-seal</b>	<b>Subject-specific label</b>	<b>Maximum duration of accreditation</b>
Ba Computer Engineering	With requirements	Euro-Inf <sup>®</sup>	30.09.2021
Ma Informatics Engineering	With requirements	Euro-Inf <sup>®</sup>	30.09.2021

### **Requirements**

#### **For all programmes**

- A 1. (ASIIN 5.2) Ensure that the Diploma Supplement includes information about the competence profile of the programme in terms of learning outcomes (as recommended by the European model).
- A 2. (ASIIN 5.1) Ensure consistency between all language versions as well as completeness of information of the module descriptions.

**For the Bachelor**

- A 3. (ASIIN 1.1, 1.3) Ensure that fundamental knowledge of the theoretical principles of Computer Science is part of the education in the early stage of the curriculum as a mandatory module, irrespective of the chosen specialization.
- A 4. (ASIIN 1.1, 1.3) Ensure that a software project is included as a mandatory module regardless of the chosen specialization in order to ensure that all students acquire competences in the field of programming and software engineering.
- A 5. (ASIIN 1.1, 1.3) Ensure within the specialization “Software Engineering” that the project jointly developed in the three modules “Process Models”, “Quality Management and Improvement” and “Requirements Engineering” is clearly documented in the respective module descriptions.

**Recommendations**

**For all programmes**

- E 1. (ASIIN 4.1) It is recommended to further support teaching staff in participating in current research.

## H Fulfilment of Requirements (31.03.2017)

### Comments of the peers and the Technical Committee (15.03.2017)

**Requirements**

**For all programmes**

- A 1. (ASIIN 5.2) Ensure that the Diploma Supplement includes information about the competence profile of the programme in terms of learning outcomes (as recommended by the European model).

Primary Treatment	
Peers	fulfilled

	Explanation: An adequate Diploma Supplement has been presented by the HEI Vote: unanimous
FA 04	fulfilled Explanation: The Committee follows the assessment of the peers without any changes. Vote: unanimous

A 2. (ASIIN 5.1) Ensure consistency between all language versions as well as completeness of information of the module descriptions.

Primary Treatment	
Peers	fulfilled Explanation: The module descriptions were generally complete and accessible in all language versions. One peer criticized that the module descriptions of the new course “Languages and Machines” and the modified description of the modified courses “Algorithms and Complexity” and “Legal aspects” are still missing. Vote: majoritarian (4 vs. 1 partly fulfilled)
FA 04	partly fulfilled Explanation: For a complete fulfillment of the requirement the committee deems a presentation of the complete module descriptions necessary including those of the newly introduced modules. Vote: unanimous

**For the Bachelor programme**

A 3. (ASIIN 1.1, 1.3) Ensure that fundamental knowledge of the theoretical principles of Computer Science is part of the education in the early stage of the curriculum as a mandatory module, irrespective of the chosen specialization.

Primary Treatment	
Peers	fulfilled Explanation: The evidence presented by the HEI documents that a new course “Languages, Automata and Grammars” has been added. However, no detailed module description is given, which would have been helpful for an overall assessment. Further it was criticized by one peer that the changes made should be communicated on the website. Vote: majoritarian (4 vs. 1 partly fulfilled)
FA 04	partly fulfilled Explanation: According to the committee a complete assessment of the newly introduced course is only possible once a module description is presented by the HEI.

	Vote: unanimous
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- A 4. (ASIIN 1.1, 1.3) Ensure that a software project is included as a mandatory module regardless of the chosen specialization in order to ensure that all students acquire competences in the field of programming and software engineering.

Primary Treatment	
Peers	fulfilled Explanation: The evidence presented by the HEI documents that a new course “Web Project” has been added. However, no detailed module description is given, which would be helpful for a final assessment. Vote: majoritarian (4 vs. 1 partly fulfilled)
FA 04	partly fulfilled Explanation: According to the committee a complete assessment of the newly introduced course is only possible once a module description is presented by the HEI. Vote: unanimous

**For Ba Information Systems**

- A 5. (ASIIN 1.1, 1.3) Ensure within the specialization “Software Engineering” that the project jointly developed in the three modules “Process Models”, “Quality Management and Improvement” and “Requirements Engineering” is clearly documented in the respective module descriptions.

Primary Treatment	
Peers	fulfilled Explanation: Evidence details how information regarding the SE Joint Project is included in each module description (i.e. “Process Models”, “Quality Management and Improvement” and “Requirements Engineering”). Verification of such statements can be effectively corroborated through the links provided to the module descriptions. Vote: unanimous
FA 04	fulfilled Explanation: The Committee follows the assessment of the peers without any changes. Vote: unanimous

## Decision of the Accreditation Committee (31.03.2017)

*Assessment:* The Accreditation Committee follows the recommendations given by the peers and the Technical Committee and considers the requirements 2, 3 and 4 as not yet fulfilled.

The Accreditation Committee decides to extend the label award as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Computer Engineering	Requirements 2, 3 and 4 not fulfilled	Euro-Inf®	30.09.2021 (prolongation of six months)
Ma Informatics Engineering	Requirements 2, 3 and 4 not fulfilled	Euro-Inf®	30.09.2021 (prolongation of six months)

## I Fulfilment of Requirements (29.09.2017)

### Comments of the peers and the Technical Committee (20.09.2017)

#### Requirements

##### For all degree programmes

- A 1. (ASIIN 5.1) Ensure consistency between all language versions as well as completeness of information of the module descriptions.

Initial Treatment	
Peers	<p>fulfilled</p> <p>Explanation: The module descriptions were generally complete and accessible in all language versions. One peer criticized that the module descriptions of the new course “Languages and Machines” and the modified description of the modified courses “Algorithms and Complexity” and “Legal aspects” are still missing.</p> <p>Vote: majoritarian (4 vs. 1 partly fulfilled)</p>

TC 04	partly fulfilled Explanation: For a complete fulfillment of the requirement the committee deems a presentation of the complete module descriptions necessary including those of the newly introduced modules. Vote: unanimous
AC	Not completely fulfilled Explanation: The Committee agrees with the assessment of parts of the peers and the Technical Committee and deems a presentation of the complete module descriptions necessary including those of the newly introduced modules.
<b>Secondary Treatment</b>	
Peers	fulfilled Justification: The required descriptions of the modules „Languages, automata and grammars“ and „Web Project“ are now available via the web site of the program Vote: unanimous
TC 04	fulfilled Vote: unanimous Justification: The TC agrees with the assessment of the peers.

**For the Bachelor's programme**

- A 2. (ASIIN 1.1, 1.3) Ensure that fundamental knowledge of the theoretical principles of Computer Science is part of the education in the early stage of the curriculum as a mandatory module, irrespective of the chosen specialization.

<b>Initial Treatment</b>	
Peers	fulfilled Explanation: The evidence presented by the HEI documents that a new course “Languages, Automata and Grammars” has been added. However, no detailed module description is given, which would have been helpful for an overall assessment. Further it was criticized by one peer that the changes made should be communicated on the website. Vote: majoritarian (4 vs. 1 partly fulfilled)
TC 04	partly fulfilled Explanation: According to the committee a complete assessment of the newly introduced course is only possible once a module description is presented by the HEI. Vote: unanimous
AC	Not completely fulfilled Explanation: The Committee agrees with the assessment of parts of the peers and the Technical Committee considering a complete assessment of the newly introduced course only possible once a module description is presented by the HEI.

Secondary Treatment	
Peers	fulfilled Justification: The module description of „Languages, automata and grammars “ has been presented, and it is available via the web site of the program
TC 04	fulfilled Vote: unanimous Justification: The TC agrees with the assessment of the peers.

**For the Master’s programme**

- A 3. (ASIIN 1.1, 1.3) Ensure that a software project is included as a mandatory module regardless of the chosen specialization in order to ensure that all students acquire competences in the field of programming and software engineering.

Initial Treatment	
Peers	fulfilled Explanation: The evidence presented by the HEI documents that a new course “Web Project” has been added. However, no detailed module description is given, which would be helpful for a final assessment. Vote: majoritarian (4 vs. 1 partly fulfilled)
TC 04	partly fulfilled Explanation: According to the committee a complete assessment of the newly introduced course is only possible once a module description is presented by the HEI. Vote: unanimous
AC	Not completely fulfilled Explanation: The Committee agrees with the assessment of parts of the peers and the Technical Committee considering a complete assessment of the newly introduced course only possible once a module description is presented by the HEI.
Secondary Treatment	
Peers	fulfilled Justification: The module description is available via the web site of the program
TC 04	fulfilled Vote: unanimous Justification: The TC agrees with the assessment of the peers.

## Decision of the Accreditation Committee (29.09.2017)

*Assessment:* The Accreditation Committee follows the recommendations given by the peers and the Technical Committee and considers the requirements to be fulfilled.

The Accreditation Committee decides to award the labels as follows:

<b>Degree programme</b>	<b>ASIIN-label</b>	<b>Subject-specific label</b>	<b>Accreditation until max.</b>
Ba Computer Engineering	All requirements fulfilled	Euro-Inf®	30.09.2021
Ma Informatics Engineering	All requirements fulfilled	Euro-Inf®	30.09.2021



## 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 Computer Engineering:

Graduates in Computer Engineering are fully prepared to study, design and install computer networks, projects of system engineering and industrial computing, projects of software engineering and systems of information application.

Apart from teaching and research the most common professional activities of a graduate in Computer Engineering are:

- Executive posts (obtaining the master's degree in Computer Engineering): director of information systems, director of development, director of production and exploitation or IT manager.
- Management positions: intermediate technical staff, project manager, functional analyst, area manager, consultant, database architect, quality, methodology and organization manager or system architect.
- Technical posts: database administrator, networks and systems manager or microgrids manager.

The following **curriculum** is presented:

**1st COURSE (60 credits)**

Code	Subject	Type	Semester	Credits
102000	<u>Introduction to Programming 1</u>	FB	1	6
102002	<u>Computer Organization 1</u>	FB	1	6
102004	<u>Computational Logic</u>	FB	1	6
102005	<u>Algebra</u>	FB	1	6
102008	<u>Physics</u>	FB	1	6
102001	<u>Introduction to Programming 2</u>	FB	2	6
102003	<u>Computer Organization 2</u>	FB	2	6
102006	<u>Statistics and Optimization</u>	FB	2	9
102009	<u>Business Management</u>	FB	2	9

**2nd COURSE (60 credits)**

Code	Subject	Type	Semester	Credits
102016	<u>Databases</u>	B	1	6
102010	<u>Data Structures</u>	B	1	6
102012	<u>Operating Systems</u>	B	1	9
102007	<u>Discrete Mathematics</u>	FB	1	6
102014	<u>Computer Architecture</u>	B	2	6
102011	<u>Algorithms and Complexity</u>	B	2	6
102015	<u>Communication Networks</u>	B	2	9
102017	<u>Human-Computer Interaction</u>	B	2	6
101434	<u>Cross-curricular subject</u>	O	2	6

**3rd COURSE (60 credits)**

Code	Subject	Type	Semester	Credits
102013	<u>Systems and Applications Administration and Management</u>	B	1	6
102021	<u>Legal, Social and Professional Aspects</u>	B	1	6
102018	<u>Software Engineering</u>	B	1	6
102020	<u>Artificial Intelligence</u>	B	1	6
102022	<u>Concurrent and Parallel Systems</u>	B	1	6
102019	<u>Databases and Software Engineering II</u>	B	2	6
102023	<u>Web Systems and Technologies</u>	B	2	6
	Specialization module (48 credits between the 3rd and 4th course)	B	2	18

**4th COURSE (60 credits)**

Code	Subject	Type	Semester	Credits
102059	<u>Internship</u>	B	1	15
102060	<u>Bachelor Thesis</u>	B	2	15
	Specialization module (48 credits between the 3rd and 4th course)	B	1 i 2	30

**Major in Computing**

- 102038: Advanced Programming in Artificial Intelligence
- 102039: Computational Models and Complexity
- 102040: Automatic Learning and Reasoning
- 102041: Distributed Computing
- 102042: Computational Tools for Problem Solving
- 102043: Language Processing Algorithms
- 102044: Hardware and Software Verification Systems

### Major in Software Engineering

- [102052: Requirements Engineering](#)
- [102053: Quality Management and Improvement](#)
- [102054: Process Models](#)
- [102055: Software Architectures](#)
- [102056: Free Software Engineering](#)
- [102057: Systems Integration](#)
- [102058: Project Management](#)

### Major in Information Technologies

- [102024: Computer Networks and Communications](#)
- [102025: Applications for Mobile Devices](#)
- [102026: User-Centered Design](#)
- [102027: Distributed Computing and Applications](#)
- [102028: Applications and Communications Security](#)
- [102029: Enterprise Software Architecture](#)
- [102030: Networked Computing Platforms](#)

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 Informatics Engineering](#):

#### Objectives

The objectives of this Master's Degree, regulated by the Resolution of 8 June 2009 of the General Secretariat of Universities, which establishes recommendations for the report of official degrees in the area of Computer Engineering, are as follows:

- Capacity to project, calculate and design products, processes and installations in all fields of Computer Engineering.
- Capacity to manage computing systems works and installations, in compliance with current regulations, and assure quality service.
- Capacity to manage, plan and supervise multidisciplinary teams.
- 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.
- Capacity to elaborate, strategically plan, manage, coordinate and technically and economically manage projects in all fields of computer engineering following quality and environmental criteria.

- Capacity to work as general directors, technical directors and research, development and innovation project directors in computer engineering companies and technology centres.
- Capacity to implement and manage computer equipment manufacturing processes, guaranteeing personal and material safety, the final quality of products and their homologation.
- 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.
- Capacity to understand and apply ethical responsibility, legislation and professional ethics in computer engineering activities.
- Capacity to apply economic principles, manage human resources and projects, and comply with computer legislation, regulation and normalization.

### **Specific Competences**

The Master's Degree in Informatics Engineering of the UdL entitles graduates to practice professionally as computer engineers, and provides them with the following specific competences:

- Capacity to integrate computer technologies, applications, services and systems, in general and in broader and multidisciplinary contexts.
- Capacity to strategically plan, elaborate, manage, coordinate, and technically and economically manage in areas related to computer engineering, in compliance with quality and environmental criteria. These areas include systems, applications, services, networks, computer infrastructure, installations, software development, and multidisciplinary work contexts.
- Capacity to manage research projects, develop and innovate, work in companies and technologic centres and guarantee personal and material safety and the final quality of products and their homologation.
- Capacity to model, design and define architecture, as well as implant, manage, operate, administrate and maintain applications, networks, systems, services and computer contents.
- Capacity to understand and apply the function and organization of the Internet and the technologies and protocols of new generation networks, component models, intermediary software and services.
- Capacity to ensure, manage, audit and certify the quality of developments, processes, systems, services, applications and computing products.
- Capacities to design, develop, manage and evaluate the mechanisms of safety certification and guarantee the treatment and access to information in a local or distributed processing system.
- Capacity to analyse the needs of information in an environment and carry out the construction of an information system in all its stages.
- Capacity to design and evaluate operating systems and servers, as well as applications and systems based on distributed computing.

- Capacity to understand and apply the advanced knowledge of high performance computing and numeric or computing methods to engineering problems.
- Capacity to design and develop systems, applications and computer services in embedded and ubiquitous systems.
- Capacity to apply mathematic methods, statistics and artificial intelligence to model, design and develop applications, services, intelligent systems and knowledge based systems.
- Capacity to use and develop methodologies, methods, techniques, specific use programmes graphic computing regulations and standards.
- Capacities to conceptualize, design, develop and evaluate the human-computer interaction of products, systems, applications and computer services.
- Capacities to create and exploit virtual environments, and create, manage and distribute multimedia content.

### **Transversal competences**

Additionally, the University of Lleida and the Higher Polytechnic School have established some transversal competences within the syllabi of all their degrees, which include:

- Acquiring solid oral and written expression.
- Knowledge of a foreign language.
- Command of ICT.
- Respecting the fundamental rights of equality between men and women, promoting Human Rights, peace and democratic values
- Capacity to plan and organize personal work.
- Capacity to consider the socio-economic context and sustainability criteria in engineering solutions.
- Capacity to transmit information, ideas and solutions to specialized and non-specialized customers.
- Capacity to conceive, design and implement projects and/or give new solutions using engineering tools.
- Being motivated to obtain quality and make continuous progress.

The following **curriculum** is presented:

**FIRST COURSE (60 ECTS)**

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

**BIG DATA ANALYTICS SPECIALITY**

103088	<u>Massive Data processing</u>	III	2	6
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**VIDEO GAME DEVELOPMENT SPECIALITY**

103091	<u>Video Game Programming Techniques and Fundamentals</u>	III	2	6
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**ENTERPRISE RESOURCE PLANNING SYSTEMS SPECIALITY**

103094	<u>Business Vision in ERP Systems</u>	III	2	6
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**MOBILITY IN COMPUTER TECHNOLOGIES**

103097	<u>Mobility 1</u>	III	2	6
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**SECOND COURSE (30 ECTS)**

Code	Course	Module	Semester	ECTS
103075	<u>Master Thesis</u>	V	1	12
	Optional Subjects Module	IV	1	6

**BIG DATA ANALYTICS SPECIALITY**

103089	Data Mining	III	1	6
103090	Big Data Project	III	1	6

**VIDEO GAME DEVELOPMENT SPECIALITY**

103092	Mobile Game Developing	III	1	6
103093	Video Game Development for High Performance Platforms	III	1	6

**ENTERPRISE RESOURCE PLANNING SYSTEMS SPECIALITY**

103095	Management and Functional Areas in ERP Systems	III	1	6
103096	Business Process Integration with ERP Systems	III	1	6

**MOBILITY IN COMPUTER TECHNOLOGIES**

103098	<u>Mobility 2</u>	III	1	6
103099	<u>Mobility 3</u>	III	1	6

Optional Subjects Module

**Option 1: Computer Science Technologies**

- 103089 Data Mining
- 103092 Mobile Game Developing
- 103095 Management and Functional Areas in ERP systems
- 103104 Trending Topics in Computer Science



**Option 2: Practices in Companies**

- 103101 Work Placement in a Company

**Option 3: Research**

- 103102 Work Placement in a Research Group

**Option 4: Mobilitat**

- 103100 Mobility 4