The self assessment report for degree programme accreditation

Grau en Enginyeria Informàtica (GEI)

Màster universitari en Enginyeria Informàtica (MEI)

Master in Innovation and Research in Informatics (MIRI)

Master in Artificial Intelligence (MAI)

Facultat d'Informàtica de Barcelona

Universitat Politècnica de Catalunya

DOCUMENT ESBORRANY, EN PROCÉS DE REVISIÓ LINGÜÍSTICA I TÈCNICA (15/2/21)

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A. About the Accreditation Procedure

General Data

Website of the Higher Education Institution	http://www.fib.upc.edu/en http://www.upc.edu
Faculty/Department offering the Degree Programme	FIB-Facultat d'Informàtica de Barcelona (Barcelona School of Informatics) UPC-Universitat Politècnica de Catalunya (Technical University of Catalonia)

This document describes the Self-Assessment Report (SAR) for the accreditation of four Informatics degree programmes at the Barcelona School of Informatics (in Catalan Facultat d´Informàtica de Barcelona, FIB) at the UPC-BarcelonaTech (Universitat Politècnica de Catalunya). UPC is a public university in Spain dedicated to higher education and research, specialised in the fields of engineering, architecture and applied science.

Two agencies are involved in the accreditation process. AQU Catalunya (*Agència per a la Qualitat del sistema Universitari a Catalunya*) and ASIIN (*Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematic)*. FIB is applying both to AQU and ASIIN (through the AQU-ASIIN partnership), in addition FIB is also applying to the Euro-Inf quality label, which is awarded to degree programmes at Bachelor and Master level that comply with the "Euro-Inf Framework Standards and Accreditation Criteria for Informatics Programmes". EQANIE (European Quality Assurance Network for Informatics Education, which ASIIN is a member of) is the body responsible for this seal.

Self-assessment report development

Self-Assessment Report team

The preparation of this Self-Assessment Report has been in charge of a specific internal assessment committee: the Internal Evaluation Committee (in Catalan, CAI, *Comitè d'Avaluació Interna*).

Person	Position	
Josep Fernández	Dean	Academic staff
Lluís Belanche	Vice-dean/head of studies	Academic staff
Gemma Sesé	Vice-dean/head of studies for the Initial Phase	Academic staff
Daniel Jiménez-González	Vice-dean of Postgraduate Studies	Academic staff
Montserrat Maureso	Academic secretary	Academic staff
Joan Antoni Pastor	Vice-dean for Institutional Relations	Academic staff
José Manuel Diéguez	Head of the UGEGM FIB Unit at UTG CNTIC	Support staff
Rosa Mª Martín	Head of ICT Unit at UTG CNTIC	Support staff
Rosa Anglés	Support Staff for Quality	Support staff
Maribel Castillo	Support Staff	Support staff
Albert Obiols	inLAB support Staff	Support staff
Ramon Sanguesa	Instructor	Academic staff
Marina Alapont	GEI student	Student
Joaquim Ferrer	GEI student	Student
Carlota Catot	MEI student	Student
David Alvarez	MIRI student	Student
Victor Gimenez	MAI student	Student
Carlos Navarro	Professional and member of FIB Quality Committee	Professional

Self-Assessment Report development process

GEI, MEI, MAI and MIRI were accredited by AQU/ASINN in October 2016, and the three degree programs (GEI, MEI and MIRI) that applied for the Euro-Inf label, obtained their label accreditation by ASINN on 30 September 2016 (E.0.1.12). Consequently, the next accreditation process for MEI, MIRI and MAI has to take place in the academic year 2020/2021 (every four years). Regarding GEI, MEI and MIRI Euro-Inf labels expire in September 2021 (every five years). Finally, GEI accreditation will have to take place in the academic year 2022/2023 (every six years).

In order to arrange the accreditation and renewal of the euro-inf label for the 4 degrees, it has been requested to carry out these processes throughout the academic year 2020/2021.

After having checked with the AQU about this possibility, the following calendar has been scheduled:

- October 2020. Constitution of the CAI.
- From 20/10/2020 to 10/1/2021. Collection of data and evidence, and drafting of the self-report. Weekly follow-up by the faculty management team and regular CAI meetings.
- 11/01/2021. Delivery of the 1st version of the self-report to the GPAQ.
- From 12/01/2021 to 22/01/2021. Technical review of the GPAQ self-report.
- From 22/01/2021 to 14/02/2021. Inclusion of new contents elaborated as a result of the technical revision of the GPAQ.
- 15 to 22 February 2021. Public exhibition of the document. This phase has been done through the accreditation section of the degrees included in the quality section of the centre. Members of the community and other interest groups are informed via email. This stage is very positively valued because it enables feedback from other agents not involved in writing the self-report.
- 23 February. CAI meeting. Presentation and approval of the final self-report for discussion (meeting minutes).
- 24 February. Approval of the self-report to the Standing Committee of the centre (evidence Standing Committee Announcement).
- 25 February. Delivery to GPAQ-UPC of the final version to refer it to AQU/ASINN.

Self-Assessment Report evaluation

All CAI members contributed to developing the self-assessment report with highly satisfactory compliance. The whole FIB community also contributed to meeting the needs of this task.

The evidence and information used for the elaboration of the document have been considered sufficient and appropriate by the members of the CAI.

The quality of the evidence and information used is guaranteed because it mostly comes from the FIB's annual reports and the official UPC databases, especially from the Planning, Assessment and Quality Bureau (GPAQ). The CAI guarantees that the samples of executions provided are real samples.

During the SAR development, we call on the community for references in order to collect specific data.

We received feedback on the self-assessment report publicly from February 16th to February 22nd (xxx contributions) To Be Completed.

Document Structure

This Self-assessment report includes the necessary information for the joint accreditation process carried out by AQU and ASIIN quality agencies.

The remainder of this document is structured following ASSIN Guideline for Programme Accreditation ASIIN Seal & European Networks (EUR-ACE®, Euro-Inf®, Eurobachelor®, Euromaster®) v2017.

AQU defines 6 standards for the criteria and requirements of programme assessment (2014, "Guide to the accreditation of recognised first and second cycle degree programmes"). The following table on the left shows ASSIN guidelines and criteria, and for each one the related AQU standard.

ASSIN Guidelines	Standard AQU
1. The Degree Programme: Concept, content & implementation	
Criterion 1.1	S1.1 S1.2 S2.1
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5.Transparency and Documentation	S2.1 S2.2
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Criterion 5.2	
Criterion 5.3	S1.5
6. Quality Management: Quality Assessment and Development	S2.3 S3.1 S3.2 S3.3

Additionally, the following information required by AQU has been added:

- Context information has been included in the beginning of this document.
- Improvement plan has been summarized at the end of the report in section D. Continuous improvement process. A more detailed improvement plan has been included as an annex.
- COVID-19 specific actions have been described in different sections .

Seals applied for

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)
Grau en Enginyeria Informàtica (GEI)	Bachelor in Informatics Engineering	AQU, ASIIN, Euro-Inf® Label	AQU 15.12.2022 ASIIN EuroInf 30.09.2021	
Màster universitari en Enginyeria Informàtica (MEI)	Master in Informatics Engineering	AQU, ASIIN, Euro-Inf® Label	AQU 15.12.2020 ASIIN EuroInf 30.09.2021	
Master in Innovation and Research in Informatics (MIRI)	Master in Innovation and Research in Informatics (MIRI)	AQU, ASIIN, Euro-Inf® Label	AQU 15.12.2020 ASIIN EuroInf 30.09.2021	
Master in Artificial Intelligence (MAI)	Master in Artificial Intelligence (MAI)	AQU International mention	AQU 15.12.2020 AQU International mention 26.07.2022	

Please note that MAI is an inter-university programme including UPC, UB (*Universitat de Barcelona*) and URV (*Universitat Rovira i Virgili*) offering a state-of-the-art education in the field of Artificial Intelligence. Arguably such field is playing a key role in today's IT. So FIB applies with the MAI academic programme for an internationalisation mention under 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[1]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Grau en Enginyeria Informàtica (GEI)	Enginyer Tècnic en Informàtica B.Sc. in informatics engineering (GEI)	Computer Engineering Computing Information Systems Information Techn. Software Engineering	Level 6	Full time / part time		8 Semesters	240ECTS	405 per year 2010-2011
Màster universitari en Enginyeria Informàtica (MEI)	Enginyer en Informàtica M.Sc. in informatics engineering (MEI)		Level 7	Full time / part time		3 Semesters	90 ECTS	50 per year 2010-2011
Master's degree in Innovation and Research in Informatics (MIRI)	Master's degree in Innovation and Research in Informatics (MIRI)	Advanced Computing Computer Graphics & Virtual Reality Computer Networks & Distributed Systems Data Science High Performance Computing	Level 7	Full time / part time		4 Semesters	120 ECTS	80 per year 2010-2011
Master's degree in Artificial Intelligence (MAI)	Master's degree in Artificial Intelligence (MAI)		Level 7	Full time / part time		3 Semesters	90 ECTS	50 per year 2010-2011

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

C. Self-assessment for the ASIIN-Seal[2]

The Barcelona School of Informatics (FIB)

The Barcelona School of Informatics (FIB), since the academic year 1977-78, has been the teaching institution of UPC in charge of higher education in the fields of Computer Science, Computer Engineering and other related domains (E.0.1.1). The FIB offers six degree programmes with completely adapted curricula to the European Higher Education Area (EHEA) and innovate educational methodologies: two Bachelor's degree in Informatics Engineering (GEI), and in Data Science and Engineering (GCED), and four Master's degree in Informatics Engineering (MEI), in Innovation and Research in Informatics (MIRI), in Artificial Intelligence (MAI), and in Secondary and Upper Secondary Education, Vocational Training and Foreign Language Teaching (MSEC).

The FIB also supports further official degree programmes that are managed by other institutions: Bachelor's degree in Bioinformatics (ESCI-Universitat Pompeu Fabra), Master's degree in Cybersecurity (ETSETB-Universitat Politècnica de Catalunya), Erasmus Mundus Master in Big Data Management and Analytics (Université Libre de Bruxelles), Master in Computational Modelling in Physics, Chemistry and Biochemistry (Universitat de Barcelona), and Master in Pure and Applied Logic (Universitat de Barcelona).
Two new degree programs will be launched soon: the Bachelor's degree in Artificial Intelligence and a Master's degree in Data Science (a spin-off of the MIRI Data Science specialization), both starting in the academic year 2021/2022.

FIB requests academic staff in charge of teaching subjects in eight UPC departments (check here the departments list - evidence E.0.1.9). Their professional experience and investigation is carried out by means of different groups of research and investigation bodies (published at the website at Research and innovation - evidence E.0.1.10). "Computer science" is the thematic area with the most scientific production of the UPC. Furthermore, this area is very concentrated in the FIB. The UPC library service produces comparative reports on scientific production versus other national and international universities that place the scientific production of the UPC (and therefore, of the FIB) as a world reference school in the field of informatics (computer science and engineering).

FIB's teaching and research activity is recognised repeatedly in the most well-known rankings all around the world (E.0.1.2 -FIB ranking webpage- and E.0.1.4 -UPC ranking webpage- take a look at computer science and information system subjects). Focusing in the thematic rankings, which can show better the influence of FIB in the marks obtained, UPC appears in a leading position in Spain, and a quite strong position also in Europe and the World, in the Academic Ranking of World Universities 2020 (ARWU–Shanghai Ranking) in the field of Engineering, Technology and Computer Science (one of the two first in Spain, 151-200 in the world); in the QS World University Rankings 2020 by Faculty, both in Engineering and Technology (1st in Spain, 76thth in the world) and in Computer Science and Information Systems (1st in Spain, 51-100 in the world).

[2] Includes the assessment for the European subject-specific seals, where applicable. When the accreditation process is finalized, possible requirements and/or recommendations and also deadlines apply to the ASIIN seal as well as to the subject-specific seals.

In addition to these rankings, we are also positively evaluated in a couple more rankings published recently and with a different approach. On one hand, the Ranking ISSUE 2020 (U-Ranking, Fundación BBVA) orders the Spanish universities under different scopes, ranking the UPC 1st in Teaching and 2nd in Research and Innovation and Technological Development. On the other hand, there is the 3rd Ranking University-Enterprise (*Fundación Everis*): UPC appears 3rd in the field of Informatics and ICT.

The school is located on the North Campus of the UPC and has modern facilities, some of which are shared with other centres such as the Rector Gabriel Ferraté Library, entrepreneurship space, study rooms, multimedia laboratory and recording studio, reprographic, catering and banking services, as well as the student union, a centre where the school's student delegation and associations carry out their activities.

The FIB institutional website is the main website to interface with all the relevant stakeholders (staff, alumni, current and prospective students, potential employers, and informatics companies). The website provides information about the School, the bachelor degree programmes, and the master degree programmes. The school introduction summarises the main features: the school in figures (2106 students, 443 graduates in the last full-year course, over 10.000 graduates since 1979), the school's history with some relevant years with a brief overview, and employment opportunities in several sectors and professional fields.

FIB governance (E.0.1.5) is carried out by the dean as the highest executive authority, the dean's team, and the governing bodies: the School Board and The Standing Committee that performs executive functions, and specific bodies.

Each degree programme has its own specific governing body. As for the degree programmes involved in the accreditation process, their governing bodies are:

- CAGEI as the GEI Academic Committee
- CAMEI as the MEI Academic Committee
- CAMIRI as the MIRI Academic Committee
- CAIMAI as the MAI Academic Committee

Other specific bodies are: a general Academic Assessment Committee, three Curricular Committees, a Quality Committee, and actually during the accreditation process an Internal Evaluation Committee. All these governance bodies are elected or appointed within staff (academic and support staff) and students. FIB Quality Assurance System (QAS) involves all this governance structure.

Academic and support staff related to FIB involve management and technical support staff (see E.0.1.6 FIB Staff) from the CNTIC Management Transversal Unit (E.0.1.7 UTG CNTIC Structure), innovation support staff (see E.0.1.8 inLab FIB), and academic staff in charge of teaching subjects.

UTG CNTIC Management and technical support staff engage 160 employees. inLab FIB team involves additional academic and technical staff, and students for the innovation, research and technology transfer activities. inLab FIB has been recognized as a TECNIO center by ACCIÓ, the Catalan Agency for Business Competitiveness.

Academic staff are requested to several departments (8 of the UPC, see E.0.1.9), of whom 240 people collaborated last academic year with teaching assignment mainly at FIB (category distributions are detailed for Criterion 4.1 of this report). The total number of students last academic year was 2439. It includes the 4 new EHEA degrees submitted for accreditation (GEI, MEI, MIRI and MAI), Bachelor's degree in Data Science and Engineering (GCED), Erasmus Mundus Master in Big Data Management and Analytics (BDMA), and Master in Secondary and Upper Secondary Education, Vocational Training and Foreign Language Teaching (MSEC) (see Masters).

The evolution of academic staff is: from 224 in 2015-16 to 240 in 2019-20 (E.0.1.3 and also more detailed in Criterion 4.1).

Evidence E.0.1.3 also shows number of students evolution (enrolled and graduated):

	Students	GEI graduates	MEI graduates	MIRI graduates	MAI graduates
2016-17	2080	234	12	37	29
2017-18	2215	229	7	35	34
2018-19	2360	257	23	59	24
2019-20	2439	227	10	60	37

The total number of students is rising according to the new degree offer in the EHEA framework. GEI was introduced during the 2010-2011 academic year with students enrolled at first and second programme year (first to fourth semester subjects). First GEI graduates were in 2012-13. First graduates for new EHEA Masters' degrees were in 2013-14.

1. The Degree Programme: Concept, content & implementation

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

The different degrees offered by FIB cover the most significant areas of informatics engineering. FIB currently offers 6 own programme degrees and participates in another 5 inter-centre and inter-university programme degrees.This self assessment report concerns four Informatics degree programmes at FIB (GEI, MEI, MIRI and MAI).

The Bachelor degree in Informatics Engineering (GEI, E.1.1.1) was introduced during the 2010-2011 academic year, based on the curricula designed in 2003 and in accordance with the rules stated by EHEA. In addition, three official masters were introduced during the 2012-2013 academic year: MEI (Master in Informatics Engineering, E.1.1.3), MIRI (Master in Innovation and Research in Informatics, E.1.1.5) and MAI (Master in Artificial Intelligence, E.1.1.7). The masters –except MEI– are taught entirely in English. The new curricula implies new teaching criteria: ECTS (European Credit Transfer System), focused on student participation, innovation in teaching methods, and use of modern educational technologies. The FIB continues to the present day on the same course of action.

The informatics degrees are officially verified by the Spanish government and then authorised by the Catalan government before they can be deployed. Since the adaptation of the Spanish university system to the EHEA framework, the structure of university studies in Spain distinguishes Bachelor degrees (4 years of study, 240 ECTS, usually) and Master degrees (1-2 years, 60-120 ECTS).

The Spanish Government establishes specific rules for degrees on the so-called 'regulated professions'. Such professions (e.g. Medicine, Architecture or Engineering) have specific laws clearly defining its competences. As Computer Engineers in Spain have a similar status to regulated professions, the Spanish Government has also defined recommendations for the development of curricula for Bachelor and Masters informatics degrees (GEI and MEI). The interested reader can find more information at: Spanish university system (evidence E.1.1.9), reference documentation (info AQU at evidence E.1.1.10), and Spanish Royal Decree (evidence E.1.1.11).

Bachelors and Masters are regulated by the Spanish Government Royal Decree RD 1393/2007 (amended by the RD 861/2010). GEI and MEI programme degrees have a specific regulation (resolution 12977/2009). FIB designed GEI and MEI according to such laws, while MIRI and MAI are thematic masters. These regulations are based on international standards such as the Computing Curricla 2005 proposed by the professional associations AIS, IEEE and ACM.

GEI verification took place on 30 July 2010, and MEI verification on 19 September 2012. MIRI and MAI received the verification on 28 December 2012. GEI, MEI, MAI and MIRI were accredited in October 2016, and the three degree programs (GEI, MEI and MIRI) that applied for the Euro-Inf label, obtained their label accreditation by ASINN on 30 September 2016. MAI that applied for the international additional distinction obtained it in the same accreditation process.

Degree programmes to accreditate					
Name of the programme	**RUCT code**	**Crèdits ECTS**	**Verification date**	**Last Accreditation year**	**Academic coordination/ Programme degree manager**
Grau en Enginyeria Informàtica (GEI)	GRAU00000407	240	29/07/2010	2016	GEI committee / Vice-dean head of studies
Màster universitari en Enginyeria Informàtica (MEI)	DGU000001058	90	19/09/2012	2016	MEI committee / Vice-dean of Postgraduate Studies
Master's degree in Innovation and Research in Informatics (MIRI)	DGU000001097	120	28/12/2012	2016	MIRI committee / Vice-dean of Postgraduate Studies
Master's degree in Artificial Intelligence (MAI)	DGU000001164	90	28/12/2012	2016	MAI committee / Vice-dean of Postgraduate Studies

Under the spanish university rules, this criterion is satisfied with the initial verification of each degree programme (GEI at 2010; MEI, MIRI, MAI at 2012).

Introduction: Objectives, design competences and stakeholders' needs

The Bachelor Degree in Informatics Engineering (GEI) provides graduates with all required knowledge, skills and competences to work in the field of Informatics Engineering. GEI offers a solid training in the fundamentals of informatics engineering complemented with an advanced training in one of the five recognized areas of Informatics defined by international professional associations: Computer Engineering, Computer Science, Information Systems, Information Technology, Software Engineering.

The master's degree in Informatics Engineering (MEI) provides its graduates with the knowledge and hands-on experience in a wide range of information technology fields: from cloud computing to security, from computer graphics to information systems, with a focus on IT management and leadership. Graduates become the "Swiss Army knife" of IT in the organizations where they work.

The Master in Innovation and Research in Informatics (MIRI) is designed to provide a solid background in different aspects of research in informatics, while preparing its graduates to become experts in any of the fields of specialization offered. MIRI offers 6 areas of expertise: Advanced computing, Computer graphics and virtual reality, Computer networks and distributed systems,

Data science (it has been replaced by a new Master in Data Science), High performance computing and Service engineering (not taught actually).

The master's degree in Artificial Intelligence (MAI) offers an integrative and cutting-edge approach to the field and its application to real scenarios. Research and innovation in AI spans knowledge representation and reasoning, machine learning, natural language processing, autonomous agents, computer vision robotics, and visualization. The emphasis is on practical techniques—and a solid theoretical background—for designing and constructing intelligent systems, enabling graduates from this course to apply their skills in a variety of settings. Graduates will have the skills to carry out AI research in academic and R&D environments and to identify how AI techniques can provide intelligent solutions to IT problems in companies and organizations.

The programme's design (competence profile and structure of the curriculum) meets the requirements of the discipline and complies with the required level of study according to the qualification framework in the EHEA in Spain (in Spanish *Marco Español de Cualificación para la Educación Superior*, MECES).

The educational objectives are outlined by the description of the learning outcomes that graduates require for practising their profession. Competences are these learning outcomes. They are a combination of knowledge, skills (intellectual, practical, social, etc.), attitudes and values that enable individuals to carry out tasks and solve problems in specific academic, professional or social settings. Under the new EHEA framework, graduates should have achieved:

- Technical competences (domain-specific or specialist competences) that are closely linked to the demands of the professional areas associated with their degree. For EQANIE, they are Conceptual basis for informatics, Analysis, and Design and implementation. And for ASIIN they are Subject-Specific-Criteria for informatics: Formal, algorithmic and mathematical, Analysis, design, implementation and project management, Technological, Methodological and transfer, Interdisciplinary Competencies.
  FIB defined these competences according to the Spanish Government recommendations for the development of curricula for Bachelor and Masters informatics degrees.
- Generic competences (other professional competences, social or soft competences) to connect with society. For EQANIE they are Economic, legal, social, ethical and environmental context, Informatics practice, Other Professional Skills competences, and for ASIIN Social Competencies and Self-Competencies. UPC approved an agreement on 8 generic or transversal competences to be common for all UPC degrees: Entrepreneurship and Innovation, Sustainability and Social Compromise, Third Language, Effective Oral and Written Communication, Team Work, Solvent Use of the Information Resources, Autonomous Learning and Gender Perspective (the last one was introduced in April 2020). Furthermore, FIB defined 2 others: Appropriate Attitude towards Work and Reasoning.

The design of the four degree programmes were based on all these competences, which should be acquired across all disciplines and specialisations. In 2007, FIB defined a competences committee that was in charge of working out a competences list to be fulfilled by graduates. This committee took into account stakeholders' needs by considering related organizations' points of view: graduates (see FibAlumni), informatics professional association (see COEINF), and informatics technologies festivity sponsors (see Festibity). Furthermore, some surveys were conducted among 353 professionals, 79 academic staff and 150 senior students (see JENUI 2009), which provided relevant information. A competences list was delivered in 2009 to the FIB governance bodies as an initial document for the particular committee that was going to design new degrees in accordance with EHEA. Each programme website provides information about each degree programme competences. An FIB competences working group take care to maintain up-to-day these competences.

GEI competences (E.1.1.13): consists of the 10 generic competences (G1 to G10)[3] and 8 common technical competences (CT1 to CT8). GEI also has technical competences for each specialisation. GEI competences for degree subjects are available at the programme website (evidence E.1.1.14).

Master's generic competences consists of 5 of the UPC generic ones (except Third Language and self-directed learning), the 2 FIB generic competences, and 2 more: Applying Informatics Techniques to New Application Areas, and Integrate, Describe and Explain Applicable Techniques.
Master's technical competences are:
MEI competences (see E.1.1.13 and E.1.1.14): 10 general, 4 specific groups, and 1 for Final Master Thesis (CTFM)
MIRI competences (see E1.1.15 and E.1.1.16): 2 general, 4 specific groups, and 1 for Final Master Thesis (CTFM)
MAI competences (see E.1.1.17 and E.1.1.18): 4 general, 8 specific groups, and 1 for Final Master Thesis (CTFM)

A common procedure to develop domain-specific competences consists of setting different competence levels (based on Bloom's taxonomy) and then assigning them to the corresponding subjects or courses in the programme.

To develop generic competences into a comprehensive integrated experience, we propose a definition of each competence in terms of dimensions (or competence aspects), which are further defined according to third-level objectives. These objectives are integrated into the subjects that are considered suitable for this purpose. Thus one subject may integrate dimensions belonging to different competences at different levels, which contributes to an integral educational experience. The proposed definition is available at the website (see Competencial maps) with some related articles.

See Criterion 1.3 for an extended analysis of competence / learning outcomes.

Criterion 1.2 Name of the degree programme

Under the spanish university rules, this criterion is satisfied with the initial verification of each degree programme (GEI at 2010; MEI, MIRI, MAI at 2012).

Informatics is a key element of the Information Society, facilitating access and exchange of information between people or machines, systems and institutions. Today's socio-economic progress cannot be understood without the deployment of information technology. Engineers in the field of information technologies will constitute a fundamental base necessary for the functioning of all institutions, either from within them or as part of companies that generate or offer advanced digital services.

Informatics is part of our daily lives and a science that is well known to all collectives. The evolution and applications of computer science are so broad that its use is becoming generalised in all human activities, ranging from basic systems oriented to the collection and processing of information, to the most advanced ones that require techniques such as software engineering, virtual/augmented reality, high performance computing, distributed systems, complex computational algorithms, artificial intelligence, data science, computer security and cryptography, social computing among others.

[3] General competence G10 Gender perspective was introduced at UPC in April 2020. The development of G10 in each programme degree is a work in progress, and it's a planned action in the improvement plan.

The name of the degree programmes, in the main course language,

Grau en Enginyeria Informàtica
Màster en Enginyeria Informàtica
Master in Master in Innovation and Research in Informatics
Master in Artificial Intelligence

are well-known for the community and clearly reflect aims and learning outcomes for each programme degree.

As well, GEI and MEI programme degrees have a specific regulation (E.1.1.12).

Criterion 1.3 Curriculum

The learning outcomes achieved correspond to the intended training objectives and to the level of the MECES of the degree.

With regard to the structure and organisation of the GEI curriculum (see curriculum at evidence E.1.1.1), the public information included has been complemented with tables relating competences and subjects, as well as competencial maps defining several aspects of the competences (dimensions) in terms of objectives at three levels. This information corresponds to the analysis of the coordination in the curriculum, specifically as it relates to the topic of coordinating the generic competences and their progress throughout the subjects with the various dimensions of competence in the new model (at 3 levels each).

For master studies, the same procedure is done and the curricula have been designed so that all learning objectives and competences are achieved. The competences for each of the subjects of the master are publicand are taken from the subject guides, analyzed and evaluated by the coordination mechanism every academic year.

For both, GEI and masters, we have incorporated an automatic checking mechanism in the subject syllabus editor in order to guarantee that all the competences and objectives have been included in any of the programmed activities. This helps to double check the accomplishment of the competences of the curriculum.
As stated for Criterion 1.1, specific degree websites for GEI, MEI, MIRI and MAI include a competences section that point out which competences are associated to each degree subject/module (competences-subjects matrix).

Furthermore, syllabus include a list of competences, objectives, contents, and activities worked on the different subjects together with additional information (more information is included in Criterion 1).

A new improvement plan to introduce new UPC competence on gender perspective has been planned [270.M.521.2021]

Competences equivalence to Euro-Inf learning outcomes

The previously designed competences at FIB are consistent with the programme's competence profile and learning outcomes for informatics programmes, which were formulated by EQANIE in "Euro-Inf Framework Standards and Accreditation Criteria for Informatics Programmes" published in 2016, as well, that competencies formulated by ASIIN in "Subject-Specific-Criteria of the Technical Committee 04 –Informatics/Computer Science" in 2018.

Programme learning outcomes can be described as quality standards for knowledge, skills and competences, which graduates of an accredited course should have achieved as the educational basis for practicing their profession or for post-graduate studies. A wide range of degree programmes fall within the general area of informatics, but all their graduates should be aware of the wider spectrum of informatics.

We show in the next three tables the equivalence between EQANIE Euro-Inf learning outcomes and competences in the GEI, MEI and MIRI degree programmes.

Table that links EQANIE Euro-Inf learning outcomes with GEI competences:

Euro-Inf Learning Outcomes - Bachelor's Programme in Informatics Engineering

Euro-Inf Learning Outcomes																		
Underlying Conceptual Basis for Informatics	**Common technical competences**								Generic competences									
Graduates of a First Cycle degree should be able to:	CT1	CT2	CT3	CT4	CT5	CT6	CT7	CT8	G1	G2	G3	G4	G5	G6	G7	G8	G9
describe and explain the essential facts, concepts, theories and mathematical methods relevant to computing, computing equipment, computer communication and informatics applications as appropriate to their programme of study	x																
outline the characteristics of relevant state-of-the-art hardware and software and their practical application	x																
outline relevant historical and current developments in informatics and show insight into possible future trends and developments	x																
apply and integrate knowledge and understanding of other informatics disciplines in support of study in their own specialist area(s)		x			x	x											
demonstrate awareness of the need for deep domain knowledge when creating informatics applications in other subject areas																x	
Analysis	**Common technical competences**								Generic competences									
Graduates of a First Cycle degree should be able to:	CT1	CT2	CT3	CT4	CT5	CT6	CT7	CT8	G1	G2	G3	G4	G5	G6	G7	G8	G9
use a range of techniques to identify the requirements of real-world problems, analyse their complexity and assess the feasibility of their solution using informatics techniques		x															
describe a problem and its solution at varying levels of abstraction				x													
select and use relevant analytic, modelling and simulation methods																	x

choose appropriate solution patterns, algorithms and data structures																	x
analyse the extent to which an informatics system meets the criteria defined for its current use and future development							x										x

Design and Implementation	**Common technical competences**								Generic competences								
Graduates of a First Cycle degree should be able to:	C T1	C T2	C T3	C T4	C T5	C T6	C T7	C T8	G1	G 2	G 3	G 4	G 5	G 6	G 7	G 8	G 9
specify and design computing/network hardware/software which meet specified requirements				x													
describe the phases involved in different life cycle models used for specifying, building, testing and commissioning new systems and for maintaining existing systems		x															
select and use appropriate process models, programming environments and data management techniques for projects involving traditional applications as well as emerging application areas					x												
describe and explain the design of systems and interfaces for human-computer and computer-computer interaction														x			
apply relevant practical and programming skills to the creation of computer programs and/or other informatics artefacts				x													

Economic, legal, social, ethical and environmental context	**Common technical competences**								Generic competences								
Graduates of a First Cycle degree should be able to:	C T1	C T2	C T3	C T4	C T5	C T6	C T7	C T8	G1	G 2	G 3	G 4	G 5	G 6	G 7	G 8	G 9
demonstrate awareness of the need for a high level of professional and ethical conduct in informatics and a knowledge of professional codes of conduct										x						x	
explain how commercial, industrial, economic and social contexts affect informatics practice			x														

identify relevant legal requirements governing informatics activities, including data protection, intellectual property rights, contracts, product safety and liability issues, personnel issues and health & safety										x						x	
explain the importance of information privacy and security issues in relation to the design, development, maintenance, monitoring and use of informatics-based systems																x	
Informatics practice	**Common technical competences**								Generic competences								
Graduates of a First Cycle degree should be able to:	CT1	CT2	CT3	CT4	CT5	CT6	CT7	CT8	G1	G2	G3	G4	G5	G6	G7	G8	G9
demonstrate an awareness of appropriate codes of practice and industry standards																x	
describe and explain management techniques appropriate to the design, implementation, testing, deployment and maintenance of informatics systems, including project management, configuration management, change management, etc., and including relevant automated techniques								x									
identify risk issues, including security, health & safety, environmental and commercial risk, and explain risk assessment, risk reduction and risk management techniques										x							
undertake literature searches and reviews using databases and other sources of information														x			
design and conduct appropriate practical investigations (e.g. of system performance), to interpret data and draw conclusions														x			
Other Professional Skills and Competences	**Common technical competences**								Generic competences								
Graduates of a First Cycle degree should be able to:	CT1	CT2	CT3	CT4	CT5	CT6	CT7	CT8	G1	G2	G3	G4	G5	G6	G7	G8	G9
organise their own work independently, demonstrate initiative and exercise personal responsibility																x	

communicate effectively both verbally and using a variety of communications media to a variety of different audiences												x					
plan self-learning and improve personal performance as a foundation for lifelong learning and ongoing professional development															x		
identify different ways of organising teams and the various roles within a team													x				
participate effectively in informatics group-working													x				

Table that links EQANIE Euro-Inf learning outcomes with MEI competences:

Euro-Inf Learning Outcomes - Master in Informatics Engineering

Outcomes for Second Cycle Degree (SCD) Programmes																									
Underlying Conceptual Basis for Informatics																									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9	CG10	CDG1	CDG2	CDG3	CTE1-12	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
demonstrate either deepened knowledge of a chosen specialisation or broadened knowledge of informatics in general															x										
explain in depth relevant concepts and scientific principles appropriate to their programme of study, some of which may be from outside informatics	x																								
demonstrate awareness of topics at the forefront of their specialisation and evaluate their significance																	x								
Analysis																									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9	CG10	CDG1	CDG2	CDG3	CTE1-12	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
apply appropriate analysis methods to the solution of complex problems in informatics and to assess their limitations								x																	
use fundamental knowledge to investigate new and emerging technologies and methodologies																	x								

collect and analyse research data and use appropriate analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of analytical methods.																x									
Design and Implementation																									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9	CG10	CDG1	CDG2	CDG3	CTE1-12	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
describe and explain design processes and methodologies relevant to their subject area and be able to apply and adapt them in unfamiliar situations																x									
specify and complete informatics tasks that are complex, incompletely defined or unfamiliar																x									
apply state-of-the-art or innovative methods in problem solving, possibly involving the use of other disciplines								x																	
demonstrate that they can think creatively to develop new and original designs, approaches, methods, etc																				x					
Economic, legal, social, ethical and environmental context																									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9	CG10	CDG1	CDG2	CDG3	CTE1-12	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
demonstrate awareness of the need for a high level of																					x				

professional and ethical conduct in informatics																									
identify relevant legal, commercial, industrial, economic and/or social contexts appropriate to their area of study and explain their relevance																				x					
evaluate risk and information security issues relevant to their area of study																				x				x	
Informatics practice																									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9	CG10	CDG1	CDG2	CDG3	CTE1-12	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
describe and explain applicable techniques and methods for their particular area of study and identify their limitations														x											
apply informatics techniques to new application areas, taking account of relevant commercial, industrial, social and environmental constraints																					x				
contribute to the further development of informatics														x	x				x						
Other Professional Competences																									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9	CG10	CDG1	CDG2	CDG3	CTE1-12	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
organise their own work independently, demonstrating initiative and exercising personal responsibility																								x	

appreciate the skills required to work with and lead a team that may be composed of people from different disciplines and different levels of qualification							x															x			
undertake literature searches and reviews using databases and other sources of information																							x		
communicate effectively both verbally and using a variety of communications media to a variety of different audiences and preferably also in a second language																		x							
plan self-learning and improve personal performance as a foundation for lifelong learning and ongoing professional development																			x						

Table that links EQANIE Euro-Inf learning outcomes with MIRI competences:

Euro-Inf Learning Outcomes - Master in Innovation and Research in Informatics

Outcomes for Second Cycle Degree (SCD) Programmes																		
Underlying Conceptual Basis for Informatics	**Technical competences**							**Generic competences**										
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CEC1	CEC2	CEC3	CGCB00 CEE1-5	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
demonstrate either deepened knowledge of a chosen specialisation or broadened knowledge of informatics in general							x											
explain in depth relevant concepts and scientific principles appropriate to their programme of study, some of which may be from outside informatics	x																	
demonstrate awareness of topics at the forefront of their specialisation and evaluate their significance						x			x									
Analysis	**Technical competences**							**Generic competences**										
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CEC1	CEC2	CEC3	CGCB00 CEE1-5	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
apply appropriate analysis methods to the solution of complex problems in informatics and to assess their limitations								x										
use fundamental knowledge to investigate new and emerging technologies and methodologies									x									
collect and analyse research data and use appropriate analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of analytical methods.								x										
Design and Implementation	**Technical competences**							**Generic competences**										
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CEC1	CEC2	CEC3	CGCB00 CEE1-5	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
describe and explain design processes and methodologies relevant to their subject area and be able to apply and adapt them in unfamiliar situations								x										
specify and complete informatics tasks that are complex, incompletely defined or unfamiliar								x										
apply state-of-the-art or innovative methods in problem solving, possibly involving the use of other disciplines					x													
demonstrate that they can think creatively to develop new and original designs, approaches, methods, etc												x						
Economic, legal, social, ethical and environmental context	**Technical competences**							**Generic competences**										
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CEC1	CEC2	CEC3	CGCB00 CEE1-5	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
demonstrate awareness of the need for a high level of professional and ethical conduct in informatics													x					
identify relevant legal, commercial, industrial, economic and/or social contexts appropriate to their area of study and explain their relevance													x					
evaluate risk and information security issues relevant to their area of study													x			x		

Informatics practice	**Technical competences**							**Generic competences**									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CEC1	CEC2	CEC3	CGCB00 CEE1-5	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
describe and explain applicable techniques and methods for their particular area of study and identify their limitations			x														x
apply informatics techniques to new application areas, taking account of relevant commercial, industrial, social and environmental constraints													x				
contribute to the further development of informatics					x						x						
Other Professional Competences	**Technical competences**							**Generic competences**									
Graduates of a Second Cycle degree should be able to:	CG1	CG2	CEC1	CEC2	CEC3	CGCB00 CEE1-5	CTFM	CB6	CB7	CB8	CB9	CTR1	CTR2	CTR3	CTR4	CTR5	CTR6
organise their own work independently, demonstrating initiative and exercising personal responsibility	x								x			x				x	
appreciate the skills required to work with and lead a team that may be composed of people from different disciplines and different levels of qualification	x													x			
undertake literature searches and reviews using databases and other sources of information															x		
communicate effectively both verbally and using a variety of communications media to a variety of different audiences and preferably also in a second language										x							
plan self-learning and improve personal performance as a foundation for lifelong learning and ongoing professional development											x						

Improvement plans to the degree programs include reviewing GEI, MEI, MIRI and MAI based on future changes of the Computer Curricular of the ACM [270.M.509.2021].

Criterion 1.4 Admission requirements

In the first place it is important that prospective and new students know in advance which are the objectives, curriculum and admission requirements for a degree programme. For that purpose, specific websites were developed: I love bits (E.1.4.1) for GEI, with updated information that aims to solve most queries that future students may have about this degree and, at the same time, advertises the activities we carry out for secondary school students in order to bring them closer to our studies; and a web for Masters (E.1.4.2 that contains the information, structure and organization of EHEA masters.

For GEI admission, FIB receives an official list from the government, made basically using an offer and demand general rule. Candidates are ranked according to the marks obtained in high school and in the university entrance exams. It's a common procedure for all bachelor programmes at public Universities (more information at Canal Universitats of the Catalan Government).

As for master's admission, there is a specific procedure for each school. At FIB, the master's coordinator evaluates the curriculum and qualifications of each candidate during the admission

process. He/she may assign specific extra preparatory courses if the CV of the applicant shows a lack of previous knowledge .Students coming from degrees that do not guarantee a solid background in informatics are assigned extra preparatory courses. The number of credits used in these preparatory courses is between 6 ECTS and 30 ECTS, which are considered especially important to follow the master subjects and complete the computer engineering requirements in the case of MEI. The admission is denied if more than 30 ECTS are necessary, because it's not possible to equalise competences.

The FIB masters website informs about profiles of the applicants, admission procedure, selection criteria and the admitted students.

Supply and demand in the computer science labour market shows that informatics degree graduates have good prospects and placements. At Access to the labour market for graduates from catalan universities 20 it is stated that graduates take under 3 months to find the first job, and that they stay mostly in work three years after completing their degree, specially in Engineering. Detailed data related to the GEI at FIB-UPC are available at E.1.4.3.

Taking into account the number of available places, and comparing them with incoming student figures, we can see that the new strategies for attracting students have been successful. For instance, the cut-off entrance grade has risen and the female percentage in GEI has also increased (E.1.1.2). On the other hand, although the number of final enrolments in the master degrees has increased, there is still room for improvement (FIB main figure, E.0.1.3) . As a consequence, FIB will focus on boosting knowledge and social recognition of the studies and the profession of computer engineering, as it has been done since 2016. Initiatives intended to promote the role of information technology in today's society will be highly encouraged, as well as those aiming at increasing the knowledge of techniques and tools that allow building computer systems. It seeks to tighten and expand contact with secondary schools to promote a better understanding of the profession and the scope of studies in computer science engineering, and to take the opportunity to especially influence the female group. For instance, a new portal has been created to attract new incoming students, especially girls, having broadcast it to more than 2000 target contacts (under permission and following the new LOPD regulations). All good indicator results show that the 2015 improvement plan has been successfully achieved.
New promotional actions to increase the number of applicants are planned [270.M.511.2021].

Bachelor degree (GEI)

GEI at FIB is the bachelor's degree with the highest demand at UPC, and 7th among all bachelor's programmes at catalan universities (cohort 2020). Indicators corresponding to the last five cohorts of incoming students (E.1.1.2) show a positive trend both in the first-option demand from the 2016-2017 up to 2020-2021 academic years (551, 535, 575, 582 and 746) and their associated cut-off mark (8.3, 8.5, 9.4, 9.3 and 10.1 -maximum mark: 14-), which represent an extraordinary increase from 6.04, the cut-off mark corresponding to the 2014-2015 academic year. Taking into account that the number of places available is 400, these figures indicate the improved academic level of new students and also the effectiveness of promotional activities (see E.1.4.4 secondary school activities: open days, teaching fairs, Ramon Llull Day, etc.). As for the percentage of incoming women, it has been steadily increasing from 9.5% in the 2016 cohort up to 14.5% in the cohort 2020. Even though improving those figures involves several external issues, which do not depend on university decisions, such as the treatment of technology subjects at the early stages of secondary school, our promotional actions seem to point in the right direction. In addition, UPC makes attracting female talent one of its priorities, and FIB participates in a UPC gender working group through the Head of Institutional Support and External Relations Unit and the Vice-dean for Promotion and Communication (see gender equality program in catalan, evidence E.1.4.5).

The percentage of students who have chosen GEI as their first option on the pre-enrollment procedure is very high, being around 97% of the overall enrollments. This means that a vast majority of first-year students are highly motivated to undertake the degree.

It should be noted that the actual number of incoming students may exceed by up to 5% the number of available places. It is customary practice for all degrees to receive a longer list of potential students in order to balance those that change their minds just a few days before registration. For GEI this has been rare up to now, and this is one of the reasons for this overbooking.

Most incoming students have completed secondary studies within the science or the technology specialities. Therefore, they are appropriately qualified to begin the degree. Nevertheless, a number of students have completed higher level vocational training course studies (in Catalan, Cicles Formatius de Grau Superior) (3.3%, 5.2%, 1.3%, 3.4% and 4.5% from 2016 to 2020) (E.1.1.2). These students have some shortcomings in the most theoretical subjects. This is why they are offered an introductory support course (evidence E.1.4.6) prior to the start of the studies, which focuses on the study of foundations in physics and mathematics.

In order to get the best incoming students, it is necessary to take into account the results from other global indicators, which have been obtained essentially from surveys addressed to new incoming students (E.1.4.7). According to these survey results (prepared with a FIB Business Intelligence tool that collects FIB data), 84.3% of new students reported having known about the degree from the centre's website, and 48.6% are planning to continue completing a master's degree. Both indicators were taken into account when designing strategies to attract students for the degree (GEI) and master's courses.

In the current context of budgetary restraint in public universities, the number of places offered for changing the university and/or university studies in the GEI has been reduced from 20 places (until 2017) to 5 (since 2018). Requests meeting the minimum requirements are prioritised according to the student's college entrance qualification and the number of credits which can be validated. Recognition of subjects is carried out comparing topics, and a record of the approved recognitions is kept to maintain a uniform approach over time.

Masters' degrees (MEI, MIRI, MAI)

Admission to the master's is performed twice per academic course (but MAI). Undergraduate students can finish their studies in either February or June/July; so we offer them the possibility to continue in any of our master's programs with no delay. The target group of students in our master's comes from Informatics Engineering and Data Science and Engineering degrees at FIB or in other schools. Students coming from degrees in telecommunications, electronics, industrial engineering or similar are assigned extra preparatory courses before they can begin the master's program if their background is deemed unsatisfactory. The number of credits used in these preparatory courses is between 6 ECTS and 30 ECTS, which are considered specially important to follow the master subjects and complete the computer engineering in the case of MEI. The admission is denied if more than 30 ECTS are necessary, because it's not possible to equalise competences. In particular, from 2016 up to 2019, 17 students (15 for MEI, 2 for MIRI) have been asked to do some complementary courses. So far, only three (two MEI students and one MIRI student) students seem that they will not finish the master: two of them only with the TFM left and usually that means that they start working, and another has the TFM and one compulsory subject that was never enrolled. There are two other MEI students that are currently doing the TFM, and the rest have already finished. Therefore, potentially, 14 out of 17 students with complementary courses will finish their studies with an average number of extra credits of 12 ECTS credits (2 extra subjects), that means that will need maximum a semester more than the ideal number of semesters of the master. On the other hand, students have been able to complete the computer engineering formation.

We have the final new enrolled or registered students from evidences E.1.1.4, E.1.1.6 and E.1.1.8. And we have also information on the students who previously tried to enrol in these master's degrees (applicants). We can summarize in the following tables the maximum number of students that can be registered (capacity), the number of students that apply (applicants), the number of students admitted (admitted) and the number of students that eventually register and start the master's (registered) for each master's (MEI, MIRI and MAI):

MEI	**2016-2017**		**2017-2018**		**2018-2019**		**2019-2020**	
	Sept.	Feb.	Sept.	Feb.	Sept.	Feb.	Sept.	Feb.
Capacity	50		40		40		40	
Applicants	32	22	41	18	49	3	36	3
Admitted	25	17	30	14	45	3	31	2
Registered	14	13	13	10	15	3	16	2

MIRI	**2016-2017**		**2017-2018**		**2018-2019**		**2019-2020**	
	Sept.	Feb.	Sept.	Feb.	Sept.	Feb.	Sept.	Feb.
Capacity	80		80		80		80	
Applicants	64	39	96	11	111	15	124	28
Admitted	61	32	80	9	81	12	97	22
Registered	45	20	56	9	57	7	60	14

MAI	**2016-2017**		**2017-2018**		**2018-2019**		**2019-2020**	
	Sept.	Feb.	Sept.	Feb.	Sept.	Feb.	Sept.	Feb.
Capacity	50		50		50		50	
Applicants	82		113		216		232	
Admitted	48		62		54		75	
Registered	34		36		43		33	

MEI, MIRI and MAI students' origin figures show high proportions of foreign students: 40%, 29% and 43% foreign students considering EU students respectively, 37%, 20% and 27% if we consider only non EU students. In the case of MEI, most of the foreign students come from North and South America, and one of the reasons is that the teaching language is Spanish. We would like to introduce English so that we can open MEI to other countries. In the case of MIRI, Asia is the most

common origin of the foreign students, then EU countries, and finally North and South America. Finally, UE and Asia students are the majority of the foreign students in MAI.

New MEI students nationality	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**
FIB graduates	2	5	4	3	7
UPC graduates	2	6	6	2	5
Catalunya	2	4	3	3	2
Spain	2	1	1	1	-
EEC	-	1	-	2	-
Europe not EEC	-	-	1	-	-
North and South America	5	10	8	6	5
Àsia	1	-	-	1	-
Àfrica	-	-	-	-	-
Oceania	-	-	-	-	-

New MIRI students nationality	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**
FIB graduates	26	26	25	22	31
UPC graduates	5	5	7	5	4
Catalunya	5	5	5	5	17
Spain	5	5	9	15	5
EEC	4	7	6	9	3
Europe not EEC	1	3	-	1	1
North and South America	4	5	6	3	8
Àsia	7	9	6	4	8
Àfrica	-	-	1	-	-
Oceania	-	-	-	-	-
New MAI students nationality	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**

FIB graduates	7	5	2	12	8
UPC graduates	3	2	6	4	1
Catalunya	5	6	5	6	6
Spain	5	5	6	7	6
EEC	5	6	9	5	5
Europe not EEC	-	2	1	-	2
North and South America	5	5	5	5	6
Àsia	8	3	-	4	1
Àfrica	2	-	2	-	-
Oceania	-	-	-	-	-

Master's admission exceeds the number of seats offered, but registration figures are below capacity. We have been working in two directions: the first one is to increase the number of admitted students that end up registering. The other direction is in efforts to increase the number of applicants. Both efforts are related to the global FIB improvement plan.

Part of this plan is to directly promote to our undergraduate students with special sessions. The percentages of the new master's students belonging to the GEI and UPC studies in 2019/2020 was 36.8% in the case of MEI, 40.3% for MIRI and 10.38% for MAI. However, our intention is to promote both at FIB level, UPC level but also at European and other areas of the world to benefit the internationalization of our masters. In the case of MEI, this is more oriented to countries with Spanish language, that limits the number of abroad students and the origin universities. In the case of MAI and MIRI the number of international students are about 20-25% and are open to any students with the necessary level of English (B2).

Internationalisation of the MAI educational programme

Artificial Intelligence (AI) research is interdisciplinary by nature and draws on computer science, mathematics, statistics, biology, neuroscience, cognitive science, linguistics, ethics, psychology and law. Research in AI at the consortium of Catalan universities supporting this program spans knowledge representation and reasoning, machine learning, natural language processing, autonomous agents, computer vision robotics, and visualisation.

MAI degree programme emphasis on practical techniques, and a solid theoretical background, for designing and constructing intelligent systems, enabling graduates from this course to apply their skills in a variety of settings. These skills are in high demand in the market. Graduates of this program have a good overview of the main AI techniques and an in-depth understanding of how to apply these techniques in at least one area within multi-agent systems, reasoning, data analytics, natural language processing and deep learning. And graduates also have the skills to carry out AI research in academic and R&D environments and to identify how AI techniques can provide intelligent solutions to IT problems in companies and organisations.

MAI is taught entirely in English. This program is addressed to national and international students who wish to acquire advanced knowledge in AI in order to occupy positions of responsibility in industry, the public sector and academia in Catalonia, Spain or abroad. The program covers many research areas related to the design, analysis and application of AI; and was modified in 2017 to adapt its contents and focus of interest.

The admission requirements for the UPC's official masters can be found at What are the requirements to enrol in a master's degree?. But candidates must provide proof of their English proficiency. The Academic Committee is in charge of the admission decisions of the candidates. The criteria are: Academic Information (50%), Background and professional experience (40%) and Motivation (10%).

The criteria details follow:

Academic Information:

- Final average grade for the undergraduate degree that provides access to the master's degree
- Ranking of the university issuing the previous degree, using the most common rankings (e.g. ARWU, QS World University, etc.)
- Academic performance on the previous degree

Background and professional experience:

- Suitability of the candidate's previous degree. Holders of bachelor's degrees in disciplines in the field of Computer Science and Mathematics will be given preference, but candidates from other disciplines are welcome
- Experience in innovation and research projects
- Additional university degrees

Motivation:

- Candidate's resume and motivation letter

MAI, as well as the other EHEA degree programmes at FIB, has a wide range of mobility facilities (at Mobility in evidence E.1.4.8), both for students and academic staff.

MAI, as a EHEA degree programme, is a 90 ECTS programme (three semesters full time). Now FIB is adapting these agreements to the MAI degree programme, studying the implementation of double diploma agreements (improvement plan: New Double degrees agreements within the UNITE consortium and other potential partners in all masters and GEI [270.M.510.2021]), and in particular, UPC university is currently working in a possible UNITE university consortium to develop a AI master among different universities, where MAI may actively participate.

Internationalisation of MAI academic staff

The academic staff, MAI Faculty, concerns an important academic group from UPC, UB and URV. They meet the qualifications requirements for programme delivery, and they have sufficient and recognised teaching, research and, where applicable, professional experience:

A total of 42 teachers participate in MAI during the 2019/2020 academic year. Permanent teachers carried out 88,5% of teaching activity (and 11,5% by non-permanent teachers). 90,7% of teaching activity is carried out by Ph.D. holders (and 9,3% by person with just a master's degree).

Criterion 4.1 includes detailed information about MAI academic staff

Internationalisation MAI results

Although MAI is a course of 90 ECTS it has a high number of international participation looking at the amount of international students enrolled (not from Spain), the number of students doing mobility, the number of ERASMUS students, and the number of international graduate students:

	2015-16	2016-17	2017-18	2018-19	2019-20
Number of international graduates	TBD	TBD	TBD	TBD	TBD
Number of international students enrolled	20 (50%)	16(47%)	17(47.2%)	14(32%)	14(40%)
Number of students participating in mobility (incoming and outgoing)	TBD	TBD	26	27	32
ERASMUS students participating in MAI	TBD	TBD	TBD	TBD	TBD

TBD: To be determined

2. The Degree Programme: Structures, Methods & Implementation

Criterion 2.1 Structure and modules

The programme's design (competence profile and structure of the curriculum) meets the requirements of the discipline and complies with the required level of study according to the qualification framework in the EHEA in Spain (in Spanish, Marco Español de Cualificación para la Educación Superior, MECES). This verification ensures that all degree programmes are divided into modules. Each module is a sum of teaching and learning whose contents are concerted. With its choice of modules, the structure ensures that the learning outcomes can be reached and allows students to define an individual focus and course of study. The curriculum is structured in a way to allow students to complete the degree without exceeding the regular course duration. The modules have been adapted to the requirements of the degree programme. They ensure that each module's objectives help to reach both the qualification level and the overall intended learning outcomes.

Planning, delivery and assessment are adequate for enabling achievement of the learning outcomes, and are consistent with the intended ones which correspond to the appropriate level for the programme in the European Higher Education Area (EHEA) at adequate rates. Bachelor degree (GEI) and Masters' degrees (MEI, MIRI and MAI) were designed in accordance with EHEA curricula which imply new teaching criteria: student participation, innovation in teaching methods, and use of modern educational technologies. For all four programmes, as an incentive for excellence, students' mobility is supported and promoted as well as student participation in educational activities related to university-business cooperation. The goal of these activities is to complete the training received by students at the university.

Mobility

FIB students can also take part in various mobility programmes. Each one is based on a number of agreements with other universities and institutions in different countries. All these agreements allow the student to make a stay in a foreign university and attend lectures, do the final project/thesis or accomplish a double degree. The school is constantly working to secure more agreements in order to offer students a wider range of destinations to choose from. We want to highlight evidence (at E.2.1.1) showing Mobility programs, Double degree, and Internships and other activities abroad.

UPC belongs to a network of European universities called CLUSTER. This participation implies the direct access of students from the UPC to the different universities belonging to the network. Also UPC belongs to the network CINDA where many countries from Latin America, and the

Magalhães network is a consortium of universities in Europe, Latin America and the Caribbean created to promote and support the exchange between students in these areas.

FIB has established different agreements with universities or institutions from different countries, and is constantly working to secure more agreements. All these agreements allow the student to make a stay in a foreign university to go to lectures, do the final project/thesis or accomplish a double degree. Thanks to the agreements and the help of the coordinator of the master or the specialization the outgoing and incoming students know, in advance, which subjects those students have to do. In case of any problem with the enrolment of any of the courses of the agreement, the coordinator analyzes the curriculum of the target and source curriculum and suggests alternative subjects. Both universities should agree on the proposed alternative subjects.

The School, its teaching staff and its degree programmes are internationally recognised for their quality and for continuous innovation in the design of curricula and teaching methodologies. This spirit of excellence has placed the School at the forefront of delivering IT courses at university level. Thanks to its efforts, it has academic exchange and double degree agreements with 150 prestigious universities worldwide (see Partner universities map at E.2.1.1).

FIB has also incorporated an international and intercultural dimension into the purpose, function and delivery of its education. MEI, MIRI and MAI received AGAUR International Master's Programme mention for 2013-14 and 2014-15 academic years. This mention identifies master's programmes with an outstanding international dimensions and professor qualification.

Relation of mobility programs (see Mobility programs) availables for FIB students: Erasmus+, SICUE, América Latina, USA and Canada, UPC-Europa, UPC-China, Go for Europe, Vulcanus, Scholarships of National Institute of Informatics (NII) Tokyo, CERN, IAESTE, Balsells Scholarships, AREAS+.

Some of them has double degree program: École d'Ingénieurs ISIS (Informatique et Systèmes d'Information pour la Santé) and Centre universitaire Jean-François Champollion, Castres, França for GEI; École d'Ingénieurs ISIMA (Institut Supérieur d'Informatique, de Modélisation et de leurs Applications) and Université Blaise Pascal, Clermont-Ferrand, França, for MEI; Centro de Investigación en Computación and Instituto Politécnico Nacional de los Estados Unidos Mexicanos, México D.F., México, for MIRI.

The strong internationalisation of the school results in a high number of student exchanges. UPC indicators about the number of incoming and outgoing students at FIB are:

	Incoming	**Outgoing**
2017/18	148	72
2018/19	130	70

2019/20	121	56

Please note that the outgoing figure is highly dependent on the available public funding, and for 2020, the pandemic situation stops almost everything. In general, the number of incoming students doubles the number of outgoing students.

Regarding mobility assessment we have gathered information about MIRI and GEI mobility, where there is more mobility thanks to more consolidated mobility programmes, due to proximity and research interests. In both cases, the mobility satisfaction is 4.7 and 4.8 for MIRI (evidence E.1.1.6) and GEI (evidence E.1.4.4) on a grading scale from 1 to 5, with 5 meaning “totally agree”.

Improvement plans are proposed in this self-assessment-report to review double degree agreements within the UNITE consortium [270.M.510.2021] and to adapt to the new Erasmus+ programme [270.M.514.2021].

External practices

The framework for FIB student participation in educational activities related to university-business cooperation, is called educational cooperation agreements (see Industrial Practices at evidence E.2.1.2). These kinds of activities are extracurricular for masters’ degrees. For GEI they can be extracurricular or curricular, in this later case it is mandatorily associated with the accomplishment of the final degree project in a company.

Through Educational Cooperation Agreements, the University gives companies the opportunity to take on students in their final years so that they are able to gain practical professional experience. They will not be subject to contractual employment obligations and they may be entitled to tax deductions.

For GEI, the external curricular practices are mandatorily associated with the accomplishment of the Final degree project in a company and share with it the same training activities (project management module), supervision and assessment. At information for students (evidence E.2.1.2), they can find as well, the Educational Cooperation Agreement and the working plan documents.

The analysis performed by the evaluation of the final master’s thesis and the feedback of the employers show that the MECES level is achieved and that students are proficient in the competences taught in the master or GEI programme.

In the case of extracurricular external professional practices, those are not mandatorily associated with the final project but the agreements are previously reviewed to guarantee that those fit with the target degree. In this case, the tutor associated with the agreement is the vice-dean of international relations for GEI and the vice-dean for postgraduates studies for masters.

Practices are positively evaluated in general in all the programmes as a mechanism to acquire other useful knowledge to their studies (Satisfacció ESTUDIANTAT Pràctiques on a grading scale

from 1 to 5, with 5 meaning “totally agree”, 3.5 at MIRI (evidence E.1.1.6), 3.8 at GEI (evidence E.1.1.2) and 4 for MAI (evidence E.1.1.8) and MEI (evidence E.1.1.4).

For the 2019/20 academic year, the amount of external curricular practices was 10 (7 for MAI, 2 for MIRI, and 1 for MEI) and 177 for masters and GEI respectively. This means about 26% and 46% of the total number of external practices performed durant this year. On the other hand, a total of 19 labor experience recognition were done in 2019/2020 for the master students: 1 for MEI and 18 for MIRI. The high number of MIRI students with labor experience is thanks to the tight relation with the Barcelona Supercomputing Center and HP Inc. (evidence E.2.1.11 with restricted access), which is really good to create networking and research and industrial cooperations.

Improvement plans have been identified to use the new UPC applications to deal with the external practices [270.M.508.2021].

Teaching coordination mechanisms

Agents involved in the coordination processes ensure that the objectives of the courses are feasible, implementable and consistent with the assigned competences. The bachelor’s degree implies a larger coordination structure than the master’s, because it involves more students, subjects and academic staff. The master’s can be organized in an easier way, but it can also be broadened when necessary.

All degree programmes have an Academic committee responsible for the final decisions that will be delivered to the Standing Committee for effective execution. For example, every semester subjects’ teaching guides are checked and the development of the subjects is analysed. If necessary, the modifications proposed by the professors are discussed before presenting those to the academic committee.

In addition, generic competences or professional skills deserve specific coordination due to their transverse nature. This is called transverse coordination, and there has been appointed a coordinator for each one.

Bachelor degree (GEI)

Several coordination mechanisms have been devised for the Bachelor Degree in Informatics Engineering (GEI), which are clearly described on the website (E.2.1.3). The existence of these mechanisms is one of the strengths of the program. They have facilitated both the allocation of different levels of competence in all subjects, accessible to everyone, and the monitoring of their degree of achievement.

The academic staff responsible for the subjects constitutes the first level of coordination mechanisms, and this is usually a senior or expert professor. These are proposed by the department in charge of imparting a given subject, and it must be ratified by the school. They should be partners among the school and the instructors who teach the course, and they must coordinate the relationships with students. The rules governing the functions were approved by the Standing Committee of the School Board on 05/20/15 (see the corresponding Standing Committee minutes, evidence E.2.1.4).

The common compulsory subjects of the GEI are divided into five areas, each of which has a coordinator. The coordinator’s partners for each of these areas are those responsible for the subject, and their basic function is the vertical coordination of objectives, contents and activities of the subjects involved. Each speciality of the GEI has also been appointed a coordinator, who is also in charge of the vertical coordination with the common block.

To assure the uniform distribution of the subject load that a student may register for throughout the semester, there also exists what is known as horizontal coordination. The horizontal coordination corresponding to the first two semesters (early stage) is the responsibility of the Head of Studies for the Initial Phase (early stage), and the horizontal coordination of the other common compulsory subjects is performed by the Head of Studies. The speciality coordinator takes responsibility for the horizontal coordination of each of the five specialities. All this coordination may use student surveys about subject workload: "ECTS project" in the yearly Academic Report (in Catalan, see Annual reports evidence E.0.1.2 at bottom).

All coordinators meet at least once a year with both Heads of studies. The ultimate responsibility for the coordination of studies lies with the Head of Studies.

CAGEI (GEI Academic Committee) is the specific committee relevant to GEI teaching coordination with regular meetings (evidence E.2.1.5 CAGEI minutes with restricted access). This academic committee and some (three) curricular assessment committee deliver agreements to the executive Standing Committee. Evidence E.0.1.5, at School Governance Specific committee shows the current composition and regulation for each committee. CAGEI minutes display decision-making processes adapting regulations to academic needs (evaluation regulations, academic staff assignment to specific tasks like first course subject responsibility).

Masters' degrees (MEI, MIRI, MAI)

All master's have the same coordination structure. The coordination is implemented in three different levels: at the programme year level, at the area level (i.e. group of courses in the same area) and global. For each master, the names of all these coordinators and their functions are published. The area coordinator is responsible for distributing the learning objectives and competences among the courses in the area. The global coordination ensures the coordination among areas and semesters. This global coordination is one of the tasks of the Master's Academic Committee, and there is one for each Master's: CAMEI (MEI Academic Committee), CAMIRI (MIRI Academic Committee) and CAIMAI (MAI Academic Committee). Academic committees regularly meet and deliver agreements to the executive Standing Committee (evidence E.2.1.6 has restricted access for minutes of CAMEI, CAMIRI or CAIMAI). In the case of MAI, which is an inter-university programme including UPC, UB (Universitat de Barcelona) and URV (Universitat Rovira i Virgili), it also has the goal to coordinate the three university teams.

Each Master's Academic Committee is composed of several professors (according to the departments involved in the master's programme), the school management (Dean, Vice-Dean) and school staff (Head of the Decision Support Office). The current composition and regulation for each Specific committee is shown at E.0.1.5. The duties of the Academic Committee include the coordination of areas and the supervision of the education objectives/competences/contents of the programme year subjects. No subject can change any of the above without the explicit permission of the area coordinator and this committee.

Finally, for all the masters, and with the purpose of better coordination among subjects, specific meetings for common compulsory subjects in order to analyse their contents in collaboration with specialization coordinators have been organized. This has helped to 1) reduce any existing overlap, 2) to coordinate contents when necessary and 3) to consider the needs of more advanced specialized subjects. Specialization coordinators have also performed coordination meetings among specialized subjects.

Final degree project

In the case of the GEI bachelor's thesis (TFG in Catalan, evidence E.2.1.8), there exists an initial training module on project management (Thesis management course) which allows the student to establish precisely the goals and scope of his/her work, plan it and think about the technical competences that will be needed to carry it out. All of this is done under the guidance of his/her project supervisor and with the help of the project management professors. The Final degree projects are related to the specialisation that the student has chosen and must cover some of the technical competences of that specialisation, in addition to the generic ones. Assessment of cross-disciplinary competences is based on rubrics (evidence E.2.1.9).

For the master final project, the supervisor guides the students to develop a proposal of the final project (title, brief descriptions and objectives of the project) that achieves the competences and objectives of the master's degree. This proposal has to be done in one of the specialisations of the master in the case of MIRI and with no specialisation in the case of MEI and MAI. The final project proposal has to be done before the semester when the students enrol the final project. In the case of MIRI, the master thesis proposal is evaluated by the coordinator of the MIRI specialisation the student belongs to, who is the expert or can check with other professors in the area, if the proposal targets the competences of the specialization. For MEI and MAI is done by the coordinator of the master who is an expert in the field and has the vision of all the competences and subject curriculum. In case it is rejected, observations are indicated, and the supervisor and the student has to change the final project proposal to fit the requirements of the rejection. Once the proposal is approved, the project supervisor has to guide the student along the semester to guarantee the completion of the final project achieving the objectives indicated in the proposal.

On the other hand, students are also aimed to study the possibility of completing the Master Thesis with a company agreement or foreign university. In this case, a master thesis tutor is required to guarantee the competences and quality of the master thesis document.

In any case, it is the responsibility of the supervisor or tutor to validate the work done by the student before it can be evaluated by an evaluation committee. The supervisor or tutor are linked to an academic unit (Department, Research Institute, etc.) and with expertise and teaching in GEI or master degrees. The work will be done under the direction of a senior teacher. If the director of the final project is a novice teacher, it will be necessary for another senior teacher to act as the speaker of the work, ensuring the adequacy of the work to the objectives of a final project of the studies. However, a professor of the University Teaching Staff or of the Scales of Research Staff of the Consejo Superior de Investigaciones Científicas or professors or researchers in higher education or research bodies, Spanish or foreign, may also lead a project. In this case, however, it will be necessary for another senior teacher to act as the project tutor.

For both, GEI and masters, the final project evaluation committee follows the regulations of each study with the objective of guaranteeing the proper evaluation of the final projects. Those evaluation committees (three professors - the supervisor is not a member) are automatically generated by an application that considers a database of professors of the degree and the expertise of the professors in the area. After this automatic assignment of professors to committee, this result is double checked by the specialization coordinators and the coordinators of the masters, and if necessary, a modification of the committee is done.

Recognition of credits acquired externally by the students

Regulations allow recognition of subjects and credits for external practices and other activities.

The Center has as a frame of reference the UPC degree and master's degree regulations (NAGRAMA - acronym in Catalan). The Center, and based on the NAGRAMA regulations for teaching centers and university research institutes, develops specific aspects of the studies of the university master's degrees that are taught within the Barcelona School of Informatics. The regulatory framework of the UPC is quite flexible and allows, thanks to the specific regulations of each degree, the adaptation of the general academic regulations (NAGRAMA) to the singularities of each Center and each degree.

The Faculty of Informatics of Barcelona is reviewing the regulations in order to adapt them to higher-ranking regulations and as a result of the proposals for improvement that arise from the analysis of the processes to which it refers, in accordance with the objectives of the degree. The regulations are finally approved by the Standing Committee, which is made up of members of the management team, faculty, students, and administration and services staff.

In the case of masters' degrees, new regulations have been added to include recognition of labour experience credits and curricular external practices related to the final master thesis. From 2018, when these new regulations were approved, there have been 52 students (16 curricular external practices and 36 labour experiences recognitions - evidence E.2.1.10). Some of those students have been able to continue their studies meanwhile they were working in the same competences and the same field of the master. Finally, in order to motivate students to end their studies in a reasonable period of time a normative of minimum academic progress has been introduced which is flexible with those students doing partial time in their studies.

NAGRAMA regulation also allows recognition of subjects. This is carried out by comparing topics previously completed by students with those of GEI. A record of the approved recognitions is kept to maintain a uniform approach over time.

Students' study progress rates adequacy

In general students at all levels have some type of tutorship and guidance. Special care is taken for students with other capacities and high performance athletes.

To guarantee studies are ended in an adequate period of time there is a permanece regulation for masters and special first year regulation in GEI. On the other hand, special curricular evaluation can be done by the academic commissions to help the progress of the students and to avoid critical situations where students have a good overall performance in all the subjects but some special cases.

In the following chapter, Exams: System, Concept & Organisation are commented and evidence is given.

GEI studies:

For students enrolled at FIB, a tutorial action plan has been devised, which includes three different programs: peer mentoring (*mentories*), peer academic mentoring (*aula lliure)*, both of them specially addressed to first year undergraduate students, and tutorship.
Additional actions are organized for degree students in order to give specific support and information about degree specialisations, final degree projects and mobility programs. Academic support services for master's students are also provided.

The abandonment rate at GEI has significantly decreased since the launch of these mentoring programs (26,6% in 14/15, 24,3% in 15/16, 19,7% in 16/17 and 21,7% in 17/18 on the first year; 46,8% in 15/16, 42,6% in 16/17, 42,1% in 17/18, 35,9% in 18/19 and 30,6% in 19/20 within the whole degree) (see evidence E.1.1.2) This outcome shows how relevant guidance programs are to improve student's success.

The GEI graduation rate in the last course 2019/20 is 35,8%, more than twice the graduation rate in 2014-15 (16.5%), much higher than the minimum goal of 14%. Indeed, last year with information about the initial phase (2018-2019) performance shows that more than 54% of students could finish this initial phase in the expected time, which is almost doubling 2014-15 performance.

This is partially thanks to the introduction and consolidation of the re-evaluation mechanism and other complementary plans (tutorial plan, revision of the planning and assessment method of some subjects), the students' performance at the Initial Phase follows a growing trend. On the other hand, during the last few years there has been an increase in the admission cut-off mark, which has also helped to improve the performance. No correlations results are shown between the drop-off rate and the admission cut-off mark because there is no significant difference between the cut-off and the best mark.

Concerning the rest of the global academic indicators of the degree, the goals are being achieved. Specifically, the efficiency rate has been maintained at over 94% in the last three years of graduates, whereas the stated goal was only to be over 68%, increasing more than 6% the efficiency rate of the last review. We plan to enhance support strategies at GEI to increase the efficiency rate even more [270.M.516.2021]

Masters studies:

FIB Masters in the new EHEA framework started in 2012. In the case of MAI, each student master is assigned a tutor from the admission period that has the role of helping the MAI student with the enrolment and guidance during the master. In the case of MIRI and MEI, the coordinator of the master is in charge of tutoring the students, with the help of the specialization coordinators for MIRI students.

MEI Studies:

Evidence E.1.1.4 shows academic results for MEI. A summary follows:

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
MEI academic results	Egress rate (%)	91,4%	92,8%	92,9%	93,1%	94,2%
	Attainment rate (%)	86%	79,9%	79,9%	84,4%	86,3%

	Drop-out rate (%)	5,9%	40,9%	0%	20,8%	33.3%
	Graduated rate (%)	52,9%	40,9%	62,5%	62,5%	54,2%
	Efficiency rate (%)	87,8%	97,6%	87%	87,6%	88,9%

These global academic indicator rates are high enough (and also global MEI qualifications at evidence E.2.1.11 with restricted access). In any case, we are working on increasing the graduation rate in several ways: facilitating they can work and study with better timetables (2 or 3 days a week), partial time following an industry itinerary (external practices and TFM modality B or D) and contacting students that only have the final project left or small number of credits left. Regarding the drop-out rate we have been doing actions to motivate and help students to end their studies. The deviation observed in the % of drop-out is due to the reduced number of enrolled students which makes this number to significantly increase or decrease with few students that decide to give up the master. In any case, in our improvement plan we are proposing new features and directions for the MEI programme since this programme fits with a national MEI regulation (evidence BOE-MEI).

MIRI Studies:

Evidence E.1.1.6 shows academic results for MIRI. A summary follows:

		2015-2016	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**
MIRI academic results	Egress rate (%)	94,4%	94,4%	96,6%	97%	95%
	Attainment rate (%)	85,7%	87,6%	91,7%	92,4%	88,4%
	Drop-out rate (%)	19%	14%	29,5%	17,5%	10,4%

	Graduated rate (%)	64,3%	72,1%	52,5%	63,5%	70,2%
	Efficiency rate (%)	95,5%	97,9%	94,2%	96,7%	94,1%

These global academic indicator rates are high enough (and also global MIRI qualifications at evidence E.2.1.11 with restricted access). In the case of MIRI, the drop-out rate is more stable and usually those are due to labor reasons when students decide to focus full time in their jobs. Also, we have noticed that some students enroll in MIRI because they were interested in some specific subjects to achieve the minimum number of ECTS credits to be able to start their Ph.d.

MAI Studies:

Evidence E.1.1.8 shows academic results for MAI. A summary follows:

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
MAII academic results	Egress rate (%)	96,7%	97,9%	96,1%	98,7%	99,1%
	Attainment rate (%)	86,9%	91,9%	88,4%	95,1%	92%
	Drop-out rate (%)	0%	8,7%	11,9%	5,7%	18,4%
	Graduated rate (%)	87,5%	65,2%	76,2%	82,9%	71%
	Efficiency rate (%)	100%	95,9%	94,8%	94%	96,8%

These global academic indicator rates are high enough (and also global MAI qualifications at evidence E.2.1.11 with restricted access). The drop-out rate in MAI has usually been small. Last year was especially high compared to the rest of the years. We believe this was due to some changes in the subjects, elective spots limitations, mobility reasons, together with some not expected and puntual drops. We are analyzing this number at the same time that we are improving the coordination of the three universities and subjects contents.

Graduates' occupation rates adequacy

The number of graduates is 223 in course 2019/20 (evidence E.1.1.2), as shown in the table below.

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
GEI graduates	Women	16	17	18	28	18
	Men	181	217	211	229	205
	Total	197	234	229	257	223

The most recent employment satisfaction survey is that of the 2020 edition (evidence E.2.1.12) in which the employment rate is 96.7% and the adequacy rate is 89%, which is 15% better than the last review 74.1%. In this same survey, the mean of the assessment of the utility of theoretical education is 5.4 and the mean of the assessment of the utility of practical education is 5.2 (both of which in an assessment range of 1 to 7, which 7 meaning the best).

The graduate association "FIB Alumni" and the companies in the ICT sector which we collaborate with provide us context information, which confirms a very high employment rate of our graduates and their excellent reputation in the ICT professional environment.

At evidence (E.2.1.1) we can see that graduates are mainly working three years after completing their university studies, especially in Engineering.

The number of MEI graduates is 10 in course 2019/20 (evidence E.1.1.4), as shown in the table below.

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
MEI graduates	Women	1	2	1	4	1
	Men	10	10	6	19	9
	Total	11	12	7	23	10

The most recent employment satisfaction survey is that of the 2020 edition (evidence E.2.1.13) in which the employment rate is 85.7% (100% after finishing the studies) and the adequacy rate is 85.7%.

In this same survey, the mean of the assessment of the utility of theoretical education is 4.4 and the mean of the assessment of the utility of practical education is 4 (both of which in an assessment range of 1 to 7, which 7 meaning the best). In 2020, the global evaluation of the subjects and academic staff done by the students was 3.5 and 4 (assessment range of 1 to 5), respectively (evidence E.1.1.4) . This means that actions still can be done in order to improve the student academic satisfaction once they reach the market. Related to that, we've been working towards the implementation of a MEI Dual Master programme, with a more professional orientation, which will be verified as part of a new improvement plan [270.M.517.2021] .

The number of MIRI graduates is 59 in the 2019/20 course (evidence E.1.1.6), as shown in the table below.

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
MIRI graduates	Women	3	6	5	13	8
	Men	33	31	30	43	51
	Total	36	37	35	56	59

The most recent employment satisfaction survey is that of the 2010 edition (evidence E.2.1.13) in which the employment rate is 88.9% (94.5% after finishing their studies) and the adequacy rate is 70.6%. In this same survey, the mean of the assessment of the utility of theoretical education is 5.5 and the mean of the assessment of the utility of practical education is 5.3 (both of which in an assessment range of 1 to 7, which 7 meaning the best). In 2020, the global evaluation of the subjects and academic staff done by the students was 3.5 and 4 (assessment range of 1 to 5), respectively (evidence E.1.1.6) . Here, as the students are specialized in a field the overall satisfaction is better than those for MEI students. This makes us think about possible orientations of MEI studies following the computer curricular of the ACM.

The number of MAI graduates is 29 in the 2016/17 course (evidence E.1.1.8), as shown in the table below.

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
MAII graduates	Women	-	4	5	5	8
	Men	13	25	29	19	29
	Total	13	29	34	24	37

The most recent employment satisfaction survey is that of the 2020 edition (evidence E.2.1.13) in which the employment rate is 81.8% (100% after finishing their studies) and the adequacy rate is 81.8%. In this same survey, the mean of the assessment of the utility of theoretical education is 4.8 and the mean of the assessment of the utility of practical education is 4.7 (both of which in an

assessment range of 1 to 7, which 7 meaning the best). In 2020, the global evaluation of the subjects and academic staff done by the students was 3.5 and 4 (assessment range of 1 to 5), respectively (evidence E.1.1.8) .

Assessment of the training received

In the same year 2020, the global evaluation of the subjects and academic staff done by students was 3.5 and 4 (assessment range of 1 to 5), respectively. For graduated GEI students, the assessment of the level of training received shows a global satisfaction of 5.4 and 5.2 for the theoretical and practical part respectively (on a grading scale from 1 to 7, with 7 meaning “totally agree”, D1 and D2 sections, evidence GEI-Graduated). On the other hand, *Indicadors de satisfacció* on evidence E.1.1.2 (on a grading scale from 1 to 5, with 5 meaning “totally agree”), the results show a high score for subjects global satisfaction (3.5) and professor teaching (3.9), being the employment ratio more than 98% at the moment of the survey and to the best of our knowledge all of them with a job.

For MEI students, the assessment of the level of training received in the master's degree for those graduated student shows a global satisfaction of 4.4 for the theoretical part and 4 for the practical part (on a grading scale from 1 to 7, with 7 meaning “totally agree”) (H1 section, evidence E.2.1.13). However, this evaluation significantly increases if we look at the teamwork evaluation and decision making, raising up to 5.4 and 5.1, respectively. On the other hand, *Indicadors de satisfacció* on evidence E.1.1.4 (on a grading scale from 1 to 5, with 5 meaning “totally agree”), the results show a good score for subjects global satisfaction (3.4) and professor teaching (3.8).

For MIRI students, the assessment of the level of training received in the master's degree for those graduated student shows a global satisfaction of 5.5 for the theoretical part and 5.3 for the practical part (on a grading scale from 1 to 7, with 7 meaning “totally agree”) (H1 section, evidence E.2.1.13). The evaluation of capacity building in documentation and identification of sources and resources and oral and writing expression with 5.6 and 5.2, respectively. On the other hand, *Indicadors de satisfacció* on evidence E.1.1.6 (on a grading scale from 1 to 5, with 5 meaning “totally agree”), the results show a high score for subjects global satisfaction (3.5) and professor teaching (3.9).

For MAI students, the assessment of the level of training received in the master's degree for those graduated student shows a global satisfaction of 4.8 for the theoretical part and 4.7 for the practical part (on a grading scale from 1 to 7, with 7 meaning “totally agree”) (H1 section, evidence E.2.1.13). On the other hand, *Indicadors de satisfacció* on evidence E.6.1.7 (on a grading scale from 1 to 5, with 5 meaning “totally agree”), the results show a high score for subjects global satisfaction (3.5) and professor teaching (4).

In any case, all masters students evaluate positively the decision making formation developed as it can be seen at H2 section, evidence E.2.1.13, page 75, with a grade of 5.6 or more (on a grading scale from 1 to 7, with 7 meaning “totally agree”). This is an important aspect since master students may decide to continue with PhD studies or being an important part of an organization, contributing with their ideas and decisions.

COVID-19

In general, subjects have not changed contents at all or very little changes have been introduced, although they have adapted their lectures to the rhythm of the students doing in some cases individual monitoring (as detailed in the special and temporal addendum of teaching guides).

On the other hand, after the lockdown period when all lectures were online, all timetables of GEI and masters has been adapted to have different type days: days with only theoretical lectures, days with laboratory and problems lectures, and days with essential laboratories (if everything has to go to online but essential lectures that requires lab material). This division of the timetables has been done to reduce the mobility of the students and try to guarantee that students have only-online or only-face-2-face days, based on the pandemic situation in each moment. These changes in the timetable have not influenced the structure of the subjects since there has been a tight coordination between departments, professors and FIB managements.

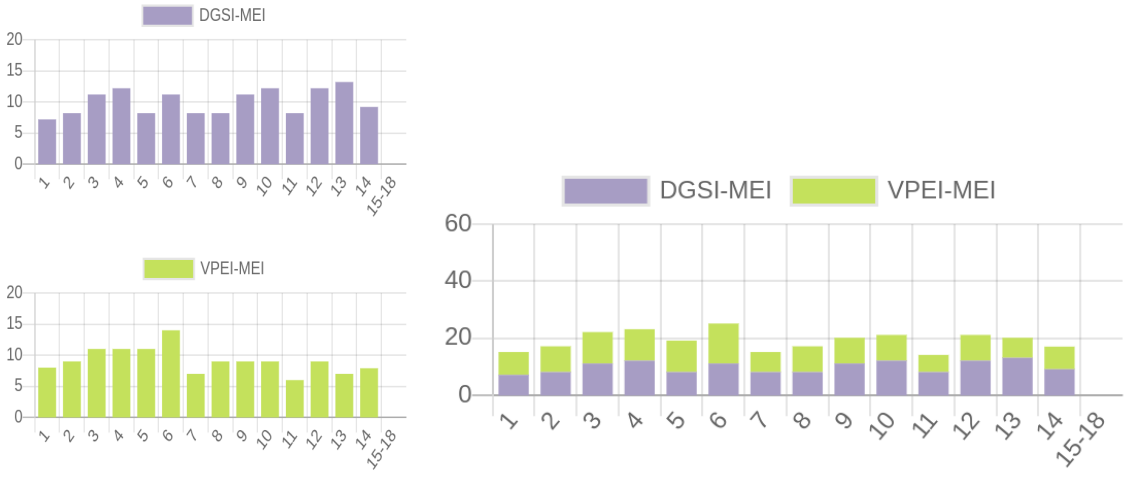
Two implementation plans have been proposed to take profit of lessons learnt during the COVID-19 period to review FIB strategy for on-line/blended/hybrid learning [270.M.512.2021] and FIB BYOD strategy [270.M.513.2021].

Criterion 2.2 Work load and credits

The teaching methodology, the contents and each of the activities done in each subject is public and reviewed each semester. The activities have to be defined by the responsible lectures indicating the contact classes dedicated (laboratory, theory and/or problems), the number of hours estimated of autonomous learning and guided activities per week. This estimates the total number of hours dedicated by students. This activity is reviewed by the academic commissions so that the number of hours is adequate to the number of ECTS of the subject.

On the other hand, each semester FIB aims undergraduate students to fill a survey about the number of hours dedicated to a subject, correlating this information with the final grade of the students in the subject. This statistics is a feedback for the lectures to detect any anomalous situation with the activities. Figure below shows an example for one subject which is a compulsory subject: 10 students participate in the survey, which is voluntary. In this Figure, guide indicates the number of hours that the responsible estimated for the different activities (Theory-T, Problems-P, Laboratory-L, Autonomous learning-AA, Guided activities-AD). In this case, the estimated number of hours was really close to the number of hours dedicated by the students. Although this tool is really useful, the student participation is not high. Therefore, one improvement action should be planned to reach a much higher participation of the undergraduate students, as ask the master students fill it as well.

On the other hand, coordinators have a tool to measure the overall estimated workload that students have based on the enrolled subjects. This tool is able to show the amount of dedicated hours among the weeks of the semester per subject and the sum of all the subjects' workloads. Figure below shows an example for two individual subjects of MEI. On the left, the subject workload is shown. On the right, the sum of both of them is shown. Each figure shows the amount of work for each individual week from 1 to 14, when students have contact classes and lectures, and as a global amount of work for a set of weeks, 15-18, when there are no contact classes and only AA and AD activities occur.



With regard to the external practices, students who sign an educational cooperation agreement are subject to a maximum of 900 hours of internship in the same academic year. On the other hand, based on their studies, the total number of hours during all the programme is:

- GEI: maximum of 1.800 hours
- Master of 90 ECTS: maximum of 900 hours
- Master of 120 ECTS: maximum of 1.200 hours

For GEI students, it is an indispensable condition for the student to have passed at least half of the credits on the course they are studying to participate in an agreement. For master students they can start from the beginning of master (from the last regulation review of external practices at UPC -2020). The agreement and the evaluation of those agreements with the final project guarantees that the amount of work done fits the regulations requirements.

Criterion 2.3 Teaching methodology

The overall analysis of GEI and master studies is that all those subjects with a really practical and research oriented approach have better satisfaction grades. In any case, the number of students enrolled in the subject and the academic year of the curriculum also contributes to be more or less motivated, which is usually a reason for the level of satisfaction, although the overall evaluation is high.

We detail the teaching methodology and evaluation method of a set of subjects of the GEI and master's degrees.

GEI studies:

The evaluation method of all the degree subjects is public in the teaching guide and accessible through GEI website (Syllabus at evidence E.2.1.3).

The teaching methodology and activities of each subject are described in detail in the teaching guide (Syllabus at evidence E.2.1.3 and they are reviewed each semester by the CAGEI.

In the case of the Final degree project, the assessment is divided into three stages (initial, intermediate and final) where different actors participate (professor of the project management course, project supervisor and final evaluation committee). Both the technical and the generic competences are assessed, the latter by means of evaluation forms at the three stages, with a weighting of 60% and 40% respectively. All the information about the Final degree project and its evaluation is public and accessible (evidence E.6.1.2).

GEI Degree final projects during the 2019-20 academic year were approx 215 (based on evidence E.6.2.1).

Materials involved in the last evaluation of some students have been collected for some selected subjects of the curriculum (evidence E.2.1.11 with restricted access)):

-M1: **Mathematics I** (compulsory course in the initial phase, first year, first semester)

This course further develops the concepts of reasoning that are introduced in the course Mathematical Foundations; this is done through the study of two subjects with which every computing engineer must be familiar: graph theory and linear algebra.

Teaching methodology:

In the theory classes the teacher explains the subject accompanying it with some examples and solving problems of the list.

During the practical classes students solve problems under the supervision of the teacher; some of these problems must be prepared prior to the class. There are also several activities in the laboratories in order to practice all the concepts worked at theoretical classes.

Evaluation methodology:

Subject tries to be very practical with several lab sessions that help the learning process of the students. Practical sessions are graded. Continues evaluation is done although the student can have a final exam to increase the final grade or pass the subject.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 3.65 (on a grading scale from 1 to 5, with 5 meaning "totally agree", evidence RESTRICTED-M1-1920-Q1) for both objectives and planned activities which is a good grade considering that this is the first academic year for most of the students and there is a huge number of students enrolled.

-PRO2: **Programming II** (compulsory course in the initial phase, first year, second semester)

In this course, modular design and object-oriented design are introduced, using C++ programming language; new data structures are presented, both linear (stacks, queues, lists) and hierarchical (binary, n-ary and general trees); iterative design and recursive design are studied in depth, emphasizing the importance of reasoning about the correctness of a given design, and the detection and improvement of inefficient solutions; finally, implementations of linear and tree data structures are presented, using recursive data types.

Teaching methodology:

Topics are explained in a practical way by using many examples. Theory classes (two-hour session) introduce knowledge, techniques and concepts that are used in laboratory sessions (three-hour session). Presentation and discussion of the solutions of a set of problems are included.

Evaluation methodology:

A programming project is used to integrate knowledge and skills of the entire course, except for the topic (recursive data types) which is assessed in a theory exam. Practices and two partial exams help to develop a continuous evaluation.

Student satisfaction about objectives and planned activities:

Regarding the objectives, the student satisfaction has been 3.16, 3.42, and 2.76 in 2018/19-Q1 (evidence RESTRICTED-PRO2-18-Q1), 2018/19-Q2 (evidence RESTRICTED-PRO2-18-Q2) and 2019/20-Q1 (evidence RESTRICTED-PRO2-19-Q1), which is the last semester we have surveys before the pandemic situation. On the other hand, for the planned activities we have 3.09, 3.28 and 2.47 in the same years. We are evaluating the low grades and working with the professor to attend this situation.

- SO: **Operating Systems** (compulsory course, second year, third semester)

The course provides an overview of the OS from three perspectives: services offered by the system to users/ programs and their utilization, major internal design elements of a kernel (data structures and algorithms) and finally relates these two components to understand how it affects performance of a system implementing programs concurrently (or in parallel depending on the architecture). The course focuses on the context of an OS kernel (within node), not entering network issues.

Teaching methodology:

The course has two types of class: Theory and laboratories. The theory classes are mainly oriented to generic or to explain concepts applied to the particular case of Linux, that is, they are really practical. The laboratory classes are weekly and include work performed prior to the student: class exercises to do individually and some questions that must be delivered at the end of class.

Evaluation methodology:

Attendance to at least 80% of the laboratory sessions is a necessary condition to pass the continuous evaluation of the course. Although all the sessions include these questions to deliver, not all of them are evaluated, only those that are marked as such. The rest are used to track students and monitor the implementation of previous work and attitude of students in class. Especially in laboratory classes is assessed issues such as student punctuality and positive attitude to the subject.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 3.89 and 3.66 (evidence RESTRICTED-SO1920-Q1), respectively, for both objectives and planned activities which reflects the good organization of the course.

- EEE: **Business and Economic Environment** (compulsory course, second year, fourth semester)

Teaching methodology:

There are two parts: Economics and Business. Economic Part: Study the socioeconomic environment where the activity of the company through sessions that simulate a minicourse about how to be a good minister of economy and provides tools to understand how the economy of a country. Business Part: Description of what is a company, relationships with the environment, the role of the employer, the type of company, etc. .The main processes and activities carried out in each department are studied, as if it were a documentary series called "What is the business?"

Evaluation methodology:

It consists of a mix of lectures, reading various documents, preparation of some "Continuous Assessment Practices" (PECs) and debate sessions, where the topics studied until that day are discussed and assessed.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is even higher than in the previous subject: 3.80 and 4.11 (evidence RESTRICTED-EEE1920-Q1), respectively. The activities performed in the subject are up to date real situations that students thanks to deal with.

- IA: **Artificial Intelligence** (specialization compulsory in Computing):

In this course we aim to give an overview of artificial intelligence, introducing the types of problems that can be solved, its theoretical foundations, the basic techniques and how to apply them. The approach of the course is to balance theory with practical activities.

Teaching methodology:

The classroom sessions are divided into theory, problems and laboratory sessions. Theory sessions introduce the knowledge of the course concepts, switching between the exhibition of new material with examples and discussion with students on concepts and examples. Problem sessions deepen the knowledge on techniques and algorithms explained in the Theory sessions. They stimulate the participation of students to discuss possible alternatives. Laboratory sessions develop small practical assignments by using AI tools and languages in order to practice and enhance the students' knowledge on concepts, techniques and algorithms.

An innovation assignment will come from a group work where examples on business innovation related to the use of Artificial Intelligence techniques should be found and analyzed. The work is presented and discussed in the classroom.

Evaluation methodology:

The student assessment consists of a partial exam mark, a final exam mark, a mark for the Innovation assignment and a laboratory mark. The laboratory mark comes from the practical assignments' reports.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is really high: 4.14 and 3.62 (evidence RESTRICTED-IA1920-Q1), respectively. AI is a hop topic field and it motivates students. The innovation assignment may also be one of the reasons for these results.

- DSBM: **Design of Microcomputer-Based Systems** (specialization compulsory in Computer Engineering):

The main objective of the subject is to acquire the necessary knowledge to design and implement embedded systems both in their hardware aspect (design of input / output interfaces, design of microcontroller supervision systems, connection of advanced peripherals, hardware design with immunity to noise ...) as software (programming with scarce resources, hardware conscious programming, real time from interruptions, concurrency of real-time tasks, communications with advanced peripherals ...).

Teaching methodology:

There is a complementation between classes of theory and problems, lectures are reinforced with examples showing the possible alternatives and solutions to common problems. Some topics are

proposed for self-assessment exercises so that students can be aware of your progress, and may ask teacher support in case it detects any deficiency. The practical sessions take place in situ in the laboratory teaching department in the FIB. There are two practices that require large cumulative work of students in the preparation of a project.

Evaluation methodology:

The grade for this course is obtained from the weighted average of the marks of theory, laboratory practices and final work. The laboratory mark is obtained while doing practical work in the lab, with at least two partial deliveries of the practices.

In addition students must deliver a design of an embedded system based on a real problem. This work has to be presented at the end of the course and contributes to the mark. The docs for this design is written in English. The quality of design, the selection of components and clarity of the presentation will be evaluated.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.63 (evidence RESTRICTED-DSDB1920-Q1) for both objectives and planned activities. The good planning of the activities with a really practical approach seems to be the part of this successful student satisfaction.

-PES: **Software Engineering Project** (Specialization compulsory in Software Engineering)

A project is the most common activity of engineering in their professional development, even in many companies all the engineering work is organized around projects. And informatics engineering is not immune to this trend, but is clearly present. Within the speciality of software engineering, this course is designed to reproduce, as far as possible, the project development of a software system such as in the professional environment, i.e., with a project team with different roles, and taking into account all aspects of project management: planning, cost, schedule, deliverables, meeting minutes, oral presentations, etc ... It is therefore a completely practical course. Necessary techniques have already been acquired in previous courses and in PES will be implemented during the realization of a project on a case to be presented.

Teaching methodology:

It is a project-based course, and therefore essentially practical. The classes are always in a classroom laboratory with an expected number of 3 to 5 project teams per classroom. The project teams are composed of 5 to 7 students, in order to allow implementing a non-trivial prototype.

The explanations of concepts needed (most at the first two weeks, but also at any time whenever necessary) are in the same classroom. The teacher in the classroom, acts as tutor of the teams.

The project starts from a general idea and tries to reproduce a real project, with all its elements (deadlines, deliverables, project management, etc..). The methodology used is agile, organized as an initial inception phase and then 4 development iterations.

Evaluation methodology:

In a project's course, what needs to be qualified is the realization of the project itself. The project is developed as team work, but also the team members have assigned different tasks which demand to be evaluated individually.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 3.96 and 4.0 (evidence RESTRICTED-PES1920-Q1) for objectives and planned activities, respectively. This subject is also practical and includes teamwork that seems to be part of the good results it has.

-ER: **Requirements Engineering** (Specialization compulsory in Information Systems)

Teaching methodology:

The teaching method of the course is of the family of PBL (Project Based Learning) and the centerpiece is a project (which varies each year) for which students, working in groups, have to make the complete engineering requirements.

Evaluation methodology:

Part of the evaluation is done based on the evaluation of the first assignment of the groups, but also several course exercises are required. Each student submits (via a moodle platform) her/his own solution to the exercises, within the specified deadline. The completion of the exercise requires learning new skills. Feedback is quickly done so that they will be discussed in class.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.24 and 4.22 (evidence RESTRICTED-ER1920-Q1) for objectives and planned activities, respectively. Both teamwork and practical approach are key on those good results.

-PI: **Internet Protocols** (Specialization compulsory in Information Technologies)

Teaching methodology:

The course consists of lectures combined with exercises where students learn the theoretical foundations of the subject. An challenge is proposed at the beginning of the course. Students should seek information on the topic and defend the chosen topic, presenting the relevant technological aspect, systems integration, adaptability and other aspects. The presentation must involve 3 of the students of the group.

During the laboratories, students solve a modular network. Every 2 students design and program a part of the network so that in the end, all modules are to form a whole that works. Students are encouraged to work on one side in teams of 2, to solve their module, and coordinate with the other modules to work on everything. Each lab covers an aspect of the topics covered in class. It is essential the understanding of the theory (works responsibilities) for the lab work.

Evaluation methodology:

Evaluation and teaching methodology helps the learning process of the students. And although the laboratories and exercises are not the main part of the course evaluation they seem to be very well evaluated.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 3.78 and 3.91 (evidence RESTRICTED-PI1920-Q1) for objectives and planned activities, respectively. Again, the practical approach is something that students thank with a high satisfaction result.

Furthermore, we have also collected evidence of the materials involved in the evaluation of the subjects and Final degree project (TFG, in Catalan) (evidence E.2.1.11 in restricted access).

MEI studies:

The evaluation method of all the degree subjects is public in the teaching guide and accessible through the FIB web pages

http://www.fib.upc.edu/en/masters/mei/assignatures.html

Materials involved in 2018/19-Q2 and 2019/2020-Q1 evaluation of some students have been collected for some selected subjects of the MEI curriculum (evidence E.2.1.11 in restricted access):

- VPEI-MEI: **Viability of Innovative Business Projects** (compulsory subject)

The course aims to promote the entrepreneurial spirit of the participants while establishing the process for developing a business plan that goes around an innovative business idea.

Teaching methodology:

The process of developing the business plan is done around one or more within three main innovation concepts. The three axes for the development of an innovative business idea around which the matter evolves, are: the identification of long-term market trends as a source of innovation, technology benchmarking as an innovative inspiration and ethical business model as the core of innovative thinking.

Case studies form a fundamental part of the course. In some cases, theory lectures include short lectures of entrepreneurs or managers to provide real guidance on how he / she addressed the main issue the session is about.

Regarding project sessions, they focus on enabling students to progress in building their business plan. The methodologies used range from group dynamics and brainstorming to doing online market research, preparation of specific parts of the business plan or cross-presentation between group members. Project development sessions are carefully scheduled and designed to facilitate the implementation of business plans.

Evaluation methodology:

The assessment is based on student presentations and the defence of the business plan in front of a jury comprising course faculty members and - optionally - another member of the teaching staff or guest professional.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2018/19-Q2 as it was not possible to do it during the first semester under the pandemic situation, is 3.83 and 3.67 (evidence RESTRICTED-VPEI-MEI1920-Q1) for objectives and planned activities, respectively. In addition, the contents of the subject is evaluated

with 4.0. The practical way of lecturing, with external actors explaining their experience seems to be really appreciated by the students.

- ISDCM-MEI: **Internet, Security and Multimedia Contents Distribution** (compulsory subject)

Teaching methodology:

This course gives an overview and the most technically and practically possible view of the problems and solutions to the development of Internet secure multimedia applications. The subject is organised from a practical point of view with many use cases and laboratory practices.

For this reason, examples and problems are used to introduce the concepts to help students to attain the skills needed. Also, students are encouraged to interact and discuss possible solutions.

Laboratory practices are built to complement theory and problem classes and have an integrative perspective (project type) since students implement small modules to be integrated in a final practice.

Evaluation methodology:

There are 2 partial exams, with several daily “mini-tests” to guarantee continuous evaluation, a long assignment that includes presentation, discussion and documentation, and several laboratory exercises. Final exam is also possible if the student needs it.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2018/19-Q2 as it was not possible to do it during the first semester under the pandemic situation, is 3.36 and 3.21 (evidence RESTRICTED-ISDCM-MEI1819-Q2) for objectives and planned activities, respectively. The evaluation grade is similar to the average although it would be interesting to try to analyze why this course, being so practical, does not obtain a higher evaluation as other subjects.

MEI Degree final project during 2018-19 and 2019-20 academic years were approx 23 and 10, respectively (number of graduated students, evidence E.1.1.4). Furthermore, we have also collected evaluation examples of the final master project (TFM, in Catalan) (evidence E.2.1.11 in restricted access).

MIRI studies:

The evaluation method of all the degree subjects is public in the teaching guide and accessible through the FIB web pages:

http://www.fib.upc.edu/en/masters/miri/syllabus.html

Materials involved in the evaluation of some students (mostly of academic year 2019-2020) have been collected for some selected subjects of the MIRI curriculum (evidence E.2.1.11 in restricted access):

- CPDS-MIRI: **Concurrence, Parallelism and Distributed Systems** (Compulsory):

Teaching methodology:

The course presents the models, challenges, algorithms and systems focusing on three main aspects/modules: concurrency (multiple computations interacting with each other), parallelism (multiple cores or processors), and distribution (multiple computers across a network).

Following a set of introductory sessions, the course has three modules: concurrency, parallelism and distribution. The student has to select two of the three modules. The lectures are complemented with programming exercises to illustrate the problems and evaluate the solutions.

During the course there will be two types of activities:

a) Activities focused on the acquisition of theoretical knowledge.

b) Activities focused on the acquisition of knowledge through experimentation by implementing and evaluating empirically in the laboratory the mechanisms explained at a theoretical level.

The theoretical activities include participatory lecture classes, which explain the basic contents of the course. The practical activities include seminar laboratories where students implement the mechanisms described in the lectures. The seminars require a preparation by reading the statement and supporting documentation, and a further elaboration of the conclusions in a report.

Evaluation methodology:

The final grade is calculated from the grades of the two modules taken by the student although the students have to look at all of them.

For each module, there is an exam and a lab grade. The exam comprises problems on the theory taught. The lab grade reflects the work done by the students in the practical assignments.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.08 and 3.81 (evidence RESTRICTED-CPDS-MIRI1920-Q1) for objectives and planned activities, respectively. This subject is really practical in any of the three modules and has been updating their material to the interest of the students.

-SMDE-MIRI: **Statistical Modelling and Design of Experiments** (Compulsory):

Teaching methodology:

The aim of the course is to provide students with the tools needed to cope with complex systems using statistical modeling techniques. The students also learn different techniques of experimental design. The course is practical and aims that students will be able, once the course is completed and from the work done in the sessions, to solve real problems similar to those developed in class.

Evaluation methodology:

The course has different exercises that the students must solve during the course, in addition to a small final exam with a not significant weight of the final grade.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.03 and 4.02 (evidence RESTRICTED-SMDE-MIRI1920-Q1) for objectives and planned activities, respectively. The mechanism used in this subject is really practical, having an overall interest of the contents of more than 4.0. This subject has been adapting their contents to the specialization interest and also the interest of the students.

-CPS-MIRI: **Combinatorial Problem Solving** (Specialization compulsory in Advanced Computing):

A combinatorial problem consists in, given a finite collection of objects and a set of constraints, finding an object of the collection that satisfies all constraints (and possibly that optimizes some objective function). Combinatorial problems are ubiquitous and have an enormous practical importance. In this course we will study three different general paradigms for solving combinatorial problems: linear programming, propositional satisfiability and constraint programming. For each of them, we will study the algorithmic foundations, as well as modelling techniques.

Teaching methodology:

The main feature of the teaching methodology is the use of materials accessible through the web, specifically designed for a self-learning course. These materials allow reformulating teaching in such a way that the traditional model of classes largely disappears.

Thus:

1. It regards the class as a baseline for work, which the student must continue and deepen on his/her own.

2. It builds upon high quality materials (slides, lists of problems, solved problems, examples of laboratory practical work, LP/SAT/CP software, bibliographic references).

3. It aims at motivating students, with examples, discussions, comments, etc... The intuitions behind the definitions, properties and techniques are discussed in group.

The laboratory encourages independent work by the students. The role of the teacher will be mainly to assist and evaluate the students, who should work mostly autonomously.

Evaluation methodology:

A part of the grade is obtained by means of a written exam at the end of the course, meanwhile the rest of the grade is obtained as the mean of three successive projects (one for CP, another one for LP, and another one for SAT) that the students have to hand in.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2018/19-Q2 as it was not possible to do it during the first semester under the pandemic situation, is 4.75 and 4.75 (evidence RESTRICTED-CPS-MIRI1819-Q2) for objectives and planned activities, respectively. The teaching methodology applied and the practical approach, makes the level satisfactory very high. A possible reason is the significant interest in the contents of the subject that is also of the 4.75 over 5 observed in the same satisfaction survey.

- GTCG-MIRI: **Geometric Tools for Computer Graphics** (Specialization compulsory in Computer Graphics and Virtual Reality):

This course has been designed to provide students with the geometric tools most ubiquitously used in computer graphics. This includes the mathematical description of geometric objects; rudiments of differential geometry for curves and surfaces; computation of intersections, affine transforms and projections; and some basic geometric algorithms.

Teaching methodology:

There are theory classes, problems solving classes, and laboratory classes. Theory classes are aimed at presenting and discussing the geometric techniques included in the syllabus. These classes are mainly conducted by the instructor. Problems solving and laboratory classes are aimed at consolidating the knowledge acquired and its specific application. In these classes, students will present, discuss (problems) and implement (laboratory) their solutions to problems that will have been posed in advance.

Evaluation methodology:

Along the course, students get assigned some problems solving and implementing. This homework is presented in class by the students, and revised by the instructor, giving as a result the homework component of the final grade. There is also a final written exam, mainly devoted to problem solving, which gives the exam component of the final grade.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.42 and 4.42 (evidence RESTRICTED-GTCG-MIRI1920-Q1) for objectives and planned activities, respectively. Again, a practical together with a continuous learning approach helps to the interest and satisfaction of the students.

- CNANM-MIRI: **Computer Network Architectures and Network Management** (Specialization compulsory in Computer Networks and Distributed Systems):

Teaching methodology:

Theoretical sessions are complemented by discussion sessions based on assigned readings. Studying some selected research papers will provide the flavor of research work.

Evaluation methodology:

Assignments, discussion and active participation are a significant part of the final grade.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.25 and 4.50 (evidence RESTRICTED-CNANM-MIRI1920-Q1) for objectives and planned activities, respectively. Discussions sessions and the research approach seems to be part of the interest and satisfaction of the students.

-DW-MIRI: **Data Warehousing** (Specialization compulsory in Data Science):

Teaching methodology:

The course comprises theory, and lab sessions.

Theory: The theory lectures comprise the teacher's explanations and problem solving. The students have some contents to be read and prepared outside the classroom.

Laboratory: Mainly, the lab sessions are dedicated to the practice (with and without computer) of the concepts introduced in the theory lectures, by means of exercises that are done during the class time. Some tools are used for the design and practice on a specific DBMS or tool (e.g., Oracle). There are three project deliverables that are done outside the class.

Evaluation methodology:

The evaluation is mainly based on the theory problems and laboratory assignments, in addition to a final exam.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 3.46 and 3.79 (evidence RESTRICTED-DW-MIRI1920-Q1) for objectives and planned activities, respectively. The amount of students of this course and the level of exigency of the laboratory makes students have lower satisfaction of the activities than other practical subjects, although this is still good.

-OS-MIRI: **Operating Systems** (Specialization compulsory (High Performance Computing):

The focus of this course is twofold. On the one hand, students get a detailed understanding of some basic mechanisms such as memory management that will help them understand the support offered by the hardware to the operating system (that is described in hardware-architecture courses). On the other hand, the students see how operating systems manage the resources in a High Performance computing system (HPC). This part includes job management, storage, power efficiency, and virtualization among others.

Teaching methodology:

This course is based on three kinds of activities: some where the professor describes some theoretical concepts in the class, other are self learning activities where students learn about some specific systems in their own reading papers/documents selected by the professor and applying the acquired knowledge in the laboratory, and finally, group discussions activities.

Evaluation methodology:

The evaluation of this course consists of a final exam, practical assignments and questionnaires about the self-learning activities.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.14 and 3.57 (evidence RESTRICTED-SO-MIRI1920-Q1) for objectives and planned activities, respectively. This course

has a really practical approach where real situations are proposed and groups of students work together to solve them.

MIRI Degree final project during 2019-20 academic years were approx 59 (evidence E.1.4.9). Furthermore, we have also collected evaluation examples of the final master project (TFM, in Catalan) (evidence E.2.1.11 in restricted access).

MAI studies:

The evaluation method of all the degree subjects is public in the teaching guide and accessible through the FIB web pages

http://www.fib.upc.edu/en/masters/mai/syllabus.html

Materials involved in the last evaluation of some students (academic year 2019-2020) have been collected for some selected subjects of the MAI curriculum (evidence E.2.1.11 in restricted access):

- CI-MAI (UPC): **Computational Intelligence** (compulsory subject)

The aim of this course is to provide the students with the knowledge and skills required to design and implement effective and efficient Computational Intelligence solutions to problems for which a direct solution is impractical or unknown. Specifically, students acquire the basic concepts of fuzzy, evolutionary and neural computation. The students also apply this knowledge to solve some real case studies.

Teaching methodology:

The topics exposed in the lectures are very well motivated (why is this important?) and motivating (why is this relevant nowadays?) and supplemented with many real examples. These lectures introduce all the knowledge, techniques, concepts and results necessary to achieve a solid understanding of the fundamental concepts and techniques.

These concepts are reflected in the practical work that must be delivered at the end of the course. There are three laboratory sessions to reinforce the theoretical concepts introduced in the lectures as well as to prepare for the practical work. This practical work requires the student to pick a real problem that collects and integrates the knowledge and skills of the course. There is also a written test of essential knowledge of the subject. In addition, there are small practical exercises after each laboratory class.

Evaluation methodology:

The course evaluation consists of several small lab assignments and a long assignment that contributes significantly to the final grade, and a theoretical-practice exam.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 3.89 and 3.88 (evidence RESTRICTED-CI-MAI1920-Q1) for objectives and planned activities, respectively. Although these

indicators do not reach 4.0, the contents of the subject was evaluated with 4.33, which is a high qualification.

- CV-MAI (UB): **Computational Vision** (compulsory subject)

This course introduces the main aspects of computational vision, from fundamentals on image formation and basic image operations until object recognition, going through the main problems of computer vision: segmentation, keypoint extraction, pattern recognition and face recognition. The classical and the latest state-of-the-art methods will be revised for the computer vision problems and methods will be used to solve some of these problems.

Teaching methodology:

The course is divided in a series of theory and practical sessions:

- Participatory theory sessions in which new concepts are introduced and discussed between students. Group discussion is strongly encouraged. Textbook chapters and research papers are provided to facilitate debate and exchange of ideas.

- Practical sessions are devoted to solving problems, designing methods and developing prototypes. These sessions allow students to put into practice previously introduced concepts to gain further insight.

Evaluation methodology:

Students are assessed based on their work in practical tasks (delivery of practices in groups of 2 students) and a final exam of theory. The weighting of the final mark will be proportional to the respective workloads of the practical tasks and the final exam of theory.

Student satisfaction about objectives and planned activities of the subject:

The student satisfaction, for 2019/20-Q1, is 4.18 and 4.30 (evidence RESTRICTED-CV-MAI1920-Q1) for objectives and planned activities, respectively. The research and practical approach contributes to the high satisfaction of the students.

MAI Degree final projects during 2019-20 academic year were approx 37 (evidence E.1.1.8). Furthermore, we have also collected evaluation examples of the final master project (TFM, in Catalan) (evidence E.2.1.11 in restricted access).

Familiarizing the students with independent academic research and writing plays a vital role in the programme.

For all the programmes all students have a good opportunity to create networking and work with professors that are both lecturers and researchers, or even part of a company. Therefore, all of them have lots of opportunities to know independent academic research. As examples, we comment on some of the subjects where those chances are explicitly treated.

GEI students have the chance of attending PAE, which is a subject where a multi-disciplinary project is developed taking base on a challenge defined by a company. This gives the opportunity to create networking and also know independent academic work, sometimes related to research. On the other hand, all GEI students have a compulsory work done under GEP (in catalan) to

develop their projects. They are guided in the work of planning, research and writing their technical projects.

In the case of MEI students, all subjects at Direction and Management Module: Strategic Planning and IT Governance, Viability of Innovative Business Projects, Incorporating The Know-How Into The Decision Process, Financing for Innovative Business Projects, EFQM and Quality Management and Sustainability, Economy and Social Commitment provide good opportunities to develop research, speaking and writing skills.

For MIRI students, most of the subjects are state of the art of the research and usually students end performing a research related TFM. Indeed, SIRI and TMIRI are two compulsory MIRI subjects that are completely oriented to the formation by means of research oriented seminars (workshops, conferences, hands-on, state of the art reports, etc.) about the different specializations and the introduction to Techniques and Methodology of Innovation and Research in Informatics.

For MAI students it happens something similar to MIRI students, being AI a hot topic nowadays, professors are keeping up to date the subjects contents. In addition, there are also explicit opportunities to attend seminars for Professional Practices in AI and AI Seminars, where national or international lecturers can come to explain relevant research in a field of Artificial Intelligence during one week.

Finally, there are more than 300 final projects that have been done during the academic year 2019, and more than 70% seem to be research oriented either proposed by students, professors, companies and research centers (evidence E.2.1.11 in restricted access).

COVID-19

From the beginning of the pandemia, FIB have continued all the studies from the very first day of the lockdown. At that moment UPC had just signed an agreement with Google Suite, and this helped to continue performing synchronous lecturing with students at the same timetable with a large number of students.

In general, depending on the subject, different mechanisms were done to continue the course that was asked to be published to all the students in the subject learning platform used, and with dean communication to all the community (evidence communications emails).

Some of the strategies donde during the lockdown were:

- Use video conference for synchronous lectures and practical classes
- Extra material with slides, videos, exercises and practical assignments
- Use video and/or screencast material for asynchronous lectures and practical classes
- Use the learning platform (Racó) for assignment submissions
- Use mail and/or forum for asynchronous consultation
- Use chat and/or video conferencing for synchronous consultations

Regarding laboratories and practices, several professors had to prepare all the material, even embedded boards, so that they distributed them among all the students one day before the lockdown in order to be able to do this non virtualizable sessions with boards possible. Other professors, thanks to the TIC support (commented below), could manage to virtualize the sessions using cluster and systems remotely. In general, professors try to keep continuous contact with the students and continuous online support to the students.

In any case, heads of studies were looking at any problem in the lecturing of the classes due to the pandemic situation both for students or professors COVID affections.

Regarding the evaluation, in the following section about Exams and Evaluations, some proof of evaluations and practices are provided both during the lockdown and during the period with a lightly pandemic situation (after summer 2020). In case of the lockdown period, all evaluations were done online.

Some examples of online evaluations were:

- Exams done using a moodle platform online (Atenea) using new hardware and software support added to provide enough computational power to sever several online exams with hundred of students
- Exams providing the statement and giving some limited period of time
- Racó submission practices
- Oral presentations and discussions using videoconference

After this lockdown period, the government health commission and universities agree to make exam evaluations face-2-face with all the health measures. Due to the pandemic situation and the classroom limitations to guarantee the social distance, the number of chances to do evaluation out of the time table of the subjects is reduced. In the case of FIB, one week in the middle of the semester is exclusively dedicated to evaluations. Therefore, subjects, in some cases, have had to adapt their evaluation methods so that they can take profit from at least one face-2-face evaluation as a mid-term evaluation and a final examination at the end of the semester, if needed (evidence addendum).

Regarding the final project, their evaluation has been online thanks to the videoconference mechanism. TIC support during the lockdown period was crucial to integrate and create a mechanism to prepare, build and give evaluation support to the final project evaluation committee. The overall feedback of the evaluation committees and students has been very good.

Finally, UPC performed a survey about the level of satisfaction of the students and professors during the lockdown period. The global satisfaction survey of students about the synchronous lectures using streaming was about 3.1 (out of 5.0) during the lockdown period, which is something that we should remark as good grade (not ideal) considering the 0 time transition from face-2-face to online classes. Indeed, if we look at the global satisfaction about their learning process and the professor's support evaluations are 3.4 and 3.6 respectively (evidence LOCKDOWN-SURVEYS).

Criterion 2.4 Support and assistance

For the GEI students, a welcoming orientation event takes place on the day of the students' first registration. Additionally, FIB's Dean and the vice Dean for first year students welcome the students in a special event, where senior students also participate. Specific information on the usual administrative procedures and tutorship is also given.

After enrolling at FIB, students support services include:

- Useful information for first year students has been gathered in a welcome guide web-page (see E.2.4.1)

- For students enrolled at FIB, a tutorial action plan has been devised, which includes three different programs: peer mentoring (*mentories*), peer academic mentoring (*aula lliure)*, both of them specially addressed to first year undergraduate students, and tutorship (see E.2.4.2).
Additional actions are organized for degree students in order to give specific support and information about degree specialisations, final degree projects and mobility programs. Academic support services for master's students are also provided.

- Peer mentoring (*mentories)*. Senior undergraduate / master's students welcome and accompany all first year students over seven 1-hour sessions during their first semester at FIB. The program began in September 2016 and it is intended to ease integration in a new environment, to encourage the building of positive relationships and to give them some tips in order to develop healthy and profitable study habits. Each new edition begins with a call, throughout the month of May, to attract mentors. All selected volunteers (at least 28 for GEI and 4 for GCED are required) receive completely free training in coaching tools (about 10 hours). A last-year student is the overall coordinator of the program, under the supervision of the Vice-dean head of studies for first year students and the Vice-dean for students. Peer mentoring sessions begin at the same time of the academic course. Each mentor takes care of 15-18 new students, and communication outside sessions, which is highly encouraged, is dealt with through the FIB intranet (Racó). A guide for sessions has been published through the creative commons license (E.2.4.3)
A review of last editions of the program can be found at evidence E.2.4.4. According to surveys launched at the end of every edition, a majority of students are satisfied or very satisfied with the program (65,4% in 16/17, 86% in 19/20) and would recommend it to new enrolled students (75,8% in 16/17, 90% in 19/20). Additionally, some impact on academic performance has been encountered, in spite of the absence of discussions on academic subjects within the meetings: higher fidelity to the program encompasses better academic performance.

- Peer academic mentoring (*aula lliure*). The program began in September 2017 and it is addressed to GEI students. Within the program, senior students deliver reinforcement classes to first year students at no financial cost. Subjects of Q1 (F, FM, IC, PRO1) are taught during the fall semester and those of Q2 (M1, M2, EC, PRO2) in the spring semester. A senior trainer acts as coordinator of the program. He /she is responsible for the initial call and selection of trainers, sessions scheduling and admission process, under the supervision of the Vice-dean head of studies for first year students and the Vice-dean for students. Around the third week of the semester, first year students apply to the program, applications are processed within one week, and the beginning of sessions takes place in the fourth week of the term. A minimum of 10 sessions per subject per semester are scheduled, with every session lasting two hours. A review of last editions can be found at the website. As confirmed by the surveys that have been carried out, the experience is proving positive both for the students who practice for the first time as teachers in front of their peers, and for those who are mentored, as more than 90% acknowledge the program as very useful and they would recommend it (see E.2.4.5). An analysis of results obtained for six subjects mentored during the academic years 17/18 and 18/19 can be found in E.2.4.6.
The abandonment rate at GEI has significantly decreased since the launch of these mentoring programs (26,6% in 14/15, 24,3% in 15/16, 19,7% in 16/17 and 21,7% in 17/18 on the first year; 46,8% in 15/16, 42,6% in 16/17, 42,1% in 17/18, 35,9% in 18/19 and 30,6% in 19/20 within the whole degree) (see E.1.1.2) This outcome shows how relevant guidance programs are to improve student's success.

- Tutorship. FIB offers a tutoring program that provides guidance to all students at GEI, GCED and masters degrees on a voluntary basis. Tutorship is mainly undertaken by the head of studies at GCED, by the master coordinator at MEI, by the specialisation coordinator and the master coordinator at MIRI, and by master's professors, the master's university coordinators and the general master coordinator at MAI. The FIB intranet is a powerful tool in the processes involving tutorship. Students sign up for a tutor, and tutors volunteer as such by using a specific application developed within the Racó. Moreover, tutors can check relevant information about tutored students (registered subjects, timetables, e-mail addresses) there, as well as supporting material to prepare tutorships meetings. As for the GEI, about 60 students are tutored every semester with the

assistance of about 25 professors. Tutorship at FIB scored highest among all UPC schools and faculties (5.7/10)

-Degree students can also address their queries to some of the school Dean's team members (Vice Deans Heads of studies, Vice Dean Head of Studies for first year students and Vice Dean of Students). Students can meet them on their scheduled times, which are available on the FIB website. They can also arrange an appointment by telephone or e-mail.

Students give a high score to tutorship satisfaction (3,1). From specific surveys on the mentorships programs for first year students (E.2.4.4 and E.2.4.5) it can be concluded that a vast majority of them highly recommend to participate at the program, not only as students but also as mentors.

- Students' associations. The student's representative body at FIB is the students' delegation (see E.2.4.7), which is also responsible for giving support to students' general and academic-related questions. A wide range of associative, cultural, sports and leisure opportunities are available for FIB students (see E.2.4.8 FIB Associations).

- Equal opportunities. FIB ensures equal opportunities for students with disabilities. The Dean appoints a responsible for inclusion (E.2.4.9) who works in close collaboration with the UPC Office for Equal Opportunities (see E.1.4.5) . Specific support is given to students with special educational requirements. The total amount of these students has increased by 40% as a consequence of the COVID crisis.

- Gender equality. UPC has defined a Gender equality plan (evidence E.2.4.10) . The protocol for prevention and action against sexual and / or sexual harassment, sexual orientation, gender identity or gender expression affecting students in the university environment of the UPC was updated in 2019 (evidence E.2.4.11).

Student professional guidance

Finally, just before graduating, some professional guidance is available:

- Two types of educational cooperation agreement with external organizations allow students to apply and complement the knowledge they acquired during the degree through internships with companies and public administration institutions that collaborate with the FIB (E.2.4.12). FIB students are opting for these agreements in growing numbers in the last years, and they can also develop their Final Degree Project within those external contexts.
- Jobs bank. The school has a jobs bank (evidence E.2.4.13), which is updated on a daily basis and is widely used by the students. They can find both internships and job offers, along with their details (information such as the company name, the location of the job, timetable, requisites and contact information for interested people to apply). Any question regarding jobs/internships can be addressed to the External Projects and Relations Area.
- Talent training program at inLab FIB (see Talent at E.0.1.8 inLab FIB). Experiential learning is also provided through inLab FIB, an innovation and research lab based in the FIB for providing a learning lab specialized in informatics engineering, for creating a professional environment focused on developing talent and training our students, and for developing multidisciplinary R+D projects. 37 students were tutorized through inLab Talent program during 2019-2020 term (19,4% women).
- FIB Business Seminars provided by external organizations. These short courses, which are delivered by industry and professional services, allow students to catch up on the latest ICT advancements. These courses were organized, as a whole pack, once a year, but they have been recently integrated within the activities of FIB Visiona.
- FIB Visiona (E.2.4.14) is the student organization within FIB that for nearly 30 years, with different names, has organized a physical job fair both in springUNITE and autumn, where a number of IT companies (including leading multinational corporations in the IT sector) make their presentations to students, hold conferences and introduce students into the labour market through personal interviews and CV reviews. Along the year, meetings and workshops with cutting-edge IT

companies and institutions are organized, that have assumed the purpose of what was previously named FIB Business Seminars (prior point).

Graduates give similar scores for professional guidance satisfaction in all degree programmes. External internships are highly scored (GEI 3.8, MEI 4, MIRI 3.2 and MAI 3.4). It should also be mentioned that the FIBAlumni graduates' association E.2.4.15 (now in collaboration with the E.2.4.16 UPC Alumni), offers professional orientation, seminars and meetings to keep in touch when graduated.

We have identified improvement plans to increase interest for research among GEI students [270.M.515.2021], to open research opportunities for master students [270.M.520.2021] and to Increase collaboration with the Barcelona Supercomputing Center and other research centers for MAI students [270.M.519.2021].

Support for mobility programs and foreign student support
PENDENT

3. Exams: System, Concept & Organisation

Criterion 3 Exams: System, concept and organisation

The evaluation method of all the degree subjects is public in the syllabus and accessible through the FIB web pages. According to the EHEA framework, a sufficient number of assessment activities of varied types are planned for each subject and they allow both the summative and the formative evaluation of the students. All the assessment activities are consistent with the specific goals and generic competences assigned to the subject in the curriculum, as is specified in detail in the teaching guides of the subjects. The evaluation method of each subject is reviewed each semester by the Degree Academic Committees at the request of the professor in charge of the subject, who proposes the required modifications for a better adaptation to the target learning outcomes.

The evaluation methods used include exams, assignments, lab sessions, projects, and presentations. The evaluation method is tailored to the course objectives and competences. Each Degree Academic Committee is responsible for checking the procedures so that each course does reliably and accurately evaluate the learning objectives and competences.

See Criterion 5.3 for evidence on regulations for each degree.

The basic guidelines for subject assessment are gathered in the “Academic regulations for degree and master’s students at UPC” document (E.3.0.1). It states which are the student’s rights and obligations during the assessment procedure. For instance, students that cannot take an examination for exceptional reasons, which can be duly justified, the faculty must fix an alternative date for the student to be assessed, within the corresponding academic period. Moreover, according to these regulations, students are entitled to request a review of their assessment results. Under no circumstances other than a transcription error will the review procedure lead to a lower mark being awarded. Appealing decisions made by professors is also possible. The student must file an appeal, explicitly stating the reasons, with the director or dean of the school within seven days of the publication of the mark in question.

The professor responsible for a subject, together with the professors who teach it, must propose a teaching guide that explains the assessment criteria and grading method to be used and the weighting of assessed activities. The specific Academic Commission that oversees student assessment is responsible for approving the teaching guide prior to the start of the academic year, distributing it as widely as possible using the resources it has, ensuring that it is followed correctly and interpreting it if any doubts arise. A detailed version of teaching guides is published at the website, which is updated every semester. More details on teaching guides can be found at Criterion 3.1

Specific FIB regulations for exams and grades have been published on the web page (E.3.0.2). These regulations refer to issues such as the publication of the conditions of the exams and the deadlines for the publication of grades and revisions. (For instance, assessment results should be delivered within two weeks and revision of assessments should take place 24 hours after publication of results)

If a fraudulent act concerning a student’s assessment occurs, a specific protocol of action exists at FIB (E.3.0.3) The protocol requires the existence of the so-called Disciplinary Committee, whose members are the dean, the heads of studies, the vice dean for postgraduate studies and the

student delegate. After hearing the teachers and the students involved, the committee will decide on the application of the disciplinary measures.

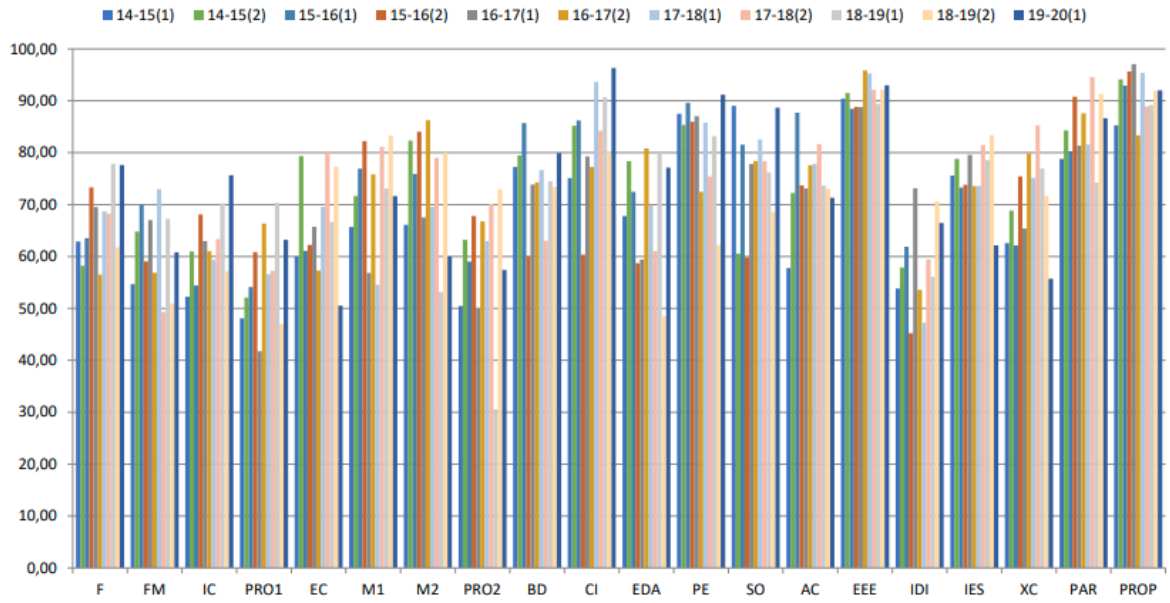
Materials involved in 2018/19, 2019/2020 and 2020/2021 academic year evaluations for students of the subjects commented above have been collected (evidence E.2.1.11 in restricted access). In particular we have tried to collect exams, mid-term and final examinations, practices and final projects of the GEI, MEI, MAI and MIRI. We have decided to include some material of 2019/2020-Q2 and 2020/2021 years to show some of the evaluation done during the lockdown situation. In 2019/2020-Q2 we had to pass from face-2-face contact classes to virtual in one day. All subjects had to adapt the lectures, material and evaluation to this situation in less than one week. Nowadays, we can have face-2-face evaluations in the Campus but subjects' lectures may be from totally contact classes (first year of GEI) up to 100% virtual classes (MAI studies). On the other hand, all the final exam statements and solutions, several mid-term exams and solutions, and final projects can be found on the UPC commons repository of exams (E.3.0.4).

The academic year calendar of GEI and masters is published with the final project defense period, the global final exam evaluation period and in the case of last academic year (2020-2021), a midterm exam week has been booked in half semester. This midterm exam week helps to do a face-2-face exam week free of lecturing in the Campus due to the pandemic situation.

Regarding the detailed exam calendar, each programme has the mid-term and final exams publics (evidence GEI- E.3.0.5, MEI-E.3.0.6, MIRI-E.3.0.7 and MAI-E.3.0.8) on the web before the enrolment of the students. The exams that appear in this calendar are those that are not done in the official timetable of the subjects. This way students plan which subjects want to enroll to avoid having more than one exam on the same day, for instance. On the other hand, each subject guide explicitly indicates which are the activities of evaluation and the approximated week when those are done along the semester. In the same guide all subjects have to explicitly publish the assessment criteria, which has to be evaluated by the academic commission of the studies if they are changed, in advance to the enrolment of the students. For instance, SO-MIRI has its assessment criteria published where several assignments are required: 5 Reading assignment activities in red square in weeks 2, 4, 8, 10 and 13, and a final exam in week 15.

Regarding the final projects, all the evaluation process of the final project is published and all students know it in advance. In addition, students are warned up through the Racó platform, indicating which are the next assignment deadlines. In general, there is a proposal evaluation (accept or reject) assignment before the enrollment of the final project, GEP assignment evaluation in the case of GEI students, follow-up assignment evaluation in the case of the GEI, follow-up assignment coordination with the director/tutor, memory assignment evaluation by the tutor/director and assignment evaluation committee. For the evaluation committee, students are required to publish and upload it to the Racó platform one week before the defense is done. This Racó platform also includes a plaggi system based in Urkund that helps the programme committee to avoid unfair situations.

Regarding the progress of studies, the next figure shows the % of students that pass (axes y) the compulsory subjects of GEI (axes x) for several consecutive years (year (semester)). First year GEI subjects (F up to PRO2, initial phase) usually have lower performance than other subjects because during this period there are several students that will end their studies.



After the first year the average % of passed students is about 70-90% and we also can see that during natural semesters (students passing subjects in the expected time) have better performance than the other semesters.

In any case, the percentage of passed students has significantly improved from 2014. One of the reasons for the first-year students' performance is the number of tutorial actions done.

Once the students are in the specialization subjects, their performance used to be higher than 70%.

With regards to the masters, following figures shows the total number of students (Tot), the number of students that pass the subject (Apr), the number of students that almost pass the subject (Sus>=4), the number of students that do not pass the subject (Sus.) and the number of students that do not do any evaluation activity. Then, the percentage of students is shown related to pass and not pass the subject, considering or not the number of students that do not attend any activity (Sense NP). Finally, the average grade is shown.

MAI students performance 2019/20-Q1

Assig.	Tot	Apr.	Sus.>=4	Sus.	NP	% Apr	% Sus	Sense NP % Apr	Sense NP % Sus	NM sense NP	MHs
CI	34	33	0	0	1	97,06%	2,94%	100,00%	0,00%	7,92	1
CV	33	32	0	0	1	96,97%	3,03%	100,00%	0,00%	8,21	2
IHLT	39	34	3	1	1	87,18%	12,82%	89,47%	10,53%	7,03	2
IMAS	33	32	0	0	1	96,97%	3,03%	100,00%	0,00%	9,07	1
IML	37	35	1	0	1	94,59%	5,41%	97,22%	2,78%	8,44	0
PAR	32	31	0	0	1	96,88%	3,13%	100,00%	0,00%	8,57	2
BDA	10	10	0	0	0	100,00%	0,00%	100,00%	0,00%	8,40	0
DL	21	18	1	2	0	85,71%	14,29%	85,71%	14,29%	7,04	0
IDADM	7	7	0	0	0	100,00%	0,00%	100,00%	0,00%	7,71	1
CIR	23	22	0	0	1	95,65%	4,35%	100,00%	0,00%	8,64	0
HLE	24	23	1	0	0	95,83%	4,17%	95,83%	4,17%	7,60	1
IDSS	16	16	0	0	0	100,00%	0,00%	100,00%	0,00%	8,46	0
NDVW	25	25	0	0	0	100,00%	0,00%	100,00%	0,00%	9,01	0
CPP	21	20	0	0	1	95,24%	4,76%	100,00%	0,00%	7,28	1
IDAAB	25	25	0	0	0	100,00%	0,00%	100,00%	0,00%	9,19	0
ISP	21	21	0	0	0	100,00%	0,00%	100,00%	0,00%	8,36	0
NTR	5	2	0	0	3	40,00%	60,00%	100,00%	0,00%	9,00	0
PPAI	21	17	0	4	0	80,95%	19,05%	80,95%	19,05%	6,94	1
AHCT	19	18	0	0	1	94,74%	5,26%	100,00%	0,00%	8,12	0
AVPR	4	2	0	0	2	50,00%	50,00%	100,00%	0,00%	7,90	0

In general, the performance of students is good. In the case of the NTR it happens that the number of students is small and there are three students that decide to give up.

MEI students performance 2019/20-Q1

Assig.	Tot	Apr.	Sus.>=4	Sus.	NP	% Apr	% Sus	Sense NP % Apr	Sense NP % Sus	NM sense NP	MHs
ACAP	27	20	1	4	2	74,07%	25,93%	80,00%	20,00%	5,61	0
CSI	26	23	0	0	3	88,46%	11,54%	100,00%	0,00%	7,00	1
SEU	20	19	0	0	1	95,00%	5,00%	100,00%	0,00%	8,31	1
SGI	24	22	2	0	0	91,67%	8,33%	91,67%	8,33%	7,05	1
PEGTI	19	18	0	0	1	94,74%	5,26%	100,00%	0,00%	8,80	0
ID	8	8	0	0	0	100,00%	0,00%	100,00%	0,00%	8,94	0
TMD	7	6	0	0	1	85,71%	14,29%	100,00%	0,00%	9,07	0
IKPD	8	8	0	0	0	100,00%	0,00%	100,00%	0,00%	9,18	0
MEEGQ	9	9	0	0	0	100,00%	0,00%	100,00%	0,00%	9,67	0
SECS	10	9	0	1	0	90,00%	10,00%	90,00%	10,00%	6,60	0

In the case of MEI, all subjects have a good performance under the point of view of the percentage of passed students.

MIRI students performance 2019/20-Q1

Assig.	Tot	Apr.	Sus.>=4	Sus.	NP	% Apr	% Sus	Sense NP % Apr	Sense NP % Sus	NM sense NP	MHs
AMMM	61	44	5	6	6	72,13%	27,87%	80,00%	20,00%	6,09	1
CPDS	48	39	2	5	2	81,25%	18,75%	84,78%	15,22%	6,33	1
SMDE	55	48	0	2	5	87,27%	12,73%	96,00%	4,00%	7,62	2
TMIRI	52	49	0	1	2	94,23%	5,77%	98,00%	2,00%	7,41	0
RA	19	14	2	1	2	73,68%	26,32%	82,35%	17,65%	7,26	1
AGT	17	15	0	1	1	88,24%	11,76%	93,75%	6,25%	7,63	0
AVLSI	6	6	0	0	0	100,00%	0,00%	100,00%	0,00%	6,42	0
CSN	21	18	0	3	0	85,71%	14,29%	85,71%	14,29%	7,62	0
GTCG	21	15	2	2	2	71,43%	28,57%	78,95%	21,05%	6,77	1
VAR	16	15	0	0	1	93,75%	6,25%	100,00%	0,00%	7,97	0
CA	16	16	0	0	0	100,00%	0,00%	100,00%	0,00%	8,20	1
GPR	10	10	0	0	0	100,00%	0,00%	100,00%	0,00%	8,76	1
SV	8	8	0	0	0	100,00%	0,00%	100,00%	0,00%	8,48	1
CNANM	7	6	0	0	1	85,71%	14,29%	100,00%	0,00%	8,00	0
SANS	6	6	0	0	0	100,00%	0,00%	100,00%	0,00%	9,17	1
SNM	8	7	0	0	1	87,50%	12,50%	100,00%	0,00%	7,79	1
FINE	15	15	0	0	0	100,00%	0,00%	100,00%	0,00%	8,49	1
IAS	17	15	0	0	2	88,24%	11,76%	100,00%	0,00%	7,77	2
DAKD	30	26	0	0	4	86,67%	13,33%	100,00%	0,00%	7,94	0
DW	41	28	1	7	5	68,29%	31,71%	77,78%	22,22%	5,44	0
ASM	25	21	2	1	1	84,00%	16,00%	87,50%	12,50%	6,13	0
BSG	22	21	1	0	0	95,45%	4,55%	95,45%	4,55%	6,18	0
IR	22	22	0	0	0	100,00%	0,00%	100,00%	0,00%	7,88	0
KMLMM	25	23	0	0	2	92,00%	8,00%	100,00%	0,00%	8,04	0
OTDM	25	25	0	0	0	100,00%	0,00%	100,00%	0,00%	7,40	1
OS	16	14	1	1	0	87,50%	12,50%	87,50%	12,50%	6,53	0
PA	18	14	0	0	4	77,78%	22,22%	100,00%	0,00%	8,16	0
CHPC	17	17	0	0	0	100,00%	0,00%	100,00%	0,00%	8,09	0
PD	15	15	0	0	0	100,00%	0,00%	100,00%	0,00%	9,83	4
SA	14	14	0	0	0	100,00%	0,00%	100,00%	0,00%	9,44	1
SCA	11	11	0	0	0	100,00%	0,00%	100,00%	0,00%	7,99	1
ADSDB	12	9	0	2	1	75,00%	25,00%	81,82%	18,18%	6,73	0
VBP	23	23	0	0	0	100,00%	0,00%	100,00%	0,00%	7,61	0

All subjects have good behaviour. Only DW has smaller behaviour if we consider the total number of students. This DW, as we showed, has a significant amount of continuous work and it seems that was the reason students gave up.

4. Resources

Criterion 4.1 Staff

Academic and support staff (management and technical) deal with the accomplishment of programme outcomes.

Academic staff

Even though Universities cope with a scenario of budgetary austerity, there is sufficient teaching staff in the school, and staff assignments are adequate for them to carry out their duties and attend to the students. FIB requests academic staff in charge of teaching subjects in eight UPC departments (evidence E.0.1.9). Their professional experience and investigation is carried out by means of different groups of research and investigation bodies (see E.0.1.10).

Academic staff are requested to several departments (8 of the UPC), of whom 240 people collaborated last academic year with teaching assignments mainly at FIB. The total number of students last academic year was 2439. It includes the 4 new EHEA degrees submitted for accreditation (GEI, MEI, MIRI and MAI), Bachelor's degree in Data Science and Engineering (GCED), Erasmus Mundus Master in Big Data Management and Analytics, and Master in Secondary and Upper Secondary Education, Vocational Training and Foreign Language Teaching (MSEC) (see E.1.1.10).

Academic staff with teaching assignment mainly at FIB last four academic year and their category distributions is shown in the next tables (E.0.1.3 - FIB main figures and facts):

		Full Professor	*Tenured University Professor*	*Full Professor (college)*	*Associate Professor (college)*	*Tenured Assistant Professor*	*Associate Full Professor*	*Faculty*	*Assistant Professor*	*Lectures*	*Other*	*TOTAL*
Academic staff with teaching assignment mainly at FIB (PDI first assignment)	2019-2020	27	83	1	7	46	2	9	-	63	2	240
	2018-2019	29	84	1	7	47	2	9	-	47	2	228
	2017-2018	28	86	1	7	46	2	9	-	41	2	222
	2016-2017	27	89	1	7	49	-	10	-	33	1	217

Professors with permanent positions in Spain can be employed by the national Spanish Government (civil servants) or by the regional government, and they correspond to Full professors, Associate professors, and Assistant professors.
During the past four years, the evolution of academic staff distribution in categories is: from 183 to 175 permanent academic staff (that is from 84,3% to 72,9%), from 34 to 65 non-permanent academic staff, and from 190 to 192 Ph.D. holders (that is from 87,5% to 80,0%), from 27 to 48 non-Ph.D holders (see section 4.2 for detailed information for each programme degree).

		Permanent Ph. D.	*Permanent No Ph.D.*	*No Permanent Ph.D.*	*No Permanent No Ph.D.*	*TOTAL*
Academic staff with teaching assignment mainly at FIB (PDI first assignment)	2019-2020	169	6	23	42	240
	2018-2019	173	6	16	33	228
	2017-2018	172	7	14	29	222
	2016-2017	175	8	15	19	217

Lecturers are professionals that work outside the University and are specialists of recognised competence. They are hired on a temporary and part-time basis to contribute their knowledge and professional experience to the University.

The decline in universities funding has led to a decrease in the number of permanent teaching staff, which has been replaced by non-permanent teachers (mainly lecturers), who combine university activity with other jobs. This policy means there is a lack of generational change of permanent teaching staff. Likewise, in this group the percentage of doctors and people who carry out research activities is reduced.

Lecturers mainly teach professional-oriented subjects, in this way universities combine the academical approach offered by permanent academic staff with a professional approach offered by non-permanent academic staff.

Therefore academic staff meet the qualification requirements for programme delivery, and they have sufficient and recognised experience in teaching, research and, where applicable, professional experience. Merit-based salary increases for teaching and research at public universities in Catalonia are regulated. These increases, or premiums, are an annual individual consolidated amount allotted by each university's board and are subject to a positive evaluation by AQU. Merits in research are evaluated according to six-year periods of research, while merits in teaching are evaluated according to five-year periods.

UPC carries out an annual evaluation of the teaching staff. In academical year 2019/2020, the percentage of academic staff in four categories A B C or D in both teaching and research (UPC defined the four categories from A, the best, to D according to several indicators) are: 79.47% of FIB academic staff have A or B categories in both teaching or research (66.2% have A in teaching and A in research).

The assignment of teachers to the different training activities is carried out in coordination with the departments. In the subjects, one teacher plays the role of coordinator and is responsible for coordinating the teaching team and the dialogue with students. The syllabus includes the list of teachers involved in each subject.

In the first year subjects, people with good pedagogical attitudes and accessibility are chosen, who have the capacity to support students in their learning process and in its integration in the University. They are permanent teachers with extensive teaching experience.

Academic Regulations for the Final Degree Thesis set the profile of the teaching staff (or the professional, in the case of an internship in a company) that can lead the project. Project supervisor has to be a graduate person, assigned to the FIB, with teaching experience of at least three years and a good knowledge of the curriculum of the school. When it is carried out at a company, the supervisor is a graduate person working at company, and a FIB teacher acts as advisor with the aim of ensuring that the work meets the school requirements.

A final project can be co-directed by two or more people. In any case, at least one of them must meet the requirements of the senior professor and assume all the responsibilities assigned in this regulation to the director of the final project.

Internship at a company is not compulsory for any of the programme degrees. Any teacher in the school can be the internship tutor, and it’s in charge to support the student and supervise that the activity meets the school requirements.

Academic staff involved in each subject is published in the FIB annual report. The results for UPC student satisfaction surveys show good assessment for instructor and subject satisfaction as can be seen in the Criterion 2.1 section.

A detailed information of academic staff with teaching and research experience, projects, department affiliation (E.XXX) is available with restricted access.

GEI academic staff:

Detailed indicators of GEI academic staff are included in evidence E.1.1.2. The current list of faculty assigned to this degree programme is available at evidence E.4.1.1 (with links to detailed description of their scientific production and activities).

A total of 256 teachers participate in GEI during 2019/2020 academic year. Permanent teachers carried out 79,4% of teaching activity (and 20,6% by non-permanent teachers). 81,5% of teaching activity is carried out by Ph.D. holders (and 18,5% by person with just a master's degree).
Academic staff with teaching merits carried out 78,9% of teaching activity. Regarding research merits, 63,7% of teaching activity was carried out by teachers with a positive research evaluation.
Teachers without merit is mostly due to the fact that their kind of contract does not allow them to do so (e.g. lectures).

The following table summarises the teaching merits according to teachers' departments.

GEI		Total	Teaching merits	Research merits
701	AC	62	49	44
707	ESAII	14	8	6
715	EIO	19	9	8
723	CC	69	60	53
732	OE	13	7	3
747	ESSI	31	17	14
748	FIS	10	10	10
749	MAT	27	19	17

There are 5 kinds of learning activities in GEI: Theory classes (with max. 60 students per grup), Problems classes (with max. 40 students per grup), Laboratory (with max. 20 students per grup), Guided learning activities (individual or small group) and Autonomous learning activities.
The student/teacher ratio is 9.1 in 2019/2020 academic year.

MEI academic staff:

Detailed indicators of MEI academic staff are included in evidence E.1.1.4 The current list of faculty assigned to this degree programme is available at evidence E.4.1.2 (with links to detailed description of their scientific production and activities).

A total of 29 teachers participate in MEI during 2019/2020 academic year. Permanent teachers carried out 74,7% of teaching activity (and 25,3% by non-permanent teachers). 76,5% of teaching activity is carried out by Ph.D. holders (and 23,5% by person with just a master's degree). As can be seen, in MEI there is a significant number of industry professionals who participate in the master's degree as non-permanent part-time teachers.

Academic staff with teaching merits carried out 71,2% of teaching activity. Regarding research merits, 67,3% of teaching activity was carried out by teachers with a positive research evaluation. Teachers without merit is mostly due to the fact that their kind of contract does not allow them to do so (e.g. lectures).

MEI		Teaching merits	Research merits
701	AC	7	7
707	ESAII	2	0
715	EIO	1	1
723	CC	7	7
732	OE	1	0
747	ESSI	3	3
749	MAT	2	2

There are 5 kinds of learning activities in MEI: Theory classes (with max. 40 students per grup), Problems classes (with max. 20 students per grup), Laboratory (with max. 20 students per grup), Guided learning activities (individual or small group) and Autonomous learning activities.
The student/teacher ratio is 6 in 2019/2020 academic year.

MIRI academic staff:

Detailed indicators of MIRI academic staff are included in evidence E.1.1.6. The current list of faculty assigned to this degree programme is available at evidence E.4.1.3 (with links to detailed description of their scientific production and activities).

A total of 93 teachers participate in MIRI during 2019/2020 academic year. Permanent teachers carried out 89,6% of teaching activity (and 10,4% by non-permanent teachers). 93,1% of teaching activity is carried out by Ph.D. holders (and 6,9% by person with just a master's degree).

Academic staff with teaching merits carried out 86,9% of teaching activity. Regarding research merits, 84,9% of teaching activity was carried out by teachers with a positive research evaluation. Teachers without merit is mostly due to the fact that their kind of contract does not allow them to do so (e.g. lectures).

MIRI		Teaching merits	Research merits
701	AC	32	30
707	ESAII	0	0
715	EIO	9	8
723	CC	32	31
732	OE	1	1
747	ESSI	2	2
748	F	0	0
749	MAT	1	1

There are 5 kinds of learning activities in MIRI: Theory classes (with max. 40 students per grup), Problems classes (with max. 20 students per grup), Laboratory (with max. 20 students per grup), Guided learning activities (individual or small group) and Autonomous learning activities.
The student/teacher ratio is 6.7 in 2019/2020 academic year.

MAI academic staff:

Detailed indicators of MAI academic staff are included in evidence E.1.1.8 (Note: academic staff information includes only UPC personnel). The current list of faculty assigned to this degree programme is available at evidence E.4.1.4 (with links to detailed description of their scientific production and activities).

A total of 42 teachers participate in MAI during the 2019/2020 academic year.

> MAI-UPC: 24 academic staff (91% PhD), 92 merits in teaching positively evaluated, 64 merits in research positively evaluated, and currently participating in 12 competitive projects as IP, and other 11 competitive projects (no IP).
>
> MAI-UB: 12 academic staff (100% PhD), 30 merits in teaching positively evaluated, 20 merits in research positively evaluated, and currently participating in more than 30 competitive projects.
>
> MAI-URV: 6 academic staff (100% PhD), 28 merits in teaching positively evaluated, 24 merits in research positively evaluated, and currently participating in 5 competitive projects as IP, and other 3 competitive projects (no IP).

Permanent teachers carried out 88,5% of teaching activity (and 11,5% by non-permanent teachers). 94,7% of teaching activity is carried out by Ph.D. holders (and 5,3% by person with just a master's degree).

For UB, all of them are professors with Ph.D. and 75% of them have merits in teaching and research positively evaluated. The rest of professors with no merits are both because they can not have them under the contract they have or because the professor has an ICREA grant. For URV professors, 100% of professors have merits in teaching and research.

Academic staff with teaching merits carried out 86% of teaching activity. Regarding research merits, 86% of teaching activity was carried out by teachers with a positive research evaluation. Teachers without merit is mostly due to the fact that their kind of contract does not allow them to do so.

	UPC	UB	URV
Teaching merits	88.4	75	100
Research merits	88.4	75	100

There are 5 kinds of learning activities in MAI: Theory classes (with max. 50 students per grup), Problems classes (with max. 25 students per grup), Laboratory (with max. 25 students per grup), Guided learning activities (individual or small group) and Autonomous learning activities.
The student/teacher ratio is 5 in the 2019/2020 academic year.

Academic staff research and development activities

Scientific and technological production of FIB academic staff is described at FUTUR website (E.4.1.5). The following table summarizes the most relevant research activities

	Competitive project	Non competitive project	Theses	Journal article	Conference Papers
2020	145	27	24	176	52
2019	164	37	31	199	213
2018	158	35	35	249	264
2017	166	35	36	221	267

Obviously, COVID-19 has a negative impact in scientific and technological production in 2020.

In the case of MAI professors belonging to UB and URV, that do not appear at FUTUR website, we have that most of the professors are nowadays participating in one or more national and european competitive projects. In the case of the UB, the 12 professors participate in a total of 19 national and european competitive projects. In the case of the URV, 6 professors participate in a total of 10 national and european projects.

FIB academic staff has a significant research activity. Evidence E.4.1.6 (in restricted access) reports research projects undertaken by them. As well, the UPC library service produces comparative reports on scientific production versus other national and international universities. "Computer science" is the thematic area with the most scientific production of the UPC (see E.4.1.7). Furthermore, this area is very concentrated in the FIB: 24462 of the 35882 results related

to "computer science" are tagged under "Facultat d'Informàtica de Barcelona". Relevance of the scientific and academic production of the UPC and FIB can be seen in the different bibliometric studies (see E.4.1.8) such as the comparative study of the scientific publication of UPC vs. other national and international universities in the area of computer science (2007-2017) (see E.4.1.9). Also in the recerTIC UPC, which is a set of works that intends to give a representative view of the UPC's scientific publishing on topics of interest in the field of information and communication technologies (see E.4.1.10 for Computer security, E.4.1.11 for Machine learning, E.4.1.12 for Bioinformatics, E.4.1.13 for Data science and E.4.1.14 for Robotics). These reports place the scientific production of the UPC (and therefore, of the FIB) as a world reference school in the field of informatics (computer science and engineering).

FIB Academic Staff research is carried out by means of different groups of research and investigation bodies, where international outstanding projects are being developed (see E.0.1.3): Barcelona SuperComputing Center (BSC-CNS), Virtual Reality Centre of Barcelona (CRV), Biomedical Engineering Research Center (CREB) , IDEAI - Intelligent Data Science and Artificial Intelligence Research Center and TALP - Center for Language and Speech Technologies and Applications. Also through inLab FIB.

The research groups listed below have among their members a significant number of professors who teach at FIB:

- ALBCOM - Algorithms, Computational Biology, Complexity and Formal Methods
- ARCO - Architectures and Compilers
- CAP - High Performance Computing Group
- CBA - Broadband Communications Systems
- CNDS - Computer Networks and Distributed Systems
- DAMA-UPC - Data Management Group
- DCCG - Research group on discrete, combinatorial and computational geometry
- DMAG - Distributed Multimedia Applications Group
- GESSI - Group of Software and Service Engineering
- GIE - Engineering Informatics Group
- GNOM - Group of Numerical Optimization and Modelling
- GPLN - Natural Language Processing Group
- GRBIO - Biostatistics and Bioinformatics Research Group
- GREC - Knowledge Engineering Research Group
- GRINS - Intelligent Robots and Systems
- KEMLG - Knowledge Engineering and Machine Learning Group
- LARCA - Relational Algorithmics, Complexity and Learning Laboratory
- LOGPROG - Logic and Programming
- MD - Discrete Mathematics
- MPI - Information Modelling & Processing
- SIMCON - Computer Simulation in Condensed Matter Research Group
- SOCO - Soft Computing
- SUSHITOS - Services for Ubiquitous Social and Humanistic Information Technologies and Open Source Research Group
- ViRVIG - Visualisation, Virtual Reality and Graphic Interaction Research Group
- VIS - Vision and Intelligent Systems

The research activity carried out by the research groups is closely related to the curricula of the masters taught at FIB.

Support staff

Support staff related to FIB involve also administrative and technical support staff (see E.0.1.7 FIB Staff) from the CNTIC Management Transversal Unit (E.0.1.8 UTG CNTIC Structure) and innovation support staff (see E.0.1.9 inLab FIB).

UTG CNTIC Management and technical support staff engage 160 employees. It is structured in different service units that provide the necessary human resources to be able to offer quality services. The Units involved in the services of the Barcelona School of Informatics are: FIB Institutional Support and External Relations Unit (USIRE), FIB Degree and Master's Studies Management Unit (UGEGM), Resources and Services Unit (URiS), ICT Services Unit (TIC).

inLab FIB team (E.0.1.9 inLab FIB) involves additional academic and technical staff, and students for the innovation, research and technology transfer activities. inLab FIB has been recognized as a TECNIO center by ACCIÓ, the Catalan Agency for Business Competitiveness.

The following table summarises the permanent support staff at FIB according to its unit.

Support unit	Permanent staff
USIRE	7
UGEGM	11
URiS	13
UTIC	21
inLab FIB	9

Criterion 4.2 Staff development

Teaching staff development

The institution offers support and opportunities for enhancing teaching quality. The ICE (in Catalan, *Institut de Ciències de l'Educació* - evidence E.4.2.1) offers a formation planning for academic staff with a wide variety of lectures at UPC. The number of courses offered was 170 courses in 2019, with a significant amount of them to support online teaching during the pandemic period, 132 courses in 2018, 95 courses in 2017 and 90 courses in 2016 (evidence E.4.2.2 with restricted access). FIB teaching staff has highly participated in several lectures since the new EHEA degrees were deployed and mainly devoted to innovation and new methodologies. In particular, more than 150 members of the academic staff at FIB have participated in almost 100 courses, with a total of 691 participations from 2016. A special formation has also been done to promote english at ICE suggested by FIB, other centers, and by ICE itself for FIB academic staff (49 courses from 2016). Training and support is also provided to deal with special needs students.
On-line training has been offered during the pandemic period to improve on-line teaching and to use new tools.

Additionally, there is a close collaboration between FIB and ICE since the master's degree in Secondary and Upper Secondary Education, Vocational Training and Foreign Language Teaching (MSEC) is mainly done by professors of this institute and there are academic staff of FIB both in the ICE direction and performing some lectures. This master is mostly education oriented for the training of teachers of pre-university levels (Secondary Education, High School Education and Vocational Training).

Teaching staff and gender perspective

Online training has been offered on how to incorporate the gender perspective in university teaching. Special events have been organized also related to this topic https://igualtat.upc.edu/ca/esdeveniments/la-perspectiva-de-genere-a-la-docencia. The number of courses related to the gender perspective has been 19 from 2016 (evidence E.4.2.2 with restricted access).

A special permission is allowed since 2019 to be able to intensify research activities after maternity leaves.

Sabbatical leaves

UPC has implemented a specific programme for sabbatical leaves. This programme provides access to paid leave for a maximum duration of 12 months. The aim of this action is to promote the research activity of the selected persons. Due to budget restrictions, the programme offers a limited number of sabbatical leaves.

Technical and administrative staff development

Staff training is organized in different areas: Social responsibility, Teaching support, Research support, Personal Skills development, Management and quality, Information and Communication Technologies, Languages, Occupational safety and health and Legislative and regulatory framework (See E.4.2.3).

A specific program aims to promote the learning and improvement of language skills including specific accompanying training actions for the official accreditation of English.

Criterion 4.3 Funds and equipment

Resources

FIB resources provide adequate support for the learning process, as shown in survey satisfaction for academic and support staff and students. Learning facilities and learning equipment are well assessed by academic, support staff and GEI, MEI, MIRI and MAI students and are considered to be appropriate for the number of students in the School.

The satisfaction surveys for academic staff and students show the highest scores in equipments (3,93 in E.4.3.2 FIB Academic staff satisfaction survey 2017-2018, 3,94 in E.4.3.4 FIB staff satisfaction survey 2018-2019 and 3,99 in E.4.3.1 FIB students satisfaction survey 2016-2017), on a grading scale from 1 to 5 (with 5 meaning "totally agree")

GEI graduates' survey shows a high score (4,2 over 5) in the perception of helpfulness of Intranet and Virtual Campus. It also indicates a high appreciation of equipment (4,1) and library services (4,1) (see E.4.3.1). Master postgraduate students have also a high satisfaction level with installations and specialized resources: 4 for MEI, 3,9 for MIRI and 3,5 for MAI (see E.4.3.3).

The Dean's Team is responsible for detecting the needs of infrastructure and equipment, analyzing their viability and taking the appropriate steps to meet these needs. It will be supported in the assessment of the hardware and software needs presented to it by the ICT Services Unit of the UTG CNTIC. The Management of Material Resources is performed according to process 270.1.4.1 of FIB Quality Assurance System.

Currently FIB offers various material resources and facilities that support students during their learning trajectory.

Lecture rooms (see E.4.3.5) Currently, classrooms used by the School for lecturing are part of six North Campus modules intended exclusively for teaching classrooms and their use is shared with the other centers located on Campus.
The six modules of the North Campus dedicated to teaching currently contain 86 teaching classrooms and 2 classrooms of drawing, with a total built area of 7,871 m2 and a capacity for 13,400 students (6,700 simultaneous students in two morning and afternoon shifts).

In order to respond to the challenges presented by COVID-19, several classrooms on the A1-A6 buildings have been equipped with cameras and ambient microphones to use as hybrid classrooms (see E.4.3.6). These classrooms will allow the development of face-to-face teaching activity and, at the same time, facilitate remote access to students who are unable to attend classes on campus due to the health situation.
The assignment of classrooms to the centers is reviewed each academic year according to the typology, equipment and capacity required for the teaching of degrees. Currently, FIB has assigned 33 classrooms in modules A4, A5 and A6, of different typologies (small, medium-sized or high-capacity) with a capacity for 2,360 students divided into morning and afternoon schedules. All these 33 lecture rooms are equipped with a computer connected to the network, a projector and wireless coverage. 23 of them are also equipped as hybrid classrooms.

Computer labs (see E.4.3.7)
The FIB annual report displays an extended description about activities, projects and resources at FIB computer labs (see evidence E.4.3.8 FIB Annual Report 2018-2019). A detailed catalog of IT services (see E.4.3.9) is provided by the ICT Services Unit of UTG CNTIC, with 12 technical staff fully dedicated to FIB IT Services plus 9 people shared with other units.
Computer labs are sufficient for most classes and teaching laboratories for subjects that require specific and/or more technical tools. FIB students have access to 19 computer labs and 2 group work classrooms with a total of 384 equipment (370 PCs, 10 iMacs and 4 quick reference terminals with Raspberry), so that 1 place is available for every 5,5 students, approximately. A 3D printer is also available for academic works. All these labs are equipped with computers connected to the network, a projector and wireless coverage. On-line requests for free labs are provided by the website.

Computers are renewed frequently, so they mostly are under warranty or can be replaced during the same day.

All computer labs have programs installed for student teaching activities and teachers required for each degree. Classrooms are used for teaching, by reservation of the teaching staff, and in a regime of free access when there is no assigned teaching, in the opening hours established. Special configurations for online exams are also set up on demand (90 on-line exams were performed at computer labs during 2018-19, using an overall of 370 computer labs).

Five computer labs have been equipped also as hybrid classrooms. Mobile webcams are provided for the rest of them.

All Labs have air conditioning. Improvements have been made to ventilation and air conditioning to prevent COVID-19 dissemination: new windows, new air conditioning system and purifiers have been installed in different labs.

Other Teaching Labs (see E.4.3.10)

- Computer Architecture Teaching Labs (2 labs with 25 PCs each, 12 routers and 4 clusters)
- Automatic Control Teaching Laboratories (2 labs with 12 work places each, equipped with computers, oscilloscopes, function generators, robotic kits and other specialized material)
- Physics department Lab (22 workplaces)
- Master of training professorship of secondary education Tech classroom (11 PC and a workshop zone where tools of modelling, kits of specific training for mechatronics, electronics, PLC modules, electrical and varied systems tools).

Department labs are also described in E.4.3.8.

Servers and network infrastructure
In addition to those, FIB ICT infrastructure has 40 physical servers (75 virtual servers), 46 terabytes of disc storage, 32 network switches, 21 wifi access points, 7 firewalls and 1.445 network connection points.

FIB ICT Services to support teaching and learning

Management of FIB ICT services is performed according to process 270.1.4.2 of FIB Quality Assurance System.

Remote access to computer labs equipment is also available through specific services (VPN, Coronabroker, etc.) which have been reinforced during the pandemia (see IT services to study remotely at E.4.3.9).

These are some of the FIB services for learning and teaching:

Aula Virtual
FIB offers AulaVirtual service, a virtual desktop environment based on RAVADA (an open source UPC project) providing upto 80 virtual computers that can be used remotely with the same services as the Computer Labs ones.

Coronabroker
A special service developed that allows students to allocate and remotely use free computers in the labs. It was set up during the first weeks of the confinement due to the pandemia.

Virtual servers
A cloud infrastructure is offered for certain courses that students can develop their practice with their own virtual servers (see Cloud FIB for teaching service at E.4.3.9)

Racó
Racó is the own FIB intranet providing access to timetables, syllabus, subjects information and updated news.
Special applications of Racó to support different academic activities and processes, such as the final degree submission and evaluation.
The FIB annual report includes indicators of usage of Racó (see ANNEX IV at E.4.3.8): more than 1.300.000 accesses to Raco.
The MAI degree also uses UB and URV intranets.

Specific support tools
The school has also developed some specific tools for teaching. This is the case for Jutge.org (https://jutge.org/), LearnSQL (https://learnsql.fib.upc.edu/moodle/) and RACSO platforms (https://racso.lsi.upc.edu/juez/). They are, respectively, automatic correction tools of computer

programs, SQL statements and formal languages. Used in some subjects of programming and databases, they are not only limited to evaluating students' assessments but also for giving feedback and helping them to detect committed errors.

UPC ICT Services to support teaching and learning

EDUROAM wifi connection
Additionally, EDUROAM wireless connections are available in all buildings and spaces of the School to students and the rest of the university community: campus classrooms, library, open spaces of the campus, etc.

Atenea Virtual Campus
UPC moodle adaptation. Through this platform you can: Exchange information and communication between teachers and students; publish materials and activities of the subject; access from mobile devices**.**
A specific instance for exams (ATENEA Exams) has been set up to improve reliability and scalability for evaluations. WIRIS integration with ATENEA allows powerful questioners.

GSuite Enterprise for Education
UPC current contract includes video and voice conferencing in large meetings (up to 250 participants) with recording functionality (using Gmeet), groups, chat, drive and other tools to support learning and collaboration.

Plagiarism detection tool
A system based on the URKUND software, which compares the contents to be reviewed with the public documents found on the internet, published material and the documents delivered through this tool within the UPC scope, This tool is integrated with ATENEA and Racó (for final degree works plagiarism checking).

UPC Estudiants (mobile application)
The UPC mobile app for students provides updated news and personalized schedules for students. UPC estudiants can be installed from AppleStore or GooglePlay.

e-secretaria
Access to registration, official certificates and official procedures.

UPC library

The Rector Gabriel Ferraté Library serves the FIB. All UPC libraries offer users a wide range of library services and access to library information bibliographic collections as well as in the digital library. Libraries provide extensive opening hours, computers connected to the Internet and individual and group workspaces.
The UPC libraries have the scientific and technical bibliographic resources specialized in the different areas of polytechnic knowledge that support all the degrees of the University (http://bibliotecnica.upc.edu). UPC Physical collections include copies of monographs (104.263), magazine collections (1.852) and other serials (962). They also have electronic resources that support network learning and research: online books (34.767), online journals (17.831), Final Degree Thesis / Online dissertations (48.106) and Databases (184).

Evidence E.4.3.11 provides data about the use and satisfaction by FIB students of the collections, spaces and equipment and services offered by the library. It reports an overall satisfaction with the library of 5.1 (on a grading scale from 1 to 6, with 6 meaning "totally agree").

UPC Commons

The institutional repository (see E.4.3.14) stores magazine articles, research reports, participation in conferences by UPC research staff members, final degree projects of UPC students, academic materials and past exams from UPC teaching staff.

More than 3.300 FIB Academic works are indexed and preserved in UPCommons, including final degree projects of the programs to be accredited (see E.4.3.12). The specific report on FIB Academic works shows the main features from this documentary set (see E.4.3.13).

Financial resources

UPC is a public Spanish University and is funded by the national and regional governments (see legal framework). Public universities are state-owned but granted a considerable degree of independence when it comes to self-government. Public universities are subject to Spanish administrative law, just as any other public body of the state. Public university staff, lecturers and professors are mainly granted civil servant status, which serves as a tenure.

Spanish universities continue to face economic restrictions, which began in 2008 in a context of economic crisis that continues to this day. The most significant fact is that Catalonia devotes 0,715% of its GDP to universities, while the EU-22 average is 1,27% (E.4.3.15, report "Comparación entre comunidades autónomas en España, Europa y la OCDE, 2009-2015", December 2017). The FIB community has coped with this situation coinciding with the deployment of new EHEA degrees, which implies important teaching demands related to the rising number of students and number of ECTS (E.0.1.3). Recent recession years and investments reductions is partially offset by fundraising through collaboration with companies.

The UPC budget (see E.4.3.16) is managed at two levels: a centralised budget and a delegated budget for each school and department. The UPC central administration manages the centralised budget. This budget includes the teaching and support staff salaries, major investments and financial operations for all the university.

The schools are provided with a delegated budget for some current expenses like teaching and lab materials. Additionally, schools are allowed to keep a share of some incomes like Educational Cooperation Agreements or classroom rental. The FIB Standing Committee approves the budget, which is published in the annual report.

The next table shows the evolution of FIB budget:

Budget Close					**Budget approved**
	2016	**2017**	**2018**	**2019**	**2020 (*)**
Incomes	305,246.06 €	303,301.42 €	347,195.87 €	380,771.53 €	391,212.11 €
Expenses	274,187.93 €	226,385.58 €	323,023.98 €	304,143.27 €	391,212.11 €
(*) 2020 Budget hasn't been closed yet					

These are the three main income accounts for the FIB delegated budget:
- FIB receives an allocation as one of the UPC schools, for current expenditures. The next tables show allocations of the most recent years. Government' austerity measures brought about yearly decreases in the allocations from 2012 until 2016:

	2012	2013	2014	2015	2016
FIB Allocation (euros)	196.468,26	125.739,69	89.795,15	88.148,00	88.046,57

This decrease has been partially reverted during the last four years:

	2017	2018	2019	2020
FIB Allocation (euros)	101.994,52	108.181,22	122.991,50	134.237,11

- Educational Cooperation Agreements establish a tax for university management that partially were yielded to FIB in recent years:

	2017	2018	2019	2020
ECA (euros) - budget previewed incomes	95.000,00	120.000,00	120.000,00	130.205,37
actual incomes		137.071,65	177.645,13	

- In these recent years FIB received over 20.000 euros from rents of classrooms and common places (for example for TechTalent Center training) and 14.185 € for the FIB bar fee.

FIB 2020 initial budget approved expenses include:

	2020
Ordinary expenses	73.000,00
FIB Computer Labs (A5, B5, C6)	25.000,00
Other Teaching Laboratories material	12.000,00
Teaching Material	12.000,00
inLab FIB	7.000,00
Grants	59.000,00
ICT investments	115.000,00
Others	88.212,11

Investments

The School invests yearly over 80.000 € in ICT equipment that is complemented by UPC yearly programs to renew equipment. FIB initial budget for 2020 allocated 115.000 € for ICT investments that was complemented with:

- 28.000 € (“Convocatòria de renovació Equipament Docent 2020”, UPC annual program to renew learning equipment)
- 8.950 € (“Pla TIC 2020”, UPC annual program to renew IT equipment).

In addition to previous regularly incomes and expenses, FIB has incomes for specific investments: industry funding programs and governmental (national or international) funding programs. For example: AGAUR grants (International Master’s programme for MEI, MIRI and MAI), specific projects (FIB Visiona, inLab Talent, inLab crowdfunding), industry donations (Everis, Google ,Social Point).

Covid-19 specific investments and funds (2020)

COVID-19 special investments for the school have been done thanks to extra assignment of:

- 60.000 € from FIB budget
- 45.908,00 € from the UPC program to install hybrid classrooms to support COVID-19 situation (“Dotació aules multimèdia als centres UPC curs 2020-21”)
- 32.057,44 € from UPC special COVID-19 funds to improve on-line learning.

UPC has also assigned specific funds for the school to improve support for first year students:

- 7.500 € for mentoring internship grants
- 31.200 € for teaching student assistants

5. Transparency and Documentation

Relevant and readily accessible information to all stakeholders

The FIB website (E.0.1.1) ensures easy and universal access to all relevant stakeholders. Pertinent information related to FIB degree programmes is complete and up to date at this website.

In 2017, the new FIB website was launched with the aim of providing a more modern and responsive website (adaptable to different devices), with a more visual design, and reorganising the information to improve the experience of users. It provides public information, complete and published entirely in Catalan, and mostly in English and Spanish.

Additionally, a continuous work of information is carried out through the different social networks of the centre (Facebook, Youtube, Twitter, Instagram) with which we disseminate the news and the most relevant facts related to the FIB, its community and its studies.

For enrolled students in each degree programme, there exists a specific website: evidence E.5.0.1 for GEI and evidence E.5.0.2 for Masters. It contains the information on the specific organization (syllabus, faculty, final or thesis project, exams, timetables, calendar). The information is updated before the start of the academic year, and much of the teaching information is updated each semester. Maintenance and information issues are treated daily.

Enrolled students also have access to different intranets for some reserved information. One allows them to access their registration and produce official certificates (we call that “e-secretary”), and it is handled by UPC. Another two intranets offer them access to the virtual classrooms: one is hosted by UPC (see E.5.0.3, ATENEA, an adaptation of Moodle Course Management System), and the other by the FIB (see E.5.0.4, Racó, an ad-hoc platform developed by FIB IT service). They incorporate various educational tools adapted to the implementation of degrees within the EHEA (warnings, notes, calendars, and assignments).

Additionally, the School also relies on other channels to offer information on its degrees and its functioning:

- MediaFIB: video-publishing and live event broadcasting platform, used for the publication of teaching videos associated with syllabus, promotional videos and live broadcast of the School events (E.5.0.5). In operation until 2018, subsequently it has been replaced by the FIB YouTube channel.
- Institutional YouTube channel: audiovisual platform for the broadcast and publication of videos associated with the studies and the live events streaming (E.5.0.6).
- Information screens in the public spaces of the FIB: information points in public areas of greater affluence of the FIB such as computer rooms, the FIB building and the square, in order to publish the most relevant news of the School.
- Social networks: updated information about the FIB through the Twitter (E.5.0.7), Facebook (E.5.0.8) and Instagram (E.5.0.9) channels.
- The custom point of contact implemented in 2011 for reporting technical issues has been expanded since 2019 for all areas. It is a tool (for the FIB community, it is an intranet) to optimize all the processes involved in responding to queries and/or incidents sent through electronic means such as email, online forms, etc., which have been increasing significantly. This personalized point of contact for telematic consultations aims to optimize resources, increase the response capacity of the organization, and avoid the following problems encountered: repeated consultations and/or incidents directed to different areas, allocation of resources caused concurrently by repeat the same query to different areas, and there is no user feedback on the status of your query while it is being resolved (E.5.0.10).

- An open contact form for inquiries, suggestions, complaints and congratulations, accessible from the FIB home page.

The process of programme monitoring and, where applicable, accreditation of degree programmes for the UPC is available at the UPC VSMA website (E.5.0.11, which in Catalan means, *Verificació Seguiment Modificació Acreditació* or verification, monitoring, modification and accreditation of degree programmes). The FIB outcomes of programme monitoring are available there as well as at FIB QAS (evidence E.5.0.12), the School Quality system).

The section The school in figures on the website (evidence E.0.1.4) shows the main indicators of the FIB, as well as the annual academic results (in Catalan, see Annual reports), while the aggregate indicators of academic results and satisfaction of the centre can be consulted through the UPC's corporate data management and analysis system (E.0.1.10). These indicators complement those offered on the page of each degree, thus facilitating consultation by all stakeholders. UPC Rankings website (E.0.1.5) also report on the positioning of the FIB in the main world university rankings.

Management of incidents, complaints and suggestions:The 270.1.2.6 process, Management of incidents, complaints and suggestions of the School's SIGQ, guarantees the receipt of incidents. These will be recorded, if applicable, informed, analyzed and, solved on the basis of transparency and efficiency, by the School's management team. In any case, any suggestion, complaint and congratulation receives the gratitude of the School. From the website you can access the forms enabled to receive incidents (E.5.0.10).

Criterion 5.1 Module descriptions

The publication of syllabus on the FIB website provides students with the information to determine what is intended to learn, how it will be assessed and the expected workload of the subject.

The Syllabus tool integrated in Racó allows:

- For the head of studies: validate changes introduced by teacher/module coordinator, report changes, post/publish at website. Assign which competences are going to be evaluated in GEI subjects. Different integrated views of subjects to help coordination.
- For subject coordinators: a specific tool to assist introducing the following information:
    - subject website, with additional information
    - teaching method(s) and work load (weekly hours)
    - intended learning outcomes (module objectives)
    - content
    - Planned Activities also evaluation activities
    - Competences (Choosing which competences of the degree are going to be developed in the subject)
    - previous capacities
    - form(s) of assessment and details explaining how the subject mark is calculated
    - basic and complementary recommended literature

  - COVID-19 Addendum (temporal modifications and measures due to COVID-19)
  - planned use/applicability
  - Support for catalan, spanish and english.

Teaching guides are public and accessible to all students and teaching staff, showing the following information:

- module identification name
- teachers and subject coordinator
- link to the module website with additional information, if exists
- teaching method(s) and work load (weekly hours)
- credit points
- module type (compulsory, elective)
- intended learning outcomes (module objectives)
- module content
- Planned Activities also evaluation activities
- Competences
- planned use/applicability
- admission requirements
- form(s) of assessment and details explaining how the module mark is calculated
- basic and complementary recommended literature with links to the library.
- COVID-19 Addendum (how covid-19 measures can change any previous point)

Syllabus are available in Catalan, Spanish and English

Date of publication is kept internally. Syllabus are also stored in the Academic Information System for each semester. Therefore, students can get from e-secretaria the syllabus of the subjects they have done in the right semester.

Exemples: MIRI Syllabus | FIB - Barcelona School of Informaticspc.edu)

Criterion 5.2 Diploma and Diploma Supplement

PENDING

Guiding Questions

- Have any problems occurred with awarding the graduation certificates and Diploma Supplements to the students? If yes, what was the reaction?

Possible Evidence

- Sample graduation certificate for each degree programme
- Sample Diploma Supplement for each degree programme
- Sample transcript of records for each degree programme

Criterion 5.3 Relevant rules

For enrolled students in each degree programme, there exists a specific website: evidence [E.2.1.3] for GEI and evidence (E.2.1.4) for Masters. It contains the information on the specific organization (syllabus, faculty, final or thesis project, exams, timetables, calendar). The information is updated before the start of the academic year, and much of the teaching information is updated each semester. Maintenance and information issues are treated daily.

There is an academic regulations section on the website of the Barcelona School of Informatics for each degree (E.5.3.1 for GEI, E.5.3.2 for MEI, E.5.3.3 for MIRI and E.5.3.4 for MAI). Regulations are reviewed according to QAS process 270.1.1.1.

6. Quality Management: Quality Assessment and Development

Criterion 6 Quality management: quality assessment and development

FIB has among its main goals the continuous assurance of the quality of all of its academic programs. Some years ago, their adaptation to the EHEA was considered as an opportunity to design an internal Quality Assurance System (QAS), which as defined and accredited in June 2009 along the Program AUDIT framework in accordance with the AQU guidelines, also in compliance with the principles of legality, publicity, transparency and participation. Since then, the actual implementation of the QAS has evolved and has relied upon the decided internal organizational and academic structure of FIB, composed by the appropriate set of academic bodies or decision units. Thus, it is the entire FIB governance structure, where a numerous group of students, teaching and management staff participate, that is used to perform the FIB Quality Assurance System (QAS) in a distributed and coordinated manner, rather than a single unit dealing with all issues related to the assurance of the quality of all the academic programs provided by FIB. In this way, the analysis and decision-making processes undertaken are considered adequate for enabling the programme outcomes to be accomplished for every program. Thus, FIB processes are repeated in a continuous, regular and formal way, mostly every academic year or semester, and some longer than yearly.

The Dean's team and governing bodies are in charge of beginning, monitoring, assessing and supplying documentary evidence for all the processes. FIB staff carries out the different tasks, and minutes of the bodies' meetings are regularly reported to the target groups. The public results of all these operating procedures bring about transparency to all these guided processes with continuous improvement plans. This way of functioning follows the QAS-designed processes, as were initially designed and accredited, in a way such that their main purpose has permeated and evolved as the different governing bodies have being adapting to new conditions (new programs, new activities, new members, new governing stiles) in the long period since the original QAS was proposed. This evolution makes FIB's typical work flexible, versatile and adaptive.

However, in the last two years there has appeared, both at the Spanish and the Catalan level, a new accreditation alternative, in addition to the separated accreditation of programs. In this option, named institutional accreditation, instead of accrediting every single university program provided by a school, official external processes named as program verification, for new programs, and program accreditation, for already existing programs, it is the internal QAS which becomes the centre of evaluation, with a formal QAS process-based evaluation of the school functioning.

Along this recent opportunity, the current Dean's team believes that, for the near future, it will be more appropriate and convenient for FIB to prepare for such an institutional accreditation, as soon as we have adapted the functioning of its governing bodies not just to the spirit and purposes of the accredited QAS, but more explicitly to its formal concepts and processes. In the other way around, we also have to adapt the formal QAS description to whatever particular functioning of our governing bodies that was not explicitly described in our current QAS manual.

Furthermore, in July 2017 the creation of the new administrative unit, UTG CNTIC, shared with another UPC school and some UPC departments, was approved. Although such a new unit was fully started in 2019, some of its processes involving FIB have not been fully defined until recently. This has involved major organizational changes among support staff. Also for this reason, the current Dean's team believes that there is room for improvement and was ready for addressing such an improvement action in the second half of the Dean's team first mandate, a period that has unfortunately been greatly impacted by the Covid-19 pandemia, and all the urgent and adhoc actions that have had to be, and still are being addressed by the team. Thus, we had to delay the improvement action proposed in order to review all of our quality assurance processes and to establish some kind of more homogeneous protocol for standardising rules and regulations that deal with formal communication and the exchange of information between governing bodies and target groups.

In the meantime, we next explain the basic governance functioning as it is currently being undertaken. The governance of FIB is carried out by the Dean (as the highest executive authority), the Dean's team, and the governing bodies: the School Board and the Standing Committee that perform executive functions. Decision-making processes based on continuous improvement processes rely on the School Board, with a minimum of two yearly meetings, and the Standing Committee, FIB's executive body that meets bimonthly. Regulations and minutes of these meetings are public (in Catalan, School Board minutes and Standing Committee minutes), and they follow an overall plan-do-check-act periodic cycle between the Dean's team and, mainly, the Standing Committee.

Each degree programme has its own specific academic body: CAGEI, CAMEI, CAMIRI and CAIMAI. Other specific bodies are: a general Academic Committee, three Curricular Committees, an Internal Assessment Committee, established for verification and accreditation processes, and a Quality Committee, with members external to FIB established for a more institutional and transversal purpose.

As mandated by the laws of public universities in Spain, and the relevant regulations set up at UPC and FIB, all FIB members (students, teaching and support staff) regularly run in the election of the School Board and the Standing Committee by following the procedures in the Regulations of the FIB. Then, most of all the other committee members are elected, with a few directly named by the Dean. The regulations and up-to-date composition of all these committees are public (E.0.1.1 at School Governance Management).

The Quality Assurance System public information

According to the commitment of transparency required for university institutions in the framework of the EHEA, universities must have and follow policies and systems of internal quality assurance. FIB's internal Quality Assurance System (QAS) is formally established and published (evidence (E.2.2.3), the School Quality system).

A mandatory yearly management report of the Dean's team is presented to the School Board with the information, the organization and decided measures of the corresponding semesters. QAS processes are evaluated according to the last academic year, and new proposals are presented. Special mention must be made of the annual accountability that you can find in the Academic

Report. FIB presents annual Academic Reports and Management Reports to the School Board and they are public at the website (in Catalan, see E.4.3.8 FIB Annual Report 2018-2019 and E.6.0.2).

The monitoring reports, the accreditation reports, as well as the verifications reports of the degrees taught by the FIB can be found in the quality section of the school website (E.6.0.1).

The QAS and degree programmes design

The School Board is the collegiate body with the highest authority over internal regulations as well as over the control and expression of the position and aspirations of the school. Therefore, this is the QAS body in charge of programme design final approval. It is on the FIB School Board where the implementation of the AUDIT assurance of programme quality relies. From the degree programme design in the EHEA framework the process evolved by FIB defining ad-hoc expert committees that took into account stakeholders' needs prior to degree design approval.

The QAS and degree programmes monitoring

All the FIB governance bodies are concerned with monitoring processes, but the Standing Committee (CP in Catalan, *Comissió Permanent*) is the body that specifically ensures continuous enhancement of programme quality through the regular data analysis as prepared by FIB's staff and presented by the Dean. The educational programme quality assurance process produces monitoring reports (with modifications, reverification, if necessary), which are approved by both the Standing Committee and eventually the School Board.

FIB has also a Quality Committee, with a more institutional and transversal opinion purpose, whose composition also includes personnel not related to FIB: two UPC personnel not assigned to FIB, and two non UPC personnel who come from firms related to informatics. Monitoring process consists of two ordinary meetings per year that gather information at "*Grups*" *Comissió de Qualitat* (CQUAL). New improvement proposals are delivered to the standing committee when necessary.

The QAS and degree programmes accreditation

Overall, as with the design and monitoring of programs, all the FIB governance bodies are also concerned with any accreditation process of a FIB degree programme. However, for every particular accreditation project, an ad-hoc committee is set for that purpose: *the Internal Assessment Committee* (CAI). CAI is the internal assessment committee responsible for the Self-Assessment Reports implied in any accreditation process undertaken, be it for a single or a cluster of programs, with the local AQU Catalan university quality agency and, in the last occasions, with the international agency ASIIN, as facilitated by AQU for the accreditation of our programs with regard to the Euro-Inf labels. In this way, FIB makes every effort to adapt to the accreditation procedure proposed by AQU in accordance with ASSIIN, consisting of an ad-hoc process that is undertaken every 4 or 6 years, dependent on the program level.

For such a project, all the relevant information is gathered at "*Grups*" *Comitè d'Avaluació Interna de la FIB* (CAI), once prepared by fib's staff and analyzed by the Dean's team and the other academic bodies.

The QAS and degree programmes results

The Standing Committee is the executive body that holds bimonthly meetings. Two of these meetings, usually in the spring and autumn seasons, are called to coincide with the two corresponding School Board meetings. In these meetings, a compilation is presented regarding information, outcomes (particularly learning outcomes), including stakeholder satisfaction. Collecting and analysing outcomes is another main AUDIT process whose implementation at FIB relies on several sources from FIB, UPC and external, but more specifically with a Business Intelligence tool developed at FIB (named in Catalan "Quadre de Comandament") that collects the most important FIB data usable by the specific academic committees for each degree programme.

We recall that the Standing Committee feeds on specific academic bodies. Each degree programme has its own specific body: CAGEI as the GEI Academic Committee, CAMEI as the MEI Academic Committee, CAMIRI as the MIRI Academic Committee, and CAIMAI as the MAI Academic Committee. The information for each specific committee meeting is gathered at "*Grups*" *CAGEI, CAMEI, CAMIRI* and *CAIMAI*.

We recall that the process to collect and analyse outcomes ends up in the presentation of the relevant results (grades by subjects, teaching surveys, etc.) to the bimonthly meetings of the Standard Committee that gather information at "*Grups*" *Comissió Permanent (CP).* Minutes and outcomes from the meetings are published at the website (in Catalan, *Actes de les reunions i documents generats (CP), evidence E.0.1.20*).

In addition to the collection and analysis of programmes results information undertaking at FIB level, other important information is collected and shared with the school by the UPC transversal processes implemented at the UPC administrative unit dedicated to the management of academic planning and quality (GPAQ). This unit provides FIB, and its governing bodies, not only some key internal information, such as student teaching surveys, but also important external information, which permits FIB to benchmark and compare the results of its programmes with those of other UPC schools and, also with the help of external institutions such as AQU, with results of other Catalan, Spanish and international universities.

Overall, taking into consideration both information systems and instruments internal to FIB as well as similar information instruments and systems external to FIB, run by GPAQ, or other units at UPC, or even outside our university (e.g. AQU), the Dean's team at FIB believes that we do have plenty of varied and detailed information on the results of our programmes. Often the challenge is more to integrate those many and varied information sources into a formal and homogeneous way to present and share them, at the appropriate levels, with the various governing bodies of our school.

The QAS and continuous improvement processes

At FIB all of the governing bodies are concerned with the continuous improvement processes, but it is the Dean's team that is in charge of improvement actions and plans, in collaboration with specific programme bodies (CAGEI, CAMEI, CAMIRI, CAIMAI). All minutes and outcomes from the collegiate body meetings are published at the website. And finally the annual Monitoring Report (the mandatory yearly monitoring report with improvement plans presented to the Standard Committee) and annual Academic Report (the mandatory yearly management report of the Dean's

team presented to the School Board) are also published at the website (in Catalan, see Annual reports).

Finally, the Dean's periodic election is the naturally regulated and periodic process for a more detailed re-examination of needs, objectives, outcomes, educational process, resources, partnerships, and the management system. The final mandatory management report of the Dean's team (and also the yearly management reports) display the decision-making history.

FIB's current Dean's team believes that the above-mentioned QAS consistency analysis and update effort will bring our school not just the future chance to present to an institutional accreditation but also, and as important as that, the possibility to reconsider in a critical way the various processes undertaken by the governing bodies in order to gain any potential improvement in the management of our school. In fact, undertaking such an improvement action was a goal programmed for the second half of the Dean's team first mandate (courses 2019-20 and 2020-21), also as a way to prepare for the current accreditation project. Unfortunately, this has been a period that has been greatly impacted by the Covid-19 pandemics, and all the urgent and adhoc actions that have had to be, and still are being addressed, by the Dean's team.

However, instead of just delaying the QAS consistency analysis and update for after the current accreditation project, we have decided to address it and try to complete it, while preparing for this accreditation project, as a way of making greater use of the team's work. This is why we can present as an evidence of such a work the provisional document where we are reviewing all of our quality assurance processes and where we pretend to establish our more formal and homogeneous protocol for standardising rules and regulations that deal with formal communication and the exchange of information between governing bodies and target groups. We expect that, after the current accreditation project, such a QAS analysis and update effort will help us adapt and improve our functioning so that we will eventually be ready for a future institutional accreditation of FIB.

Furthermore, QAS is currently being adapted and completed to integrate changes derived from the reorganization of functions implied by the creation and deployment of the new UTG CNTIC administrative unit, and to improve all the processes. It will be submitted for approval in 2021. Communication and transparency about the FIB quality system will also be reviewed.

In fact, and directly related to the further formalization of FIB's QAS, our university is currently undertaking an "Institutional Accreditation" project at university level with AQU, where two other schools participated on a pilot status. When preparing for such an accreditation, UPC invited FIB to participate in the pilot project, but FIB Dean's team considered that, also given the Covid-19 circumstances and the need to prepare for this program and international accreditation project, it was more appropriate for FIB to avoid participating in that institutional accreditation pilot project, and to wait for its results and lessons learnt.

The current Dean's team at FIB has decided to commit to a project to prepare for such a future "Institutional Accreditation", after the UPC pilot project is finished, something which is expected to be concluded at this course's end (july 2021). Thus, we have included such a commitment as a key improvement action, to be carried out as soon as the Covid-19 urgent situation is over, while we do the consistency analysis and update of our QAS (as part of action [270.M.495.2016]), and in this way also to be synchronized with the end of the UPC pilot project.
Reviewed QAS processes are included as evidence E.6.0.3.

D. Continuous improvement process

Continuous improvement process assessment

Monitoring process performed improvement plans, some of them finished at present and some others still in work. The current analysis in the accreditation process performs new improvement plans for each degree programme.
In what follows we summarise the suggested changes and the status of the old and new improvement plans for each degree programme.

Bachelor degree (GEI)

Degree	Source of change	Suggested change	Status
GEI	Monitoring Report	M.482.2016.Consolidate English taught subjects	Partially done
GEI	Monitoring Report	M.483.2016. Possible GEI double specialization	Done
GEI	Monitoring Report	M.494.2016. Review of TFG between GEI itineraries	Done
GEI	Monitoring Report	M.497.2016. Improve performance of new incoming students	Done. New FIB improvement plan [M.516.2021] to enhance support strategies
GEI	Monitoring Report	M.499.2019.Review of cybersecurity subjects in GEI	Done

New improvement plans for GEI degree programme concern:
- Increase interest for research among GEI students [M.515.2021].
- Enhance support strategies at GEI to increase the efficiency rate even more [M.516.2021].

Masters' degrees (MEI, MIRI, MAI)

Master	Source of change	Suggested change	Status
MEI,MIRI, MAI	Monitoring Report	M.486.2016. Renaming some subjects (MEI, MIRI, MAI)	Done
MEI, MIRI,MAI	Monitoring Report	M.500.2018. Increase the amount of enrolled students at masters	Done
MEI, MIRI,MAI	Monitoring Report	M.503.2018. Improve innovation and collaboration with companies in Masters	Done

New improvement plans for all masters degrees:
- Open research opportunities for master students [M.520.2021].

Master	Source of change	Suggested change	Status
MEI	Monitoring Report	M.485.2016.Study the implementation of a dual master programme	Done. New FIB improvement plan [M.521.2021] about Dual Master MEI programme verification
MEI	Monitoring Report	M.498.2019. Reduce overlaps of the subjects between GEI and MEI	Done

New improvement plans for MEI degree programme concern:
- Dual Master MEI programme verification [M.521.2021].

Master	Source of change	Suggested change	Status
MIRI	Monitoring Report	M.487.2016. MIRI reorganisation of semesters and contents of compulsory courses	Done
MIRI	Monitoring Report	M.488.2016. MIRI: find a mechanism to recognise courses taken in previous undergraduate studies	Done
MIRI	Monitoring Report	M.489.2016. Creation of more seminars for MIRI	Done
MIRI	Monitoring Report	M.501.2019. MIRI: Review CPDS common compulsory subject	Done

New improvements plans for MIRI degree programme concern:
- MIRI: Adaptations derived from the new Data Science Master. [M.518.2021].

Master	Source of change	Suggested change	Status
MAI	Monitoring Report	M.490.2016. MAI: recognise credits from other programs	Done
MAI	Monitoring Report	M.491.2016 MAI: new intensifications	Done
MAI	Monitoring Report	M.492.2016. MAI: review structure and contents of existing intensifications	Done
MAI	Monitoring Report	M.493.2016. MAI: change the mandatory nature off the subject Intelligent data analysis applications in business. Improvement plan	Done
MAI	Monitoring Report	M.502.2019 MAI: Reduce issues related with mobility to URV Campus	Partially done.

New improvements plans for MAI degree programme concern:
- Increase collaboration with the Barcelona Supercomputing Center and other research centers [M.519.2021].

Transversal or common changes

Degree	Source of change	Suggested change	Status
GEI, MEI, MIRI, MAI	Monitoring Report	M.448.2016.Website upgrade	Done. New improvement plan about new promotional actions [M.511.2021]
GEI, MEI, MIRI, MAI	Monitoring Report	M.484.2016.New double degree agreements	Done. New improvement plan for new double degree agreements within the UNITE consortium. [M.510.2021]
GEI, MEI, MIRI, MAI	Monitoring Report	M.481.2016. QAS revision and implementation	Done.
GEI, MEI, MIRI, MAI	Monitoring Report	M.495.2016. Implement entirely the QAS review process	In progress, QAS is being updated to include UTG CNTIC organization and improve processes.Due on July 2021

GEI, MIRI, MAI	Monitoring Report	M.504.2018. Pre-enrolment of optative subjects	In progress
GEI, MEI, MIRI, MAI	Monitoring Report	M.505.2019. New application to manage incoming mobility students	In progress, nearly finished.
GEI, MEI, MIRI, MAI	Monitoring Report	M.506.2017. Consolidate inLab FIB and its Talent Program	Done
GEI, MEI, MIRI, MAI	Exceptional COVID-19 situation	M.507.2020. Covid-19 actions	In progress

New improvements plans:
- Integration of the external practices in the new UPC Applications [M.508.2021].
- Review external practices regulations and implementation [M.522.2021]
- Improvements to GEI, MEI, MIRI and MAI based on future changes of the Computer Curricular of the ACM [M.509.2021].
- New Double degrees agreements within the UNITE consortium and other potential partners in all masters and GEI [M.510.2021].
- New promotional actions to increase the number of applicants [M.511.2021].
- Review FIB strategy for on-line/blended/hybrid learning [M.512.2021].
- Review FIB BYOD strategy [M.513.2021].
- Review mobility agreements according to the future Erasmus+ programme [M.514.2021].
- Introduce gender perspective as a transversal competence in GEI, MEI, MIRI and MAI [M.521.2021].

Improvement plans

This is included as ANNEX 1 :

E. Evidences

E.0.1.1 FIB Website	https://www.fib.upc.edu/en
E.0.1.2 The school in figures webpage	https://www.fib.upc.edu/en/fib/school/school-figures
E.0.1.3 FIB main figures and facts Llibre de dades FIB	https://gpaq.upc.edu/lldades/quadrecomandament.asp?codiCentre=270
E.0.1.4 UPC ranking webpage	https://www.upc.edu/ranquings/ca/posicions-de-la-upc-als-principals-ranquings
E.0.1.5 School Governance	http://www.fib.upc.edu/en/centre/govern.html
E.0.1.6 FIB Staff	https://www.fib.upc.edu/en/fib/school/staff
E.0.1.7 UTG CNTIC Structure	https://utgcntic.upc.edu/ca/estructura
E.0.1.8 inLab FIB	https://inlab.fib.upc.edu/en
E.0.1.9 FIB Departments	https://www.fib.upc.edu/en/research/departments
E0.1.10 FIB Research	https://www.fib.upc.edu/en/research
E.0.1.11 FIB quality system information	https://www.fib.upc.edu/ca/la-fib/sistema-de-qualitat
E.0.1.12 Acreditació	https://www.fib.upc.edu/ca/la-fib/sistema-de-qualitat/acreditacions
E.1.1.1 GEI website	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering
E.1.1.2 GEI Main figures and facts	https://gpaq.upc.edu/lldades/centres.asp?codiCentre=270&codiTitulacioDursi=GRAU00000407&nomCentre=Facultat%20d%27Inform%C3%A0tica%20de%20Barcelona&nomTitulacio=Grau%20en%20Enginyeria%20Inform%C3%A0tica&cursIniciTitulacio=2010-2011&numCredits=240&tipusEnsenyament=Grau&codiFC=
E.1.1.3 MEI website	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering

E.1.1.4 MEI Main figures and facts	https://gpaq.upc.edu/lldades/centres.asp?codiCentre=270&codiTitulacioDursi=DGU000001058&nomCentre=Facultat%20d'Inform%C3%A0tica%20de%20Barcelona&nomTitulacio=M%C3%A0ster%20en%20Enginyeria%20Inform%C3%A0tica&numCredits=90&tipusEnsenyament=M%C3%A0ster%20universitari&codiFC=
E.1.1.5 MIRI website	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics
E.1.1.6 MIRI Main figures and facts	https://gpaq.upc.edu/lldades/centres.asp?codiCentre=270&codiTitulacioDursi=DGU000001097&nomCentre=Facultat%20d'Inform%C3%A0tica%20de%20Barcelona&nomTitulacio=Erasmus%20Mundus%20Master's%20degree%20in%20Innovation%20and%20Research%20in%20Informatics%20(MIRI)&numCredits=120&tipusEnsenyament=M%C3%A0ster%20universitari&codiFC=
E.1.1.7 MAI website	https://www.fib.upc.edu/en/studies/masters/master-artificial-intelligence
E.1.1.8 MAI Main figures and facts	https://gpaq.upc.edu/lldades/centres.asp?codiCentre=270&codiTitulacioDursi=DGU000001164&nomCentre=Facultat%20d'Inform%C3%A0tica%20de%20Barcelona&nomTitulacio=M%C3%A0ster%20en%20Intel%C2%B7ligència%20artificial%20(Pla%202012)&numCredits=90&tipusEnsenyament=M%C3%A0ster%20universitari&codiFC=
E.1.1.9 Spanish University System	https://www.euroeducation.net/prof/spainco.htm
E.1.1.10 Màster website	http://www.fib.upc.edu/en/masters.html
E.1.1.11 Spanish Royal Decree	https://gpaq.upc.edu/sat/documents/referencia/RD%201397-2007%20modificado%20RD%20861-2010.pdf
E.1.1.12 BOE resolution 12977/2009	https://www.boe.es/boe/dias/2009/08/04/pdfs/BOE-A-2009-12977.pdf
E.1.1.13 GEI Competences	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering/curriculum/competences
E.1.1.14 GEI Competences for degree subjects (competences-subjects matrix)	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering/curriculum/competences-degree-subjects

E.1.1.15 MEI Competences	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering/curriculum/competences
E.1.1.16 MEI Competences for degree subjects (competences-subjects matrix).	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering/curriculum/competences-degree-subjects
E.1.1.17 MIRI Competences	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics/curriculum/competences
E.1.1.18 MIRI Competences for degree subjects (competences-subjects matrix).	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics/curriculum/competences-degree-subjects
E.1.1.19 MAI Competences	https://www.fib.upc.edu/en/studies/masters/master-artificial-intelligence/curriculum/competences
E.1.1.20 MAI Competences for degree subjects (competences-subjects matrix)	https://www.fib.upc.edu/en/studies/masters/master-artificial-intelligence/curriculum/competences-degree-subjects
E.1.1.21 Enquesta satisfació Graduats i Graduades AQU 2020	https://estudis.aqu.cat/dades/ReportingServices/Report/ReportTemplate/319?ReportName=RptGrausCatalunyaMain&ReportDescription=RptGrausCatalunyaMain&Width=100&Height=650&tipusFiltreType=Graus
E.1.1.22 Informe historic satisfacció titulats	https://www.upc.edu/portaldades/ca/enquestes/estudiantat/enquesta-de-satisfaccio-de-titulats/enquestes-de-satisfaccio-de-titulats-1/informes-historics/fib.pdf
E.1.4.1 I love bits website for prospective and new bachelor students	http://www.ilovebits.fib.upc.edu/
E.1.4.2 Masters website for prospective and new master students	http://masters.fib.upc.edu/
E.1.4.3 Access to the labour market for graduates	https://www.aqu.cat/doc/doc_42542075_1.pdf

General report 2020 (in catalan) General report 2017 (in english) Specific Data for Bachelor's degree in Informatics (included GEI at FIB-UPC)	https://www.aqu.cat/doc/doc_18272729_1.pdf https://estudis.aqu.cat/dades/ReportingServices/Report/ReportTemplate/318?ReportName=RptGrausCatalunyaMain&ReportDescription=RptGrausCatalunyaMain&Width=100&Height=650&tipusFiltreType=Graus#
E.1.4.4 FIB secondary school website (in catalan)	https://www.fib.upc.edu/secundaria
E.1.4.5 Igualtat de gènere a la UPC	https://igualtat.upc.edu/ca/pla/disseny-estrategia-genere
E.1.4.6 GEI introductory support course (in catalan)	https://www.fib.upc.edu/ca/estudis/graus/grau-en-enginyeria-informatica/matricula/curs-intensiu
E.1.4.7 GEI new students survey	https://www.upc.edu/portaldades/ca/enquestes/estudiantat/enquestees-a-lestudiantat-nou-de-primer-curs/fitxers/nous-de-1er-2019-20/enquestas_nous_201920_fib.pdf
E.1.4.8 FIB Mobility	https://www.fib.upc.edu/en/mobility
E.2.1.1 FIB Mobility	https://www.fib.upc.edu/en/mobility
E.2.1.2 FIB Industrial Practices	https://www.fib.upc.edu/en/companies/industrial-practices
E.2.1.3 GEI Coordination Webpage (in catalan)	https://www.fib.upc.edu/ca/estudis/graus/grau-en-enginyeria-informatica/pla-destudis/coordinacio-del-grau
E.2.1.4 Standing Committee minutes	http://www.fib.upc.edu/fib/centre/govern/organs-colegiats/actes.html
E.2.1.5 CAGEI minutes (restricted access)	pending
E.2.1.6 CAMEI, CAMIRI, CAMIMAI minutes (restricted access)	pending
E.2.1.7 GEI webpage	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering
E.2.1.8 GEI final degree project website	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering/degree-final-project

E.2.1.9 Criteria used in GEI bachelor's thesis assessment rubrics	https://www.fib.upc.edu/sites/fib/files/documents/estudis/initial-milestone-rubric.html
E.2.1.10 Practical Experience and Labor Experiences 2018-2021 (restricted access)	https://drive.google.com/drive/folders/1WfGLfMtugpL2KLS6PdrsgEuXBCZ0bLmg?usp=sharing
E.2.1.11 Qualifications evidences (restricted access)	pending
E.2.1.12 FIB GEI graduated satisfaction survey 2018-2019	https://www.upc.edu/portaldades/ca/enquestes/estudiantat/enquesta-de-satisfaccio-de-titulats/enquestes-de-satisfaccio-de-titulats-1/curs-2018-2019/fib.pdf
E.2.1.13 FIB job placement survey for master's students 2020	https://www.upc.edu/portaldades/ca/enquestes/insercio-laboral/enquesta-insercio-laboral-masters/edicio-il-2020/fib.pdf
E.2.4.1 Guia d'acollida estudiantat de grau FIB	https://www.fib.upc.edu/ca/estudis/graus/guia-dacollida-estudiantat-de-grau
E.2.4.2 Pla d'acció tutorial FIB	https://www.fib.upc.edu/ca/estudis/graus/pla-daccio-tutorial
E.2.4.3 Materials docents Mentories	https://ocw.upc.edu/curs_publicat/270MENT/2019/1
E.2.4.4 Mentories entre iguals FIB	https://www.fib.upc.edu/ca/estudis/graus/pla-daccio-tutorial/mentories-entre-iguals
E.2.4.5 Aula Lliure FIB	https://www.fib.upc.edu/ca/estudis/graus/pla-daccio-tutorial/aula-lliure
E.2.4.6 AENUI2019. Una propuesta de mentoría académica entre iguales para el Grado en Ingeniería Informática	http://www.aenui.net/ojs/index.php?journal=actas_jenui&page=article&op=view&path%5B%5D=495
E.2.4.7 DEFIB website	http://defib.upc.edu/
E.2.4.8 FIB Associations	https://www.fib.upc.edu/en/fib/university-life/associations
E.2.4.9 Responsables d'inclusió	https://inclusio.upc.edu/ca/compromis-upc/responsables-dinclusio/responsables-dinclusio
E.2.4.10 Third UPC Gender Equality Plan 2016-2020	https://igualtat.upc.edu/ca/shared/third-upc-gender-equality-plan.pdf
E.2.4.11 Sexual harassment information (in catalan)	https://igualtat.upc.edu/ca/drets/assetjament
E.2.4.12 Industrial Practices	http://www.fib.upc.edu/en/empresa/practiques/estudiant.html

E.2.4.13 FIB job bank	http://www.fib.upc.edu/en/empresa/borsa.html
E.2.4.14 FIB VIsiona	https://fibvisiona.com/en
E.2.4.15 FIB Alumni	https://www.fibalumni.net/
E.2.4.16 UPC Alumni	https://alumni.upc.edu/ca
E.3.0.1 Academic regulations for degree and master's students at UPC	https://www.upc.edu/sga/ca/shared/fitxers-normatives/AcademicRegulations_EN/NAGRAMA/acord-prorroga-nagrama-20-21_en_definitiu.pdf
E.3.0.2 FIB Exams regulations (in catalan)	https://www.fib.upc.edu/sites/fib/files/documents/actes/propostareglamentexamensqualificacions.pdf
E.3.0.3 FIB Protocol on fraudent acts (in catalan)	https://www.fib.upc.edu/sites/fib/files/documents/actes/protocol_fraus_actes_avaluacio_cp.pdf
E.3.0.4 UPCcommons repository of exams	https://upcommons.upc.edu/handle/2117/134985
E.3.0.5 GEI exams calendar	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering/exams
E.3.0.6 MEI exams calendar	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering/exams
E.3.0.7 MIRI exams calendar	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics/exams
E.3.0.8 MAI exams calendar	https://www.fib.upc.edu/en/studies/masters/master-artificial-intelligence/exams
E.4.1.1 GEI Academic Staff	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering/faculty

E.4.1.2 MEI Academic Staff	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering/faculty
E.4.1.3 MIRI Academic Staff	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics/faculty
E.4.1.4 MAI Academic Staff	https://www.fib.upc.edu/en/studies/masters/master-artificial-intelligence/faculty
E.4.1.5 FIB scientific production of UPC researchers	http://futur.upc.edu/FIB
E.4.1.6 Project participation of UPC academic staff (restricted access)	https://drive.google.com/drive/folders/1hwEuu7Qc4Y19TfGEk1G6EMjcBp6Xkpp1?usp=sharing (restricted)
E.4.1.7 FUTUR UPC Researchers' Scientific Production Portal	https://futur.upc.edu/mapes_coneixement
E.4.1.8 Bibliometric Studies	https://bibliotecnica.upc.edu/en/brgf/serveis/estudis-bibliometrics
E.4.1.9 Estudi comparatiu de la publicació científica en l'àmbit de la informàtica a la UPC vs. altres universitats d'àmbit nacional i internacional (2007-2017)	http://hdl.handlhttp://hdl.handle.net/2117/22885e.net/2117/22885
E.4.1.10 recerTIC UPC - Computer security	<https://bibliotecnica.upc.edu/brgf/serveis/estudis-bibliometrics/estudi-comunicacio-cientifica-upc-computer-security
E.4.1.11 recerTIC UPC - Machine learning	https://bibliotecnica.upc.edu/brgf/serveis/estudis-bibliometrics/estudi-comunicacio-cientifica-upc-machine-learning
E.4.1.12 recerTIC UPC - Bioinformatics	https://bibliotecnica.upc.edu/brgf/serveis/estudis-bibliometrics/estudi-comunicacio-cientifica-upc-bioinformatics
E.4.1.13 recerTIC UPC - Data science and engineering	https://bibliotecnica.upc.edu/brgf/serveis/estudis-bibliometrics/estudi-comunicacio-cientifica-upc-data-science-engineering
E.4.1.14 recerTIC UPC - Robotics	https://bibliotecnica.upc.edu/brgf/serveis/estudis-bibliometrics/estudi-comunicacio-cientifica-upc-robotics

E.4.2.1 ICE website	https://www.ice.upc.edu/ca/professorat-upc/formacio-continuada/formacio-per-a-la-docencia
E.4.2.2 ICE courses 2016-2019, Academic FIB participation, English courses 2016-2019 (Restricted access)	https://drive.google.com/drive/folders/1-wsGiv4Oa2RIXfrssTwOnuPxsj0LKeDV?usp=sharing
E.4.2.3 Staff training and development (in catalan)	https://www.upc.edu/sdp/ca/formacio-del-pas
E.4.3.1 FIB students satisfaction survey 2016-2017	https://www.upc.edu/portaldades/ca/enquestes/estudiantat/enquestes-de-satisfaccio-als-estudiants-acreditacio-titulacions/2016-2017/270_01.pdf
E.4.3.2 FIB Academic staff satisfaction survey 2017-2018	https://www.upc.edu/portaldades/ca/enquestes/pdi/2017-18/fib.xlsx
E.4.3.3 FIB Masters postgraduates satisfaction survey 2018-2019	https://www.upc.edu/portaldades/ca/enquestes/estudiantat/enquesta-de-satisfaccio-de-titulats/titulats-de-master/2018-19/fib.pdf
E.4.3.4 FIB staff satisfaction survey 2018-2019	???
E.4.3.5 Teaching Classrooms	https://www.fib.upc.edu/en/fib/rooms/teaching-classrooms
E.4.3.6 Campus Nord Hybrid Classrooms	https://www.fib.upc.edu/en/fib/it-services/campus-nord-hybrid-classrooms
E.4.3.7 FIB Computer Labs	https://www.fib.upc.edu/en/fib/rooms/computer-labs
E.4.3.8 FIB Annual Report 2018-2019	https://www.fib.upc.edu/sites/fib/files/documents/fib/memoria-2018-2019-definitiva-br.pdf
E.4.3.9 FIB IT Services	https://www.fib.upc.edu/en/fib/it-services
E.4.3.10 FIB Teaching laboratories	https://www.fib.upc.edu/en/fib/rooms/teaching-laboratories
E.4.3.11 Library survey of FIB students for 2018-19 academic year	https://www.upc.edu/portaldades/ca/enquestes/biblioteques/informes/2018-19/centres/fib.pdf
E.4.3.12 FIB Academic Works	https://upcommons.upc.edu/handle/2099.1/1441
E.4.3.13 Report on FIB Academic Works deposited in UPCcommons	https://bibliotecnica.upc.edu/en/brgf/serveis/treballs-academics-fib

E.4.3.14 UPCommons. Portal del coneixement obert de la UPC	https://upcommons.upc.edu/
E.4.3.15 Observatorio del sistema universitario	https://www.observatoriuniversitari.org/es/files/2017/11/Quien-financia-la-universidad.pdf
E.4.3.16 UPC Budget for 2021	https://www.upc.edu/ca/la-upc/la-institucio/fets-i-xifres/pressupost
E.5.0.1 GEI website	https://www.fib.upc.edu/en/studies/bachelors-degrees/bachelor-degree-informatics-engineering
E.5.0.2 Masters website	http://www.fib.upc.edu/en/masters.html
E5.0.3 Atenea	https://www.upc.edu/atenea/servei-atenea
E.5.0.4 Racó	https://raco.fib.upc.edu/cas/login?locale=en_US
E.5.0.5 Media FIB channel	http://media.fib.upc.edu/fibtv/
E.5.0.6 YouTube channel	https://www.youtube.com/user/mediafib
E.5.0.7 FIB Twitter	https://twitter.com/fib_upc
E.5.0.8 FIB Facebook	https://www.facebook.com/fib.upc
E.5.0.9 FIB Instagram	https://www.instagram.com/fib.upc/
E.5.0.10 Custom point of contact for the FIB community	https://peticions.utgcntic.upc.edu
E..5.0.11 VSMA website	http://www.upc.edu/seguimentdetitulacions
E.5.0.12 FIB website of the school's quality system	https://www.fib.upc.edu/ca/la-fib/sistema-de-qualitat
E.5.3.1 GEI Academic Regulations (in catalan)	https://www.fib.upc.edu/ca/estudis/graus/grau-en-enginyeria-informatica/normativa-academica
E.5.3.2 MEI Academic Regulations	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering/academic-regulations
E.5.3.3 Academic Regulations for MIRI master Thesis	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics/academic-regulations

E.5.3.4 Academic Regulations for MAI master Thesis	https://www.fib.upc.edu/en/studies/masters/master-artificial-intelligence/academic-regulations
E.6.0.1 FIB QAS (in catalan, curren appoved version)	https://www.fib.upc.edu/sites/fib/files/documents/fib/270.saiq.pdf
E.6.0.2 FIB Management report 19-20 (approved at School Board))	https://www.fib.upc.edu/sites/fib/files/documents/actes/jf20201216_p4_informegestio_19-20_v3.pdf
E.6.0.3 FIB updated QAS (in catalan)	
E.I.2 Spanish Computer Olympic	https://olimpiada-informatica.org/
E.I.3 FIB MEI Industrial Modality	https://www.fib.upc.edu/en/studies/masters/master-informatics-engineering-industrial-modality
E.I.4 FIB MIRI ADSDB	https://www.fib.upc.edu/en/studies/masters/master-innovation-and-research-informatics/curriculum/syllabus/ADSDB-MIRI
E.I.5 FIB MIRI seminars	https://raco.fib.upc.edu/seminaris/GestioAlumnesSeminaris
E.I.7 FIB Covid Support	https://www.fib.upc.edu/en/date-information-about-covid-19