

## **ETSETB Academic Regulations for MET and MEE Master Degrees**

This document is a translation of the original Catalan version of the academic regulations for master degree courses at the ETSETB.

The Catalan version is the only legally valid document for the purposes of regulation and enforcement.

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## 1. Admission and enrolment

### 1.1. Weighting of applicants' records

If there are more applications than places, they will be weighted according to the following admission mark:

**Admission mark = Origin + Academic record + CV**

where:

#### **Origin: Student's degree that grants access to MET master**

ORIGIN	MARK
Degree requiring no bridge subjects	1.5
Telecommunication Engineering Degree (officially recognised in Spain)	1.5
Degree qualifying the holder to exercise the profession of Technical Telecommunication Engineer and requiring bridge subjects	1
Technical Telecommunication Engineering Degree	0.75
Other degrees	0

#### **Origin: Student's degree that grants access to MEE master**

ORIGIN	MARK
Degree in Electronic Systems Engineering	1.5
Degree in Automation and Industrial Electronic Engineering or equivalent	1.5
Electronic Engineering Degree (officially recognised in Spain)	1.5
Telecommunication Engineering Degree (officially recognised in Spain)	1.5
Degree in Science and Telecommunication Technologies Engineering or equivalent	1.25
Degree qualifying the holder to exercise the profession of Technical Telecommunication Engineer with other specialities not mentioned previously.	1.25
Technical Telecommunication Engineering Degree	1
Technical Industrial Engineering specializing in Industrial Electronics	1

Other engineering degrees	0,5
Other degrees	0

### Academic record: global mark of the academic record

In accordance with the provisions of Point 4.5 of Annex I of RD 1044 of 1 August 2003, which establishes the procedure for the issue of the European Diploma Supplement by universities, and the provisions of Article 5.3 of Royal Decree 1125/2003, which defines the European Credit Transfer System and the grading system for official university degree courses, the academic records of master's degree holders are weighted using the following ratio:

- The total number of credits obtained, each multiplied by the value of the corresponding mark and divided by the number of credits obtained. Recognised credits with no attached mark will not be considered for the purposes of weighting student records.

ECTS scale	A	B	C	D	D
International qualitative	Distinction	Excellent	Good	Pass	Pass
Spanish qualitative	Matrícula de honor	Sobresaliente	Notable	Bien	Suficiente
Spanish quantitative		mark $\geq$ 9	9>mark $\geq$ 7	7>mark $\geq$ 6	6>mark $\geq$ 5
POINTS	4	3	2	1	1

### CV (Curriculum Vitae):

The Masters Academic Committee will assess the following points: job experience, additional studies and other languages. The assessment will carry a score of between 0 and 1.

Once the applicants have been classified according to the evaluation criteria above, as many applicants as places available will be admitted, in strict order of priority. Should there be any withdrawals, the next applicants on the list will be admitted, again according to their order of merit.

The Masters Academic Committee may exceptionally admit a larger number of applicants from those anticipated in the considered period, due to the special quality of

the CVs of the applicants or for the school's own strategic reasons, always depending on the means available for providing teaching of the highest quality.

## 1.2. Order of enrolment

### **New students:**

The order of registration of new students follows the criterion of the "Admission mark" described in the previous section.

### **Students already enrolled once:**

The order of registration of students who have already enrolled once will be according to the following criteria:

A)

#### **Enrolment mark = Average mark of enrolled ECTS credit in the preceding semester**

All enrolled ECTS credits will be taken into account to compute the average: passed and failed. "Non Presented" subjects will not be taken into account in the computation of the average.

B) In case of a tie, according A)

#### **Enrolment mark = Admission mark**

C) In case of a tie, according A) and B)

#### **Alphabetic order: Name + Surname**

## 1.3. Enrolment conditions

Students are responsible for arranging their own enrollment for courses.

To ensure compatibility of schedules, students should not register for courses with overlapping schedules.

Should students fail to comply with the above condition because of overlapping schedules and/or evaluation commitments, they are not entitled to any change of date or alteration of assessment commitments already scheduled in the syllabus of the enrolled subjects.

### **Changes in enrolled courses:**

The ETSETB sets the period for the submission of applications to change enrolled courses, this period being within the first five weekdays of the academic term.

Limitations: Students may only submit one application for enrolment changes affecting all subjects in which the student is enrolled. Changes that may compromise the continuity of subjects in which only a few students are enrolled will not be accepted.

**Students with job contract:**

In order to obtain priority in the order in which a class group is chosen, students who are currently employed must submit a Social Security Treasury Certificate to the Secretary of the ETSETB at least two working days before the starting date of the corresponding period of enrolment.

Prioritization in the choice of class group will only affect those students with a valid work contract consisting of at least twenty hours per week Monday to Friday. Students with educational cooperation agreements (internships in companies) will not be entitled to prioritization.

## 2. Academic performance requirements

Students enrolled in MET and MEE masters should fulfil the following minimum requirements:

- Obtain at least 15 ECTS credits the first academic year (2 semesters), such credits to include all the ECTS credits awarded during the studies for which the student is enrolled. Adapted or recognized ECTS credits will not be taken into account.
- The maximum period in which one student can be enrolled in the master is 8 academic years.

Students who fail to achieve the minimum required academic performance will be asked to withdraw from the program.

### 3. Credit recognition tables between degrees of the former academic structure and the current master degrees

*Credit recognition* is granted by the school or university research institute for credits obtained in former official university courses, which will then count towards the total credits required for award of the official master's degree. This recognition requires proof of equivalence of specific and/or transversal skills and student workload as regards subjects in courses leading to official degrees.

One subject can only recognize another subject as a maximum.

**In all cases, the maximum number of credits that can be recognized is 60 ECTS.**



### 3.1. Subject recognition from Telecommunication Engineering to MET

Subject recognition for students holding a degree in Telecommunications Engineering (officially recognised in Spain) consists of 60 ECTS, preferably the 9 compulsory subjects, and 3 elective subjects to be chosen from the options detailed below:

<b>MET compulsory subject</b>	<b>ECTS</b>	<b>ETSETB Telecommunication Engineering subject</b>	<b>Credits</b>
Advanced communications for wireless systems	5	Signal processing	6
Communication networks	5	Communication networks, systems and services	6
Communication networks	5	Telematics laboratory II + Telematics laboratory III	3 + 3
Electronic instrumentation and optoelectronics	5	Electronic instrumentation	6
Electronic system design for communications	5	Circuit design and electronic systems	6
Innovation-based service management	5	Business administration	4.5
Management of telecommunication projects and companies 2	5	Thesis I	6
Overlay networks	5	Data transmission	6
Overlay networks	5	Telematics laboratory II + Telematics laboratory III	3 + 3
Overlay networks	5	Communication networks, systems and services	6
Telecommunication systems	5	Telecommunication systems	3
Wireless communication links and antennas	5	Antennas	6

Wireless communication links and antennas	5	Communications laboratory II + Communications laboratory III	3 + 3
Wireless communication links and antennas	5	Communications laboratory III + Communications laboratory IV	3 + 3

MET elective subject	ECTS	ETSETB Telecommunication Engineering subject	Credits
Advanced mobile communications	5	Multimedia mobile communications	6
Advanced mobile communications	5	Radio communications	6
Advanced fibre optical communications	5	Optical communications	6
Advanced fibre optical communications	5	Optical fibre telecommunications	6
Data transmission protocols	5	Data transmission	6
Digital image and video processing	5	Image processing	6
Digital image and video processing	5	Speech processing	6
Distributed systems, Internet and web technologies	5	Concurrent programming	6
Electronics for communications systems (Bridge)	5	Circuits for communications	6
Machine learning	5	Pattern classification	6
Microwave, terahertz and photonic technologies	5	RF circuits and microwaves	6
Microwave, terahertz and photonic technologies	5	Microwaves	6
Network security	5	Cryptography and network security	6

Radar and radionavigation systems	5	Radar	6
Radar and radionavigation systems	5	Radionavegation	6
Remote sensing systems for Earth observation	5	Teledetection	6
Wireless access networks	5	Cellular access networks	6
Wireless access networks	5	Mobile systems: 3G and beyond	6

### 3.2. Subject recognition from Electronic Engineering to MET

Subject recognition for students holding a degree in Electronic Engineering (officially recognised in Spain) consists of 45 ECTS in the following 9 subjects:

MET subject	ECTS	ETSETB Electronic Engineering subject	Credits
Advanced analog circuit techniques	5	Analog integrated design	6
Advanced digital systems	5	Digital systems II	6
Electronic instrumentation and optoelectronics	5	Electronic instrumentation	6
Electronics for communications systems (Bridge)	5	Circuits for communications	6
Instrumentation and sensors	5	Electronic engineering applications I	6
Micro- and nano-electronic design	5	Microelectronic design I	6
Micro- and nano-technologies	5	Electronic and photonic devices II	6
Power control and processing	5	Electronic engineering applications II	6
Systems based on microprocessors (Bridge)	5	Digital systems I	6

### 3.3. Subject recognition from Electronic Engineering to MEE

Subject recognition for students holding a degree in Electronic Engineering (officially recognised in Spain) consists of 60 ECTS in 7 compulsory subjects and the 5 elective subjects to be chosen from the following table:

MEE Compulsory subject	ECTS	ETSETB Electronic Engineering subject	Credits
Advanced digital systems	5	Digital systems II	6
Instrumentation and sensors	5	Electronic engineering applications I	6
Innovation based service management	5	Business administration	6
Micro- and nano-electronic design	5	Microelectronic design I	6
Micro- and nano-technologies	5	Electronic and photonic devices II	6
Power control and processing	5	Electronic engineering applications II	6
Signal processing	5	Signal processing	6

MEE elective subject	ECTS	ETSETB Electronic Engineering subject	Credits
Advanced control of sensors and actuators	5	Micro- and nano-sensors and actuators	6
Advanced control of sensors and actuators	5	Sensors, actuators and microcontrollers in mobile robots	6
Alternating current energy converters: design, control and applications	5	Alternating-current energy converters: design, DSP control and applications	6
Analog and mixed-signal system-on-chip design	5	Analog integrated design	6
Biomedical instrumentation design	5	Bioengineering	6

Control theory and applications (Bridge)	5	Electronic control systems + Electronic equipment	6 + 6
Custom smart adaptive systems	5	Intelligent systems	6
Electronic devices modelling	5	High-frequency and optoelectronic devices	6
Electronic devices modelling	5	Micro- and nano-technologies	6
Electronics for communications systems (Bridge)	5	Circuits for communications	6
Electronics instrumentation systems for marine applications	5	Oceanographic and aerospace instrumentation systems	6
EMC in electronic design	5	Electromagnetic compatibility	6
EMC in electronic design	5	Electromagnetic compatibility in control and power systems	6
Energy management for distributed and integrated systems	5	Energy management for information and communication systems	6
Energy management for distributed and integrated systems	5	On-chip power management circuits	6
Introduction to microelectronic technologies (Bridge)	5	Electronic and photonic devices I	6
MEMS. Microelectromechanical systems	5	Microsystems and nanosystems	6
Microwave circuits (bridge)	5	High frequency circuits	6
Modelling, simulation and control of power electronic systems	5	Modelling, simulation and control of power electronic systems	6

Photovoltaic systems	5	Introduction to photovoltaic solar energy	6
Photovoltaic systems	5	Photovoltaic systems	6
Power control for renewable energy systems	5	Power control for renewable energy systems	6
Programmable electronics (Bridge)	5	Digital systems I	6
Programmable electronics (Bridge)	5	Electronic systems for information processing. Microprocessors and DSPs	6
Radiofrequency integrated circuits and systems	5	Circuits for communications	6
Radiofrequency integrated circuits and systems	5	RF communication systems-on-chip	6
Sensors, Instruments and measurement systems (Bridge)	5	Electronic instrumentation	6
System-on-chip physical design	5	Advanced EDA methodologies and tools for integrated circuits	6
System-on-chip physical design	5	Physical implementation of nanometer integrated systems	6
Ultrasonic systems. Instrumentation and applications	5	Ultrasonic systems. Instrumentation and applications	6

### 3.4. Subject recognition from Telecommunication Engineering to MEE

Subject recognition for students holding a degree in Telecommunications Engineering (officially recognised in Spain) consists of 35 ECTS in the 7 following subjects:

MEE subject	ECTS	ETSETB Telecommunication Engineering subject	Credits
Electronics for communications systems (Bridge)	5	Circuits for communications	6
Innovation based service management	5	Business administration	4,5
Management of telecommunication projects	5	Thesis I	6
Micro- and nano-electronic design	5	Circuit design and electronic systems	6
Microwave circuits (Bridge)	5	Microwaves	6
Sensors, instruments and measurement systems (Bridge)	5	Electronic instrumentation	6
Signal processing	5	Signal processing + Communications laboratory II	6 + 3



#### 4. Credit adaptation tables between degrees of the former academic structure and the current master degrees

##### 4.1. Subject adaptation from Electronic Engineering to MEE

MEE compulsory subject	ECTS	ETSETB Electronic Engineering subject	Credits
Advanced digital systems	5	Digital systems II	6
Instrumentation and sensors	5	Electronic engineering applications I	6
Innovation based service management	5	Business administration	6
Micro- and nano-electronic design	5	Microelectronic design I	6
Micro- and nano-technologies	5	Electronic and photonic devices II	6
Power control and processing	5	Electronic engineering applications II	6
Signal processing	5	Signal processing	6

MEE elective subject	ECTS	ETSETB Electronic Engineering subject	Credits
Advanced control of sensors and actuators	5	Micro- and nano-sensors and actuators	6
Advanced control of sensors and actuators	5	Sensors, actuators and microcontrollers in mobile robots	6
Alternating current energy converters: design, control and applications	5	Alternating-current energy converters: design, DSP control and applications	6
Analog and mixed-signal system-on-chip design	5	Analog integrated design	6
Biomedical instrumentation design	5	Bioengineering	6

Control theory and applications (Bridge)	5	Electronic control systems + Electronic equipment	6 + 6
Custom smart adaptive systems	5	Intelligent systems	6
Electronic devices modelling	5	High-frequency and optoelectronic devices	6
Electronic devices modelling	5	Micro and nanotechnologies	6
Electronics for communications systems (Bridge)	5	Circuits for communications	6
Electronics instrumentation systems for marine applications	5	Oceanographic and aerospace instrumentation systems	6
EMC in electronic design	5	Electromagnetic compatibility	6
EMC in electronic design	5	Electromagnetic compatibility in control and power systems	6
Energy management for distributed and integrated systems	5	Energy management for information and communication systems	6
Energy management for distributed and integrated systems	5	On-chip power management circuits	6
Introduction to microelectronic technologies (Bridge)	5	Electronic and photonic devices I	6
MEMS. Microelectromechanical systems	5	Microsystems and nanosystems	6
Microwave circuits (bridge)	5	High frequency circuits	6
Modelling, simulation and control of power electronic systems	5	Modelling, simulation and control of power electronic systems	6
Photovoltaic systems	5	Introduction to photovoltaic solar energy	6
Photovoltaic systems	5	Photovoltaic systems	6

Power control for renewable energy systems	5	Power control for renewable energy systems	6
Programmable electronics (Bridge)	5	Digital systems I	6
Programmable electronics (Bridge)	5	Electronic systems for information processing. Microprocessors and DSPs	6
Radiofrequency integrated circuits and systems	5	Circuits for communications	6
Radiofrequency integrated circuits and systems	5	RF communication systems-on-chip	6
Sensors, Instruments and measurement systems (Bridge)	5	Electronic instrumentation	6
System-on-chip physical design	5	Advanced EDA methodologies and tools for integrated circuits	6
System-on-chip physical design	5	Physical implementation of nanometer integrated systems	6
Ultrasonic systems. Instrumentation and applications	5	Ultrasonic systems. Instrumentation and applications	6

#### 4.2. Subject adaptation from former MEE to current MEE

Current MEE compulsory subject	ECTS	Former MEE subject	ECTS
Advanced digital systems	5	Digital systems II	5
Advanced digital systems	5	High-level digital design	5
Instrumentation and sensors	5	Electronic engineering applications I	5
Innovation based service management	5	Business administration	5
Micro- and nano-electronic design	5	Microelectronic design I	5
Micro and nanotechnologies	5	Electronic and photonic devices II	5
Power control and processing	5	Electronic engineering applications II	5
Signal processing	5	Signal processing	5

Current MEE elective subject	ECTS	Former MEE subject	ECTS
Advanced control of sensors and actuators	5	Micro- and nano-sensors and actuators	5
Advanced control of sensors and actuators	5	Sensors, actuators and microcontrollers in mobile robots	5
Alternating current energy converters: design, control and applications	5	Alternating-current energy converters: design, DSP control and applications	5
Analog and mixed-signal system-on-chip design	5	Analog integrated design	5
Biomedical instrumentation design	5	Bioengineering	5

Control theory and applications (Bridge)	5	Electronic control systems + Electronic equipment	5 + 5
Custom smart adaptive systems	5	Intelligent systems	5
Electronic devices modelling	5	High-frequency and optoelectronic devices	5
Electronic devices modelling	5	Micro- and nano-technologies	5
Electronics for communications systems (Bridge)	5	Circuits for communications	5
Electronics instrumentation systems for marine applications	5	Oceanographic and aerospace instrumentation systems	5
EMC in electronic design	5	Electromagnetic compatibility	5
EMC in electronic design	5	Electromagnetic compatibility in control and power systems	5
Energy management for distributed and integrated systems	5	Energy management for information and communication systems	5
Energy management for distributed and integrated systems	5	On-chip power management circuits	5
Introduction to microelectronic technologies (Bridge)	5	Electronic and photonic devices I	5
MEMS. Microelectromechanical systems	5	Microsystems and nanosystems	5
Microelectronic design II (elective subject without teaching)	5	Microelectronic design II	5
Microwave circuits (bridge)	5	High frequency circuits	5

Modelling, simulation and control of power electronic systems	5	Modelling, simulation and control of power electronic systems	5
Photovoltaic systems	5	Introduction to photovoltaic solar energy	5
Photovoltaic systems	5	Photovoltaic systems	5
Power control for renewable energy systems	5	Power control for renewable energy systems	5
Power electronic circuits (bridge)	5	Electronic equipment	5
Programmable electronics (Bridge)	5	Digital systems I	5
Programmable electronics (Bridge)	5	Electronic systems for information processing. Microprocessors and DSPs	5
Radiofrequency integrated circuits and systems	5	Circuits for communications	5
Radiofrequency integrated circuits and systems	5	RF communication systems-on-chip	5
Sensors, Instruments and measurement systems (Bridge)	5	Electronic instrumentation	5
System-on-chip physical design	5	Advanced EDA methodologies and tools for integrated circuits	5
System-on-chip physical design	5	Physical implementation of nanometer integrated systems	5
Ultrasonic systems. Instrumentation and applications	5	Ultrasonic systems. Instrumentation and applications	5

## 5. Recognition of credits for professional experience

It is possible for recognition to be given to elective ECTS credits for duly accredited professional experience. The maximum number of recognized ECTS credits is 15.

The recognition criterion is defined in the academic regulations for master's degree courses of the UPC.

Students should provide:

- An official record of employment confirming the contractual relationship between the student and the company in which the professional experience was acquired.
- A document issued by the company outlining the work carried out by the student and the period in which this work was carried out.

Masters MET and MEE provide the possibility of elective credit recognition by performing internships in companies or laboratories. The academic load of these internships correspond to 15 ECTS credits and they are regulated in the academic regulations for master's degree courses of the UPC.

Students may choose only one of the two options: recognition of credits for professional experience or for internship.

Should credits for previously studied subjects be eligible for recognition, the maximum amount of recognized credits including subjects and duly accredited professional experience is 60 ECTS.

Masters MET and MEE provide the possibility of performing research stays in universities, research institutes and companies. In order to get recognition of these stays, students should enrol subjects named "Introduction to research".

## 6. Bridge subjects

These subjects correspond to the 120 ECTS of the master's degree programmes and should be studied by those students whose access profile is not in complete compliance with the optimum access profile.

The Masters Academic Committee will analyse the academic background of each applicant student and will determine which bridge subjects he or she has to enrol.



## **7. Additional bridge courses to be followed by students admitted to MET or MEE**

The UPC requires that those students with an admission profile corresponding to a Spanish three-year diploma course (*enginyeria tècnica o diplomatura*), and who enrol for master's degree that provides access to a regulated profession, are obliged to obtain an 30 additional ECTS credits that are not included in the 120 ECTS of the master.

Therefore, students enrolling for a Master in Telecommunication Engineering (MET), and who hold an admission degree in Telecommunication technical engineering or Electronic technical engineering, will be required to obtain 30 ECTS credits in the Bachelor's degree in science and technologies of telecommunications. Subjects will depend on the student profile.

The Master in Electronic Engineering (MEE) does not provide access to a regulated profession, so students are not required to obtain these additional credits.

In exceptional circumstances, the Masters Academic Committee will consider the possibility of allowing access to students with admission profiles different from the typical ones. In such cases, additional ECTS credits not included in the 120 ECTS of the master may be required.

These bridging courses that students are required to study will belong to one of the degrees taught at the ETSETB and will consist of a maximum of 30 ECTS credits. The number of credits and the subjects to be taken will vary depending on the admission degree and the student's academic record.

While for the purposes of the enrolment fee, these additional ECTS credits consist of bachelor's degree credits, they will be regarded as master's degree credits.

## 8. Tutor assignment procedure

All students admitted to a master's degree course will be assigned an academic tutor.

Tutors are faculty members selected from among those teaching master courses according to a round-robin system, with the aim that each faculty member be assigned a similar number of students.

The tutor assignment procedure is as follows:

- When students are accepted for an MEE master, they will be assigned a tutor from the Electronic Engineering Department.
- When students are accepted for an MET master, they will be asked which intensification they wish to study: communications, networks, multimedia or electronics.
- Should students know what intensification they wish to study, they will be assigned a tutor according to the following criterion:
  - Communication or multimedia intensifications: assignment of a tutor from the Signal Theory and Communications Department.
  - Networks intensification: assignment of a tutor from the Telematics Engineering Department.
  - Electronics intensification: assignment of a tutor from the Electronic Engineering Department.
- Should students be undecided about the intensification they wish to study, they will be assigned a tutor from any department.
- The ETSETB will notify students of the name and email of their tutors to enable consultation on academic matters during the enrolment procedure.
- At the time of the official enrolment, the ETSETB will ask students again about the intensification they wish to study, and will change the tutor if he or she is not suitable for the intensification chosen by the student, according to the above criteria.
- The tutors' names will subsequently be posted on the ETSETB computer system.

### 8.1. Tutor tasks

- Guidance on the total number of credits and specific subjects that each student must take.
- Monitoring of academic progress.