Annexes to ETSETB Academic Regulations for MET and MEE Master Degrees

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Annex 1: Admission profiles

Typical admission profiles for MET:

- Bachelor's degree in Telecommunication Technologies and Services Engineering.
- Bachelor's degree in Science and Telecommunications Technologies.
- Bachelor's degree in Audiovisual Systems Engineering.
- Bachelor's degree in Electronic Systems Engineering.
- Bachelor's degree in Telecommunications Systems Engineering.
- Bachelor's degree in Telematics Engineering.
- Five-year degree in Telecommunications Engineering (Enginyer Superior de Telecomunicació): 60 ECTS credits can be recognised.
- Five-year degree in Electronic Engineering (Enginyer Superior Electrònic): 45 ECTS credits can be recognised.
- Diploma in Telecommunications Engineering (Enginyer Tècnic de Telecomunicació): students must pass additional bridging courses with a load of 30 ECTS credits.
- Diploma in Electronic Engineering (Enginyer Tècnic Electrònic): students must pass additional bridging courses with a load of 30 ECTS credits.

Admission profiles for MET in accordance with the Master's Academic Committee criterion:

- Bachelor's degree in Engineering Physics: additional bridging courses with a maximum load of 60 ECTS credits must be passed, depending on the specialization of the applicant.
- Bachelor's degree or five-year degree in Physics: additional bridging courses with a maximum load of 60 ECTS credits must be passed, depending on the specialization of the applicant.
- Bachelor's degree or five-year degree in Software Engineering, Computer Engineering, Informatics Engineering or similar: students must pass additional bridging courses with a maximum load of 60 ECTS credits, depending on the specialization of the applicant.

Typical admission profiles for MEE:

- Bachelor's degree in Engineering of Electronic Systems.
- Bachelor's degree in Engineering Physics.
- Bachelor's degree in Automatics and Industrial Electronics Engineering.
- Bachelor's degree in Science and Telecommunications Technologies.
- Bachelor's degree in Engineering of Telecommunications Systems.
- Bachelor's degree in Engineering of Audio-visual Systems.
- Bachelor's degree in Telematics Engineering.

- Five-year degree in Electronic Engineering (Enginyer Superior Electrònic): 60 ECTS credits can be recognised.
- Five-year degree in Telecommunications Engineering (Enginyer Superior de Telecomunicació): 35 ECTS credits can be recognised.
- Diploma in Telecommunications Engineering (enginyer tècnic de telecomunicació): additional 30 ECTS credits must be passed.
- Diploma in Electronic Engineering (enginyer tècnic en electronica): an additional 30 ECTS credits must be passed.

Admission profiles for MEE in accordance with the Master's Academic Committee criterion:

- Bachelor's degree or five-year degree in Physics: students must pass additional bridging courses with a maximum load of 60 ECTS credits, depending on the specialization of the applicant.

Annex 2: English language requirements

Candidates are required to provide accreditation of English language proficiency at Common European Framework English level B2.2.

Conditions of certification established by the Master's Academic Committee:

- To have English as the native language.
- To have studied in an English-speaking country (1 semester at least).
- To have studied a University academic program imparted in English (1 semester at least).
- To hold a European Higher Education Area degree that includes English level B2.
- English language certificate:
  - Cambridge: FCE.
  - TOEFL PBT >= 567; CBT >= 227; IBT >= 87.
  - IELTS: 5.5.
  - TOEIC: 750.
- Escuela Oficial de Idiomas: Certificado de nivel avanzado (Level 5).
- To obtain a B2 English certificate at the UPC:
  - Language services and resources at the UPC.
  - Merit School.

Annex 3: Bridge Subjects

MET bridge subjects

The MET bridge subjects are as follows:

- Antennae and microwaves (AAM)
- Data transmission protocols (DTP)
- Digital communications (DC)
- Electronics for communications systems (ECS) (shared with MEE)
- Signal processing (SIGPRO)
- Systems based on microprocessors (SBMIC) (shared with MEE)
- Telecommunication systems fundamentals (TSF)

Required bridge subjects for most common access profiles to MET:

Admission profile	Bridging subjects
• Bachelor's degree in audiovisual systems engineering	• Antennae and microwaves (AAM) • Digital communications (DC) • Data transmission protocols (DTP) • Electronics for communications systems (ECS) • Telecommunication systems fundamentals (TSF)
• Bachelor's degree in telecommunication systems engineering	• Data transmission protocols (DTP) • Electronics for communications systems (ECS)
• Bachelor's degree in electronic systems engineering	• Antennae and microwaves (AAM) • Digital communications (DC) • Data transmission protocols (DTP) • Signal processing (SIGPRO) • Telecommunication systems fundamentals (TSF)

• Bachelor's degree in telematics engineering	• Antennae and microwaves (AAM) • Digital communications (DC) • Electronics for communications systems (ECS) • Telecommunication systems fundamentals (TSF) • Signal processing (SIGPRO) or Systems based on microprocessors (SBMIC), based on the intensification that the student wishes to enrol
• Electronic engineering	• Antennae and microwaves (AAM) • Digital communications (DC) • Data transmission protocols (DTP) • Telecommunication systems fundamentals (TSF)

Mapping between subjects of the science and technologies of telecommunications degree (Cittel) and the second cycle of MET telecommunication engineering bridge subjects

Students currently enrolled in a program different from:

- Degree in science and technologies of telecommunications (Cittel)
- Second cycle of Telecommunication engineering

may enrol for elective subjects that will enable them to study bridge subjects on accessing MET. These subjects are as follows:

MET bridge subject	Cittel subject	Telecommunication engineering subject
Antennas and microwaves	Antennas and microwaves	Antennas + Microwaves
Data transmission protocols	Data transmission protocols	Data transmission
Digital communications	Advanced digital communications	Communications I + Communications II
Electronics for communications systems	Electronics for communications	Circuit design and electronic systems
Networks analysis and evaluation	Network performance analysis and evaluation	Communication networks, systems and services
Signal processing	Signal processing for communications and audiovisual systems	Signal processing
Systems based on microprocessors	Electronic systems based on microprocessors	Circuits and electronic systems IV
Telecommunication system fundamentals	Radiocommunications + Wire transmission	Radiocommunications + Optical communications

MEE bridge subjects

MEE bridge subjects are:

- Control theory and applications (CTA).
- Electronics for communications systems (ECS) (shared with MET).
- Introduction to microelectronic technologies (IMT).
- Programmable electronics (PROEL).
- Sensors, instruments and measurement systems (SIM).
- Systems based on microprocessors (SBMIC) (shared with MET).

Required bridge subjects for the most common MEE access profiles:

Admission profile	Bridging subjects
• Bachelor's degree in science and technologies of telecommunications	• Control theory and applications (CTA) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL) • Sensors, instruments and measurement systems (SIM)
• Bachelor's degree in engineering of audiovisual systems	• Control theory and applications (CTA) • Electronics for communications systems (ECS) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL) • Sensors, instruments and measurement systems (SIM)
• Bachelor's degree in telecommunications systems engineering	• Control theory and applications (CTA) • Electronics for communications systems (ECS) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL) • Sensors, instruments and measurement systems (SIM)
• Bachelor's degree in telematics engineering	• Control theory and applications (CTA) • Electronics for communications systems (ECS) • Introduction to microelectronic technologies (IMT)

	• Programmable electronics (PROEL) • Sensors, instruments and measurement systems (SIM) • Systems based on microprocessors (SBMIC)
• Bachelor's degree in automatics and industrial electronics engineering	• Electronics for communications systems (ECS) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL)
• Telecommunication engineering	• Control theory and applications (CTA) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL)
• Technical telecommunication engineering (speciality of electronic systems)	• Electronics for communications systems (ECS) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL)
• Technical telecommunication engineering (other specialities)	• Control theory and applications (CTA) • Electronics for communications systems (ECS) • Introduction to microelectronic technologies (IMT) • Programmable electronics (PROEL) • Sensors, instruments and measurement systems (SIM)
• Bachelor's degree in engineering physics	• Electronics for communications systems (ECS) • Programmable electronics (PROEL) • Control theory and applications (CTA) • Systems based on microprocessors (SBMIC)

Mapping between subjects of the electronic systems engineering degree and the second cycle of MEE electronic engineering bridge subjects

Students currently enrolled in a program different from Bachelor's Degree in Telecommunication Technologies and Services Engineering (TTSE) speciality in Electronic Systems or Degree in Electronic Systems (to extinguish) may enrol for elective subjects offered in those degrees that are considered equivalent to bridge subjects. These subjects are as follows:

MEE bridge subject	TTSE Speciality in electronic systems	Degree in Electronic Systems
Control theory and applications (CTA)	Electrònica de Potència I Sistemes de Control (EPSC)	Electrònica de Potència (EPOT)
Electronics for communications systems (ECS)	Electrònica de Comunicacions (ECOMSE)	Electrònica de Comunicacions (ECOMSE)
Introduction to microelectronic technologies (IMT)	Fonaments de Micro I NanoTechnologies (FMNT)	Fonaments de Micro I NanoTechnologies (FMNT)
Programmable electronics (PROEL)	Disseny de Sistemes Electrònics Digitals (DSED)	Sistemes Electrònics Programables (SEP)
Sensors, instruments and measurement systems (SIMS)	Instrumentació I Sistemes de Mesura (ISDM)	Instrumentació I Sistemes de Mesura (ISM)
Systems based on microprocessors (SBMIC)	Disseny de Sistemes Basats en Microprocessadors (DSBM)	Sistemes Electrònics Basats en Microprocessadors (SEBM)

Annex 4: Additional bridging courses established by the Master's Academic Committee for admittance to MET

The following courses must be completed by students with non-typical admission profiles for admittance to MET. These courses are additional to the MET 120 ECTS credits and are belong to the Bachelor's Degree in Telecommunication Technologies and Services Engineering. They are taught in Catalan or Spanish:

Admission profile (Diplomas - Enginyeries tècniques)	Additional bridging subjects (Taught in Catalan or Spanish)
• Diploma in telecommunication engineering specializing in telematics • Enginyeria tècnica de telecomunicació especialitat en telemàtica	• Radiació i propagació (RP - 230013) • Comunicacions digitals avançades (CDA SISTEL - 230051) • Electrònica de comunicacions (ECOMSE - 230036) • Processament de senyal audiovisual i de comunicacions (PSAVC - 230092) • Radiocomunicacions (RCOMSISTEL - 230054)
• Diploma in telecommunication engineering specializing in telecommunication systems • Enginyeria tècnica de telecomunicació especialitat en sistemes de telecomunicació	• Radiació i propagació (RP - 230013) • Transmissió de dades (TD - 230093) • Electrònica de comunicacions (ECOMSE - 230036) • Processament de senyal audiovisual i de comunicacions (PSAVC - 230092) • Comunicacions digitals avançades (CDA SISTEL - 230051)
• Diploma in telecommunication engineering specializing in sound and image • Enginyeria tècnica de telecomunicació especialitat en so i imatge	• Radiació i propagació (RP - 230013) • Transmissió de dades (TD - 230093) • Electrònica de comunicacions (ECOMSE - 230036) • Comunicacions digitals avançades (CDA SISTEL - 230051) • Radiocomunicacions (RCOMSISTEL - 230054)
• Diploma in electronic engineering • Enginyeria tècnica electrònica	• Radiació i propagació (RP - 230013) • Comunicacions digitals avançades (CDA SISTEL - 230051) • Transmissió de dades (TD - 230093) • Radiocomunicacions (RCOMSISTEL - 230054) • Processament de senyal audiovisual i de comunicacions (PSAVC - 230092)

Admission profile (Bachelor - Grau - Enginyeries)	Additional bridging subjects (Taught in Catalan or Spanish)
• Degree in engineering physics • Grau en enginyeria física ---------- Semester distribution: 1: AST, DSBM, MICROS, PSAVC, TD 2: AAX, CDA SISTEL, ECOMSE, ANTENES, COMOPT	• Anàlisi i avaluació de xarxes (AAX - 230066) • Antenes (ANTENES - 230053) • Aplicacions i serveis telemàtics (AST - 230020) • Comunicacions digitals avançades (CDA SISTEL - 230051) • Comunicacions òptiques (COMOPT - 230055) • Disseny de sistemes basats en microprocessadors (DSBM - 230091) • Electrònica de comunicacions (ECOMSE - 230036) • Microones (MICROS - 230052) • Transmissió de dades (TD - 230093) • Processament de senyal audiovisual i de comunicacions (PSAVC - 230092)
• Computer engineering • Informatics engineering • Software engineering ---------- Semester distribution: 1: FDE, EM, SSIS, IPAV, CN 2: CSL, ONELE, ICOM, PSAVC, OVNET 3: FISE, RP, DC, IBSM, 2 Networks intensification 4: ECS, AAM, TSF, ACWS, 1 Networks intensification, 1 elective 5: EIO, ESDC, WLA, TSYS, MTP, 1 ELECTIVE 6: TFM	• Fonaments d'electrònica (FDE - 230082) • Circuits i sistemes lineals (CSL - 230084) • Funcions i sistemes electrònics (FISE - 230014) • Electromagnetisme (EM - 230007) • Ones electromagnètiques (ONELE - 230090) • Radiació i propagació (RP - 230013) • Senyals i sistemes (SSIS - 230088) • Introducció a les comunicacions (ICOM - 230018) • Introducció al processament audiovisual (IPAV - 230089) • Processament de senyal audiovisual i de comunicacions (PSAVC - 230092) <u>Bridge subjects (not additional, inside MET's 120 ECTS credits):</u> • Electronics for communication systems (ECS) • Antennae and microwaves (AAM) • Telecommunication systems fundamentals (TSF) • Digital communications (DC)
• Electrònica industrial i automàtica	• Radiació i propagació (RP - 230013) • Introducció a les comunicacions (ICOM - 230018) • Aplicacions i serveis telemàtics (AST - 230020) • Transmissió de dades (TD - 230093) • Processament de senyal audiovisual i de comunicacions (PSAVC - 230092)

Annex 5: Credit recognition tables between Telecommunication Engineering Degrees from other universities and MET

Credit recognition tables established by the Master's Academic Committee between Telecommunication Engineering Degrees of the former academic structure from other universities and MET.

MET Compulsory subject	ECTS	Universidad Autónoma de Madrid Telecommunication Engineering subject	Credits
Advanced communications for Wireless Systems	5	Tratamiento digital señales	9
Communication networks	5	Arquitectura de redes I + Arquitectura de redes II	7.5 + 4.5
Electronic instrumentation and optoelectronics	5	Instrumentación electrónica	6
Electronic design for communications	5	Diseño de circuitos y sistemas electrónicos	6
Innovation based service management	5	Economía general	6
Management of telecommunication projects and companies 2	5	Proyectos	6
Overlay networks	5	Redes, sistemas y servicios	9
Telecommunication systems	5	Sistemas de telecomunicación	6
Wireless communication links and antennas	5	Radiación y radiocomunicación I	6

MET Elective subject	ECTS	Universidad Autónoma de Madrid Telecommunication Engineering subject	Credits
Advanced fibre optical communications	5	Comunicaciones ópticas	9
Advanced mobile communications	5	Comunicaciones móviles	6
Digital Image and Video Processing	5	Temas avanzados en proceso de señales	6
Microwave, terahertz and photonic technologies	5	Transmisión por soporte físico	9
Radar and radionavigation systems	5	Radiación y radiocomunicación II	6
Wireless access networks	5	Temas avanzados en comunicaciones	6

MET Compulsory subject	ECTS	Universidad de Cantabria Telecommunication Engineering subject	Credits
Advanced communications for Wireless Systems	5	Tratamiento digital de señales + Laboratorio de tratamiento de la señal	6 + 3
Communication networks	5	Redes y servicios telemáticos + Laboratorio de telemática	6 + 3
Electronic instrumentation and optoelectronics	5	Instrumentación electrónica de comunicaciones	6
Electronic system design for communications	5	Diseño de circuitos y sistemas electrónicos	7.5

Innovation-based service management	5	Administración y dirección estratégica de empresas o Organización de la producción I o Organización de la producción II	6 4 4
Management of telecommunication projects and companies 2	5	Administración y dirección estratégica de empresas o Organización de la producción I o Organización de la producción II	6 4 4
Overlay networks	5	Transmisión de datos + Laboratorio de transmisión de datos	6 + 4.5
Telecommunication systems	5	Sistemas de telecomunicación	6
Wireless communication links and antennas	5	Antenas y propagación	7.5

MET Elective subject	**ECTS**	**Universidad de Cantabria Telecommunication Engineering subject**	**Credits**
Advanced mobile communications	5	Radioenlaces	6
Advanced optical fibre communications	5	Sistemas de comunicaciones ópticas + Laboratorio de sistemas de comunicaciones ópticas	4,5 + 3
Electronics for communications systems (Bridge)	5	Electrónica de comunicaciones	7,5

Information technology service management	5	Gestión de red	6
Microwave, terahertz and photonic technologies	5	Tecnologías de radiocomunicaciones o Microondas o Tecnologías de radiofrecuencia	6 6 6
Radar and navegation systems	5	Radar	6

MET Compulsory subject	**ECTS**	**Universidad de Zaragoza Telecommunication Engineering subject**	**Credits**
Advanced communications for Wireless Systems	5	Tratamiento digital de la señal + Laboratorio de tratamiento de la señal	6 + 3
Communication networks	5	Redes, sistemas y Servicios de comunicaciones + Laboratorio de telemática	6 + 3
Electronic design for communications	5	Sistemas electrónicos + Electrónica digital	6 + 4.5
Electronic instrumentation and optoelectronics	5	Instrumentación electrónica	6
Innovation-based service management	5	Organización de la producción y gestión de la calidad	6
Management of telecommunication projects and companies 2	5	Proyectos	6
Overlay networks	5	Transmisión de datos +	6 + 3

		Laboratorio de comunicaciones	
Telecommunication systems	5	Arquitectura de redes	6
Wireless communication links and antennas	5	Antenas y propagación + Laboratorio de Alta Frecuencia	6 + 3

MET Elective subject	**ECTS**	**Universidad de Zaragoza Telecommunication Engineering subject**	**Credits**
Advanced mobile communications	5	Radiocomunicaciones o Comunicaciones móviles	6 6
Advanced optical fibre communications	5	Comunicaciones ópticas + Laboratorio de comunicaciones ópticas	6 + 3
Digital Image and Video Processing	5	Tratamiento digital de imagen	6
Electronics for communications systems (Bridge)	5	Electrónica de comunicaciones	6
Introduction to computer vision	5	Visión por computador	6
Microwave, terahertz and photonic technologies	5	Microondas	6
Network security	5	Criptografía y seguridad en comunicaciones	6
Radar and radionavigation systems	5	Sistemas radar o Sistemas de Radionavegación	6 6
Speech technologies	5	Tecnologías de la voz	6
Wireless networks	5	Redes de acceso celular	6

Those students holding a **dual degree** in Telecommunication Engineering from the Universitat Politècnica de Catalunya and from the Universidad Católica Andrés Bello should refer to the following compulsory subject recognition table. Elective subjects will be recognized on the basis of those studied at the UPC:

MET Compulsory subject	ECTS	Universidad Católica Andrés Bello Telecommunication Engineering subject	Credits
Advanced communications for wireless systems	5	Procesamiento de señales (UCAB) + Lab. de comunicaciones II (UPC)	3 + 3
Communication networks	5	Telemática (UCAB) + Lab. de telemática III (UPC)	4 + 3
Electronic instrumentation and optoelectronics	5	Instrumentación electrónica (UPC)	6
Electronic system design for communications	5	Diseño de circuitos y sistemas electrónicos (UPC)	6
Innovation-based service management	5	Contabilidad general y de costos (UCAB) + Economía general (UCAB)	3 + 3
Management of telecommunication projects and companies 2	5	Proyecto fin de carrera I (UPC)	6
Overlay networks	5	Transmisión de datos (UCAB) + Lab. de telemática II (UCAB)	4 + 2
Telecommunication systems	5	Sistemas de telecomunicación (UPC)	3
Wireless communication links and antennas	5	Antenas (UCAB) + Lab. de comunicaciones III (UPC)	4 + 3