

INSTITUTO SUPERIOR DE ENGENHARIA DE LISBOA
Departamento de Engenharia de Electrónica e Telecomunicações e de Computadores

Master Degree in Electronics and Telecommunications Engineering

Objectives

Teaching Science and Technology looking to increase productivity, competitiveness, creativity and a spirit of enterprise has become a major challenge. ISEL has always looked to train their students with these premises providing the market with highly qualified Human Resources with a well-defined professional profile.

The MSc Course in Electronics and Telecommunications targets engineers who want to build and advance their careers in the fast-changing and challenging field of electronics, telecommunications and computers. The course is offered by the Department of Electronics, Telecommunications and Computers Engineering, which has a highly qualified teaching staff, in scientific and in technological terms. Our department is known by its connections to the Industry and its interactions with the community through the participation of the teaching staff in post graduate activities targeting the human resources of enterprises and in projects carried out in collaboration with enterprises and external entities.

This two-year course aims to provide engineers with credentials recognized by the market in the domains of fixed and mobile telecommunications, computer networks, electronics for telecommunications and for computer systems, micro and optoelectronics, embedded and dedicated systems, integrated electronic systems, control and robotics. The main training objectives of the MSc Course are:

- To provide an in-depth understanding of the main concepts of electronics, telecommunications and computers, with a strong experimental component through extensive laboratory work with a close following;
- To enrich the capacity of the student to continuously adapt himself to the constant changes of the state of the art in the areas of electronics, telecommunications and computers;
- To develop competencies to develop a critical and independent work;
- To provide a solid education in mathematics, which is indispensable for science, engineering and management;
- To provide an in-depth experience in professional aspects of electronics, telecommunications and computers;
- To give the student the competence to establish a critical judgment about the technologies in the industrial and commercial context;
- To develop competencies of self-learning and self-innovation that allow the engineer to play his part when asked for;
- To develop competencies to deal with complex systems using the available technological resources;
- To develop competencies to analyze, to synthesize and to design systems that use concepts from electronics, telecommunications or computers;
- To transmit the necessary knowledge in a specific domain together with complementary knowledge in other domains in order to design and develop complex systems that depend on many concepts from the areas of electronics, telecommunications and computers;
- To guarantee a level of knowledge enough for the engineer wishing to follow a PhD program.

Career Opportunities

The MSc in Electronics and Telecommunications Engineering opens a vast set of career opportunities.

In the specific domain of electronics, the engineer may consider the following career opportunities:

- Systems designer – to design, develop, test and implement digital and analogue electronic equipments and systems with applications in industrial environments, home and commercial appliances using the most recent products and technologies from the market and specific dedicated modules to be embedded in the target system. The set of target systems include home appliances, embedded systems, dedicated systems, monitoring and control systems.
- Programmer of electronic systems and equipment – to install, program and maintain electronic equipments with or without integration with other equipments;
- Reengineering consultant – to upgrade the electronic systems to support new functionalities or new performance requirements, to optimize its reliability or to maintain the solutions;
- Systems integration engineer – to interact with professionals from other domains to produce an industrial system with several technological requirements;
- Project manager – to lead development teams of products for electronics and telecommunications;
- Entrepreneur – to start up enterprises with a technological background;
- Researcher – to do fundamental or applied research in the area of electronic engineering in industrial environments or in Institutes or Universities;

In the specific domain of telecommunications, the engineer may consider the following career opportunities:

- Programmer of communication systems – to develop telecommunications software for systems, applications and services used by mobile and fixed network equipment;
- Designer of communication networks – To design and implement fixed and mobile communication networks to interconnect users and servers;
- Network manager – to manage the communication infra-structure guarantying its maintenance, reliability, and security;
- Consultant of network infra-structures – to engineer and reengineer the communication infra-structure. The consultant is able to identify the hotspots of the network, to propose solutions to eliminate them and to follow and manage the restructuring process of the network;
- Consultant of pre-sales of communication networks – to elaborate technical solutions according to the specifications of the client;
- Commercial in the area of communication networks – to follow the market of the network technologies, and propose new products and services to be considered in the design of communication networks;
- Project manager – to lead development teams of products for electronics and telecommunications;
- Entrepreneur – to start up enterprises with a technological background;
- Researcher – to do fundamental or applied research in the area of telecommunications engineering in industrial environments or in Institutes or Universities;

Curricular organization

Distribution of credits ECTS by scientific area in the Master Degree in Electronics and Telecommunications Engineering:

Electronics and Computers

Scientific area	Acronym	Credits	
		Mandatory	Optional
Electronics engineering	AE	78	0 a 24
Telecommunications engineering	AT	0	0 a 24
Computers engineering	AC	12	0 a 24
Social and legal sciences, arts and humanities or others	CC	6	0
Total		96	24

Telecommunications and Computers

Scientific area	Acronym	Credits	
		Mandatory	Optional
AE – Electronics engineering	AE	0	0 a 24
AT- Telecommunications engineering	AT	78	0 a 24
AC- Computers engineering	AC	12	0 a 24
Social and legal sciences, arts and humanities or others	CC	6	0
Total		96	24

1.st year, 1.st semester

Optional Curricular Units of MEET	ECTS	Scientific area	Specialty	Area	Level
Complements of Distributed Systems (CDS)	6	IC	E	AC	M
Broadband Transmission Systems (BTS)	6	ET	E	AT	M
Mobile Communications (MC)	6	ET	E	AT	M
Electronic Systems for Telecommunications (EST)	6	ET	E	AE	M
Optoelectronic (Opt)	6	ET	E	AE	M
Electronic Systems for Signal Conditioning (ESSC)	6	ET	E	AE	M
Networks and Services of Multimedia Communication (NSMC)	6	ET	E	AT	M
State Space Control (SSC)	6	ET	E	AE	M
Antennas (A)	6	ET	E	AT	M
Computer Networks Design (CND)	6	ET	E	AT	M
Digital Communication Systems (DCS)	6	ET	E	AT	L
Radio Communications (RCom)	6	ET	E	AT	L
Telecommunication Systems (TS)	6	ET	E	AT	L
Control (C)	6	ET	E	AE	L
Embedded Systems I (ES I)	6	IC	E	AC	L
Analog and Digital Electronic Systems II (ADES II)	6	ET	E	AE	L
Internet Networks (IN)	6	ET	E	AT	L
Virtual Environments of Execution (VEE)	6	IC	E	AC	L

1.st year, 2.nd semester

Optional Curricular Units of MEET	ECTS	Scientific area	Specialty	Area	Level
Databases (DB)	6	IC	E	AC	M
Digital Teledifusion (DT)	6	ET	E	AT	M
Mobile Communication Networks (MCN)	6	ET	E	AT	M
Microwave Circuits (MC)	6	ET	E	AE	M
Micro Electronics (ME)	6	ET	E	AE	M
Electronic Systems for Signal Processing (ESSP)	6	ET	E	AE	M
Computer Network Security (CNS)	6	ET	E	AT	M
Fundamentals of Robotics (FR)	6	ET	E	AE	M
Codification of Multimedia Signals (CMS)	6	ET	E	AT	M
Analog/Digital and Digital/Analog Converters (ADDAC)	6	ET	E	AE	M
Distributed Computational Systems (DCS)	6	IC	E	AC	L
Terrestrial and Satellite Communications (TSC)	6	ET	E	AT	L
Digital Signal Processing (DSP)	6	ET	E	AT	L
Instrumentation and Measurements (IM)	6	ET	E	AE	L
Embedded Systems II (ES II)	6	IC	E	AC	L
Programmable Analog and Digital Electronic Systems (PADES)	6	ET	E	AE	L
Advanced Network Technologies (ANT)	6	ET	E	AT	L
Organization and Management of Companies (OMC)	6	CC	P	B	L
Programming in the Internet (PI)	6	IC	E	AC	L
Access Networks (AN)	6	ET	E	AT	M

2.nd year, 1.st semester

Optional Curricular Units of MEET	ECTS	Scientific area	Specialty	Area	Level
Economy and Project Management (EPM)	6	CC	P	B	M
Optical Communication Systems (OCS)	6	ET	E	AT	M
Planning and Optimization of Mobile Networks (POMN)	6	ET	E	AT	M
Telecommunication Systems Defined by Software (TSDS)	6	ET	E	AT	M
Design of Integrated Circuits (DIC)	6	ET	E	AE	M
Integrated Analog and Digital Electronic Systems (IADES)	6	ET	E	AE	M
Networks and Systems Integration (NSI)	6	ET	E	AT	M
Mobile Robotics (MR)	6	ET	E	AE	M
Simulation Models (SM)	6	ET	E	AC	M
Content Distribution Networks (CDN)	6	ET	E	AT	M
Complements of Distributed Systems (CDS)	6	IC	E	AC	M
Broadband Transmission Systems (BTS)	6	ET	E	AT	M
Mobile Communications (MC)	6	ET	E	AT	M
Electronic Systems for Telecommunications (EST)	6	ET	E	AE	M
Optoelectronic (Opt)	6	ET	E	AE	M
Electronic Systems for Signal Conditioning (ESSC)	6	ET	E	AE	M
Networks and Services of Multimedia Communications (NSMC)	6	ET	E	AT	M
State Space Control (SSC)	6	ET	E	AE	M
Antennas (A)	6	ET	E	AT	M
Computer Networks Design (CND)	6	ET	E	AT	M