

**Appendix A:**

**Dual Degree Agreement between**

**Instituto Superior Técnico (IST) and Universitat Politècnica de Catalunya (UPC),  
EPSC School**

**Duration: Academic Year 08/09 to 10/11**

Degree programme at IST:	<b>Electrical and Computer Engineering (MEEC) Major: Telecommunications (120 ECTS)</b>
Degree awarded:	M.Sc.
Language of instruction	English
Entrance admission criteria:	Bachelor of Science in Electrical and Computer Engineering Sciences
Degree programme at UPC:	<b>Telecommunication Engineering &amp; Management (MASTEAM) (120 ECTS)</b>
Degree awarded:	Master of Science in Telecommunication Engineering & Management
Language of instruction	English
Entrance admission criteria:	Bachelor of Science in Electrical and Computer Engineering Sciences
Number of students	2

**Schematic Study Plan**

<b>Option 1</b>			
Year	Institution	Studies	Remarks
1	UPC	Compulsory and elective courses	60 ECTS
2	IST	Courses + Master Thesis (co-supervised)	30+30 ECTS
<b>Option 2</b>			
Year	Institution	Studies	Remarks
1	IST	Compulsory and elective courses	60 ECTS
2	UPC	Courses + Master Thesis (co-supervised)	30+30 ECTS
<b>The schematic study plan is applicable to students originated from UPC or IST indifferently. The detailed study plan must be defined by the academic coordinators for each student.</b>			

**Contacts:**

<i>Academic responsible for the programme (MEEC):</i> Prof. António Rodrigues	<i>Academic responsible for the programme (MASTEAM)</i> Prof. Silvia Ruiz
<i>Contact person:</i> Sílvia Santos, International Office (silvia.santos@ist.utl.pt)	<i>Contact person</i> M.Jesús Melo (EPSC.Relacions.Externes@upc.edu)

**Signatures:**

Date: November 30 <sup>th</sup> , 2007	Date: November 30 <sup>th</sup> , 2007
For IST	For UPC
Prof. Carlos Matos Ferreira President, Instituto Superior Técnico	Prof. Jordi Berenguer Dean, Castelldefels School of Technology (EPSC)

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**DETAILED SYLLABUS**

FIRST YEAR STUDIES	
MASTEAM (UPC)	MEEC (IST)
Autumn Semester (minimum of 30 ECTS)	
Seminar: Team working and Project Design (0,7 ECTS)	
Module 1: <u>Wireless Communication Systems</u> (15 ECTS)	
Propagation and channel modelling (1.5)	Radio Wave Propagation -6 ECTS
Radio transmission and network access techniques (1.5)	Wireless Telecommunications Systems - 6 ECTS
Cellular and wireless communication systems (1.5)	Digital Transmission - 6 ECTS
Quality parameters, link budget and planning tools (1.5)	Telecommunication Electronics - 6 ECTS
Other radio communication systems: point to point, broadcast, satellite (1.5)	Optional Courses [Students must take 6 ECTS among these courses]
Wireless Project/Lab and optional courses (7.5)	Telecommunications Systems - 6 ECTS
Module 2: <u>Wired Data Network</u> (15 ECTS)	
Optical communications: equipment, transmission and multiplexing (2.5)	Data Coding and Compression - 6 ECTS
Optical Networks (2.5)	Microwaves - 6 ECTS
Metropolitan transport networks and services: SDH, Metro-Ethernet (2.5)	Integrated Services Networks - 6 ECTS
Wired Data Networks Project/Lab and optional courses (until 7.5 ECTS)	Entrepreneurship, Innovation and Technology Transfer - 6 ECTS
Spring semester (minimum 30 ECTS)	
Module 3: <u>Electronic Circuits Systems and Measuring Equipment</u> (15 ECTS)	
Data acquisition, sensors, signal conditioners and distribution systems (2.5)	Telecommunications Systems and Networks - 6 ECTS
Safety and electromagnetic compatibility (2.5)	Computer Networks - 6 ECTS
Advanced Signal Processing (3)	Signal Processing Electronic Systems - 6 ECTS
Advanced Coding (2)	Mobile Communication Systems - 6 ECTS
Electronic Circuit Systems and Sensors Project/Lab (5)	Optional Courses [Students must take 6 ECTS among these courses]
Module 4: <u>Network multimedia protocols and Services</u> (15 ECTS)	
Queuing and teletraffic theory (2)	Antennas - 6 ECTS
Protocols:IP, VoIP, H.323, SIP (2)	High Frequency Electronics - 6 ECTS
Resource management (admission, congestion, scheduling, signalling, routing) (2)	Audio and Video Communications - 6 ECTS
Security in protocols design (2)	Communication Theory - 6 ECTS
Distributed Services (2)	Wireless Mobile Networks - 6 ECTS
Networks, Systems and Services Project/Lab (5)	Photonics - 6 ECTS
	Engineering Management Projects - 6 ECTS

SECOND YEAR STUDIES	
MASTEAM (EPSC)	MEEC (IST)
Autumn semester (minimum of 30 ECTS)	
M5 Management and Society (7,5 ECTS)	<b>Optional Courses</b> <b>[Students must take 30 ECTS among these courses]</b>
Management and Administration (3.5)	Entrepreneurship, Innovation and Technology Transfer - 6 ECTS
Engineering and Society (4)	Engineering Management Projects - 6 ECTS
M6. Network management and system planning (7.5 ECTS)	Energy Systems for Telecommunications - 6 ECTS
Network management architectures (SNMP) (3.5)	Radio Wave Propagation - 6 ECTS
Telecommunication Policies and Common Infrastructures (4)	Wireless Telecommunications Systems - 6 ECTS
M7. Project Management and Innovation (7.5 ECTS)	Digital Transmission - 6 ECTS
Project and Directive Abilities Management (4)	Autonomus Systems - 6 ECTS
Innovation Management (3.5)	Telecommunication Electronics - 6 ECTS
M8. Networks and application design (15 ECTS)	Radio Wave Propagation -6 ECTS
Network dimensioning (2)	Telecommunications Systems - 6 ECTS
Design and UML (2)	Data Coding and Compression - 6 ECTS
Concurrent programming and database (2)	Microwaves - 6 ECTS
Advanced Java or C++ programming (1.5)	Telecommunications Management and Public Policies - 6 ECTS
Network and application design Project/Lab (7.5)	Mechanisms for Quality of Service Support in the Internet - 6 ECTS
M9. Telecomm Business Start-Up (15 ECTS)	Integrated Services Networks - 6 ECTS
Enterprise creation (3.5)	Elective course - 6 ECTS
Product development and patents (2)	
I+D technological plan (2)	
Telecomm Business Start-Up Project/Lab (7.5)	
M10.Research seminars (2 ECTS)	
M11.Telecommunication Forums (2)	
M12 Practical training in a company (6)	
M13 Practical training in a research lab (6)	
M14 Architectures for Content Protection (3.5)	
M15 Systems and Emerging Technologies in Communications (3.5)	
Spring semester	
Thesis 30 ECTS supervised by both partners	