



Mobile Communications

By Télécom Paris, at Eurécom

KEYWORDS

Radio Engineering/Mobile Networking/Signal Processing Techniques/Mobile Communication Systems/ Wireless Communication

OBJECTIVES

The Master of Science in Mobile Communications aims at providing the theoretical background and the applied know-how for engineers in Mobile Communication Systems. The goal is to tackle the problems from a system viewpoint, taking a vertical cut and following a cross-layer design approach. This corresponds to both the most recent trend in research and to the most desired professional profile for engineers in this field. In fact, it is well-recognized by now that problems related to physical layer transmission techniques (RF design, signal processing algorithms, channel coding and modulation), and upper layer protocols (link layer control, multiple-access, routing), that were traditionally treated in a separated fashion in wired networks, must be treated jointly in mobile communication networks.

ENVIRONMENT

Sophia-Antipolis is considered as a major European region for telecommunications research and development in southern France. Eurécom, which is a consortium of academic and industrial partners, has established over the years a synergy with the local industrial environment on advanced research topics. During their Master of Science, students will benefit from the expertise of renowned industrial partners (Alcatel, Bouygues, Cégétel (SFR), France Télécom R&D, Philips, Thales, ST Microelectronics, Hitachi, Texas Instruments, IBM, BMW, SAP, Sharp, ESA) as well as the use of cutting edge technological platforms within Eurécom's Wireless Communication laboratory.

BACKGROUND

Good background in mathematics and signal processing is needed.

PROGRAM

The Master of Science program is full-time and starts in March. It includes 3 semesters, the last one being an internship with industry or in a R&D laboratory. The Master of Science is organized into a set of formal courses and a very substantial laboratory activity. The laboratory activity, which

spans the first two semesters, allows each student to implement, step-by-step, a small but significant case study of a Mobile Communication system in all its aspects, from RF to the network protocols. The courses are taught in English.

Spring semester

- **Radio Engineering**
RF systems
Propagation Modeling and Simulation
Cellular Architectures
- **Mobile Networking**
WLAN
GSM
Mobile IPV4, and Mobile IPV6
- **Signal Processing Technology**
Conversion Technology and Acquisition Systems
Embedded DSP Processors
PC-based DSP
RTOS aspects and the System-on-a-chip (SoC)

Fall semester

- **Mobile Communication Systems**
GSM and IS-95, UMTS
Packet radio networks
Emerging standards
Hiperlan 2, IEEE 802.11, Bluetooth
Ad Hoc Networks
- **Wireless Communication Techniques**
Single-user detection techniques
Multi-user detection techniques

- **Advanced Topics in Mobile Communications**

*Spatial Channel modeling
Multi-input multi-output (MIMO) algorithms
Adaptive coding and modulation*

Performance evaluation at system level

- **Channel coding**

*Block codes
Binary convolutional and random like codes
Repeat-Accumulate and Turbo Codes
Coded Modulation*

- **Digital communication systems**

*Digital Modulation
Detection theory and Receiver Design
Sequence Detection and Equalization*

TELECOM PARIS-EURÉCOM

Télécom Paris was founded more than a hundred years ago and is classed among the Grandes Écoles d'Ingénieurs. Because of its high scientific standard and the extremely competitive admission procedures, Télécom Paris can be compared to the highest level engineering schools and universities that one would find abroad. Télécom Paris today has a faculty of about 150 full-time staff (full professors, associate and assistant professors), over 200 part-time lecturers and a student body of about 1000 students (including 750 in the engineering studies program, and more than 200 PhD students. Télécom Paris's four departments carry out research and teaching activities in the school's central areas of expertise:

- Department of Communications and Electronics (Comelec).
- Department of Computer

Science and Networks (Infres).

- Department of Signal and Image Processing (TSI).
- Department of Economics and Social Sciences (EGSH).

Telecom Paris students with an undergraduate background can join the Eurécom master's program.

Eurécom was founded in 1992 by EPFL (Swiss Federal Institute of Technology of Lausanne) and Télécom Paris (Ecole Nationale Supérieure des Télécommunications). It is administered by an international consortium of academic and industrial partners.

The Eurécom professors, assistants and Ph.D. students perform cutting edge research in critical areas of communications and networking, including mobile and wireless communications, Internet and Web protocols, security and electronic commerce. Eurécom has many applied research contracts with external industrial partners in these and other areas. These contracts often lead to patents and prototypes with significant potential for commercialization. Eurécom's academic and research activities are organized in three departments : Corporate Communications, Mobile Communications, and Multimedia Communications.

LOCATION

Eurécom is located in Sophia-Antipolis, a major European Technology Park for IT research and development in the southern part of France. Several hundred enterprises and R&D labs of leading companies such as IBM, SAP, Texas Instruments, France Télécom, and Philips have settled in Sophia-Antipolis, creating a very international environment where foreign students can easily integrate and develop professional and human contacts.

ENTRY REQUIREMENT

Entry requirements include a four-year degree in the engineering fields covered by the Master program of Télécom Paris.

Language Proficiency

When applying, students must provide evidence of proficiency in the English language. This could include:

- having English as your mother tongue;
- studies in an English-speaking country;
- acquisition of an English language qualification (TOEFL: 550 /IELTS: 5.5 / TOEIC: 750 /Cambridge CAE).

WEBSITE

http://www.enst.fr/en/post_graduate/msci/mc.php