MASTEAM
Welcome meeting
Spring 2017 class
6 February 2017
UPC, YOUR UNIVERSITY

UNIVERSITAT POLITÈCNICA DE CATALUNYA - BARCELONATECH
Facts & figures

● UPC, the Technical University of Catalonia
  ■ Founded in 1971, from century-old schools
  ■ 21 schools in 7 cities and 9 campuses

● Figures (course 2015/16)
  ■ 34000 students
    - of which 3800 at masters, and 2300 at PhD programs
  ■ 3000 teaching and research staff
  ■ 1800 administrative and service staff

http://www.upc.edu/the-upc/the-institution/facts-figures
http://www.upc.edu/memoria/ca/la-upc/un-curs-en-xifres

● Well positioned in rankings (specifically in the ICT field) and presence in European research projects
  ■ Research and Knowledge transfer is key
Facts & figures – Rankings as of Jan 2017

https://www.upc.edu/rankings/en

- National Taiwan University Ranking by subject
  - Telecommunications, Electrical and Electronic Engineering
    - 39th globally and 1st in Spain

- Academic Ranking of World Universities (ARWU) - Shangai
  - In the 123-159 rank in Europe and the 4-9 rank in Spain

- Times Higher Education (THE) WUR
  - In the 200-248 rank in Europe and the 6-7 rank in Spain

- QS World University Rankings
  - 142th in Europe and 8th in Spain

- Times Higher Education (THE) by Subject
  - Computer Science
    - 41th in Europe and 1st in Spain

- Academic Ranking of World Universities (ARWU) - Shangai
  - Engineering, Technology and Computer Science
    - In the 76-100 rank globally and the 2nd rank in Spain

- QS World University Rankings by Faculty
  - Engineering and Technology
    - 82nd globally and 22nd in Europe

- QS World University Rankings – Top 100 under 50
  - 10th in Europe and 5th in Spain
CBL-PMT, YOUR CAMPUS

CAMPUS DEL BAIX LLOBREGAT
PARC MEDITERRANI DE LA TECNOLOGIA
A Campus (CBL) imbedded in a Technological Park (PMT)
The PMT

What is the PMT?

- The PMT is a nerve centre for research and innovation that aims to foster relations between:
  - University engineering schools (CBL, Campus del Baix Llobregat of the UPC)
  - Public research centres
  - Private companies involved in technological innovation
  - Technology-based spin-off companies

Topic Areas

- Information and Communication Technologies
- Aeronautics and Space Engineering
- Biological Engineering
- Agri-Food Engineering and Biotechnology
- Photonic Technologies
- Geo-Information and Remote Sensing
- Environmental Technologies
- Numerical Methods in Engineering

Website: http://www.pmt.es/front-page/not_available_lang?set_language=en&cl=en

Video: https://www.youtube.com/watch?v=tXwZwET0tl0
ESA BIC, Business Incubation Center
Telecommunications Technology Centre of Catalonia
School of Agricultural Engineering of Barcelona - UPC
Universitat Oberta de Catalunya (UOC, Open University)
International Center for Numerical Methods in Engineering (UPC, building shared with EETAC)
i2cat® Foundation (Internet 2 in Catalonia)
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<th>Companies established at the PMT</th>
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Campus Library

Some figures:

- Covered area: around 3,000 m², on 3 floors
- Seats: 300
- Computers: 77
- Laptops: 40
- Collections:
  - 16,000 volumes at the room,
  - 1,400 magazines,
  - 6,000 volumes on warehouse
  - 20,000 volumes in process of catalogue
- Global WiFi coverage
- Self-service printer machines
Residence

Pius Font i Quer Accommodations in Castelldefels – Opened in September 2011.

- 187 rooms which include single studios, each with bathroom and kitchen, and apartments for two people, with a living-dining room, kitchen and bathroom, all fully equipped for habitation.
- Designed to accommodate university students, grant holders, researchers, guest lecturers and other users visiting the CBL and PMT, as well as general members looking for accommodation in Castelldefels.

http://www.resa.es
Canteen

- 7:30 AM – 8 PM during the course
- Breakfast, lunch
- Study room (open also after hours)
EETAC, YOUR SCHOOL
CASTELLDEFELS SCHOOL OF TELECOMMUNICATIONS AND AEROSPACE ENGINEERING
EETAC

- Founded in 1991 as EUPBL in Sant Just Desvern
  - Bachelor in Telecommunications Systems Engineering
  - Bachelor in Networks Engineering (Telematics)
- 2001 – Changes its name to EPSC
  - Becomes a graduate school and starts the master program in telecommunications
  - Moves to Castelldefels Campus
- 2002 – Bachelor in Aeronavigation Engineering
- 2006 – MASTEAM (2 years)
- 2007 – MAST – Master in Aerospace Engineering
- 2009 – Adaptation to the Bologna process (3 year BSc)
- 2010 – Changes its name to EETAC
- 2015 – MASTEAM (1 year)
C4 building: classrooms, labs, teacher offices, research
C3 building: teacher offices, research labs + CIMNE
C3 & C4 buildings

Train station ←
Main door
C4
C3
Parking →
Door
Red tower
Yellow tower
Blue tower
Faculty offices
# Academic Programs

<table>
<thead>
<tr>
<th>Bachelor degrees (4 years)</th>
<th>Bachelor’s degree in Telecommunication Systems Engineering</th>
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<tbody>
<tr>
<td></td>
<td>Bachelor’s degree in Network Engineering</td>
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<tr>
<td></td>
<td>Bachelor’s degree in Aerospace Engineering (specialization in Air Navigation and Airports)</td>
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<td></td>
<td>Double degrees (Telecom+Network, Aerospace+Telecom, or Aerospace+Network) in 5.5 years</td>
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## Academic Programs

<table>
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<tr>
<th>Master degrees</th>
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<tbody>
<tr>
<td>Master of Science in Telecommunication Engineering &amp; Management (MASTEAM) – 1 year</td>
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<tr>
<td>Master in Aerospace Science And Technology (MAST) – 1.5 years</td>
</tr>
<tr>
<td>Master in Air Navigation and Airports (Air Traffic Controller habilitation – temporarily discontinued)</td>
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<tr>
<td>Master in Unmanned Aircraft (Drones) Systems Engineering, MUASED – 1 year</td>
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<tr>
<th>Doctoral courses</th>
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<tr>
<td>EETAC professors collaborate, among others, in the following PhD programs at UPC:</td>
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<tr>
<td>• Electronic Engineering</td>
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<tr>
<td>• Network Engineering (Telematics)</td>
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<tr>
<td>• Signal Theory and Communications</td>
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<tr>
<td>• Computer Science</td>
</tr>
<tr>
<td>• Management and Business Organization</td>
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<tr>
<td>• Aerospace Science and Technology</td>
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</table>
# University Departments and Faculty

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<thead>
<tr>
<th>DEPARTMENT</th>
<th>DEPARTMENT</th>
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<tbody>
<tr>
<td>Computer Architecture</td>
<td>Applied Physics</td>
<td>22</td>
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<tr>
<td>Electronics Engineering</td>
<td>Physics and Nuclear Engineering</td>
<td>1</td>
</tr>
<tr>
<td>Network Engineering (Telematics)</td>
<td>Institute of Energy Technology</td>
<td>2</td>
</tr>
<tr>
<td>Aeronautics Engineering (EETAC)</td>
<td>Applied Mathematics I</td>
<td>1</td>
</tr>
<tr>
<td>Signal Theory and Communications</td>
<td>Applied Mathematics III</td>
<td>1</td>
</tr>
<tr>
<td>Construction Engineering</td>
<td>Applied Mathematics IV</td>
<td>15</td>
</tr>
<tr>
<td>Management and Business Organization</td>
<td>Graphical Expression in Engineering</td>
<td>11</td>
</tr>
<tr>
<td>Materials and Structure Engineering</td>
<td>Agri-Food Engineering and Biotechnology</td>
<td>2</td>
</tr>
<tr>
<td>Geotechnical Engineering and Geo-Sciences</td>
<td>Control theory and industrial computers</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>165</td>
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</tbody>
</table>
EETAC Research Groups

- Advanced Materials and Technologies for Communications
- Audio-visual Systems
- Broadband Networks and Services
- Control, Monitoring and Communications
- Distributed Systems Architectures
- Instrumentation, Sensors and Interfaces
- Intelligent Communications and Avionics for Robust Unmanned aerial Systems
- Mobile and Radio Communications
- Optical Communications
- Wireless Networks
- Astronomy and Astrophysics
- Combinatorial & Graph Theory and Applications
- Materials group
- Microgravity and Modelization group
- Non Linear Dynamic of Fluids group
MASTEAM
MASTER IN APPLIED TELECOMMUNICATIONS
AND ENGINEERING MANAGEMENT
Scope and Objectives

● Telecommunication has evolved from audio and video communication for personal information exchange and entertainment to pervasive data communication in the Mobility and Internet-of-Things era.

● This master degree is intended for those willing to acquire the skills that will enable them to conceive, design and implement cutting-edge engineering solutions based on the latest telecommunication and Internet technologies in order to improve people’s welfare in a sustainable economy.
Approach/Strategy

- Courses cover a broad spectrum of topics including sensors to obtain data, wireless and optical technologies for data communication, advanced data-processing methods, algorithms for design optimization and the strategies to translate ideas into new devices and services.

- Yet other courses delve into cutting-edge applications such as the Internet of Things, smart objects, Body Area Networks, specialised tools such as image processing, or security, and aspects such as management and service engineering.

- Finally, students will consolidate their knowledge by applying it to a challenging problem during the master thesis.

- Teaching resources largely involve student participation in lectures, laboratory work and hands-on projects.
Structure of the master program

- **Workload**: 60 ECTS credits = 1500h
  
  [https://es.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System](https://es.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System)
  
  - At UPC masters, 1 ECTS = 25h of student activities = 9h at classroom + 16h of autonomous activities

- **Mandatory contents**: 15 ECTS
  - 1A1 courses

- **Optional contents**: 33 ECTS
  - 1A2, 1B1, 1B2
  
  - Total optional offer: 42 ECTS

- **Master Thesis**: 12 ECTS
Semester 1A (14 weeks)

- Optimization for Applied Engineering Design (3)
- Network Engineering (3)
- ICT-based Entrepreneurship (3)

Semester 1B (14 weeks)

- Service Engineering (3)
- Low-power Systems with Energy Harvesting (3)
- Applied Image Processing (3)

1A1 (7 weeks)

- Next Generation Wireless Communications and IoT (3)
- Sensors and Interfaces (3)
- Body Sensor Nodes (3)

1A2 (7 weeks)

- Optical Networks for Cloud-Based Services (3)
- IoT & Ubiquitous IP (3)
- 5G Mobile Network Planning (3)

1B1

- Creativity & Engineering (3)
- Big Data & Data Mining (6)

1B2

- Network Security Authentication & Authorization (3)
- Software Defined Radio (3)
- Project on ICT-based Business Models (3)

Master Thesis (12)

In parenthesis, the number of ECTS credits

- Recommended
- Pre-requisite
Calendar and Course Schedule

- Published in both the current website and Atenea’s MASTEAM course
  - Organized in weeks, 1-13 – check the calendar
  - Holidays
  - Adjustments such as “Tuesday May 2nd becomes a Monday”

- Exam weeks, mid-semester and end of semester – check the exam calendars

- Lectures will take place mainly in classroom C4-021B
  - Ground floor, blue tower, in the middle of the C4 building
  - Laboratories: 334-5G, 331G (yellow tower), 127B and 129B (blue tower), among others

- Weekly talks / meetings on Wednesdays 17:30h
  - Research talks, companies, academic meetings
  - Attendance is mandatory – they are part of the program
# Course Schedule (Spring 2017)

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>09:00-09:30</td>
<td>SENSORS 021B</td>
<td>NETENG 021B</td>
<td>WICOM 021B</td>
<td>NETENG 021B</td>
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<td>09:30-10:00</td>
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<td>OPTIM 021B / 334-5G</td>
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<td>11:00-11:30</td>
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<td>ENTREP 021B</td>
<td>OPTIM 021B / 334-5G</td>
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<td>SENSORS 021B</td>
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<td>13:00-13:30</td>
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<td>SENSORS 021B</td>
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<tr>
<td>13:30-14:00</td>
<td>(Only week 3)</td>
<td>Talks/meetings</td>
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<td>(Only week 4)</td>
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</table>

**Abbreviations:**
- OPTIM: Optimization for Applied Engineering Design
- NETENG: Network Engineering
- WICOM: Next Generation Wireless Communications and IoT
- SENSORS: Sensors and Interfaces
- ENTREP: ICT-based Entrepreneurship
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<th>MONDAY</th>
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<tr>
<td>08:00-08:30</td>
<td>ARASM 021B</td>
<td>OPTICAL 021B</td>
<td>ARASM 021B</td>
<td>IMAGE 021B (Only week 10)</td>
<td>5GPLAN 021B</td>
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<td>08:30-09:00</td>
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<td>IOT-IP 021B</td>
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<td>IMAGE 021B / 127B</td>
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<tr>
<td>09:00-09:30</td>
<td>5GPLAN 021B / 127B</td>
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<td>IMAGE 021B / 127B</td>
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**1A2 courses - Weeks 7 to 13 + exams week in June**

- **IOT-IP**: Internet of Things and Ubiquitous IP
- **5GPLAN**: 5G Mobile Network Planning
- **IMAGE**: Applied Image Processing
- **OPTICAL**: Next-Generation Optical Network Infrastructures for Future Cloud-Based Services
- **ARASM**: Augmented Reality & Smart Objects
- **BODYSENS**: Body Sensor Nodes
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<tr>
<td>15:00-15:30</td>
<td>LOWPOW 021B / 230B</td>
<td>LOWPOW 021B / 230B</td>
<td>LOWPOW 021B / 230B</td>
<td>SERVICE 021B</td>
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<td>16:00-16:30</td>
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<td>BIGDATA 021B</td>
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**SERVICE**  Service Engineering

**BIGDATA**  Big Data and Data Mining

**CREA**  Creativity and Engineering

**LOWPOW**  Low-power Systems with Energy Harvesting
### 1B2 courses - Weeks 7 to 13 + exams week in June

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<tbody>
<tr>
<td>15:00-15:30</td>
<td>SDR 021B</td>
<td>BUSINESS 021B</td>
<td>NETAUTH 021B</td>
<td>Free for Master Thesis</td>
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<td>15:30-16:00</td>
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<td>NETAUTH 021B</td>
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- **BUSINESS**  Project on ICT-based business models
- **NETAUTH**  Network Security - Authentication and Authorization
- **SDR**  Software-Defined Radio
Enrolment & Qualification

- Enrolment takes place on February and September
  - First enrolment (today!) is face-to-face, presentational, but the next ones can be done remotely via e-secretaria.
- You must enrol the 1x1 and 1x2 (where x = A or B) subjects – one enrolment per semester
- Qualification is numerical, scale 0-10
  - You need at least a 5 to pass the course
  - In case you obtain a 9 or more, you can be eligible for “with honors” distinction (“Matrícula d’Honor”, MH).
    - Limited to the best 5% students in each course
    - But it is up to the professors to decide if any students deserve it
Academic Performance

- If you do not pass 15 credits in your first year (2 semesters), you cannot continue your studies
  - You can request a one-time exception to the rule – but must be justified

- Alpha factor = credits passed / credits enrolled
  - If alpha < 0.5, your next enrolment will be limited to 24 credits
  - If alpha < 0.3 for 3 times, you cannot continue your studies
    - You can request a one-time exception to the rule – but must be justified
Weekly talks, seminars, visits
MASTEAM talks - Building Quantum Technologies - Carlos Abellán

Wednesday 9 November, 17:30h, C4-001 (Sala de Actos / Main Hall), Campus Castelldefels UPC.

The Master's degree in Applied Telecommunications and Engineering Management (MASTEAM) organizes a weekly series of activities (talks, technical visits, discussion pannels) that complement the academic activities with real-world experiences from companies, research centres and institutions in the main topics of the master: Internet of Things, Smart Cities, 5G mobile communications, Software-Defined Networking (SDN) and Radio (SDR), cloud computing, among others.

This week's activity will be a talk from Mr Carlos Abellán (ICFO, Institute of Photonic Sciences).

Title: Building Quantum Technologies

Abstract: In this talk we will review the state of quantum technologies at the industry level as well as current challenges and efforts towards creating scalable products. Following a pragmatic and intuitive approach, we will also discuss about those quantum effects that motivates the development of technologies. Finally, I will present a new worldwide scientific collaboration that will perform, on November 30th, several fundamental quantum physics experiments using the contribution of thousands of people like us.

Bio: BSc in Telecom engineering and MSc in Photonics Science. Experienced on bringing state-of-the-art technology from concept to customer validation. PhD student at ICFO, the Institute of Photonic Sciences, and trained at the Haas School of Business (UC Berkeley).

LinkedIn: https://www.linkedin.com/in/carlosabellan
Twitter: @cabellan
Master Thesis

• Research / development work, to be defended.
  ■ Advised / directed by a EETAC professor
  ■ Written report + public presentation, evaluation committee
  ■ Outcome: research paper (journal, conference) + divulgative poster/blog entry

• Can be done at:
  ■ EETAC research groups
  ■ Research institutes (only those with a UPC agreement)
  ■ Companies (only those with a UPC agreement)

  External theses require an academic tutor-supervisor from EETAC

• Thesis proposals are published in the EETAC website
  https://mitra.upc.es/SIA/PFC_PUBLICA.LLISTAT_OFERTS?w_codi_programa=308

• Collection of MASTEAM theses from previous years
  http://upcommons.upc.edu/handle/2099.1/4374
Internships

- You can do internships at companies (provided they have an agreement with EETAC), but you cannot obtain MASTREAM credits for that.

- Maximum of 600h during the whole program.

- When?
  - After having passed at least 15 ECTS credits.
  - Our advice: wait until the second semester / 30 ECTS.

- Your academic tutor must review and approve the work plan, considering your workload and academic records.

- If you are older than 28 years, the School insurance does not cover the internship, and you should contract one. UPC has an agreement with CONFIDE.
Mobility and Double Degrees

- Master Thesis in more than 30 partner institutions in Europe
  [Link](http://eetac.upc.edu/en/study/masters-degrees/masteam/MASTEAMErasmusAgreementsOctober2016.pdf)

- Double Degree agreements
  - 1 year MASTEAM + 1 year abroad = 2 master degrees
  - Master in Telecommunications Engineering, Università dell'Aquila (UNIVAQ), Italy. More details [here](#).
  - Cranfield University (UK):
  - Negotiations ongoing with IST Lisbon and KTH Stockholm
Access to PhD programs

- To be admitted in a PhD program in the European Higher Education Area (EHEA), you must have:
  - An official Bachelor Degree and at least an official Master Degree
  - At least 300 ECTS credits between Bachelor and Master

- MASTEAM is an official Master degree recognized by Spanish and European authorities.

- Therefore, combined with a 240 ECTS Bachelor Degree (equivalent to 4 years full-time), it allows you to access an official PhD program
  - Foreign students must legalize/convalidate their Bachelor Degrees in the Spanish Ministry of Education
Industrial Doctorates Plan of the Government of Catalonia in which the UPC participates

List of authorized thesis for reading

DOCTORAL DEGREE IN BUSINESS ADMINISTRATION AND MANAGEMENT
2016/2017 Academic Year

Doctoral programmes by subject area

- ARCHITECTURE, URBANISM AND CONSTRUCTION
- CIVIL ENGINEERING
- INDUSTRIAL ENGINEERING
- INFORMATION AND COMMUNICATIONS TECHNOLOGIES ENGINEERING
  - ARTIFICIAL INTELLIGENCE
  - COMPUTER ARCHITECTURE
  - COMPUTING
  - ELECTRONIC ENGINEERING
  - ERASMUS MUNDUS IN DISTRIBUTED COMPUTING
  - ERASMUS MUNDUS IN INFORMATION TECHNOLOGIES FOR BUSINESS INTELLIGENCE (IT4BI – DC)
  - ERASMUS MUNDUS IN INTERACTIVE AND COGNITIVE ENVIRONMENTS
  - NETWORK ENGINEERING
  - SIGNAL THEORY AND COMMUNICATIONS
- SCIENCES
Ethics & Competences

• As a UPC master student, we expect you to
  ■ Have a strong sense of ethics: cheating, copying & pasting, etc are not an option neither here nor in the professional world
  ■ Work hard: a master student must demonstrate ability to produce good results and excel – be self-demanding!
  ■ Demonstrate research-oriented and management skills
  ■ Acquire and demonstrate competences
    ▪ Cooperative work – working in teams
    ▪ Autonomous learning – not everything will be provided
    ▪ Critical thinking and self-evaluation of your work
    ▪ Good oral and written skills
    ▪ Communication – both with instructors and fellow students
  ■ Our mission is to help you discover how far you can go
PRACTICAL INFORMATION
Foreign (non-EU) students

- NIE / TIE card
  - Foreign visitor’s ID card
  - You MUST obtain your NIE / TIE as soon as possible
  - Visit
    - External relationships office at Castelldefels Campus
    - International and Corporate relations Bureau at Campus Nord Barcelona
      https://www.upc.edu/sri/en/students/international-students

- Legalisation of Academic documents
  - Spanish Ministry of Education
  - Must be started as soon as possible, in order to have it finished by the end of your studies
  - Visit the Teaching Office (Oficina de Docència)
    cbl.oficina.docencia@upc.edu
Transport tips

- The Campus can be reached by
  - Train - fastest option from Barcelona
    - All R2sud and R2 lines stop at Castelldefels – do NOT take regional trains (R13, R15, R16)
    - 6 trains/h from/to Barcelona at peak hours, 4 otherwise
    - 20-25 mins from/to Sants-Estació (central station), 25-30 mins from/to Passeig de Gràcia, 35-40 mins from/to Estació de França
  - Buses
    - L95 has a stop just outside the campus, L94 a bit farther. Approx 1 h to/from Barcelona center.
    - Also, from any bus that stops at Castelldefels
    - L99: Direct bus Castelldefels center - Airport Terminal 1
  - Car
    - Parking area close to the Olympic Canal

- Check map and details here
Transport tips

● Fares & tickets
  ■ Castelldefels belongs to Zone 1 (cheapest fare)
  ■ Buy integrated tickets (1h15 mins changing between train, metro, bus, and tram). Avoid single tickets – they are much more expensive.
  ■ If you do at least 2 trips/day (14 per week) the monthly and 3-months passes (T-mes and T-trimestre, unlimited trips for 30 or 90 days) are the best option.
  ■ Train delays of more than 15 minutes entitle you to obtain a refund.

● Apps & Twitter for service notifications
  ■ Apps:
    • ADIF (real-time train schedule)
    • Rodalies de Catalunya (train issues)
    • Próximo Bus Barcelona (real-time bus schedule)
  ■ Twitter:
    • @rodalies, @rodalia2, @rod2sudcat
    • @TMB_barcelona, @TMBinfo
EETAC information systems

- **ATENEÀ** [https://atenea.upc.edu/](https://atenea.upc.edu/)
  - An intranet for each course, with materials, assignments, etc
  - Generic courses: EETAC (Catalan), MASTEAM (English) with administrative information (normative, schedules, etc)

- **SIA / NetArea** [https://mitra.upc.es/SIA/MAPA.INICI](https://mitra.upc.es/SIA/MAPA.INICI)
  - Qualifications, transcript of records, schedules

- **e-Secretaria** [https://esecretaria.upc.edu/](https://esecretaria.upc.edu/)
  - Administrative processes: enrolment, academic requests, etc

- All the systems share the same login/password credentials, activated 24h after your enrolment
- The three platforms are accessible from EETAC’s website
MASTEAM Atenea course

Spring 2016 semester - Academic Calendar and Course Schedules

This section contains the following information related to the Spring 2016 semester:

- **Academic calendar** of the 2015/16 year, both in English version (static, as of January 2016), and a link to the current version in Catalan (just in case there is some minor modification)
- **Course schedules**, both in English version (static, as of January 2016), and a link to the current version in Catalan (just in case there is some classroom change)
- **Exam calendars** for the mid-semester (T1 and T2 courses) and end-of-semester (T3 and T4) exam periods, both in English version (static, as of January 2016), and a link to the current version in Catalan (just in case there is some change)
- **Course coordinators and professors**: link to the Catalan version of the list of course coordinators and professors
MASTEAM’s new website – under construction
Institutional e-mail address

- Format: name.surname(s)@estudiant.upc.edu

- IMPORTANT!! You will receive there all the institutional messages from the School and the professors

- Access to it via webmail or redirect it to your personal e-mail address
  https://ek2pim.upc.edu/

- You can also configure it in your IMAP e-mail client

All the systems share the same login/password credentials, activated 24h after your enrolment
Access to research databases

IEEEExplore, Springer, etc from UPC or remotely via eBIB UPC

http://bibliotecina.upc.edu/colleccions/ebib-eng
UPC ID card

- Useful for
  - Library loans
  - Access to School after hours
  - Museum & shop discounts
  - …

- Apply for it **as soon as possible**, after enrollment
  - Make sure you have updated your **address in Barcelona** and upload a digital picture to [https://identitatdigital.upc.edu/myid](https://identitatdigital.upc.edu/myid)
  - You should receive it at the designated address in 10-15 days
  - More information at [https://www.upc.edu/identitatdigital/ca/carnetupc](https://www.upc.edu/identitatdigital/ca/carnetupc)
UPC alumni

Courses, resources for your professional career, job opportunities – free for last year students like you
Work hard, play harder

● Culture
  ■ Language courses (Catalan, Spanish)
    https://www.upc.edu/slt/en/
  ■ Campus Choir
    https://cbl.upc.edu/ca/el-campus/viure-el-campus/la-coral
  ■ Catalan Traditions and Folklore
    • Festivities
      – Santa Eulàlia (Barcelona), Feb 12th
      – Sant Jordi, April 23rd
      – Sant Joan, June 24th
    • Castells
      https://www.facebook.com/GRILLATSCBL/

● Sports
  ■ UPC Sport Service http://www.upc.edu/esports
  ■ Castelldefels Olympic Canal – Gym
QUESTIONS ?
ANNEX - COURSES
1A1

- **Optimization for Applied Engineering Design**
  - *DEPT: ENTEL (3 ECTS)*
  - Optimization with Engineering Applications
  - Nature-Inspired Algorithms. Colonies and Swarms
  - Biogeography-based techniques

- **Network Engineering**
  - *DEPT: ENTEL (3 ECTS)*
  - Introduction to large-scale dynamic systems
  - Network models
  - Competitive and cooperative systems
  - Dynamic systems
1A1

● Next Generation Wireless Communications and IoT
  ➢ *DEPT: TSC (3 ECTS)*
  ▪ 4G/5G networks
  ▪ Dense cell deployment: Small Cells, HetNets, Vertical HO
  ▪ Spectrum management: cognitive networks
  ▪ Cooperative communications: Network Coding
  ▪ WSN and Internet of Things

● Sensors and Interfaces
  ➢ *DEPT: EEL (3 ECTS)*
  ▪ Signal chain design
  ▪ Sensor performance assessment
  ▪ Analog sensors and signal conditioning
  ▪ Digital sensors and their interfaces
• ICT-based Entrepreneurship
  ➢ *DEPT: OE (3 ECTS)*
  ■ Innovation models
  ■ Business models of ICT-based companies
  ■ Customer development. Lean startup concepts
  ■ Canvas analysis
  ■ Process analysis
  ■ Sales for ICT-based startups
1A2

- IoT and Ubiquitous IP
  - **DEPT: ENTEL (3 ECTS)**
  - Internet evolution
  - Internet of Things: technologies and applications
  - Wireless experience enhancement
  - Mobility support

- Next-Generation Optical Networks Infrastructures for Future Cloud-Based Services
  - **DEPT: TSC (3 ECTS)**
  - Enabling technologies for advanced optical fiber-based networks
  - Optical systems for cloud computing and data centers interconnects
  - Enabling optical systems for energy-efficient optical networks
  - Control/Management plane for optical transport networks
1A2

- **5G Mobile Network Planning**
  - *DEPT: TSC (3 ECTS)*
  - Mobile system planning: coverage and capacity optimization
  - Green networks: spectrum and energy efficiency
  - HetNets
  - Self-Organizing Networks (SON)

- **Applied Image Processing**
  - *DEPT: TSC(3 ECTS)*
  - Recent advances in 2D and 3D image capture and representation devices.
  - Next generation video coding standards for Ultrahigh-Definition and 3D systems
  - Efficient algorithms for image segmentation
  - Techniques for representation, description and analysis of color, motion and shape
  - Image processing software tools for application oriented design
1A2

- **Body Sensor Nodes**
  - *DEPT: EEL (3 ECTS)*
    - Physiological and body position and movement sensors
    - Interference reduction
    - Low-noise sensor interfaces
    - Sensor node implementation (Laboratory project)

- **Augmented Reality & Smart Objects**
  - *DEPT: AC (3 ECTS)*
    - Hardware for augmented reality
    - Software and algorithms for augmented reality
    - Smart object typology
    - Applications
1B1

- Service Engineering
  - **DEPT: ENTEL (3 ECTS)**
    - Introduction to networked services
    - Dimensioning of services
    - Provisioning of telecom services
    - Operations Management
    - Conclusions, Advanced topics and Future trends

- Low-power Systems with Energy Harvesting
  - **DEPT: EEL (3 ECTS)**
    - Low-power embedded systems
    - Analog front and back ends
    - Power Management strategies
    - Battery management and energy supervision
    - Energy harvesting and power conditioning
1B1

- **Creativity & Engineering**
  - *DEPT: TSC (3 ECTS)*
  - Problem solving and killer applications
  - Critical thinking and the role of the mind in learning
  - Promoting creativity and team leadership
  - Creative techniques

- **Big Data & Data Mining**
  - *DEPT: AC (6 ECTS)*
  - Storing big data
  - Processing big data
  - Tools and techniques to analyze big data
  - Automatic recognition of patterns in large data set
  - Recommender systems
1B2

- **Network Security Authentication & Authorization**
  - *DEPT: ENTEL (3 ECTS)*
  - Security Introduction
  - Secure Storage of Credentials
  - Passwords/credentials auditing
  - User/service authentication
  - Authenticated services and credential sharing

- **Software Defined Radio**
  - *DEPT: TSC (3 ECTS)*
  - Cognitive and Software Defined Radio
  - Cloud-RAN
  - Digital signal generation and processing strategies
  - Advanced high-efficient transceiver architectures
  - Linear and nonlinear characterization and compensation
1B2

- **Project on ICT-based Business Models**
  - *DEPT: OE (3 ECTS)*
  - Planning activities to develop a new business model
  - Project management
  - Generation of an innovative idea (students project, first part)
  - Activity plan to develop a new business model (students project, second part)
  - Selling the project (students project, third part)

- **Master Thesis**
  - *DEPT: all (12 ECTS)*