UNIVERSITE DE BRETAGNE OCCIDENTALE (UBO)
ECOLE NATIONALE D'INGENIEURS DE BREST (ENIB)

Master in Electronics Electrical Energy and Automatic Systems

Signal and Telecommunications (ST)

Aims

The Signal and Telecommunications (ST) specialization trains specialist both research and application engineers for signal, image and vision processing positions across many industrial sectors (telecommunications, medical, energy, automotive, aerospace, robotics, etc.). Graduates will have a solid grasp of advanced signal and image processing tools, including mathematical modelling of the techniques studied prior to their digital development. They will also have specific skills in current telecommunications systems, meaning that they will quickly be ready to dimension, design and deploy various infrastructures in the field of wireless, optical and wired digital communications.

This specialization offers job opportunities immediately after the Master's degree as well as the possibility of further study through doctoral programmes.

For graduates who choose to directly enter the job market, the career opportunities are quite varied. Most are specialized engineering positions in the field of telecommunications, signal and image. A few examples are: Telecommunications Engineer, Signal Processing Engineer, Image Processing Engineer, Vision Research Engineer, Electronic Engineer, Study and Development Engineer, System Engineer - Operational Research and Algorithmics.

Students who choose to go on to pursue doctoral studies can also apply for lecturer or research engineer positions following their PhD.

The ST Master's degree is a **joint degree awarded by UBO and ENIB**.

Skills acquired

Graduates from the **Signal and Telecommunications Master's degree** are professionals who demonstrate technical and practical skills in the following fields.

Telecommunications

• Proficiency in digital signal processing techniques applied to digital communications (de/modulation, de/coding, propagation, equalization, synchronization). Use of software-defined radio platforms;

• Understanding of digital communication standards and radio access technologies (GSM/GPRS, UMTS, WiFi, LTE, IoT);

• Characterization of radio-frequency and microwave telecommunications technologies and systems.

Signal and Image

• Knowledge of advanced signal and image analysis methods, and of how to implement them in different fields of engineering and put forward innovative solutions;

• Capacity to analyse a problem and find a suitable solution using methods of estimation, identification, detection, classification, shape recognition, adaptive filtering, non-stationary signal analysis, etc.

• Ability to choose, adapt and optimize techniques for data compression (voice, data and video), cryptography, and error correction coding.

Computing

• Ability to develop/optimize algorithms in different programming languages (ASM, C, C++, Python, Matlab);

• Capacity to contribute to the development of major projects.

Admission requirements

Access to the second year of this Master's course is open to students with 4 years of post-secondary education in the field of electronics and more generally in the field of "Science, Technologies and Health". Classes are taught in French; the recommended level of proficiency in French is B2.

Applications

With a maximum of 20 places on this course each year, the admissions process to the 2nd year of the Master's course is selective and application-based.

Application documents:

Application form, CV, cover letter, copy of qualifications and academic transcripts (post-secondary) + interview (possibly).

Internship

Mandatory long-term internship (4 to 6 months)

> Type of internship: Assignment
> Start of internship: February/March
> Duration: 16 weeks minimum
> Note on duration:
> The internship lasts for a minimum of 4 months and a maximum of 6 months (16 weeks minimum).

Further study

This Master's degree is a combined professional and research course and has been designed so as to ensure that the Telecommunications Master's graduates are job-ready or, for those seeking to pursue a research career, are on track to continue on to doctoral studies.

For instance, some of the projects focus on businesses' issues in this sector, while others are geared towards research. Throughout the course, students therefore have the opportunity to tackle both aspects.

Every year, various research teams from the Lab-STICC laboratory (UMR CNRS 6285) propose research topics for funded PhDs accessible to our Master's graduates.

Possibility of access to certain courses as a dual competency.

Career opportunities

Graduates are able to enter the following sectors:

Telecommunications, Digital communications, Signal and Image Processing, Research and Development.

They may occupy the following positions:

Signal processing engineer, image processing engineer, vision research engineer, electronic engineer, study and development engineer, system engineer - operational research and algorithmics, project manager for the deployment of telecommunications network links, engineering project manager, design and development engineer, research and development officer, researcher, research lecturer (after PhD and national examination).

Learning environment

Several very well equipped practical classrooms are available. Emphasis is placed on students' projects and individual autonomy. The course is supported by a leading laboratory in the field of telecommunications (Lab-STICC UMR CNRS 6285), providing assurance that students will benefit from classes taught by lecturers familiar with the latest technologies, as well as internship and PhD opportunities. Private-sector engineers as well as academic staff from jointly accredited or partner engineering schools also teach classes to offer additional insight.

Promoting success

Class sizes are small (no more than 20 students) to facilitate discussions with teachers and ensure that students benefit from close supervision.

Practical information

>   **Ecole Nationale d'Ingénieurs de Brest (ENIB)**
>   Course available as co-op programme
>   **Teaching location:** Brest
>   **Contacts:**
    Course Director:

    Abdesslam Benzinou
    Service Scolarité – Master ST
    +33 (0)2 98 05 66 16 (or 00)
    scolarite@enib.fr

Course content

The second year of this Master's course is divided into two semester-long course units, S9 and S10, the details of which are provided in the table below.

Semester 9

Digital communication	6 credits	56h
Digital video and speech	5 credits	44h
Image and shape recognition	7 credits	60h
Advanced digital communication	6 credits	56h
Preparing for the working world	6 credits	54h
- English	3 credits	
- Communication - Business	3 credits	

Semester 10

Analysis and processing of non-stationary and non-Gaussian signals	3 credits	36h
Estimation, Modelling	3 credits	36h
Industrial and intellectual property	1 credit	10h
Annual integrator project	5 credits	48h
Internship with a business or laboratory (4 to 6 months)	18 credits	

Double degree engineering students are exempt from certain modules where equivalent modules are taken as part of their general engineering programme. For further information, please contact the Course Director at ENIB.

Last update: 6th July 2023