COURSE PROGRAM

REVEALING ENGINEERS SINCE 60 YEARS

ELECTRONICS
COMPUTER SCIENCE
MECHATRONICS

FRENCH GRADUATE SCHOOL OF ENGINEERING · RESEARCH INSTITUTE
Engineering degrees at ENIB

- **MASTER LEVEL (300 ECTS*)**
  - Year 5
  - Year 4

- **BACHELOR LEVEL (180 ECTS*)**
  - Year 3

**Engineer program**

Admission with Baccalaureate + 2 years

**Integrated preparatory program**

- Year 2
- Year 1

Admission with Baccalaureate

* ECTS: European Credit Transfer System
ENIB engineering courses
Generalist systems engineer

- **35%** Internships
  - Internships in companies
  - Engineering Sciences
    - Electronics
    - Computing
    - Mechatronics

10 semesters

- **27%** Human sciences for engineers
- **20%** Mathematics
- **15%** Physics
- **8%** Internships in companies
- **30%** and
  - Engineering Sciences
    - Electronics
    - Computing
    - Mechatronics

- **65%** Teaching

35% Specialization

- 51,0% Practical classes-Labs-Projects
- 49,0% Lessons-Tutorials

65% Common core

- 64,0% Practical classes-Labs-Projects
- 36,0% Lessons-Tutorials

Teaching S1-S6

Teaching S7-S10
# Integrated preparatory program

Courses in the 1\textsuperscript{st} & 2\textsuperscript{nd} years.

## Year 1 (S1 and S2)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Teaching hours</th>
<th>Subjects</th>
<th>Teaching hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human sciences for engineers*</td>
<td>74H</td>
<td>Human sciences for engineers*</td>
<td>74H</td>
</tr>
<tr>
<td>Math - physics</td>
<td>136H</td>
<td>Math - physics</td>
<td>126H</td>
</tr>
<tr>
<td>Engineering sciences (computing, electronics &amp; mechatronics)</td>
<td>184H</td>
<td>Engineering sciences (computing, electronics &amp; mechatronics)</td>
<td>194H</td>
</tr>
</tbody>
</table>

## Year 1 (IS1)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Teaching hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General interest modules (theatre-based public speaking, workplace first aid, etc.)</td>
<td>140H</td>
</tr>
</tbody>
</table>

\* Languages-expression-economics
The preparatory program is composed of the first four semesters (S1 to S4) and the first two inter-semesters (IS1 and IS2).

### Year 2 (S3 and S4)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>S3</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human sciences for engineers*</td>
<td>84H</td>
<td>84H</td>
</tr>
<tr>
<td>Math - physics</td>
<td>105H</td>
<td>147H</td>
</tr>
<tr>
<td>Engineering sciences (computing, electronics &amp; mechatronics)</td>
<td>220H</td>
<td>178H</td>
</tr>
</tbody>
</table>

### Year 2 (IS2)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>IS2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker internship</td>
<td>4 weeks</td>
</tr>
</tbody>
</table>
## Engineer program

Courses in the 3rd & 4th years.

### Year 3 (S5 and S6)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human sciences for engineers*</td>
<td>74H</td>
<td>74H</td>
</tr>
<tr>
<td>Math - physics</td>
<td>105H</td>
<td>52H</td>
</tr>
<tr>
<td>Engineering sciences (computing, electronics &amp; mechatronics)</td>
<td>231H</td>
<td>294H</td>
</tr>
</tbody>
</table>

### Year 3 (IS3)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>IS3</th>
</tr>
</thead>
<tbody>
<tr>
<td>General interest modules (science and technology in the media, diversity awareness, etc.)</td>
<td>140H</td>
</tr>
</tbody>
</table>
The engineer program is composed of the last six semesters (S5 to S10) and the last inter-semester (IS3).

<table>
<thead>
<tr>
<th>Year 4 (S7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S7</strong></td>
<td><strong>Teaching hours</strong></td>
</tr>
<tr>
<td>Subjects</td>
<td></td>
</tr>
<tr>
<td>Languages</td>
<td>42H</td>
</tr>
<tr>
<td>Management</td>
<td>21H</td>
</tr>
<tr>
<td>Digital embedded systems</td>
<td>84H</td>
</tr>
<tr>
<td>Communication networks &amp; systems</td>
<td>84H</td>
</tr>
<tr>
<td>Power interface systems</td>
<td>84H</td>
</tr>
<tr>
<td>1 Optional module</td>
<td>84H</td>
</tr>
<tr>
<td>Technician internship (8 to 12 weeks)</td>
<td></td>
</tr>
</tbody>
</table>

### Optional modules

<table>
<thead>
<tr>
<th>Optional modules</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio frequency communication systems</td>
<td>Signal &amp; image processing</td>
</tr>
<tr>
<td>Interactive application design</td>
<td>Methods for information systems development</td>
</tr>
<tr>
<td>Materials &amp; advanced design</td>
<td>Modeling in autonomous robotics</td>
</tr>
</tbody>
</table>
# Engineer program

Courses in the 4\textsuperscript{th} & 5\textsuperscript{th} years.

<table>
<thead>
<tr>
<th>Year 4 (S8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>Teaching hours</td>
</tr>
<tr>
<td>English (Preparation for TOEIC)</td>
<td>15H</td>
</tr>
<tr>
<td>Labor law</td>
<td>15H</td>
</tr>
<tr>
<td>4 Optional modules</td>
<td>144H</td>
</tr>
<tr>
<td>Assistant engineer internship (14 to 20 weeks)</td>
<td></td>
</tr>
</tbody>
</table>

## Optional modules

<table>
<thead>
<tr>
<th>Optional modules</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial engineering</td>
<td>Corporate purchase management</td>
</tr>
<tr>
<td>International management</td>
<td>Team management</td>
</tr>
<tr>
<td>Managerial skills development</td>
<td>Introduction to marketing for engineers</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>Solidarity economy &amp; sustainability</td>
</tr>
<tr>
<td>Sociology of work</td>
<td>Industrial design</td>
</tr>
<tr>
<td>Quality &amp; environmental quality</td>
<td>Geopolitics</td>
</tr>
<tr>
<td>History of technology &amp; philosophy of science</td>
<td>Introduction to research</td>
</tr>
</tbody>
</table>
## Year 5 (S9 and S10)

<table>
<thead>
<tr>
<th></th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>Teaching hours</td>
<td>Engineer/end-of-study internships (20 to 25 weeks)</td>
</tr>
<tr>
<td>Languages</td>
<td>42H</td>
<td></td>
</tr>
<tr>
<td>Industrial design</td>
<td>21H</td>
<td></td>
</tr>
<tr>
<td>3 Optional modules</td>
<td>252H</td>
<td></td>
</tr>
<tr>
<td>Project (electronics, computing or mechatronics)</td>
<td>84H</td>
<td></td>
</tr>
</tbody>
</table>

### Optional modules

<table>
<thead>
<tr>
<th>Module</th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio frequency communication systems</td>
<td>Digital communications &amp; optical transmissions</td>
<td></td>
</tr>
<tr>
<td>Signal &amp; image processing</td>
<td>System-on-Chip design</td>
<td></td>
</tr>
<tr>
<td>Methods for information systems development</td>
<td>Virtual reality &amp; environments</td>
<td></td>
</tr>
<tr>
<td>Interactive application design</td>
<td>Artificial intelligence &amp; simulation</td>
<td></td>
</tr>
<tr>
<td>Materials &amp; advanced design</td>
<td>Vibration mechanics &amp; finite element method</td>
<td></td>
</tr>
<tr>
<td>Modeling in robotics &amp; autonomous robotics</td>
<td>Systems control</td>
<td></td>
</tr>
</tbody>
</table>

### Internships

- **Engineer (S10)**: 20-25 weeks, 46-61 weeks over 4 years
- **Assistant Engineer (S8)**: 14-20 weeks
- **Technician (S7)**: 8-12 weeks
- **Worker (IS2)**: 4 weeks

### Languages

- **VSE**: 16.5%
- **SME**: 28.2%
- **LE**: 55.3%

### Business training by companies

**S8 Internship**: Assistant Engineer
- 14-20 weeks
- 16.5% VSE, 28.2% SME, 55.3% LE

**S10 Internship**: Engineer
- 20-25 weeks
- 16.5% VSE, 28.2% SME, 55.3% LE

### Industrial Internships

- **S8**: Assistant Engineer
- **S10**: Engineer

- **LE**: 55.3%
- **SME**: 28.2%
- **VSE**: 16.5%
The inter-semesters take the form of breaks between the 2 semesters of the first 3 years

Inter-semesters IS1 and IS3 take a “different approach” to learning. Alongside technical modules such as documentary research or training in specific software, all students take some non-technical “social” modules. Theatre plays an important role at this stage, to facilitate public speaking (1st year) or to increase awareness of all kinds of discrimination (improvisational theatre in the 3rd year). Citizenship training integrating current issues such as “living with others” is combined with introductory courses: make short audio (1st year) and video (3rd year) recordings. The students also participate in the science popularization project “petits débrouillards” and have a hands on experience, as recommended by Charpak, with the association “la caisse clous”. All students also take a first aid course, which forms part of this approach. In addition to these elements, a conference series is organized around a specific theme: sustainability, science and magic, etc.
## Inter-semesters
### Humanism and critical thinking

<table>
<thead>
<tr>
<th>IS1</th>
<th>Expression</th>
<th>Enterprise</th>
<th>Engineer and Citizen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Writing workshop</td>
<td>Meeting with ENIB engineers</td>
<td>Health and Safety at Work Certificate 12h</td>
</tr>
<tr>
<td></td>
<td>Radio documentary</td>
<td></td>
<td>Critical thinking skills 12h</td>
</tr>
<tr>
<td></td>
<td>Theatre</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IS2</th>
<th>Video documentary</th>
<th>“Worker” internship, discovering a company</th>
<th>Diversity awareness 12h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science and technology in the media</td>
<td>Enterprise day 6h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science and technology in the media</td>
<td>Meeting with former workers 12h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science and technology in the media</td>
<td>Team management 12h</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IS3</th>
<th>Mind maps 30h</th>
<th>Marketing Intercultural skills 30h</th>
<th>Research initiation 30h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mind maps 30h</td>
<td>Intercultural skills 30h</td>
<td>Research initiation 30h</td>
</tr>
<tr>
<td></td>
<td>Mind maps 30h</td>
<td>Decision Making</td>
<td>Research initiation 30h</td>
</tr>
<tr>
<td></td>
<td>Mind maps 30h</td>
<td>Team Management</td>
<td>Research initiation 30h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IS4</th>
<th>Entrepreneurship 30h</th>
<th>Industrial design 30h</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Engineering 1 30h</td>
<td>Solidarity economy 30h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial Engineering 2 30h</td>
<td>Philosophy of science 30h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality 30h</td>
<td>Sociology of work 30h</td>
<td></td>
</tr>
</tbody>
</table>

