**COMPUTER_S7_MAJ**  
Fall Semester  
Graduate  

<table>
<thead>
<tr>
<th>Computer Engineering</th>
<th>6 credits</th>
<th>Lab: 41.7%</th>
<th>Final exam (3h): 58.3%</th>
</tr>
</thead>
</table>

**Prerequisite:** S5 & S6 Computer lectures

**DITN_2501**  
**Microprocessors**  
**Language**

<table>
<thead>
<tr>
<th>Lecture: 16</th>
<th>Tutorials: 18</th>
<th>Lab work: 16</th>
</tr>
</thead>
</table>

This advanced module allows the understanding of the different components of a system based on a microcontroller. The objective is reached using a guided-project using a STM32 controller and peripherals.

- Interruption/exception transfer mechanism: interruption types, vectorization, interruption masking and management.
- Microcontroller peripherals: microcontroller architecture, peripherals memory, clock, timer, ADC, DAC, extern peripherals.
- Link with C language.

**DITN_2502**  
**Object-oriented programming: JAVA**  
**Language**

<table>
<thead>
<tr>
<th>Lecture: 6</th>
<th>Tutorials: 14</th>
<th>Lab work: 16</th>
</tr>
</thead>
</table>

The module focuses on the object-oriented programming basis using JAVA language. The learning is done through practice guided by the development of an application. This module is complementary to the S5 C language module.

- Classes, instances, references
- Encapsulation, access
- Inheritance, polymorphism
- Error management, exceptions
- Graphical interface, events management
- Object-oriented design, design patterns

**DITN_2506**  
**Network fundamentals**  
**Language**

<table>
<thead>
<tr>
<th>Lecture: 6</th>
<th>Tutorials: 6</th>
<th>Lab work: 16</th>
</tr>
</thead>
</table>

The course focuses on the design of communicating applications using a data transmission protocol. TCP/IP and internet network are the main targets.

- General ideas of communication protocols
- OSI model, norms
- Local networks, access, routing
- TCP/IP protocol

**DITN_2507**  
**System programming**  
**Language**

<table>
<thead>
<tr>
<th>Lecture: 6</th>
<th>Tutorials: 6</th>
<th>Lab work: 16</th>
</tr>
</thead>
</table>

The course focuses on programming system applications offering services to other applications. Communication between application is explained, together with multithread programming.

- Input and output at low level (open, clos, read, write, fctl)
- Pipe, socket
- Process creation (fork, exec)

**DITN_2508**  
**Lab work**  
**Language**

<table>
<thead>
<tr>
<th>Lab work: 16</th>
</tr>
</thead>
</table>

The lab work consists in developing a data server accessible through the network. FTP server, HTTP, IRC.