Catalogue de cours
Course Catalogue

2024-2025
<table>
<thead>
<tr>
<th>Semestre 1</th>
<th>Semestre 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Databases</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>Bases de données relationelles</td>
<td>Business Intelligence</td>
</tr>
<tr>
<td>Data Analysis and Visualisation</td>
<td>Business Process Intelligence</td>
</tr>
<tr>
<td>Innovative Software Methods</td>
<td>Marketing and Innovation</td>
</tr>
<tr>
<td>Internet of Things</td>
<td>Research Workshop (semestre 2)</td>
</tr>
<tr>
<td>Object Oriented Programming</td>
<td>Term Project 2</td>
</tr>
<tr>
<td>Project Management</td>
<td>Web Programming</td>
</tr>
<tr>
<td>Research Workshop (semestre 1)</td>
<td></td>
</tr>
<tr>
<td>Software Design</td>
<td></td>
</tr>
<tr>
<td>Term Project 1</td>
<td></td>
</tr>
</tbody>
</table>
Semestre 1

- **Advanced Databases**
  - 5 ECTS
  - CM-TD : 36h

- **Bases de données relationnelles**
  - 5 ECTS
  - CM : 15h
  - TD : 15h

- **Data Analysis and Visualisation**
  - 5 ECTS
  - CM-TD : 36h

- **Innovative Software Methods**
  - 6 ECTS
  - CM-TD : 45h
  - Project Week

- **Internet of Things**
  - 6 ECTS
  - CM-TD 45h
  - Project Week

- **Object Oriented Programming**
  - 5 ECTS
  - CM-TD : 36h

- **Project Management**
  - 5 ECTS
  - CM-TD : 36h

- **Research Workshop (semestre 1)**
  - 2 ECTS
  - CM-TD : 15h

- **Software Design**
  - 5 ECTS
  - CM-TD : 36h

- **Term Project 1**
  - 2 ECTS
  - Project Week
### Advanced Databases

**Degree:** Master 1 2IS  
**ECTS:** 5  
**Code:** IMUMA129  
**Volume:** CM-TD : 36h  
**Langue / Language:** English  
**Description:** Nouveau cours, descriptif en attente.  
**Evaluation:** Contrôle continu intégral 2 évaluations minimum  
**Enseignant/Teacher:** Enseignant à définir. Teacher to be announced.

### Data Analysis and Visualisation

**Degree:** Master 1 2IS  
**ECTS:** 5  
**Code:** IMUMA133  
**Volume:** CM-TD : 36h  
**Langue / Language:** English  
**Description:** Data analysis is more and more important in the understanding of business and decision making processes that usually include descriptive and predictive analysis. In this course, we address two main problems for computer scientists concerned by data analysis: data collection and data visualization. The course will be divided as follows: first, students will learn how to extract and deal with imperfections in data (data munging). Second, classical calculus techniques will be considered (such as data mining, Bayesian inference and regression). Third, the students will focus on communicating the results. The main techniques and principles for interactive visualization will be considered, and students will have the opportunity to experiment different kinds of tools from predefined libraries to specialized software. Prerequisites: probability and statistics (basics), database management (SQL), algorithms.  
**Evaluation:** Contrôle continu intégral 2 évaluations minimum  
**Enseignant/Teacher:** Enseignant à définir. Teacher to be announced.

### Bases de données relationnelles

**Degree:** Licence 3 MIASH/MIAGE  
**ECTS:** 5  
**Code:** ILUMA525  
**Volume:** CM : 15h TD : 15h  
**Langue / Language:** French / English  
**Description:** 15h CM : en français + supports de cours en anglais 15h TD : en anglais  
**Evaluation:** Contrôle continu intégral 2 évaluations minimum  
**Enseignant/Teacher:** L. Perrussel.

### Innovative Software Methods

**Degree:** Master 2 2IS  
**ECTS:** 6  
**Code:** IMUMA301  
**Volume:** CM-TD : 45h + Project Week  
**Langue / Language:** English  
**Description:** The aim of this course is to study new software and innovation processes. This course will consider as a starting point classical processes, namely iterative and incremental processes. It will then go further by first exploring recent techniques such as Xtreme programming; it will then consider new techniques issued from the field of innovation management, at first gamification. Gamification has been recently viewed as a disruptive factor in a software process and fosters innovation. The course will emphasize the experimental dimension: students will experiment numerous games. Prerequisites: software process, project management, Agile development  
**Evaluation:** Contrôle continu intégral 2 évaluations minimum + semaine bloquée  
**Enseignant/Teacher:** M. Chauvin.
### Internet of Things

- **Degree:** Master 2 IS
- **ECTS:** 6
- **Code:** IMUMA305
- **Volume:** CM-TD: 45h + Project Week
- **Language:** English

**Description:** This course provides a comprehensive introduction to the Internet of Things (IoT), an emerging technology that interconnects physical devices to the internet, enabling them to collect, share, and act on data. Students will explore fundamental concepts, architecture, and components of IoT systems, including sensors, actuators, communication protocols, and data processing and retrieval techniques.

The curriculum covers key areas such as device connection with Raspberry Pi board, the attraction and storage of data in a MongoDB database and their display using web-based technology (including Angular, Node.js ...).

Through focused hands-on and a term project, students will gain the skills needed to design, implement, and manage IoT solutions.

Particular attention will be paid to the sparing use of the various components and software in order to respect energy resource constraints.

**Evaluation:** Contrôle continu intégral 2 évaluations minimum

**Teacher:** B. Gaudou / L. Marsan

### Project Management

- **Degree:** Master 2 IS
- **ECTS:** 6
- **Code:** IMUMA205
- **Volume:** CM-TD: 45h + Project Week
- **Language:** English

**Description:** This course provides a comprehensive introduction to the Internet of Things (IoT), an emerging technology that interconnects physical devices to the internet, enabling them to collect, share, and act on data. Students will explore fundamental concepts, architecture, and components of IoT systems, including sensors, actuators, communication protocols, and data processing and retrieval techniques.

### Object Oriented Programming

- **Degree:** Master 1 MIAGE 2IS
- **ECTS:** 5
- **Code:** IMUMA131
- **Volume:** CM-TD: 36h
- **Language:** English

**Description:** The objective of this course is to be able to realize an application combining data management from multiple sources (Internet, files, databases...) with statistical analysis and data visualization. The course will be divided into three parts, each one involving a final project to be delivered: an initial section on advanced object programming, a second section on implementing algorithms from artificial intelligence, and a final part on framework-based software development and design pattern. Prerequisites: basic algorithmic, basic notions of Java programming (variables, cycles, conditionals, classes and methods...), basics of object programming, graphical interfaces.

**Evaluation:** Contrôle continu intégral 2 évaluations minimum

**Teacher:** B. Gaudou / L. Marsan

### Research Workshop (semestre 1)

- **Degree:** Master 1 MIAGE 2IS
- **ECTS:** 2
- **Code:** IMUMA123
- **Volume:** CM-TD: 15h
- **Language:** English

**Description:** Contemporary job market requires a dynamic adaptation to new technologies and practices. The first objective of this weekly workshop is to acquire the capabilities for personal development to be used for life-long personal and group training: information search, elaboration, and presentation (Objective 1). A second objective is to share knowledge and experiences among the group of students to obtain an homogeneous group (Objective 2). Finally, the third objective is to learn how to work in a team, putting in practice what is being learned in the soft skills course (Objective 3). Critical thoughts and constructive attitude will be encouraged.

**Evaluation:** Contrôle continu intégral 2 évaluations minimum

**Teacher:** Enseignant à définir.
<table>
<thead>
<tr>
<th>Course</th>
<th>Degree</th>
<th>ECTS</th>
<th>Code</th>
<th>Volume</th>
<th>Langue/Language</th>
<th>Description</th>
<th>Evaluation</th>
<th>Enseignant/Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Design</td>
<td>Master 1 2IS</td>
<td>5</td>
<td>IMUMA119</td>
<td>CM-TD : 36h</td>
<td>English</td>
<td>Nouveau cours, descriptif en attente. New course, description not yet available.</td>
<td>Continuous assessment 2 evaluations</td>
<td>Teacher to be announced.</td>
</tr>
<tr>
<td>Term Project 1</td>
<td>Master 1 2IS</td>
<td>2</td>
<td>IMUMA127</td>
<td>Project Week</td>
<td>English</td>
<td>Nouveau cours, descriptif en attente. New course, description not yet available.</td>
<td>Term Project</td>
<td>Teacher to be announced.</td>
</tr>
</tbody>
</table>
Semestre 2

- **Artificial Intelligence**
  - 5 ECTS
  - CM-TD : 36h

- **Business Intelligence**
  - 5 ECTS
  - CM-TD : 36h

- **Business Process Intelligence**
  - 5 ECTS
  - CM-TD : 36h

- **Marketing and Innovation**
  - 5 ECTS
  - CM-TD : 36h

- **Research Workshop (semestre 2)**
  - 2 ECTS
  - CM-TD : 15h

- **Term Project 2**
  - 2 ECTS
  - Project week

- **Web Programming**
  - 5 ECTS
  - CM-TD : 36h
<table>
<thead>
<tr>
<th>Course</th>
<th>Degree</th>
<th>ECTS</th>
<th>Code</th>
<th>Volume</th>
<th>Language</th>
<th>Description</th>
<th>Evaluation</th>
<th>Enseignant/Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artificial Intelligence</td>
<td>Master 1 2IS</td>
<td>5</td>
<td>IMUMA134</td>
<td>CM-TD: 36h</td>
<td>English</td>
<td>Artificial intelligence is a collection of computational techniques whose applications are revolutionising the way in which we think and make businesses. The objective of this course is to be able to conceive and program two examples of such applications: a recommender system and automated profiling system, and an automated personal assistant. The techniques that will be learned range from machine learning techniques such as clustering and deep learning, to optimisation, knowledge management, inference, and the basics of natural language processing. Prerequisites: good programming skills, basics of algorithms.</td>
<td>Contrôle continu intégral 2 évaluations minimum Continuous assessment 2 evaluations</td>
<td>U. Grandi.</td>
</tr>
<tr>
<td>Business Intelligence</td>
<td>Master 1 2IS</td>
<td>5</td>
<td>IMUMA130</td>
<td>CM-TD: 36h</td>
<td>English</td>
<td>The objectives of this course are to study the concepts associated to Business Intelligence (BI) as well as to conceive and implement the components of a decision support system. First, we study the decision process in the context of a company strategy. Second, we identify the different components of a decision support system, focusing on new concepts like Self-Service BI. Third, we study how to conceive and deploy a data warehouse (data model, extraction transformation and loading processes, SQL queries). Fourth, we address multidimensional modelling (conceptual, logical and physical models) and implementation. Finally, we study new solutions dedicated to data restitution and data visualisation.</td>
<td>Contrôle continu intégral 2 évaluations minimum Continuous assessment 2 evaluations</td>
<td>M. Garouani – R. Tournier.</td>
</tr>
<tr>
<td>Business Process Intelligence</td>
<td>Master 1 2IS</td>
<td>5</td>
<td>IMUMA120</td>
<td>CM-TD: 36h</td>
<td>English</td>
<td>Nouveau cours, descriptif en attente. New course, description not yet available.</td>
<td>Contrôle continu intégral 2 évaluations minimum Continuous assessment 2 evaluations</td>
<td>Enseignant à définir. Teacher to be announced.</td>
</tr>
<tr>
<td>Marketing and Innovation</td>
<td>Master 1 2IS</td>
<td>5</td>
<td>IMUMA121</td>
<td>CM-TD: 36h</td>
<td>English</td>
<td>Nouveau cours, descriptif en attente. New course, description not yet available.</td>
<td>Contrôle continu intégral 2 évaluations minimum Continuous assessment 2 evaluations</td>
<td>Enseignant à définir. Teacher to be announced.</td>
</tr>
</tbody>
</table>
### Research Workshop (semestre 2)

- **Degree**: Master 1 2IS
- **ECTS**: 2
- **Code**: IMUMA124
- **Volume**: CM-TD : 15h
- **Langue / Language**: English
- **Description**: Nouveau cours, descriptif en attente. New course, description not yet available.
- **Evaluation**: Contrôle continu intégral 2 évaluations minimum Continuous assessment 2 evaluations
- **Enseignant/Teacher**: Enseignant à définir. Teacher to be announced.

### Web Programming

- **Degree**: Master 1 2IS
- **ECTS**: 5
- **Code**: IMUMA132
- **Volume**: CM-TD : 36h
- **Langue / Language**: English
- **Description**: Nouveau cours, descriptif en attente. New course, description not yet available.
- **Evaluation**: Contrôle continu intégral 2 évaluations minimum Continuous assessment 2 evaluations
- **Enseignant/Teacher**: Enseignant à définir. Teacher to be announced.

### Term Project 2

- **Degree**: Master 1 MIAGE 2IS
- **ECTS**: 2
- **Code**: IMUMA128
- **Volume**: Project Week
- **Langue / Language**: English
- **Description**: Nouveau cours, descriptif en attente. New course, description not yet available.
- **Evaluation**: Term Project
- **Enseignant/Teacher**: Enseignant à définir. Teacher to be announced.