# Master 2
## Mechanics and Physics in Porous media

### Semester 3

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<tr>
<th>Course Title</th>
<th>Course Description</th>
<th>ECTS</th>
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| ● Statistical thermodynamics, adsorption & interfaces                       | This course aims at providing students with basic skills on thermodynamics of inhomogeneous systems, fundamentals and practical approaches of adsorption:  
  ● Statistical Thermodynamics  
  ● Thermodynamics of inhomogeneous systems  
  ● Practical approaches of adsorption properties | 45H   |
| ● Characterization of porous media by direct and indirect techniques        | This course aims at providing students with characterization techniques of micro- to macroporous materials:  
  Characterization of textural properties of porous media by indirect techniques  
  ● Determination of specific surface area.  
  ● Pore size distribution determination for micro- and mesoporous materials.  
  ● Macropore size distribution determination.  
  Characterization of porous media by direct techniques and imaging  
  ● X-ray spectroscopy and microscopy  
  ● X-ray and neutron imaging techniques  
  ● Image processing and analysis (data acquisition, reconstruction, segmentation and optimal parameter selection) | 45H   |
| ● Advanced mechanics and computational modelling                           | This course aims at providing students with theoretical and practical skills to understand and perform non linear computations:  
  ● Non linear behaviour of materials : Plasticity, damage  
  ● Numerical methods for non-linear problems  
  ● Case study on a Finite Element Program (Cast3M) | 37.5H  |
| ● Poromechanics, fracture and transport                                    | This course aims at providing students with basic concepts of poromechanics, fracture and transport:  
  ● Effective stress and poromechanics  
  ● Fracture mechanics  
  ● Intrinsic, apparent and relative permeabilities  
  ● Reactive transport | 37.5H  |
| ● French as a Foreign Language, English                                    |                                                                                                                                         | 30H   |
| ● Bibliography                                                              |                                                                                                                                          | 30H   |

### Semester 4

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<td>● Research internship</td>
<td>30 ECTS</td>
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