### Module: Materials Science

<table>
<thead>
<tr>
<th>Code</th>
<th>MSLS_T13</th>
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<tr>
<td>Degree Programme</td>
<td>Master of Science in Life Sciences (MSLS)</td>
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<tr>
<td>ECTS Credits</td>
<td>3</td>
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<td>Workload</td>
<td>90 h: Contact 36 h; Self-study 54 h</td>
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#### Module Coordinator
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  CH-4132 Muttenz

#### Lecturers
- Dr. Michael de Wild, FHNW
- Dr. Patrick Shahgaldian, FHNW
- Guest lecturers

#### Entry Requirements
The students need a Bachelor in Materials Sciences, Chemistry, Physics, Biotechnology, Engineering, Medical Technology or equivalent.

Basic lectures on materials sciences, chemistry, physics and biomaterials are a prerequisite to follow this course.

#### Learning Outcomes and Competences
After completing the module students will be able to:
- give an overview of the broad spectra of materials from the perspective of material sciences from the macroscopic to the nanoscopic scale;
- explain different state-of-the-art technologies and methodologies for the analysis of materials;
- illustrate the important approaches involved in designing and creating materials and nanostructures;
- express the central concepts in the field of nanosciences.

#### Module Content
The solid state is discussed based on material scientific theories. The crystallographic and electronic structure of solid materials, as well as optical, mechanical and magnetic properties are examined.

The surface of materials as an interface to the environment and biology is investigated, in particular in terms of biocompatible, biofunctional and biodegradable aspects. The influence of sterilization and irradiation on material properties is reviewed.

The macroscopic and microscopic structure and properties of metallic and ceramic materials are compared and state-of-the-art characterization methods are introduced. Imperfections and their effects on material properties are highlighted. The creation, microscopic and spectroscopic characterization of nanoscopic structures is discussed. Top-down as well as bottom-up approaches are emphasized and selected applications in the field of life sciences, energy and environment are treated.

#### Teaching / Learning Methods
- Lectures
- Group Exercises
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<tr>
<th>Assessment of Learning Outcome</th>
<th>Written exam of 3h at the end of the module (open book).</th>
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<td><strong>Bibliography</strong></td>
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**Language**

English

**Comments**


**Last Update**

05.04.2017