Advanced topics in nuclear reactor materials

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**Cursus**

<table>
<thead>
<tr>
<th>Language</th>
<th>English</th>
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<tbody>
<tr>
<td>Credits</td>
<td>4</td>
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<tr>
<td>Session</td>
<td>Winter</td>
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<td>Semester</td>
<td>Fall</td>
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<td>Exam</td>
<td>During the semester</td>
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<tr>
<td>Workload</td>
<td>120h</td>
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<tr>
<td>Weeks</td>
<td>14</td>
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<tr>
<td>Hours</td>
<td>3 weekly</td>
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<tr>
<td>Lecture</td>
<td>2 weekly</td>
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<tr>
<td>Exercises</td>
<td>1 weekly</td>
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**Remarque**

Cours donné par EPFL à PSI-Villigen

**Summary**

To comprehend advanced aspects of materials science as applied to nuclear power (fission and fusion), to get acquainted with materials for advanced plants, advanced damage characterization and life-time assessments

**Content**

- Materials for advanced nuclear plants
- Fuel behaviour under high burnup conditions
- Fuel behaviour under hypothetical accident conditions (RIA, LOCA)
- Important materials parameters
- Response of materials to high temperatures / high irradiation levels
- Advanced analytical tools for damage assessment
- Modeling of materials behaviour
- Working with highly radioactive materials
- Discussion of results from current research projects

**Learning Prerequisites**

**Recommended courses**

Nuclear fuels & materials

**Learning Outcomes**

By the end of the course, the student must be able to:

- Systematize Fuel behaviour under high burnup conditions
- Specify the role of material parameters in plant integrity assessment
- Formulate material behaviour under high temperature/high irradiation level

**Transversal skills**

- Make an oral presentation.
- Summarize an article or a technical report.
- Access and evaluate appropriate sources of information.
Teaching methods
Course takes place at PSI