**Advanced topics in nuclear reactor materials**

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<th>Cursus</th>
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<td>Génie nucléaire</td>
<td>MA3</td>
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**Language**: English

**Credits**: 4

**Session**: Winter

**Semester**: Fall

**Exam**: During the semester

**Workload**: 120h

**Weeks**: 14

**Hours**: 3 weekly

- Lecture: 2 weekly
- Exercises: 1 weekly

**Number of positions**: 1

**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