ETH-530

Advanced topics in nuclear reactor materials

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Cursus	Sem.	Type
Nuclear engineering	MA3	Opt.

Language of teaching	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	

Remark

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