Advanced topics in nuclear reactor materials

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Cursus

Génie nucléaire

Sem. MA3 Type Opt.

Language English
Credits 4
Session Winter
Semester Fall
Exam During the semester
Workload 120h
Weeks 14
Hours
Lecture 3 weekly
Exercises 2 weekly
Number of positions 1 weekly

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