Spring Semester 2010 Lecture „Safety of Nuclear Power Plants“

Lecture, when/where:	Tue: 10-12h / ML F34
Tutorial, when/where:	Tue: 12-13h / ML F34
Lecturers:	H.-M. Prasser, W. Kröger
Language:	English

Aim: To understand the physical fundamentals, functioning and safety aspects of nuclear power stations. Explanation of safety concepts and their implementation in system requirements and design. Examination of design basis accidents and postulated severe accident scenarios each together with corresponding physical phenomena. Learning methods of probabilistic risk analyses, illustration and assessment of results, handling of uncertainties. Lessons learnt from past accidents. Identification of potential optimizations and characteristics of advanced sustainable nuclear systems.

February

23	Problem of nuclear safety; safety philosophy ("defense-in-depth"), design principles, control of accident, trends/risk based approaches

March

02	Radiation protection
09	Reactor systems, dynamic behavior of the reactor, reactivity-induced accidents
16	Role of the reactivity feedback in case of reactivity-induced accidents
23	Loss of coolant accidents, emergency cooling systems, emergency power supply
30	Containment properties, passive safety systems

April

13	Core meltdown accidents
20	Operational experiences, current estimation of severe accidents; safety culture
27	Deterministics vs. probabilistics; the structure of probabilistic risk analysis (PRA), internal and external triggering events
04	Methods and results of PRA level 1 (e.g. fault- and event trees, human reliability, dependent failures)
11	Methods and results of PRA level 2 (source term)

Mai

18	Methods and results of PRA level 3 (consequences); uncertainties
25	Advanced reactor systems: evolutionary designs

June

01	Advanced reactor systems: inherently safe reactors, passive systems, closed fuel cycles/transmutation of actinides

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