



SH2773 Kärnkraftsäkerhet 6,0 hp

Nuclear Power Safety

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för SH2773 gäller från och med HT07

Betygsskala

P, F

Utbildningsnivå

Avancerad nivå

Huvudområden

Fysik, Teknisk fysik

Särskild behörighet

Recommended prerequisites: Completed course(s) in Nuclear Reactor Engineering.

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

Nuclear Power Safety (NPS) is paramount to both economic performance and public acceptance of nuclear power. The ultimate mission of NPS is to ensure that release of radioactive materials from nuclear power plants and its effect on plant personnel, public health and environment is as low as reasonably achievable. Technical content of NPS addresses both the Probability and Consequences of such radioactive releases from the plant under normal, abnormal and accident conditions, including hypothetical accidents. The NPS course aims to provide students with basics the need to be able to address questions: What are possible accidents? How do they occur? How often they occur? What are consequences?

After the course you shall possess a basic understanding of principles, issues and tools in nuclear power safety. This objective is achieved if you show that you are able to:

- Define safety requirements to be achieved in design, construction and operation of a nuclear power plant,
- Identify key milestones in accident progression scenarios (from design-basis accidents to severe core-melt accidents) and define respective prevention and mitigation measures,
- Perform a scoping assessment of a perceived threat against a plant safety barrier using contemporary knowledge and methods in safety analysis.

Kursinnehåll

The course addresses both fundamentals of safety design and methods for safety analysis of nuclear power plants, with emphasis on Light Water Reactors. Topics covered include

- safety characterization and safety features of nuclear power plants
- reactor safety principles and criteria
- design-basis and beyond-design-basis events
- accident phenomena, including severe accidents
- safety systems, containment performance
- deterministic safety analysis (basic elements)
- accident modeling simulation codes
- probabilistic safety analysis (basic elements)
- analysis of operation transients, accidents and severe accidents.
- emergency operation procedure, accident management
- safety issues and safety issue resolution
- operating experience, regulation and safety culture

Kurslitteratur

1. Lecture Materials and Complementary Course Notes
2. B. Pershagen, Light Water Reactor Safety, Pergamon Press, 1989
3. Manuals for computer codes for accident analysis

4. Scientific papers and technical reports on selected topics of plant safety

Examination

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Övriga krav för slutbetyg

To pass the course you should attend lectures and seminars, and fulfill the course assignments. The course assignments will be evaluated by the teacher. For the project course, you will present and defend your work (a safety analysis case) in seminars. The final examination constitutes of a written exam and an individual discussion with the teacher.

Lecture and seminar attendances – 2 univ. cr

First assignment – 1 univ. cr

Second assignment (project) – 2 univ. cr

Final exam – 1 univ. cr

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.