Basic Information:

Course Title: Nuclear Fuels and Nuclear Fuel Cycle
Lecturer: Assoc. Prof. Dr. Mladen Mitev
Phone: +359887148838
Email: mlmitev@inrne.bas.bg
Total Teaching Hours: 30 hours

Annotation

The Nuclear fuels, materials and thermomechanical processes in nuclear reactors examine mine, prepare, build and storage of nuclear fuels and materials. The discipline create skills for modelling and process analyses in the nuclear fuels and nuclear materials. At the end of the course, as a demonstration, specific tasks from the fields of the doctoral students enrolled in the course will be examined.

Course content

Topic 1: Nuclear fuels and breeding materials
Topic 2: Nuclear fuel cycles
Topic 3: Nuclear fuel extraction and enrichment
Topic 4: Production of fuel assemblies
Topic 5: Exploitation of fuel elements
Topic 6: Transmutation of minor actinides
Topic 7: Transport and storage of spent nuclear fuel
Topic 8: Codes for modeling the nuclear fuel behavior

Teaching and assessment methods

The teaching will be performed by lecturing.
The final grade will be formed by a passed exam in test form

Competencies acquired as a result of training

Nuclear fuel production
Nuclear fuel exploitation
Nuclear fuel safety

Literature:

1. Velev V., Filipov K., Nuclear Fuels, Ifo Design, Sofia, 2007;
2. Frank J. Rahn, Achelles Admantiades, A Guide to Nuclear Power Technology, A Wiley-Interscience Publication, John Wiley and Sons, 1986;
3. Lakov M., Theory of Nuclear Reactors, Ciela, Sofia, 2002.

4. “Basic Safety Principles for Nuclear Power Plants”, 75-INSAG-3 Rev. 1, INSAG-12, IAEA, Vienna, 1999;

5. “Безопасность Атомных Электростанции: Проектирование”, No SSR-2/1 (Rev1), Венна, Австрия, 2016;

6. “Безопасность Атомных Электростанции: Эксплуатация”, No SSR-2/2 (Rev.1) Венна, Австрия, 2017;

7. E. J Henley, H. Kumamoto, “Reliability engineering and risk assessment”, Prentice-Hall Inc. 1987; 8. “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant Specific Changes to the Licensing Basis”, U.S.NRC Regulatory Guide 1.174, Revision 1, November 2002;

9. Other IAEA safety publications, www.iaea.org