

Level : Master		
Course title: Nuclear Energy		
Status: elective		
ECTS: 8		
Requirements: -		
Learning objectives To introduction students to the processes of fission and fusion, with the basic principles of fission and fusion transformation of nuclear energy and controlled fission and fusion plants.		
Learning outcomes - General Skills: Upgrading of existing knowledge in the field of fission and fusion nuclear reactions, and obtaining a general picture of modern nuclear energy. - Specific Competencies: Understanding and adopting the general principles of nuclear energy transformation including techniques and technologies frequently used in commercial nuclear energy plants. .		
Syllabus <i>Theoretical instruction:</i> Nuclear Fission (Chain Reaction, Critical Mass, Sections, Multiplication Factor.) Fission reactors (Homogeneous and heterogeneous reactor, reactor shutdown, multiplication factor change, reactor control, reactor types). Cycles of nuclear fuel. Environmental problems. Structure of the power plant. Nuclear fusion (Fusion reactions - cross sections. Energy balance and burning conditions in fusion reactors.) Methods for heating plasma fusion (heating, trap with magnetic mirrors, adiabatic and shock compression.) Fusion plasma confinement (Tokamak devices, inertial confinement, laser radiation interaction with target.) <i>Practical instruction:</i> Calculus and individual term paper.		
Literature 1. R.L. Murray, Nuclear Energy, Elsevier, 2009 2. W.M. Stacey, Nuclear Reactor Physics, Wiley-VCH, 2007 3. W.M. Stacey, Fusion, Wiley-VCH, 2010 4. G. McCracken, P. Stott, Fusion, Elsevier, 2005		
Weekly teaching load	Lectures: 3	Exercises: 2