

Study: Physics			
Type and level of studies: Bachelor studies			
Course name: Nuclear Energetics			
Lecturer: Milosavljević Mijat			
Status: Elective			
ECTS: 6			
Attendance prerequisites:			
Course aims Introduction to the basic principles of nuclear energetics of fission and fusion and the facilities for controlled fission and fusion.			
Course outcome By the end of the course, the student should have developed: - General abilities: obtaining a general view on contemporary nuclear energy. - Subject-specific abilities: understanding and adopting general principles of the transformations of nuclear energy and the techniques and technologies that accompany this transformation.			
Course content <i>Theoretical part</i> Nuclear fission (Chain reaction, critical mass, cross-sections, multiplication factor.) Fission reactors (Homogeneous and heterogeneous reactor. Reactor poisoning. Multiplication factor change - reactor regulation. Reactor types.) Schematic diagram of a fission power plant. Nuclear fusion (Fusion reactions - cross-sections. Energy balance and combustion conditions in fusion reactors). Plasma heating methods in fusion (ohmic heating. Trap with magnetic mirrors. Adiabatic and impact compression. Pinches. Pinch instabilities.) Plasma confinement (Tokamak devices. Inertial confinement. Laser radiation interaction with a target. Energy balance in target micro-explosion) Energy balance of a thermonuclear power plant with inertial confinement. <i>Practical Part:</i> The exercises are demonstrative and include a visit to the nuclear reactor of the Institute in Vinča as well as training at plasma sources at the Laboratory for Physical Electronics.			
Literature 1. Д. Поповић: Основи нуклеарне технике, Научна књига, Београд, 1970. 2. Р. Јанев: Контролисана термонуклеарна фузија, СФИН II бр. 1, Београд, 1989. 3. В. Кнап: Нови извори енергије, Школска књига Загреб, 1993.			
Number of active classes			Other classes
Lectures: 2	Practical classes: 2	Other forms of teaching:	
Teaching methods Lectures (2 classes per week during the semester), exercises (2 classes per week during the semester).			
Assessment (maximum 100 points)			
Course assignments	points	Final exam	points
Lectures	10	Written exam	
Term test 1	20	oral exam	50
Term test 2	20	
Total	50		50