

Faculty of Science and Mathematics / PHYSICS / NUCLEAR PHYSICS

Course:	NUCLEAR PHYSICS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
5732	Mandatory	1	6	3+2+0
Programs	PHYSICS			
Prerequisites				
Aims	This course is aimed to complete general education of physicists, introducing students to the nuclear transformations and nuclear reactions, and developing their research abilities and skills to apply knowledge in practice.			
Learning outcomes				
Lecturer / Teaching assistant	Nevenka Antović / Marija Daković			
Methodology	Lectures, exercises, homework, seminar, consultations.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Radioactive nuclear transformations: Alpha decay – origin of alpha emitters, energy of alpha decay, theory, conservation laws.			
I week exercises				
II week lectures	Beta decay – theory, parity non-conservation.			
II week exercises				
III week lectures	Gamma decay – gamma transition probability, selection rules, internal conversion, nuclear isomerism.			
III week exercises				
IV week lectures	General laws governing nuclear reactions: classification, conservation laws, cross section.			
IV week exercises				
V week lectures	Interaction of neutrons with nuclei: Types of interaction. Slowing down of neutrons.			
V week exercises				
VI week lectures	Midterm exam – I			
VI week exercises				
VII week lectures	The Bohr theory of nuclear reaction.			
VII week exercises				
VIII week lectures	Scattering of fast neutrons. Basics of the nuclear optical model.			
VIII week exercises				
IX week lectures	Nuclear fission – elementary theory. Utilization of fission energy.			
IX week exercises				
X week lectures	Fission cross section. Chain reaction. Natural nuclear reactor. Fission asymmetry.			
X week exercises				
XI week lectures	Midterm exam – II			
XI week exercises				
XII week lectures	Nuclear reactions induced by light charged particles.			
XII week exercises				
XIII week lectures	Direct interaction reactions.			
XIII week exercises				
XIV week lectures	Nuclear reactions induced by gamma-quanta.			
XIV week exercises				
XV week lectures	Thermonuclear reactions.			

XV week exercises						
Student workload		6 x 40/30 = 8 hours per week. Total: 6 x 30 = 180 hours.				
Per week		Per semester				
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises 3 hour(s) i 0 minuts of independent work, including consultations		Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)				
Student obligations		Regular attendance, homework, seminar, two midterm exams and final exam.				
Consultations		As agreed with lecturer and teaching assistant.				
Literature		K. N. Mukhin, Experimental Nuclear Physics. Vol I, Mir Publishers, Moscow, 1987; W. E. Burcham, Nuclear Physics, Naučna knjiga, Belgrade, 1974 (in Serbian); D. Krpić, I. Aničin, I. Savić, Problems in Nuclear Physics, University of Belgrade, 1996 (in Serb				
Examination methods		Regular attendance: 4 points; homework: 2 x 2 points (4 points); seminar: 12 points; midterms: 2 x 15 points (30 points); final exam: 50 points. Grades (points): F (below 50), E (51-59), D (60-69), C (70-79), B (80-89), A (90-100).				
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points