Faculty of Science and Mathematics / MATHEMATICS / MECHANICS

Course:	MECHANICS			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
10151	Mandatory	3	5	3+2+0
Programs	MATHEMATICS			
Prerequisites	no			
Aims	Introducing students to the basic concepts, principles and laws of classical mechanics.			
Learning outcomes	- That the student understands the basic concepts, principles and laws of mechanics and the role of the mathematical apparatus in their formulation; - That the student develops a feeling for mathematical modeling of movement problems and gains basic experience in formulating and solving them.			
Lecturer / Teaching assistant	Prof. dr Ranislav Bulatović			
Methodology	Lectures, consultations, independent study and creation of assignments.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Space, time, movement, speed and acceleration of a point. Natural components of point acceleration.			
I week exercises	Introduction. Space, time, movement, speed and acceleration of a point. Natural components of point acceleration.			
II week lectures	Velocity and acceleration of a point in curvilinear coordinates. I homework.			
II week exercises	Velocity and acceleration of a point in curvilinear coordinates. I homework.			
III week lectures	Axioms of dynamics. Differential equations of motion of a material point. General theorems and first integrals.			
III week exercises	Axioms of dynamics. Differential equations of motion of a material point. General theorems and first integrals.			
IV week lectures	Basic models of rectilinear motion of a point. Qualitative examination of movement in a conservative force field. II homework.			
IV week exercises	Basic models of rectilinear motion of a point. Qualitative examination of movement in a conservative force field. II homework.			
V week lectures	Motion in the central force field. Keplers problem.			
V week exercises	Motion in the central force field. Keplers problem.			
VI week lectures	Dynamics of the system of free material points. The two-body problem.			
VI week exercises	Dynamics of the system of free material points. The two-body problem.			
VII week lectures	Recapitulation of the material covered. Preparation for the colloquium.			
VII week exercises	Recapitulation of the material covered. Preparation for the colloquium.			
VIII week lectures	Colloquium			
VIII week exercises	Colloquium			
IX week lectures	Kinematics of a rigid body. Angular velocity vector. Eulers theorem. Rivals formula.			
IX week exercises	Kinematics of a rigid body. Angular velocity vector. Eulers theorem. Rivals formula.			
X week lectures	Special cases of motion of a rigid body. III homework.			
X week exercises	Special cases of motion of a rigid body. III homework.			
XI week lectures	Kinematics and dynamics of complex motion of a point.			
XI week exercises	Kinematics and dynamics of complex motion of a point.			
XII week lectures	Dynamics of a non-free system of material points. Lagrangian equations of the first kind. Lagrange-Dalembert principle.			
XII week exercises	Dynamics of a non-free system of material points. Lagrangian equations of the first kind. Lagrange-Dalembert principle.			

XIII week lectures	Lagrangian equations of the second kind. IV homework.
XIII week exercises	Lagrangian equations of the second kind. IV homework.
XIV week lectures	Equilibrium stability of conservative systems. Small oscillations.
XIV week exercises	Equilibrium stability of conservative systems. Small oscillations.
XV week lectures	Hamiltons principle. Hamiltons equations.
XV week exercises	Hamiltons principle. Hamiltons equations.
Student workload	

Per week	**Per semester**
5 credits x 40/30=6 hours and 40 minuts 3 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **1 hour(s) i 40 minuts** of independent work, including consultations	Classes and final exam: **6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts** Total workload for the subject: **5 x 30=150 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) **30 hour(s) i 0 minuts** Workload structure: **106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend classes regularly, do and hand in homework and take a colloquium.
Consultations	Mondays and Tuesdays from 11 a.m. to 12 p.m
Literature	Written lectures; R.D. Gregory, Classical Mechanics, Cambridge, 2006; V. G. Vilke, Teorijska mehanika (na ruskom), MGU, 1998; S.V. Bolotin i dr., Teorijska mehanika (na ruskom), „Akademija“, Moskva, 2010.
Examination methods	Attendance to classes 4; Homeworks 16; Colloquium 35; Final exam 45
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