Course Unit Descriptor

Study Programme: Architecture

Course Unit Title: Mechanics

Course Unit Code: A207

Name of Lecturer(s): Nenad Grahovac, Miodrag Žigić

Type and Level of Studies: Bachelor level

Course Status (compulsory/elective): compulsory

Semester (winter/summer): winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 4

Prerequisites: None

Course Aims:

Professor's intention is to teach the student the following through this course: - to learn the basic concepts and definitions in mechanics as science about forces, that is, movement and body deformation under the influence of forces, - to understand the need of those concepts in the context of studying how to set the problem and how to solve the problem, - to develop the ability to recognize mechanics problems in the sense of identification, model formulation and possible solution, - to know basic principles of engineering thinking and decision making.

Learning Outcomes:

After this course the student should be able to: - connect acquired knowledge with the course of material resistance which follows directly, as well as to apply it in the engineering disciplines which use mechanics as a tool, -to recognize different movement of real systems, affects of different influence (forces and coupling forces), to analyze friction and energy balance, - to communicate with other engineers and work in a team, - to independently practice, diligently work and creatively think (to demonstrate understanding and skills as well as to use the knowledge for the design of new solutions of engineering problems), - to continue to study mechanics independently if there is a need for that.

Syllabus:

Studying objects and their basic movement. Force, momentum for the point (and axis) coupling forces. Force systems and coupling forces. Examples 1-16. Basic attributes of point movement. Global and local properties of the rigid body motion. Matrix method of assigning movement. Euler's theorem. The complex movement of the point. Theorem Koriolis. Examples 17-40. Axioms of dynamics. Momentum, angular momentum for the selected point, the kinetic energy of the material point and theorems on their changes. Basic theorems of the system dynamics. Equivalent systems of forces. Newton-Euler equations. Canning Theory. General case of the rigid body motion. Linear complementary problems. Examples 41-80. Poisson's Theorem. Invariants of the force system. Balance conditions of one and more bodies. Examples 81-100. Examples always start with the simplest problems and end with specific engineering applications. For example, engine crankshaft, ball bearing, universal (Cardan) joint , disk on the rough plane; free, forced and damped oscillatorions with one and two degrees of freedom, the dynamic damper, the dynamic balancing of rotors and the like. In the examples, different models of friction, elements of the impact theory, as well as the load of carrier lines are studied.

Required Reading: Relevant literature in English, tbd

Weekly Contact Hours: 4	**Lectures: 2**	**Practical work: 2**

Teaching Methods:

The deductive method is used in the lectures. Concepts and methods which can be applied for solving a great number of problems are selected. Seldom is the same problem solved with more different methods. Active participation of students is recommended so that each lecture is understood in class. A part of the examples is done in the lectures, and the rest is done in practice but also independently at home as a homework assignment. Student who complete homework assignment in each group of examples acquire the right to take the examination during semester, thus passing the whole or a part of the practical part of the examination right after the lectures. Besides regular, there are also pre-examination consultations as computer practice with direct application for the knowledge testing in one part of the course, by computer animation and internet guides. Practical part – problems passed during the semester are valid only in the first examination period that follows. Only students who pass the UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES COURSES IN ENGLISH practical part are invited to the oral part of the examination.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Group Assignment		Examination Assignment	
Exercises			
Test			
Test			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.