Course Unit Descriptor

Study Programme: Industrial engineering in exploitation of oil and gas

Course Unit Title: Theoretical mechanics

Course Unit Code: OAS259

Name of Lecturer(s): Associate Professor Eleonora Desnica

Type and Level of Studies: Bachelor academic degree

Course Status (compulsory/elective): Elective

Semester (winter/summer): Summer

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:

To determine and round up knowledge and skills acquired within mathematics and physics and enable deeper consideration of problems and methods of theoretical mechanics.

Learning Outcomes:

At the end of the course, students with adequate theoretical background will be able to make projects and calculations as well as solve problems in the areas of theoretical mechanics – statics, kinematics and dynamics.

Syllabus:

Theory

Classification and tasks in theoretical mechanics (statics, kinematics, dynamics); Basic concepts of classic Newtonian mechanics (motion, space, time, mass); Introduction to statics (axioms of statics, bond); Statics of a material point; Free body diagram, Elements of graphic statics; Introduction to kinematics; Basic task of kinematics of a rigid body; Translational motion of a rigid body; Rotation of a rigid body around a fixed axis; Complex motion of a material point; Introduction to dynamics; Dynamics of a material point (Newtonian laws); Dynamics of systems of rigid bodies.

Practice

Solving problems and examples in the areas covered by theoretical part of teaching.

Required Reading:

1. Morin, D.: Introductory to Classical Mechanics with Problems and Solutions, Cambridge University Press, 2008.
2. Goldstein, H., Poole, C., Safko, J.: Classical Mechanics, 3rd Edition, Pearson, 2001, ISBN: 0201316110.
3. Landau, L.D., Lifshitz, E.M., Mechanics, 3rd Edition, Volume 1 of Course of Theoretical Physics, Butterworth-Heinemann, 1976.

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

Teaching Methods:

Verbal teaching methods. Illustrative teaching methods. Demonstration teaching methods. Laboratory.

Classes (theoretical elaboration of thematic units, homework), computational exercises (preliminary exams, homework)

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	10	written exam	30
Practical work		oral exam	30
Preliminary exam(s)	30		
Seminar(s)			