Courses in Mechanics read by Assoc. Prof. Victor A. Chirikov, PhD.

1. Discipline: **MECHANICS for NAVAL ARCHITECTURE AND MARINE TECHNOLOGY**

30h Lectures, 15h Seminars, Credits: 6

Semester: **THIRD**

## ANNOTATION

The discipline "Mechanics" comprises three main parts: Statics, Kinematics and Dynamics. In Statics methods for reduction and conditions of equilibrium of force systems are studied, their application for solving of specific engineering problems as well. Mainly, the problems concerning determination of support reactions are solved here. Equilibrium of body systems with dry friction are additionally considered in this course. In Kinematics the motion of a particle and the basic motions of a rigid body, such as translation, rotation and planar motion, are studied. Kinematics of some common planar mechanisms is considered as well. The Dynamics part is devoted to the classical mechanical methods for derivation of the differential equations of motion of a particle, a rigid body and a mechanical system under forces application. After the basic concepts introduction, the methods for study of motion and equilibrium of the restricted mechanical systems are considered.

To assimilate the discipline knowledge of mainly the following mathematical sections are required: vector calculus, analytical geometry, differential and integral calculus, analysis of differential equations.

1. Discipline: **TECHNICAL MECHANICS for NAVIGATION**

30h Lectures, 15h Seminars, Credits: 4

Semester: **SECOND**

## ANNOTATION

The discipline "Technical Mechanics" comprises four main parts: Statics, Strength of Materials, Kinematics and Dynamics. In Statics methods for reduction and conditions of equilibrium of force systems are studied, their application for solving of specific engineering problems as well. Mainly, the problems concerning determination of support reactions are solved, while equilibrium of bodies with dry friction is additionally considered here. Strength of Materials is a continuation of Statics. In this part the internal forces in structures and sizing methods at major cases of loading are studied. In Kinematics the motion of a particle and the basic motions of a rigid body, such as translation, rotation and planar motion, are considered. Kinematics of some conventional planar mechanisms is introduced here. The problems concerning relative motion with respect to the two different moving observers are discussed. The Dynamics part is devoted to the classical mechanical methods for derivation of the differential equations of motion of a particle, a rigid body and a mechanical system under forces application. After the basic concepts introduction, the methods for determination of motion of the restricted mechanical systems are considered. Finally Kinematics and Dynamics of a body with a fixed point is presented, that is the basis for study of a gyroscope motion.

To assimilate the discipline knowledge of mainly the following mathematical sections are required: vector calculus, analytical geometry, differential and integral calculus, analysis of differential equations.

1. Discipline: **APPLIED MECHANICS for INDUSTRIAL MANAGEMENT and ENGINEERING DESIGN**

30h Lectures, 15h Seminars, Credits: 5

Semester: **FIRST**

## ANNOTATION

The discipline "Applied Mechanics" comprises four main parts: Statics, Strength of Materials, Kinematics and Dynamics. In Statics methods for reduction and conditions of equilibrium of force systems are studied. Mainly, the problems concerning determination of support reactions are solved here. In Strength of Materials part the internal forces in structures and sizing methods at major cases of loading are dicussed. In Kinematics the motion of a particle and the basic motions of a rigid body, such as translation, rotation and planar motion, are considered. The notions of displacement, velocity and acceleration, as well linear, as angular for bodies are introduced. Kinematics of some planar mechanisms and their points motion are considered here. The Dynamics part is devoted to the classical mechanical methods for derivation of the differential equations of motion of a particle, a rigid body and a mechanical system under forces action.

To assimilate the discipline knowledge of mainly the following mathematical sections are required: vector calculus, analytical geometry, differential and integral calculus, analysis of differential equations.