УНИВЕРСИТЕТ
ПО АРХИТЕКТУРА
СТРОИТЕЛСТВО
И ГЕОДЕЗИЯ

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УТВЪРЖДАВАМ:
Ръководител катедра „Техническа механика:
/проф. д-р инж. П. Павлов/

S C H E D U L E
(lectures)

SUBJECT: Theoretical Mechanics I

Specialty „Structural Engineering"

Department: Technical Mechanics, Faculty of Hydraulic

Leading lecturer: Prof. Dr. Eng. Peter Pavlov

Professional referral: 5.7. Architecture, Civil engineering and Geodesy		Specialty „Structural Engineering" Specialization ..... Degree MASTER OF SCIENCE
Course ID/Code: TM1aCBC		
Year of education: 1	Semester: 2 - summer	Form of education: FULL TIME UNIVERSITY LEVEL Assessment: exam Method of teaching: L & E

ACADEMIC CURRICULUM 2021/2022	Total hours			ECTS credits
	Academic Hours		Self-preparation	
	Lectures	Seminars		
Hours:	45	30	75	5

SCHEDULE - LECTURES - SE - 1 COURSE - ACADEMIC 2022-2023 YEAR - SUMMER SEMESTER

LECTURER: prof. Dr. eng. Peter Pavlov

week	date	TOPIK	Number of hours:
		Introduction	
1	20.02.2023	Subject and sections of the Mechanics. Subject, sections and basic concepts in the Theoretical Mechanics. Types of material objects, studied in the Theoretical Mechanics.	1
1	20.02.2023	Free and unfree material objects. Concept of links and types of links. Degrees of freedom (DOF) of the material objects.	1
		Module 1.1 Kinematics of a particle	
1	20.02.2023	Subject of the Kinematics. Kinematic characteristics of the particle. Ways of setting the motion of a particle.	1

2	27.02.2023	Velocity of a particle in vector, coordinate and natural way of setting the motion.	1
2	27.02.2023	Acceleration of a particle in vector, coordinate and natural way of setting the motion.	1
2	27.02.2023	Relationship between Cartesian and Natural projections of velocity and acceleration of a particle in motion in the plane.	1
3	06.03.2023	Private cases of motion of a particle - rectilinear, circular motion, harmonic motion.	1
		Module 1.2 Kinematics of a body	
3	06.03.2023	Main task of the kinematics of a body. Law of motion. Kinematic characteristics of the body.	1
3	06.03.2023	Kinematics of the most common motion of a body (motion of a body in the space). Kinematic characteristics of the body. Kinematic characteristics of a point of the body.	1
4	13.03.2023	Kinematics of the translational motion of a body. Kinematic characteristics of the body. Kinematic characteristics of a point of the body.	1
4	13.03.2023	Kinematics of the rotational motion of body. Kinematic characteristics of the body. Kinematic characteristics of a point of the body.	1
4	13.03.2023	Kinematics of the plane motion of a body. Plane motion as a sum of simple motions. Kinematics characteristics of the body.	1
5	20.03.2023	Velocity of a point of a plane moving body. Theorem for distributing the velocities of a point of a plane moving body. Instantaneous center of velocities.	1
5	20.03.2023	Acceleration of a point of a plane moving body. Theorem for distributing the accelerations of a point of a plane moving body. Instantaneous center of accelerations.	1
5	20.03.2023	Kinematics of the spherical motion of a body (motion of a body with one fixed point). Eulerian angles. Kinematic characteristics of the body. Kinematic characteristics of a point of the body.	1
		Module 1.3 Kinematics of a material system	
6	27.03.2023	Kinematics of a plane mechanism. Plan of the velocities of a plane mechanism. Plan of the accelerations of a plane mechanism.	1
6	27.03.2023	Transmission mechanism.	1
6	27.03.2023	Kinematics of the complex motion of a particle. A Theorem of absolute velocity in complex motion of a particle. A Theorem of the absolute acceleration in complex motion of a particle.	1
		Module 2.1 Force, moment of a force	1
7	03.04.2023	Subject and basic concepts in the Statics. Axioms and basic theorems of Statics.	1
7	03.04.2023	Projection of a force on plane and axis. Moment of a force about a point and an axis.	1
7	03.04.2023	Force operations allowed. Collecting two parallel forces.	1
8	10.04.2023	A couple of forces. Couples operations allowed. Lemma for parallel transmission of force.	1
		Module 2.2 Reduction of a group of forces	
8	10.04.2023	Reduction of spatial group of forces	1
8	10.04.2023	Reduction of an arbitrary spatial group of forces. Scalar components of the reduction dynam. Cases of reduction of an arbitrary spatial group of forces.	1
9	17.04.2023	Reduction to dynam and power screw. Central axis.	1
9	17.04.2023	Private cases of reduction of a spatial group of forces.	1
9	17.04.2023	Reduction of a competitive group of forces.	1
10	24.04.2023	Reduction of a plane group of forces.	1
10	24.04.2023	Reduction of a group of parallel forces.	1
10	24.04.2023	Center of gravity of a system of particles, body, surface (disk), line (rod).	1
11	01.05.2023	Theorems for determining the center of gravity. Center of gravity of some characteristic figures.	1
11	01.05.2023	Distributed loads.	1
		Module 2.3 Statics (rest) of a particle, body, system of bodies (equilibrium of a group of forces)	
11	01.05.2023	Supports and support reactions.	1
		Module 2.3.1 Statics (rest) of a particle	
12	08.05.2023	Statics (rest) of a particle loaded with a spatial initial group of forces.	1
12	08.05.2023	Statics (rest) of a particle loaded with a plane initial group of forces.	1
		Module 2.3.2 Statics (rest) of a body	
12	08.05.2023	Statics (rest) of a body loaded with a spatial group of forces.	1
13	13.05.2023	Statics (rest) of a body loaded with a plane group of forces.	1
		Module 2.3.3 Statics (rest) of a material system	
13	13.05.2023	Kinematic state of the systems. Methods for determining reactions in external and internal connections in planar disk systems.	
13	13.05.2023	Gerber systems.	1

14	22.05.2023	Three-joint systems.	1
14	22.05.2023	Plane systems of rods (trusses). Methods for determining the forces in the bars.	1
14	22.05.2023	Combined systems.	1
		Module 2.4 Rest (movement) of bodies in the presence of forces of friction	
15	29.05.2023	Friction. General information, friction classification.	1
15	29.05.2023	Friction at rest (with a tendency to slip), sliding and rolling.	1
15	29.05.2023	Friction of a flexible thread (rope) on a cylinder.	1
		Total lectures	**45**

Note: Lectures on yellow dates will be held at an additional time.

Lecturer:.....
(prof. Dr. eng. Peter Pavlov)