



<b>COURSE: PHYSICS I</b>		
<b>DEGREE: MECHANICAL ENGINEERING</b>	<b>YEAR: 1st</b>	<b>TERM: 1st</b>

<b>WEEKLY PROGRAMMING</b>								
WEEK	SESSION	DESCRIPTION	GROUPS		LABORATORY	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURE	SEMINAR	4.SB01 4.SB02 4.SB03	DESCRIPTION	CLASS HOURS	HOMEWORK HOURS Maximum 7 H
1	1	<b>Kinematics of a particle.</b> Position, velocity, and acceleration vectors; trajectory equation. Intrinsic coordinates: Tangential and normal components.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
1	2			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
2	3	<b>Kinematics of a particle.</b> Circular motion. Frames of reference.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
2	4			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
3	5	<b>Dynamics of a particle.</b> Newton's Laws of motion. Free-body diagrams. Examples of forces: weight, elastic force, normal force, centripetal force, string tension, friction force.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
3	6			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
4	7	<b>Dynamics of a particle.</b> Principle of linear impulse and momentum. Angular momentum and moment of a force. Static equilibrium.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
4	8			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
5	9	<b>Conservative and no-conservative forces.</b> Scalar and vectorial functions. Principle of work and energy. Kinetic energy. Conservative forces and potential energy. Conservation of mechanical energy.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
5	10			X		- Solve the proposed exercises.	1.66	

						- Participation in discussions and activities.		
6	11	<b>Kinetics of a system of particles.</b> External and internal forces. Generalized Newton's second Law. The center of mass. Energy, linear momentum, and angular momentum. Conservation of energy and momentum. Collisions	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
6	12			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
7	13	<b>Planar kinematics of a rigid body.</b> Translation. Rotation about a fixed axis. Relative velocity in plane motion. General plane motion. Moments of inertia. Steiner's theorem. Rolling motion.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
7	14			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
8	15	<b>Planar dynamics of a rigid body.</b> Moment of a force. Moment of a couple. Reduction of a system of forces. Equations of motion of a rigid body. Plane motion equations: Translation, fixed-axis rotation, general plane motion. Rolling motion.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
8	16			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
9	17	<b>Introduction to thermodynamics.</b> Definitions. Equilibrium, pressure, processes and equation of state. P-V diagrams.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
9	18			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
10	19	<b>Introduction to thermodynamics.</b> Temperature. Expansion and compressibility coefficients. Phase diagrams.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
10	20			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
11	21	<b>First principle of thermodynamics.</b> Work, heat and the first principle of thermodynamics. Joule experiment. Heat capacity, adiabatic processes	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6
11	22			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
12	23	<b>Second principle of thermodynamics.</b> Kelvin-Planck and Clausius formulations. Heat engines and heat pumps. Carnot's theorem.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	6

12	24			X			- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
13	25	<b>Entropy.</b> Clausius theorem. T-S diagram. Reversible and irreversible processes.	X				- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	4
14	26	Errors and uncertainty in Physics measurements. (*)			X		- Reading of the guideline document. - Analysis of results. - Preparation of the report.	1.665	3
14	27	Mechanics phenomena. (*)			X		- Reading of the guideline document. - Data acquisition. - Analysis of results. - Preparation of the report.	1.66	3
14	28	Mechanics phenomena. (*)			X		- Reading of the guideline document. - Data acquisition. - Analysis of results. - Preparation of the report.	1.665	3
	29	Thermodynamics phenomena. (*)			X		- Reading of the guideline document. - Data acquisition. - Analysis of results. - Preparation of the report.	1.665	3
<b>SUBTOTAL</b>								<b>48.33</b>	<b>+ 94 = 136.33</b>
15		Tutorials, Handing in, etc						1.66	0
16-18		Assessment						0	12
<b>TOTAL</b>								<b>150</b>	

**(\*) The schedule of laboratory sessions is tentative and will be confirmed by the course coordinator.**