Universidad Carlos III de Madrid

COURSE: PHYSICS I		
DEGREE: Physics engineering	YEAR: 1st	TERM: 1st

WEEKLY PROGRAMMING

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	**Kinematics of a particle.** Rectilinear and curvilinear motion. Position, velocity, and acceleration vectors. Trajectory equation. Tangential and normal components of the acceleration.	X				- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
1	2			X			- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
2	3	**Relative motion.** Translating Frame. Rotating Frame. Centrifugal and Coriolis accelerations.	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	**Dynamics of a particle.** Newton's Laws of motion. Free-body diagrams. Examples of forces: gravity, spring force, normal force, string tension, friction force.	X				- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
3	6			X			- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
4	7	**Dynamics of a particle.** Non-inertial frames. Linear momentum. Angular momentum and torque.	X				- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
4	8			X			- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
5	9	**Work and Energy.** Work of a force. Principle of work and 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

				X				
5	10			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
6	11	**Work and Energy** Potential energy diagrams. Effective potential. Power.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
6	12			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
7	13	**Systems of particles.** Two-particle systems.External and internal forces. Linear momentum. Angular momentum.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
7	14			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
8	15	**Systems of particles.** Angular momentum and Rotations. External Torques.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
8	16			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
9	17	**Rigid body.** Moment of inertia. Angular momentum. Planar motion. Equations of motion of a rigid body. Work and Energy of a rigid body.	X			-Reading in advance of the corresponding book chapters. - - Study and personal work on the lecture.	1.66	5
9	18			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
10	19	**Oscillations.** Harmonic motion. Undamped and damped free oscillations. Forced oscillations. Resonances.	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	**Oscillations.** Coupled oscillators. Normal modes of vibration. Small oscillations.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
11	22			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
12	23	**Waves** Wave equation. Mechanical waves. Transverse and longitudinal waves. Standing waves.	X			- Reading in advance of the corresponding book chapters. - Study and personal work on the lecture.	1.66	5
12	24			X		- Solve the proposed exercises. - Participation in discussions and activities.	1.66	
13	25	**Waves** Superposition and interference. Group velocity. Light and Sound.	X			- Reading in advance of the corresponding book chapters. -Study and personal work on the lecture.Reading in advance of the corresponding book chapters. Study and personal work on the lecture.	1.66	5

14	27	**LAB Session #1** Errors and uncertainty in Physics measurements. (**)			X		- Reading of the guideline document. - Analysis of results. - Preparation of the report.	1.66	3
14	27	**LAB Session #2** Mechanics phenomena. (**)			X		- Reading of the guideline document. - Data acquisition. - Analysis of results. - Preparation of the report.	1.66	3
14	28	**LAB Session #3** Mechanics phenomena. (**)			X		- Reading of the guideline document. - Data acquisition. - Analysis of results. - Preparation of the report.	1.66	3
	29	**LAB Session #4** Oscillations and waves. (*)			X		- Reading of the guideline document. - Data acquisition. - Analysis of results. - Preparation of the report.	1.66	3
SUBTOTAL								**48.33 + 80 = 128**	
15		Tutorials, Handing in, etc						2	2
16-18		Assessment						3	15
TOTAL								**150**	

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