



COURSE: PHYSICS I

DEGREE: AEROSPACE 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. 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 | 5 |
| 1 | 2 | | | X | | - Solve the proposed exercises. - Participation in discussions and activities. | 1.66 | |
| 2 | 3 | Kinetics of a particle. Newton's Laws of motion. Inertial frame of reference. 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 |
| 2 | 4 | | | X | | - Solve the proposed exercises. - Participation in discussions and activities. | 1.66 | |
| 3 | 5 | Kinetics of a particle. Non-inertial frames. Principle of linear impulse and momentum. Angular momentum and moment of a 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 | 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 | 5 |
| 4 | 8 | | | X | | - Solve the proposed exercises. - Participation in discussions and activities. | 1.66 | |
| 5 | 9 | Test exam#1 (*). | X | | | - Test exam. | 1.66 | 6 |
| 5 | 10 | | | X | | - Solve the proposed exercises. - Participation in discussions and activities. | 1.66 | |
| 6 | 11 | Systems of particles. External and internal forces. Energy, linear momentum. Conservation of energy and momentum. | X | | | - Reading in advance of the corresponding book chapters. - Study and personal work on the lecture. | 1.66 | 5 |

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| | | Collisions. | | | | | | | |
| 6 | 12 | | | X | | | - Solve the proposed exercises. - Participation in discussions and activities. | 1.66 | |
| 7 | 13 | Systems of particles. Angular momentum and Rotations. External Torques. Example: The rigid body. Moment of inertia. | 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 | Planar kinetics of a rigid body. Moment of a force. Moment of a couple. Reduction of a system of forces. Equations of motion of a rigid body. | 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 | Test exam#2 (*) | X | | | | - Test exam. | 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. Small oscillations.. | 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 | Fluids. Pressure and density. Archimedes' Principle. Bernouilli's Theorem. Laminar and turbulent regimes. | 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 Transverse and longitudinal waves. Stationary waves. Superposition and interference. Light and Sound. | 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 | Test exam#3 (*) . | X | | | | - Test Exam. | 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. | 1.66 | 3 |

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| | | | | | | | - Analysis of results. - Preparation of the report. | | |
| SUBTOTAL | | | | | | | | 48.33 | + 80 = 128 |
| 15 | | Tutorials, Handing in, etc | | | | | | 2 | 2 |
| 16-18 | | Assessment | | | | | | 3 | 15 |
| TOTAL | | | | | | | | 150 | |

(*) Exam dates are tentative.

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