

| No. | Title | | |
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| 1. | Subject | Mechanics | |
| 2. | Subject Code | KE002 | |
| 3. | Status | Major | |
| 4. | Credit Hours | Four (4) [(3L + 1T) x 14 weeks + 12 hours Lab] | |
| 5. | Semester and Year | Semester 1 | |
| 6. | Pre-requisite | - | |
| 7. | Mode of Delivery | Lectures, tutorials and laboratory | |
| 8. | Assessment | Assignments | 10% |
| | | Lab work/test | 20% |
| | | Class Test | 10% |
| | | Final Examination | 60% |
| 9. | Objectives | To introduce the general principles of mechanics and to give practice in their applications. | |
| 10. | Learning Outcomes | <p>Upon the completion of the unit, the students will be able to:</p> <ol style="list-style-type: none"> 1. Manipulate forces acting on a body under equilibrium conditions; 2. Apply Newton's second law to particle in motion under friction; 3. Apply suitable equations to solve problems on projectiles and free fall under gravity; 4. Solve problems on centre of gravity of rigid bodies. | |
| 11. | Details of subject | Contents | Hours |
| | | Chapter 1: Vectors | |
| | | Vector quantities. Vector representation. Unit vectors. Addition of vectors. Their resolution into components. | 3L 1T |
| | | Chapter 2: Addition of forces | |
| | | Addition of forces, Equilibrium and acceleration under concurrent forces, turning force, | 3L 1T |
| | | Chapter 3: Kinematics | |
| | | Displacement, velocity and acceleration, constant speed and constant velocity. Motion with constant acceleration, standard equations. Graphical presentation with the time. | 9L 3T |
| | | Chapter 4: Equilibrium | |
| | | Equilibrium of a rigid body Particle. Rigid body. Constrain on and degree of freedom of objects. | 3L 1T |
| | | Chapter 5: Moment and couples. | 3L 1T |
| | | Chapter 6: Newton's Laws | |
| | | Force and acceleration, Newton's First law, second law, and third law, connected particles. Free body digrams. | 3L 1T |

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| | | Chapter 6: Friction Limiting friction. Coefficient of friction. Linear motion with friction. | 3L 1T |
| | | Chapter 7: Centre of gravity Newton's theory of gravitation, centre of gravity. Centre of gravity of a rigid body. | 3L 1T |
| | | Chapter 8: Projectiles Motion under gravity. Example: free fall under gravity. Motion of a projectile. Horizontal projection. Symmetrical path. Equation of trajectory. | 6L 2T |
| | | Chapter 9: Elasticity Elastic extension under load, shear force and bending moment. Hooke's Law. Energy stored in an elastic string. | 6L 2T |
| | | Total | L = 42 hrs T = 14 hrs P = 12 hrs 68 hours |
| 12. | Main Reference | 1. Sadler, A. J., and Thorning, D. W. S. (1992). <i>Understanding Mechanics</i> . Oxford University Press. | |
| 13. | Additional Reference | 1. Bostock, L., and Chandler, S. (1996). <i>Mechanics for A-Levels</i> . Stanley Thornes (Publishers) Ltd. | |
| 14. | Practical/Lab Classes | <p>Students are required to conduct the following practical laboratory experiments, each of 2 hours duration:</p> <ol style="list-style-type: none"> 1. Investigation of the extension and vibration of a loaded spring. 2. Newton's second law. 3. Moment of inertia of a flywheel. 4. Coplanar Forces. 5. Investigating the strength of materials. 6. Oscillating system. | |