

Mechanics

Objectives: 00UR

Discipline: Physics

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Objectives and Standards for *Mechanics*

In the following chart, italicized items marked with (*) are optional enrichment items which will not be evaluated in the final exam (these are not the only possible enrichment items — they are the most commonly used ones).

OBJECTIVE	STANDARD	LEARNING OBJECTIVES
Course Objective	Achievement Context	
To analyze different physical situations and phenomena in terms of the fundamental principles of classical mechanics	<ol style="list-style-type: none"> In theoretical situations, working individually to solve problems taken from a standard college-level Physics textbook In experimental settings, in the lab, working individually or in a group, with the aid of a laboratory write-up, or of scientific documentation, to write lab reports 	
	General Performance Criteria	
	<ol style="list-style-type: none"> Appropriate use of concepts, laws and principles Adequate use of diagrams to represent physical situations Appropriate use of terminology and units Appropriate use of vector techniques where appropriate Accurate graphical and mathematical representations of motion Proper justification of the steps taken in analyzing a situation Rigorous application of Newton's Laws and the conservation principles Critical judgment of results Meticulous experimentation Proper interpretation of the limits of models 	

Elements of Competency	Specific Performance Criteria	Intermediate Learning Objectives
1. To describe the translational and rotational motion of objects	1.1. Precise use of concepts basic to the description of translational motion 1.2. Solution of problems in one dimensional motion with constant acceleration, including free fall problems	1.1.1. Define displacement, distance, average and instantaneous speed, average and instantaneous velocity, average and instantaneous acceleration. 1.2.1. Apply the standard equations describing motion in one dimension with constant acceleration using appropriate sign conventions to situations involving: <ul style="list-style-type: none"> · one object with a single acceleration; · one object whose acceleration takes on different values in different parts of the motion; and · 1.2.

Elements of Competency	Specific Performance Criteria	Intermediate Learning Objectives
		4.4.4. Analyze the motion of the centre of mass of a system of particles.
	4.5. Precise use of the concepts basic to the understanding of the principle of conservation of angular momentum	4.5.1. Define angular momentum of a particle, angular momentum of a rigid body.
	4.6. Rigorous application of the principle of conservation of angular momentum to solve problems	4.6.1. State the principle of Conservation of Angular Momentum, and recognize the conditions under which it may be used. 4.6.2. Calculate the angular momentum of a body or of a system around a fixed axis.
	4.7. Integrate previous physics knowledge - e.g. projectile motion - circular motion with knowledge of the three conservation principles- to solve multi-step problems	
	4.8. Logical and coherent explanation of everyday phenomena in terms of the conservation principles and other laws or principles from the course as necessary	
5. To verify experimentally some of the laws and principles of mechanics	5.1. Careful performance of the laboratory procedures provided	5.1.1. Work cooperatively in a small group to obtain data. 5.1.2. Employ safe procedures and show concern for one's own safety and the safety of others in the lab. 5.1.3. Exercise care in carrying out measurements to obtain the best results possible.
	5.2. Logical analysis of and appropriate mathematical treatment of data	5.2.1. Choose and apply appropriate mathematical, graphical and logical tools.
	5.3. Drawing of coherent and justifiable conclusions	5.3.1. Understand and apply the principles involved in each experiment. 5.3.2. State clearly the conclusions to be drawn from your analysis and justify them.
	5.4. Proper adherence to course norms for submitting laboratory reports	

Methodology

Mechanics is generally presented in a series of lectures, labs and demonstrations. Emphasis is placed on developing a basic grasp of the main principles introduced in