

## **COURSE SYLLABUS FORM**

American University of Beirut

Faculty of Arts and Sciences

Department: **Physics**

Course Number and Title: **Phys 103, Physics for Life Science**

### **1. Course Learning Outcomes**

This course is a freshman-level course offered for students of life sciences and does not include advanced calculus. The student after finishing this course should :

- Learn basic concepts of mechanics within the context of the Newtonian theory.
- Get familiar with problem-solving strategy
- Learn how to deal with kinematics , that is how to describe the motion of a particle in one and two dimensions.
- Study the dynamics of simple systems with the help of Newton's laws of mechanics.
- Get familiar with the concept of work and energy and energy conservation.
- Get acquainted with momentum conservation and how this principle is applied together with energy conservation to study collision problems.
- Understand how to analyze circular motion, and how to deal with motion in a rotating system
- Study mechanical systems in rotational equilibrium, deals with basic rotational dynamics , and apply the angular momentum conservation to those systems.

### **2. Resources available to the students**

Text book: College Physics

By R.A. Serway & J.S. Faughn

Saunders College Publishing

1999, 5<sup>th</sup> edition

Web site assigned to this text.

### **3. Grading Criteria**

The final grade is determined on the basis of 2 quizzes , selected out of 3 given quizzes, such that the two best quizzes have 25% each, and the final exam will be weighted by 50%. The final grade may be modified according to an adjustable normal curve.

#### 4. Schedule

Week	Topic	Assignments
1	Introduction: Definition of physical quantities: mass length and time. Dimensional analysis. Coordinate systems. Conversion of units. Significant figures.	Homework problems from Chapter 1
2 -3	Motion in One dimension: Displacement. Average versus instantaneous velocity. Acceleration. One dimensional motion at constant acceleration. Free fall.	Homework problems from Chapter 2
4-5	Motion in Two Dimensions: Vectors versus scalars. Simple vector operations. Projectile motion without friction. Relative velocity.	Homework problems from Chapter 3 Reading: Physics in Action: Freely Falling Objects
6-7	The Laws of Motion: The concept of Force. Newton's laws of motion. Application of Newton's laws of motion including friction.	Homework problems from Chapter 4 Reading: Physics in Action: Forces and Motion
8-9	Work and Energy: Definition of work. Kinetic energy and the work-energy theorem. Conservative and non-conservative forces.	Homework problems from Chapter 5
10-11	Momentum and Collisions: Momentum and Impulse. Conservation of momentum. Collisions: elastic and inelastic	Homework problems from Chapter 6
11-12	Circular Motion: Relation between angular and linear quantities. Centripetal acceleration. Motion of rotating systems. Newton's law of universal gravity. Kepler's laws of planetary motion	Homework problems from Chapter 7

12-14	Rotational Equilibrium and Rotational Dynamics: Torque. Center of Gravity. Torque and angular acceleration. Rotational kinetic energy. Angular momentum and conservation of angular momentum.	Homework problems from Chapter 8
-------	--	----------------------------------

### **5. Course Policy**

Regular attendance. No make up of the quizzes. Make up of the final exam only with legal justified reasons. Cheating in the exams is prohibited and can lead to expelling the student from the course.