SYLLABUS

Course Code	*Course Num.*	*Course Name*	*Credit Hours*	*Lec.*	*Lab.*	*Tut.*	*Private study*	*Pre-requisites*	*Course Level*	*Language*
PHY	**105**	**Classical Mechanics (1)**	**3**	**2**	**0**	**2**	**5**	**PHY 101**	**2**	**English**

A. Course Description

This course provides the fundamental principles of classical mechanics necessary to develop solid and systematic problem solving skills, and to lay the foundations for further studies in physical sciences. Topics include: linear momentum and collisions, rotation of a rigid object about a fixed axis, angular momentum, static equilibrium, universal gravitation, oscillatory motion.

B. Course Outcomes

At the end of this course the student will be able to**:**

1. Describe momentum and energy conservation in inelastic and elastic collisions.
2. Understand the technique for finding center of mass in a system.
3. Understand conditions of static equilibrium.
4. State angular momentum and the conservation of angular momentum.
5. Describe the motion of an object in orbit under the influence of gravitational forces.
6. Illustrate simple harmonic motion and analyze energy changes in oscillations.

C. References

Required Textbook

Serway R.A. and Jewett J.W., ***Physics for Scientists and Engineers with Modern Physics,*** 9th Edition, Brooks/Cole, Belmont, CA, USA (2014).

Other references

Halliday D. and Resnick R., ***Physics,*** 9thEdition, John wiley & sons (2011).

Course Website: http://www.imamm.org/

D. Topics Outline

1. ***Linear Momentum and Collisions:*** *Linear momentum and its conservation, impulse and momentum, collisions in one dimension, two-dimensional collisions, the center of mass, motion of a system of particles (*Contact hours*: 10).*
2. ***Rotation of a Rigid Object about a Fixed Axis:*** *Angular position, velocity and acceleration, rotational kinematics (rotational motion with constant angular acceleration), angular and linear quantities, rotational kinetic energy, calculation of moments of inertia, torque, relationship between torque and angular acceleration, work and energy in rotational motion (*Contact hours*: 12).*
3. ***Angular Momentum:*** *The vector product and torque, angular momentum, angular momentum of a rotating rigid object, conservation of angular momentum (*Contact hours*: 10).*
4. ***Static Equilibrium:*** *The conditions of equilibrium, more on the center of gravity, examples of rigid objects in static equilibrium (*Contact hours*: 8).*

5. ***Universal Gravitation:*** *Newton's law of universal gravitation, free-fall acceleration and the gravitational force, Kepler's laws and the motion of planets, gravitational potential energy, energy considerations in planetary and satellite motion (*Contact hours*: 12).*
6. ***Oscillatory Motion:*** *Motion of an object attached to a spring, mathematical representation of simple harmonic motion, Energy of the simple harmonic motion, The pendulum, damped oscillations, forced oscillations (*Contact hours*: 8).*

E. Office Hours

Office hours give students the opportinuity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homeworks:** During the semester.
- **Final Exam**: 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 20 %	**Midterm 2:** 20 %	**Final Exam:** 40 %
Quizzes, Homework, Attendance & Participation: 20 %		

The grading distribution:

A+	A	B+	B	C+	C	D+	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)

G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. ("Immediate family" is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

Executive Rules for Study Regulations and Exams
goo.gl/ykm7t3