

UCD School of Physics

Introductory Physics I - Syllabus - Calculus based

Summer Session 1 2017

1. Aims

The principal aim of this course is to provide a firm understanding of physical concepts and processes leaning heavily upon standard physics U.S. textbooks. Another principal aim of the course will be to apply the concepts learnt to recent advances in our understanding of science in general. In particular, ways in which biological and medical phenomena may be better understood from a physics viewpoint will be stressed, under the headings of physiology, diagnosis and therapy, and on scales from the cell through macro-organisms to the environment.

2. Objectives

By the end of this course it is to be expected that the students will have acquired an understanding of the following concepts and principles:

- Velocity and acceleration of an object
- The gravitational force and the weight of an object
- Work and both potential energy and kinetic energy
- Torque and rotational motion
- Impulse and both linear momentum and angular momentum
- Pressure in a fluid and viscous flow
- Elastic deformation and oscillatory motion
- Wave motion
- Transmission of sound
- The properties of an ideal gas
- The nature of heat
- Thermodynamics

3. Reading List

The core text (which is **Calculus** based) is:

'Serway's Principles of Physics' by Jewett & Serway (publisher: Thomson, 5th edition, 2013). Most of the assigned problems in the course will be taken from this book.

Please note this core text is supplied as an e-book free of charge to all students.

Other problems will be taken from, **'Physics'** by Halliday, Resnick & Walker (publisher: Wiley) which is also a calculus-based text.

Some problems will also be taken from the texts:

'Physics' by J.D. Cutnell & K.W. Johnson (publisher: Wiley)

'Physics' by J.W. Kane & M.M. Sternheim (publisher: Wiley)

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4. Teaching Methods

(a) Lectures

There are typically eight lectures per week scheduled for one hour.

(b) Tutorials

Tutorials are devoted to problem solving; tutorials are group-based, with each group comprising of three students, graded as a group. They are of 2.5 – 3 hours duration. Typically two sessions per week.

(c) Laboratory

Laboratory sessions are where practical learning experiments are performed. Here students will work in pairs and will be graded in pairs. They are of 3 hours duration. The students do typically 7 experiments.

Independent Study

It is estimated that each module will require a minimum of 80 hours independent study.

5. Assessment

The course will be assessed by means of a mid-session quiz and final examination, as well as the Laboratory and the problem sets.

	Date	Weighting
Problem Sets/Tutorials	Weekly Assessment	15%
Mid-Session Quiz	6th of July, 2016	10%
Final Examination	15th of July, 2016	50%
Laboratory	Weekly	25%

6. Program Director

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