

UCD School of Physics

Introductory Physics I - Syllabus - Calculus based

Summer Session 1 2015

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 eight lectures per week scheduled for one hour.

(b) Homework/ Problem Solving

One set of problems will be handed out each week, which must be submitted for marking.

(c) Workshops

There are two 2-hour workshops each week devoted to problem solving; these will be group-based, with each group comprising three students, graded as a group.

(d) Laboratory

There are two 3-hour laboratory afternoons each week in which a new experiment is performed each afternoon. Here the students will work in pairs and will be graded in pairs.

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	8th July 2015	10%
Final Examination	17th July 2015	50%
Laboratory	Weekly	25%

6. Course Lecturer

Prof Padraig Dunne

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Course Administrator

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