

## Arts and Science 2D06: Course Outline for 2008/09

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### Required material:

- **Textbook:** Giancoli, Physics for Scientists and Engineers with Modern Physics, 3<sup>rd</sup> Edition
- **Calculator:** McMaster standard calculator (CASIO fx991) – to be used for all quizzes and exams. Available in the campus bookstore.

A **website** will be used throughout the term for posting schedules, information, suggested problem sets from the textbook, last year's quizzes, historical links, etc. Here's the link:

<http://www.physics.mcmaster.ca/~chenal/2D06/>

Bookmark it and check it out weekly.

The website also contains links to other websites for readings on the history of physics and the development of ideas. These are required reading and will be mentioned at appropriate times during the course.

### Marking scheme:

25% April exam

24% December exam

20% In-class quizzes (best 6 of 7 scheduled quizzes; 3.5% each for total of 21%)

21% Laboratory work (2 major projects, one each term, and one class presentation)

10% Participation in inquiry problems and project presentation days

The December and April exams and all laboratory work must be completed to pass the course.

The final percentage grade will be converted by the standard McMaster conversion scale:

12 = 90 – 100%

11 = 85 – 89%

10 = 80 – 84%

9 = 77 – 79%

8 = 73 – 76%

7 = 70 – 72%

6 = 67 – 69%

5 = 63 – 66%

4 = 60 – 62%

3 = 57 – 59%

2 = 53 – 56%

1 = 50 – 52%

0 = 49% or less

Students must decide for themselves whether to seek and provide documentation to support requests for special consideration. This applies to any missed work, absences planned or unplanned, or any rescheduling of coursework. Students should keep a copy of anything handed in for marking (such as a project report).

## Outline of Curriculum and Objectives

### Course Objectives:

- To identify and discuss the underlying ideas, principles, and natural laws that describes a wide range of phenomena in the outside physical world: motion, forces, gravity, waves, fluids, light, space and time, quantum mechanics.
- To probe how scientific thinking and the progress of science is built on the twin principles of measurement and modeling.
- To study the historical development of the 'great ideas' in physics as developed by Archimedes, Galileo, Newton, Einstein, Bohr, de Broglie, Schrödinger, Heisenberg, and others; and to see how these ideas have influenced Western cultural history.

### Outline for Term I:

- Newtonian Mechanics: Motion (kinematics) in one and two dimensions. Forces and Newton's three laws of mechanics. Friction, circular motion. Work, kinetic energy, potential energy, conservation of energy. Momentum and collisions. Rotational motion.
- Special Relativity: The speed of light, time dilation, length contraction, simultaneity, the Lorentz transformation. Momentum and energy in special relativity.

### Outline for Term II:

- Fluid mechanics, hydrostatics, Archimedes' principle, Bernoulli's principle.
- Simple harmonic motion, wave motion, interference and diffraction of light.
- Quantum mechanics: early atomic theory, waves and probability, the uncertainty principle, the Schrödinger equation.
- General Relativity: the equivalence principle, curved space, black holes.

See the course Website for a more detailed week-by-week outline of topics.

## Statement on Academic Integrity

McMaster Senate requires the following statement to be included in every course outline.

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty, please refer to the Academic Integrity Policy, specifically Appendix 3, located at

[http://www.mcmaster.ca/senate/academic/ac\\_integrity.htm](http://www.mcmaster.ca/senate/academic/ac_integrity.htm)

The following illustrates only four forms of academic dishonesty.

- Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- Improper collaboration in group work.
- Copying or using unauthorized aids in tests and examinations.
- Not giving appropriate references in reports or presentations to previous work by other people.