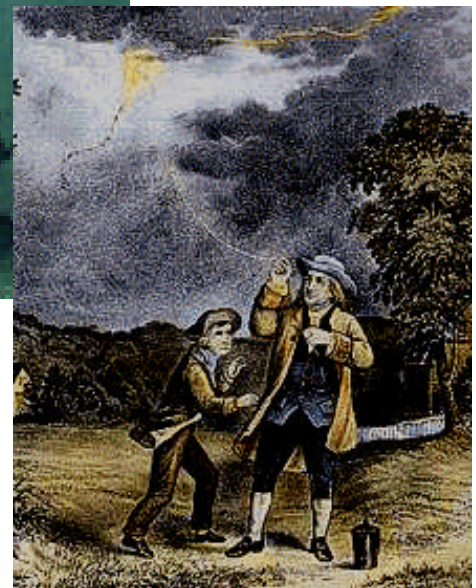
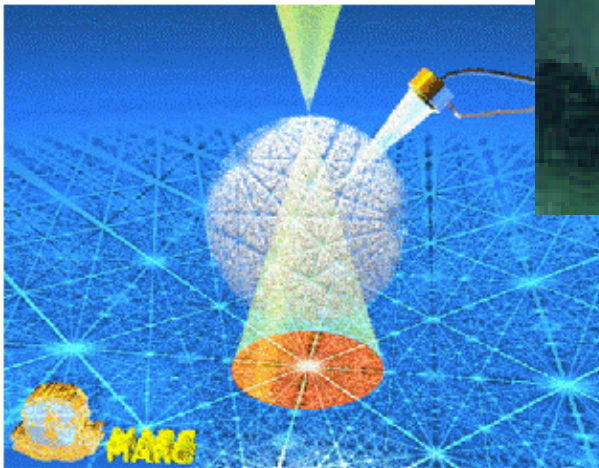
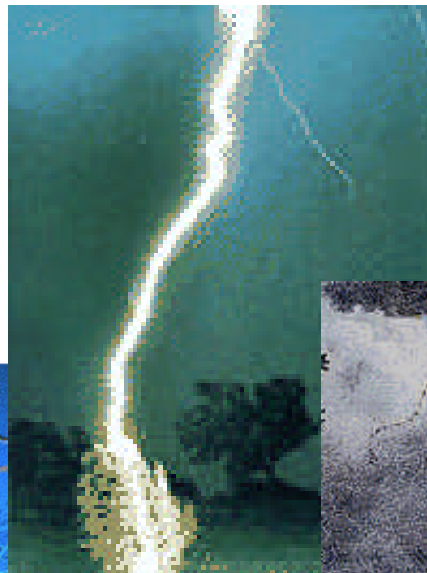
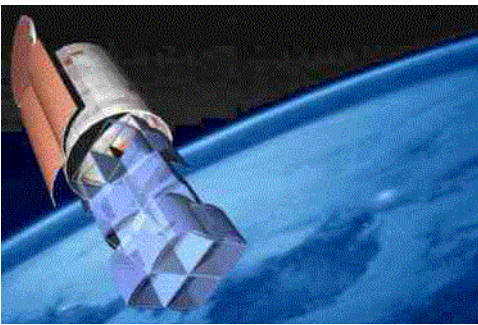




2nd year Physics Subjects 2002



The School of Physics offers a variety of 200-level courses aimed at students from a wide range of backgrounds. These subjects cover topics in fundamental physics and address their applications to technology and other areas of Science and Engineering. Even if you do not intend to major in physics, taking these courses will provide you with the opportunity to broaden your knowledge and develop analytical thinking and problem solving skills.



School of Physics 200-level subjects

Core subjects are those required as pre-requisites for higher year core courses needed for a Physics Major or Honours. They are enabling subjects for other, deeper investigations of the physical world.

640-223/243 Quantum Mechanics and Thermal Physics [Core]

Content: Our understanding of the microscopic world is based on quantum mechanics. It is of fundamental importance in physics and underpins the development of new devices and technology. The first half of this course addresses developments in physics that led to the formulation of wave mechanics and quantum physics. In thermal physics, concepts such as heat, entropy, temperature and internal energy are explored. The microscopic approach provided by kinetic theory is also discussed. These concepts are central to an understanding of many processes in physics, chemistry and engineering.

Intended enrolment: This subject is aimed at students intending to major in physics, mathematics, chemistry, computer science and engineering and is accessible to other Science students who have studied physics and mathematics at 100-level.

640-237 Astrophysics and Optics II

Content: This course provides an introduction to two major areas of modern physics. In astrophysics, the basic structure of stars, our galaxy and the universe will be discussed. In optics, the nature and propagation of light will be explored and illustrated by applications in modern instruments.

Intended enrolment: This subject is aimed at students with a background in physics who would like an introduction to these topics. Specifically it is aimed at students intending to major in physics, and engineering students and is accessible to other Science students who have studied physics and mathematics at 100-level.

640-251 Instrumentation for Scientists

Content: This subject presents the basic principles and modern techniques of instrumentation and data acquisition and presentation. Students will learn how to devise a set of measurements, automate experiments, and capture and manipulate signals using computers to log signals, process data and present information. The lectures are supported by a highly integrated laboratory program in which students develop skills in designing and computer interfacing experiments. Students are able to suit the laboratory program to their own needs by drawing on those particular laboratory exercises of relevance to their field, such as the physical, biomedical or environmental sciences.

Intended enrolment: Students intending to major in any discipline in science or engineering and who wish to gain an introduction to electronic, optical and computer based instrument control and data acquisition.

640-261 Energy and the Environment

Content: This is an introductory course that addresses the major issues of energy and resource use, its impact on the environment and strategies for a sustainable future.

Intended enrolment: This course has no pre-requisites and is aimed at a general audience. It will suit students who wish to take a single, stand-alone course, but will also provide a valuable base for those intending to do further studies in environmental science.



640-225/245 Electromagnetism and Relativity [Core]

Content: The electromagnetism part of this subject introduces the student to Maxwell's equations. These equations are used to explore electromagnetic and optical phenomena, including waves. The second half of the course develops Einstein's Special Theory of Relativity and discusses the subsequent revolution in our concepts of motion, space, time and mass.

Intended enrolment: This subject is aimed at students intending to major in physics, mathematics, physical chemistry and engineering and is accessible to other Science students who have studied physics and mathematics at 100-level and are taking relevant second year maths as a pre- or co-requisite.

640-234 Further Classical and Quantum Mechanics

Content: Half of this subject deals with the powerful and elegant Lagrangian and Hamiltonian formulations of classical mechanics. The other half of the subject deals with the further development of quantum mechanics, especially in relation to three-dimensional problems and the structure of matter. A brief introduction to statistical mechanics is also provided.

Intended enrolment: This course follows on from the Semester 1 subject, Quantum Mechanics and Thermal Physics. It is primarily aimed at students intending to major in physics, chemistry, mathematics and engineering.

640-299 Laboratory work

Content: This subject develops students' skills in experimental physics within the areas of optics, acoustics, nuclear and classical physics. Students will acquire a wide variety of experimental and data analysis techniques, along with skills in the presentation of the results of experimental work.

Intended enrolment: Students intending to major in physics.

Advanced and standard level subjects

Advanced level physics subjects (640-223 and 640-225) cover the material in more depth and assume a higher level of mathematical knowledge. Students with strong backgrounds in both 100-level physics and maths are encouraged to enrol in advanced level subjects. Both advanced and standard streams lead to Majors and Honours in Physics with suitable selection of other units. Students may qualify for and enrol in an Advanced course for e.g. 640-223 while enrolling in a Standard course for e.g. 640-245.



List of 200-level physics subjects

SEMESTER	COURSE CODE	SUBJECT
1	640-223/243	Quantum Mechanics and Thermal Physics
1	640-237	Astrophysics and Optics II
1	640-251	Instrumentation for Scientists
1	640-261	Energy and the Environment
2	640-225/245	Electromagnetism and Relativity
2	640-234	Further Classical and Quantum Mechanics
2	640-299	Laboratory Work

All of these subjects are 12.5 points

Pre-requisites

Consult the Handbook or the Physics course planning document to see if you meet the pre-requisites for these subjects. Note that 640-261 Energy and the Environment has no pre-requisites and is available to all students and that the completion of *any* two semesters of first year physics is sufficient to satisfy the physics entry requirement for 640-251 Instrumentation for Scientists. Although many of the core 200-level physics subjects require the completion of 640-121/141 and 640-122/142 Physics A and B, students who have performed well in 640-161 and 640-162 Physics (Principles and Applications) A and B, and who satisfy the mathematics pre-requisites, are also encouraged to enrol. These students should speak to the 200-level co-ordinator (contact details below).

Further information

- The University Handbook, <http://www.unimelb.edu.au/HB>.
- Physics 200-level course planning information sessions, 1-2pm, Tuesday, October 9, 2001, Hercus Theatre.
- Information from Science Faculty <http://www.science.unimelb.edu.au/courses/planning.html>
- Timetable <http://sis.unimelb.edu.au/cgi-bin/subjects.pl>
- Physics course planning document (available from School of Physics front office)
- Individual physics course planning appointments, October 15-18, 2001.

- The Physics Higher Year Course Planning Co-ordinator
Dr Lloyd Hollenberg
Room 415, Level 4, Physics Building
E-mail: l.hollenberg@ph.unimelb.edu.au