Physics and Astronomy

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

General Course Information

PHYS206
Electromagnetism and Materials

0.125 EFTS 15 Points
Second Semester

Course Coordinator and Lecturer
Materials Section (weeks 7-12)
Professor Jon-Paul Wells
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Lecturer Electromagnetism Section
(weeks 1-6)
Senior Lecturer Konstantin Pavlov
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Timetable
Please check the official UC course and timetable information. Currently we are scheduled for:
Lectures: Monday 2-3 pm (ER141), Tuesday 4-5 pm (E16), Thursday 2-3 pm (A4)
Tutorial: Wednesday 1:00 pm, Rehua 528.
Tests: Term 3 – 2-3 pm Monday 14th August (week 5),
Term 4 – 2-3 pm Monday 2nd October (week 10)

Assessment
5% Tutorial attendance and participation
20% Weekly Homework Assignments (best nine of ten will be counted)
25% Two in term tests.
50% Final Examination (on both sections).

Pre-requisites
P: (1) PHYS 102 or (PHYS101 + CHEM211); (2) MATH102 or EMTH118
RP: MATH103 or EMTH119, PHYS205, MATH201
These prerequisites may be replaced by a high level of achievement in NCEA Level 3 Physics and Mathematics with Calculus or other background as approved by the Head of Department.

Learning Outcomes

As a student in this course, I will develop the ability to:

- Understand and describe the basic concepts of electric forces, fields and potentials (exam assessment).
- Calculate forces, fields and potentials caused by electric charges (assignment and exam assessment).
- Understand and describe the concepts of magnetic fields induced by currents and the effects of magnetic fields on charges, as well as the energy associated with fields (exam assessment).
- Mathematically formulate and solve various applications in electromagnetism (assignment and exam assessment).
- Understand and describe the classifications of materials, bonding and thermal expansion (assignment and exam assessment)
- Understand and describe crystal structures and lattice dynamics (assignment and exam assessment)
- Understand and describe electric fields in matter (assignment and exam assessment)
- Understand and describe magnetic fields in matter (assignment and exam assessment)
- Understand and describe the basic contributions of solid state physics to modern technology
- Mathematically formulate and solve various applications in materials science (assignment and exam assessment).

In addition I will have developed and demonstrated the following transferrable skills:

- Writing and communication skills (assignment assessment).
- Ability to apply computational skills in MATLAB or other languages to the solution of real-world problems in electromagnetism and materials science (assignment assessment).

Textbook
Although there's no single book that we can recommend for the whole course, the Electromagnetism section will be based on

I.S. Grant and W.R Phillips, Electromagnetism (Manchester Physics Series), John Wiley and Sons

The materials section will be based on

J.R. Hook and H.E. Hall, Solid State Physics (Manchester Physics Series), John Wiley and Sons
C. Kittel, Introduction to Solid State Physics, John Wiley and Sons.

Notes
Electronic copies of the detailed lecture notes will be available on the Learn system: http://learn.canterbury.ac.nz/

Late Work
Late work is not in general acceptable without a medical certificate.

Marks and Grades: The following numbers should be considered as a guide to the expected grades under normal circumstances. The School reserves the right to adjust mark/grade conversions, if necessary.

Please note that for all invigilated assessments (tests and exams) worth 33% and above, failure to obtain a mark of at least 40% will result in a final grade no higher than an R at 100 and 200 level, and a C- at 300 level.

Grade:	**A+**	**A**	**A−**	**B+**	**B**	**B−**	**C+**	**C**	**C-**	**D**	**E**
Minimum mark %:	**90**	**85**	**80**	**75**	**70**	**65**	**60**	**55**	**50**	**40**	**0**