



UNSW Course Outline

PHYS9130 Electromagnetism for Teachers - 2024

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General Course Information

Course Code : PHYS9130

Year : 2024

Term : Term 2

Teaching Period : T2

Is a multi-term course? : No

Faculty : Faculty of Science

Academic Unit : School of Physics

Delivery Mode : Online

Delivery Format : Standard

Delivery Location : Kensington

Campus : Sydney

Study Level : Postgraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This is an online course covering electromagnetism. Lecture material and tutorial problems will be presented online. This is the third course in the graduate certificate for physics teachers. This course will teach students about electromagnetism. Electromagnetism is the branch of physics

concerned with studying interactions between electrically charged particles. In this course students will learn about electrical circuits containing resistors, capacitors and inductors. They will use Gauss's law to find electric fields and electric potentials around symmetric charge distributions. They will learn how to define and calculate capacitance. The course will also look at magnetic fields and magnetic inductance. Electromagnetic waves and optics will be considered. This course includes laboratory exercises that are completed at home and submitted online.

Assumed Knowledge: Students need to be able to differentiate and integrate polynomials to complete this course. A good understanding of HSC level extension 1 mathematics is recommended.

Course Aims

This course aims to give students a solid foundation in electromagnetism. After undertaking this course students should be confident in their ability to present electromagnetism to high school students. Students will be able to solve problems involving charges, circuits and electromagnetic waves. They will be introduced to Maxwell's equations in the integral form and be able to use these to solve problems involving moving and static charges. Students will be able to plan experiments and carry them out.

Relationship to Other Courses

PHYS9120 is a pre requisite

Course Learning Outcomes

Course Learning Outcomes
CL01 : Safely plan and conduct electromagnetism and optics experiments using high school equipment, include reliable estimates of the uncertainties in the results.
CL02 : Design experimental activities related to electromagnetism and optics to use with high school students.
CL03 : Use appropriate mathematical techniques, including calculus, to solve problems involving electromagnetism and optics.
CL04 : Apply critical thinking skills in a range of conceptual physical situations related to electromagnetism and optics.
CL05 : Draw and interpret graphs and diagrams to describe physical phenomena involving electromagnetism and optics.

Course Learning Outcomes	Assessment Item
CLO1 : Safely plan and conduct electromagnetism and optics experiments using high school equipment, include reliable estimates of the uncertainties in the results.	• Experiments
CLO2 : Design experimental activities related to electromagnetism and optics to use with high school students.	• Experiments
CLO3 : Use appropriate mathematical techniques, including calculus, to solve problems involving electromagnetism and optics.	• Online tests • Final Examination
CLO4 : Apply critical thinking skills in a range of conceptual physical situations related to electromagnetism and optics.	• Online tests • Final Examination
CLO5 : Draw and interpret graphs and diagrams to describe physical phenomena involving electromagnetism and optics.	• Online tests • Final Examination • Experiments

Learning and Teaching Technologies

Moodle - Learning Management System

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Online tests Assessment Format: Individual	20%	
Final Examination Assessment Format: Individual	50%	
Experiments Assessment Format: Individual	30%	

Assessment Details

Online tests

Assessment Overview

You will complete three online tests based on the theory covered in lectures. Each test will typically consist of six three part questions. Most questions will focus on calculations. You may attempt these tests as many times as you want with your highest mark counting. The tests will be available for a week, during weeks 4, 7 and 10. You will be given feedback about incorrect

answers.

Course Learning Outcomes

- CL03 : Use appropriate mathematical techniques, including calculus, to solve problems involving electromagnetism and optics.
- CL04 : Apply critical thinking skills in a range of conceptual physical situations related to electromagnetism and optics.
- CL05 : Draw and interpret graphs and diagrams to describe physical phenomena involving electromagnetism and optics.

Final Examination

Assessment Overview

You will sit a two hour open-book exam with five questions assessing the theory taught during the course. The exam will consist of a combination of conceptual and calculation based questions. You will sit this exam at your school or another location approved by course staff.

Course Learning Outcomes

- CL03 : Use appropriate mathematical techniques, including calculus, to solve problems involving electromagnetism and optics.
- CL04 : Apply critical thinking skills in a range of conceptual physical situations related to electromagnetism and optics.
- CL05 : Draw and interpret graphs and diagrams to describe physical phenomena involving electromagnetism and optics.

Experiments

Assessment Overview

You will be expected to complete three laboratory experiments (each weighed equally) using high school lab equipment during the course. You will develop a worksheet for high school students related to each of these experiments. These experiments will be due after the relevant content has been covered in the online lectures.

Course Learning Outcomes

- CL01 : Safely plan and conduct electromagnetism and optics experiments using high school equipment, include reliable estimates of the uncertainties in the results.
- CL02 : Design experimental activities related to electromagnetism and optics to use with high school students.
- CL05 : Draw and interpret graphs and diagrams to describe physical phenomena involving electromagnetism and optics.

General Assessment Information

Grading Basis

Standard

Course Schedule

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Elizabeth Angstmann					No	Yes
	Tze Cheung Ko					No	No

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the [UNSW Student Code of Conduct Website](#).

Academic Honesty and Plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words,

ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at <https://student.unsw.edu.au/referencing>

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The [Current Students site](#),
- The [ELISE training site](#), and
- The [Use of AI for assessments](#) site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: <https://student.unsw.edu.au/conduct>

Submission of Assessment Tasks

Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical

documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: <https://student.unsw.edu.au/special-consideration>

Important note: UNSW has a “fit to sit/submit” rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- [The Current Students Gateway](#)
- [Student Support](#)
- [Academic Skills and Support](#)
- [Student Wellbeing, Health and Safety](#)
- [Equitable Learning Services](#)
- [UNSW IT Service Centre](#)
- Science EDI Student [Initiatives](#), [Offerings](#) and [Guidelines](#)