UNSW Course Outline

ZPEM1504 Engineering Physics 1B - 2024

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General Course Information

Course Code : ZPEM1504
Year : 2024
Term : Semester 2
Teaching Period : Z2
Is a multi-term course? : No
Faculty : UNSW Canberra
Academic Unit : UC Science
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : UNSW Canberra at ADFA
Campus : UNSW Canberra
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Students will be introduced to some of the fundamentals of contemporary physics through a selection of topics spanning important areas such as electromagnetism, optics, relativity, quantum physics, atomic and nuclear physics. The course includes a laboratory program relating

to and supplementing the lecture material.

Course Aims

Engineering Physics 1B is a 6 UOC course which develops physical principles that underpin your future studies in science, and engineering. The course comprises 3 times 1-hour lectures designed for guidance, overview and conceptual learning, a 1 hour tutorial, for problem solving, and laboratories, arranged for the practical application of knowledge and concepts (spread out during the semester with about one every fortnight).

This course provides an introduction to the physics of charges, currents and fields; electromagnetism and light; and relativity, atoms and the nucleus. It underpins further study that might be taken as part of a Physics, Oceanography, Mathematics, or Aviation major in the BSc; or in Electrical Engineering or Aviation Technology programs.

Relationship to Other Courses

ZPEM1504 (Physics 1B) builds up on ZPEM1503 (Physics 1A), covering the important topics of electromagnetism, quantum mecahnics and nuclear physics. It feeds into ZPEM2502 (Physics 2B) in Year 2 and ZEIT3220 (Engineering Electromagnetics) in Year 3.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Mastered the key concepts in the topic areas of electromagnetism, optics and modern physics, demonstrated by the ability to discuss, describe and answer fundamental questions about the topics.
CLO2 : Demonstrate the ability to solve problems relating to electromagnetism, optics and modern physics readily and efficiently.
CLO3 : Demonstrate experimental and practical skills, via the practice of logbook recording of measurements when conducting laboratory experiments. In addition develop skills in team work and scientific communication with peers.
CLO4 : Develop an appreciation of how the basic Physics in the areas of electromagnetsim, optics and modern physics is intimately linked to the modern technological world.

Course Learning Outcomes	Assessment Item
CLO1 : Mastered the key concepts in the topic areas of electromagnetism, optics and modern physics, demonstrated by the ability to discuss, describe and answer fundamental questions about the topics.	• Quizzes • Class tests • Final Exam
CLO2 : Demonstrate the ability to solve problems relating to electromagnetism, optics and modern physics readily and efficiently.	• Quizzes • Class tests • Final Exam
CLO3 : Demonstrate experimental and practical skills, via the practice of logbook recording of measurements when conducting laboratory experiments. In addition develop skills in team work and scientific communication with peers.	• Laboratory experiments
CLO4 : Develop an appreciation of how the basic Physics in the areas of electromagnetsim, optics and modern physics is intimately linked to the modern technological world.	• Laboratory experiments • Class tests • Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

Learning and Teaching in this course

Moodle is the Learning Management System used across all of UNSW. All courses have a Moodle site which will become available to students at least one week before the start of semester.

Tutorials are designed to allow you to develop your conceptual and problem-solving skills with tutor- and peer-support.

Lectures will give overviews, guidance, highlight important points of interest, and further illustrate the core material via demonstrations and interactive activities.

Laboratory activities are designed to foster experimental and practical skills, in addition to providing practical insight of the theory. The laboratory program thus runs in parallel with the coursework, but it is not directly tied to it.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Laboratory experiments Assessment Format: Individual	20%	
Quizzes Assessment Format: Group	12.5%	
Class tests Assessment Format: Group	37.5%	
Final Exam Assessment Format: Individual	30%	

Assessment Details

Laboratory experiments

Assessment Overview

Students will perform several lab experiments throughout semester. Online labs will be offered if/when face to face labs are not possible.

Course Learning Outcomes

- CLO3 : Demonstrate experimental and practical skills, via the practice of logbook recording of measurements when conducting laboratory experiments. In addition develop skills in team work and scientific communication with peers.
- CLO4 : Develop an appreciation of how the basic Physics in the areas of electromagnetsim, optics and modern physics is intimately linked to the modern technological world.

Detailed Assessment Description

Seven out of total eight labs and all online prelab exercises contributes towards the lab mark.

Quizzes

Assessment Overview

weekly quizzes

Course Learning Outcomes

- CLO1 : Mastered the key concepts in the topic areas of electromagnetism, optics and modern physics, demonstrated by the ability to discuss, describe and answer fundamental questions about the topics.
- CLO2 : Demonstrate the ability to solve problems relating to electromagnetism, optics and modern physics readily and efficiently.

Detailed Assessment Description

Weekly STACK Moodle quizzes are completed outside of class and together contribute 12.5% to the final grade.

Class tests

Assessment Overview

Students will be assessed through tests and short quizzes.

Course Learning Outcomes

- CLO1 : Mastered the key concepts in the topic areas of electromagnetism, optics and modern physics, demonstrated by the ability to discuss, describe and answer fundamental questions about the topics.
- CLO2 : Demonstrate the ability to solve problems relating to electromagnetism, optics and modern physics readily and efficiently.
- CLO4 : Develop an appreciation of how the basic Physics in the areas of electromagnetsim, optics and modern physics is intimately linked to the modern technological world.

Detailed Assessment Description

Three in-class Stests (12.5% each) will contribute 37.50% of the total mark. Students who do not achieve a grade of 50% in a Test will be offered the opportunity to re-sit a supplemental test to achieve a maximum grade of 50%. The grade awarded for the test missed will be based solely on the supplemental.

Final Exam

Assessment Overview

Final exam to be held in the exam period.

Course Learning Outcomes

- CLO1 : Mastered the key concepts in the topic areas of electromagnetism, optics and modern physics, demonstrated by the ability to discuss, describe and answer fundamental questions about the topics.
- CLO2 : Demonstrate the ability to solve problems relating to electromagnetism, optics and modern physics readily and efficiently.
- CLO4 : Develop an appreciation of how the basic Physics in the areas of electromagnetsim, optics and modern physics is intimately linked to the modern technological world.

Detailed Assessment Description

A final 2 hour pen and paper exam in the exam period will contribute 30% to the total mark.

General Assessment Information

All quizzes and the tests will require students to demonstrate their ability to solve physics problems via conceptual reasoning, algebraic manipulation, graphical interpretation and numerical calculation. Note that all marks issued during the session are provisional and may be subject to change. The only official mark is the final course mark, issued by the University after the examination period.

You can use generative AI software in this course to the extent specified in the assessment instructions. Any output of generative software within your assessment must be attributed with full referencing. If the outputs of generative AI such as ChatGPT form part of your submission and is not appropriately attributed, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension and exclusion. Please note that the outputs from these tools are not always accurate, appropriate, nor properly referenced. You should ensure that you have moderated and critically evaluated the outputs from generative AI tools such as ChatGPT before submission. To cite: OpenAI (Year Accessed). ChatGPT. OpenAI. https://openai.com/models/chatgpt/

Grading Basis

Standard

Requirements to pass course

The assessment for the course has been designed so that an overall mark of 50% or greater indicates that the student has unambiguously demonstrated satisfactory completion of each learning outcome. For this reason, and consistent with the UNSW policy of abolishing the Pass Conceded grade, students who receive less than 50% overall for the course will receive a fail grade.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 15 July - 19 July	Lecture	Coulomb's Law and Electric field
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 2 : 22 July - 26 July	Lecture	Gauss' Law
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 3 : 29 July - 2 August	Lecture	Electric potential, Capacitance, Resistance
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 4 : 5 August - 9 August	Lecture	Magnetic field
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 5 : 12 August - 16 August	Lecture	Magnetic forces and Faraday's Law
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 6 : 19 August - 23 August	Lecture	Faraday's Law, Inductance, EM Waves
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 7 : 9 September - 13 September	Lecture	Geometric optics and polarisation
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 8 : 16 September - 20 September	Lecture	Interference
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 9 : 23 September - 27 September	Lecture	Diffraction
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 10 : 30 September - 4 October	Lecture	Light as quantum particles
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 11 : 7 October - 11 October	Lecture	Quantum mechanics
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 12 : 14 October - 18 October	Lecture	Atomic Physics
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections
Week 13 : 21 October - 25 October	Lecture	Nuclear Physics
	Tutorial	
	Laboratory	Note the labs are not on every week. Refer to the lab schedule in the Laboratory sections

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings. Students are indeed expected to attend all lectures, tutorials, laboratory sessions and assessments unless their absence has been approved by the course coordinator. Students who have missed assessments or a laboratory, or expect to miss such a requirement, must inform the course coordinator by email at the earliest practicable date:

In typical circumstances of missed assessments, a formal application for Special Consideration via the prescribed University procedure may be appropriate. Alternative assessment can then be arranged. Otherwise, in the case of absence a mark of zero will be awarded for the assessment.

General Schedule Information

Course Schedule

Wk#	Starts on	Tue lecture	Wed lecture	Fri lecture	Tuts(Thu)
1	15 Jul	Intro	E-1	E-2	ET1
2	22 Jul	E-3	E-4	E-5	ET2
3	29 Jul	E-6	E-7	E-8	ET3
4	5 Aug	E-9	E-10	Test1	ET4
5	12 Aug	E-11	E-12	Lost (Fri)	ET5
6	19 Aug	E-13	E-14	E-15	ET6
Mid-Semester Break					
7	9 Sep	L-1	L-2	L-3	LT1
8	16 Sep	L-4	MT	L-5	LT2
9	23 Sep	Q-1	Q-2	Test2	QT1
10	30 Sep	Q-4	Q-5	Q-6	QT2

11	7 Oct	Q-7	Q-8	MT	MT (Thu)
12	14 Oct	Q-9	Q-10	QT-11	QT3
13	21 Oct Q	-12	Q-13	Test3	QT4

Course Resources

Prescribed Resources

Halliday's Fundamentals of Physics, 1st Australian & New Zealand Edition, by Halliday, Walker, Keleher et al. published by Wiley Australia (ISBN: 978-0-730-38287-4) or an e-book (ISBN 978-0-730-38286-7). Note that the printed textbook also provides a personal access code for the e-book. The UNSW Library also has unlimited e-book access to an earlier edition of the textbook which may be useful for accessing end-of-chapter problems.

Recommended Resources

In addition to the prescribed textbook, other useful reference material, such as lecture slides, tutorial questions and solutions, and study guides, will be distributed via the course Moodle page.

Course Evaluation and Development

Student evaluative feedback on this course is gathered via UNSW MyExperience, Science student staff liaison meetings and, most importantly, direct informal discussions between students and staff. Student feedback is taken seriously, and continual improvements are made to the course based in part on such feedback. Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct Policy (https://www.gs.unsw.edu.au/policy/documents/studentc odepolicy.pdf)

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Oleh Klochan		B26/G24			No	Yes
Lecturer	Warrick Lawson		B26/137			No	No
	Paul Fraser		B26/104			No	No
Lab director	Wayne Hutchison		B26/G22			No	No