

## PHYS1210: Advanced Physics I

Callaghan

Semester 2 - 2023



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

## OVERVIEW

### Course Description

Physics underpins most aspects of modern engineering, technology, and medicine; developments in physics often drive social change. Knowledge of physics is therefore vital to understanding the world around us. Physics is needed to make new materials, monitor our environment, put satellites into orbit, harness energy, determine the strength of structures, take scans of the human body, develop faster computers, etc. The course is calculus based and covers topics from mechanics and kinematics, wave mechanics, electricity, particle physics, cosmology, and thermal physics.

### Requisites

Students who have successfully completed FNPS1001 and FNPS1002 cannot enrol in this course.

### Assumed Knowledge

HSC Mathematics Advanced (with a result in Bands 5 or 6) or equivalent and HSC Physics or equivalent

### Contact Hours

#### Callaghan

#### Laboratory \*

Face to Face on campus

3 hour(s) per Week for 11 Weeks starting Week 2

This includes the introductory lab session.

#### Lecture

Face to Face on campus

3 hour(s) per Week for Full Term

#### Tutorial

Face to Face on campus

1 hour(s) per Week for 12 Weeks

### Unit Weighting Workload

\* This contact type has a compulsory requirement.

10

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

# COURSE OUTLINE

[www.newcastle.edu.au](http://www.newcastle.edu.au)

CRICOS Provider 00109J

---

# CONTACTS

<b>Course Coordinator</b>	<b>Callaghan</b> Dr Joshua Williams Joshua.S.Williams@newcastle.edu.au Consultation: Details available on Canvas
<b>Teaching Staff</b>	Dr Renee Goreham Renee.Goreham@newcastle.edu.au Consultation: Details available on Canvas  Other teaching staff will be advised on the course Canvas site.
<b>School Office</b>	<b>School of Information and Physical Sciences</b> SR233, Social Sciences Building Callaghan CESE-SIPS-Admin@newcastle.edu.au +61 2 4921 5513 9am-5pm (Mon-Fri)

# SYLLABUS

<b>Course Content</b>	A calculus-based physics course aimed at students who have completed HSC Physics and Mathematics Mechanics and Kinematics Wave Mechanics Foundations of Electricity Big Questions in Physics Foundations of Thermodynamics
<b>Course Learning Outcomes</b>	<b>On successful completion of this course, students will be able to:</b> 1. Explain the basic principles of mechanics, waves, electricity and thermodynamics, and their relevance to aspects of engineering, technology, physical phenomena and everyday situations.  2. Solve qualitative and quantitative problems using mathematics and the principles of physics.  3. Perform laboratory and computational experiments and interpret the significance of the results with regards to the principles and applications of physics.  4. Communicate the results and significance of both theoretical and experimental work in written form.  5. Contribute to team and group work for scientific investigations and for the process of learning.
<b>Course Materials</b>	<b>Lecture Materials:</b> <ul style="list-style-type: none"><li>- Video recordings, notes and lab notes will be available via Canvas.</li></ul> <b>Recommended Text:</b> <ul style="list-style-type: none"><li>- University Physics with Modern Physics, by Hugh D. Young and Roger A. Freedman</li></ul>

---

# COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

**Contact Hour Requirements:**

- Laboratory Induction Requirement: Students must attend and pass the induction requirements before attending these sessions. In order to participate in this course students must complete a compulsory safety induction.
- Tutorial attendance requirement: Students must attend a minimum 80% of tutorials from weeks 2-13. Attendance records are kept and will be recorded via the myUON app.

# SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	17 Jul	Particle Physics	Lectures x3;	Complete online lab induction
2	24 Jul	Cosmology	Lectures x3; Tutorial 1; online quiz 1; Laboratory Induction; Laboratory 1	Online quiz due end of week 2; Laboratory report in-class
3	31 Jul	Mechanics 1	Lectures x3; Tutorial 2; online quiz 2; Laboratory 2	Online quiz due end of week 3; Laboratory report in-class
4	7 Aug	Mechanics 2	Lectures x3; Tutorial 3; online quiz 3; Laboratory 3	Online quiz due end of week 4; Laboratory report in-class; Class Test 1
5	14 Aug	Mechanics 3	Lectures x3; Tutorial 4; online quiz 4; Laboratory 4	Online quiz due end of week 5; Laboratory report in-class
6	21 Aug	Mechanics 4	Lectures x3; Tutorial 5; online quiz 5; Laboratory 5	Online quiz due end of week 6; Laboratory report in-class
7	28 Aug	Thermal Physics 1	Lectures x3; Tutorial 6; online quiz 6	Online quiz due end of week 7
8	4 Sep	Thermal Physics 2	Lectures x3; Tutorial 7; online quiz 7	Online quiz due end of week 8
9	11 Sep	Electricity 1	Lectures x3; Tutorial 8; online quiz 8; Laboratory 6	Online quiz due end of week 9; Laboratory report in-class; Class Test 2
10	18 Sep	Electricity 2	Lectures x3; Tutorial 9; online quiz 9; Laboratory 7	Online quiz due end of week 10; Laboratory report - in-class
Mid Term Break				
Mid Term Break				
11	9 Oct	Oscillations	Lectures x3; Tutorial 10; online quiz 10; Laboratory 8	Online quiz due end of week 11
12	16 Oct	Waves	Lectures x3; Tutorial 11; online quiz 11; Laboratory 9	Online quiz due end of week 12; Laboratory 9 report - in class; Week-11 lab long report due (date and time is on Canvas)
13	23 Oct	Review	Tutorial 12; online quiz 12	Online quiz due end of week 13; Class Test 3
Examination Period				
Examination Period				

# ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Class Tests	Class Test 1 will be held in week 4; Class Test 2 will be in week 9 and Class Test 3 will be in week 13.	Individual	20%	1, 2, 4
2	Laboratory Reports	Pre-lab online quizzes due before each lab. In-class laboratory reports are to be done during the lab session from weeks 2 - 6, 9, 10, 12. Week 11 is a full lab report written outside of the laboratory class; due a week after the timetabled laboratory.	Group	30%	2, 3, 4, 5
3	Online Quizzes	Due to be done on Canvas, weeks 2-13 on the corresponding Monday at 11:30pm	Individual	10%	1, 2
4	Final Examination	During exam period	Individual	40%	1, 2, 4

## Late Submissions

The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

## Assessment 1 - Class Tests

<b>Assessment Type</b>	Quiz
<b>Purpose</b>	The purpose and benefit of the class tests and/or regular quizzes is to provide the students with regular feedback on student learning in a similar format to the final examination.
<b>Description</b>	Three class tests will be held online on Canvas and will consist of 10 multiple choice questions and two long answers questions.
<b>Weighting</b>	20%
<b>Length</b>	1 hour each
<b>Due Date</b>	Class Test 1 will be held in week 4; Class Test 2 will be in week 9 and Class Test 3 will be in week 13.
<b>Submission Method</b>	Online Online submission through Canvas
<b>Assessment Criteria</b>	Demonstrate a level of conceptual understanding on course content and quantitative problem-solving abilities.
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Online - 2 weeks after assessment due date. Presented on Canvas.

## Assessment 2 - Laboratory Reports

<b>Assessment Type</b>	Tutorial / Laboratory Exercises
<b>Purpose</b>	The purpose of laboratory activity is to enable peer-to-peer learning; develop oral communication skills and the ability to record data, synthesise an opinion and convey this clearly in a well presented and articulate manner.
<b>Description</b>	Laboratories will be done in class to gain hand-on experience and group experience on concepts learnt with lectures. They will go for 3 hours and results will be recorded in the laboratory manual.
<b>Weighting</b>	30%
<b>Length</b>	3 hour laboratory sessions, see Canvas for weeks
<b>Due Date</b>	Pre-lab online quizzes due before each lab. In-class laboratory reports are to be done during the lab session from weeks 2 - 6, 9, 10, 12. Week 11 is a full lab report written outside of the laboratory class; due a week after the timetabled laboratory.
<b>Submission Method</b>	In Class Except laboratory 8, which is to be submitted online as a PDF.

---

<b>Assessment Criteria</b>	Demonstrate a level of scientific lab skills, team work and communication skills
<b>Return Method</b>	In Class
<b>Feedback Provided</b>	In Class - Feedback will be provided a week after the assessment due.

### Assessment 3 - Online Quizzes

<b>Assessment Type</b>	Quiz
<b>Purpose</b>	Together with non-assessable online homework, these provide students with instant feedback on progress.
<b>Description</b>	Weekly online quizzes will be done every week (2-13) and will be a series of 10 multiple choice questions. Each quiz can be done at home and students will have a week to complete them.
<b>Weighting</b>	10%
<b>Due Date</b>	Due to be done on Canvas, weeks 2-13 on the corresponding Monday at 11:30pm
<b>Submission Method</b>	Online Online through Canvas
<b>Assessment Criteria</b>	Demonstrate a level of conceptual understanding on course content and quantitative problem-solving abilities.
<b>Return Method</b>	Online
<b>Feedback Provided</b>	No Feedback.

### Assessment 4 - Final Examination

<b>Assessment Type</b>	Formal Examination
<b>Purpose</b>	The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse and hypothesise from this material. Marks are awarded in accordance with Table 1 from the Grading Scales in the 2014 Course Management and Assessment Procedure Manual (Policy 000996) at <a href="http://www.newcastle.edu.au/policy/000996.html">http://www.newcastle.edu.au/policy/000996.html</a>
<b>Description</b>	The formal examination will cover every topic taught in PHYS1210. Part A will be multiple choice questions and part B will be long answered questions.
<b>Weighting</b>	40%
<b>Length</b>	2 hours
<b>Due Date</b>	During exam period
<b>Submission Method</b>	Formal Exam
<b>Assessment Criteria</b>	Demonstrate a level of conceptual understanding on course content and quantitative problem solving abilities.
<b>Return Method</b>	Not Returned
<b>Feedback Provided</b>	No Feedback.
<b>Additional Information</b>	Students are permitted a non-programmable scientific calculator. However, instruction booklets or cards for the calculator are not permitted in the exam as students are expected to familiarize themselves with the calculator's operations beforehand. A double-sided A4 memory aide is also permitted.

# ADDITIONAL INFORMATION

## Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

## Attendance

\*Skills are those identified for the purposes of assessment task(s).

Attendance/participation will be recorded in the following components:

- Laboratory (Method of recording: Sign-in in person on entry to the lab)
- Tutorial (Method of recording: Attendance Check-in app via MyUON)

## Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

## Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

## Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

## Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

---

**Adverse  
Circumstances**

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:

<https://policies.newcastle.edu.au/document/view-current.php?id=236>

**Important Policy  
Information**

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at <https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures> that support a safe and respectful environment at the University.

*This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.*

© 2023 The University of Newcastle, Australia