

## PHYS1205: Fundamentals of Engineering Physics

Callaghan

Semester 2 - 2023



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

## OVERVIEW

### Course Description

For engineers, knowledge of physics is essential to understand and transform the world around us. This course is designed for students in selected Engineering programs with no or little physics background. It focuses on illustrating and developing an understanding of the interplay between mathematics and physics in engineering. The course examines some of the core topics in physics essential for further studies in engineering such as Mechanics, Vibrations & Waves, Fluids and Optics.

### Requisites

Students who have successfully completed [both FNPS1001 and FNPS1002] or PHYS1150 or PHYS1200 or PHYS1210 cannot enrol in this course.

### Assumed Knowledge Contact Hours

HSC Mathematics Advanced or equivalent

#### Callaghan

#### Laboratory \*

Face to Face On Campus

3 hour(s) per Week for Full Term starting Week 1

#### Lecture

Face to Face On Campus

14 hour(s) per Term Full Term starting Week 1

Week 1 has a 2 hour lecture, weeks 2-11 have a 1 hour lecture per week which must occur after all labs have been conducted for the week.

### Unit Weighting Workload

\* This contact type has a compulsory requirement.

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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

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# CONTACTS

**Course Coordinator**      **Callaghan**  
Dr Renee Goreham  
Renee.Goreham@newcastle.edu.au  
(02) 4913 8252  
Consultation:  
Office hours 9 am – 5 pm

**Teaching Staff**              Other teaching staff will be advised on the course Canvas site.

**School Office**                **School of Information and Physical Sciences**  
SR233, Social Sciences Building  
Callaghan  
CESE-SIPS-Admin@newcastle.edu.au  
+61 2 4921 5513  
9am-5pm (Mon-Fri)

# SYLLABUS

**Course Content**

- Mathematical Methods in Physics-Vectors
- Mechanics & Kinematics
- Wave Mechanics
- Fluids
- Optics

**Course Learning Outcomes**      **On successful completion of this course, students will be able to:**  
1. Explain the basic principles of physics and mathematics and how they apply to practical situations and engineering problems.  
  
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.

**Course Materials**              **Lecture Materials:**  
- 1. All lectures will be recorded for viewing on the course Canvas site  
2. Course Material including videos, notes and quizzes will be available on the course Canvas site

**Other Resources:**  
- **Laboratory Workbook**  
Students must purchase the PHYS1205 Course Workbook from the Print Centre and bring it to the first workshop session in Week 1.

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**Recommended Text:**

- Principles of Physics (A calculus-based text) 5 Edition, R.A. Serway, J.W. Jewett - Thomson 2012

# 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. The laboratory in week 1 is a compulsory laboratory safety induction session.

# SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	17 Jul	Introduction to Measurement	Introduction: How the course work,. presented in 2 lectures, 1 lectorial and Learning Laboratory 1	Compulsory Safety induction, workbook completion and Learning Laboratory Summary Sheet
2	24 Jul	Fundamentals of Motion in 1D	Review Lecture Topic 1 Learning Laboratory 2 Preparation for Topic 3	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
3	31 Jul	Fundamentals of Motion in 2D and 3D	Review Lecture Topic 2 Learning Laboratory 3 Preparation for Topic 4	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
4	7 Aug	Forces	Review Lecture Topic 3 Learning Laboratory 4 Preparation for Topic 5	Online quiz. Workbook completion and Learning Laboratory Summary Sheet.
5	14 Aug	Work and Energy	Review Lecture Topic 4 Learning Laboratory 5 Preparation for Topic 6	Online quiz. Workbook completion and Learning Laboratory Summary Sheet Class Test 1 during lecture on Topics 2,3,4
6	21 Aug	Momentum and Collisions	Review Lecture Topic 5 Learning Laboratory 6 Preparation for Topic 7	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
7	28 Aug	Rotation and Torque	Review Lecture Topic 6 Learning Laboratory 7 Preparation for Topic 8	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
8	4 Sep	Static Fluids	Review Lecture Topic 7 Learning Laboratory 8 Preparation for Topic 9	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
9	11 Sep	Fluids in motion	Review Lecture Topic 8 Learning Laboratory 9 Preparation for Topic 10	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
10	18 Sep	Optics	Review Lecture Topic 9 Learning Laboratory 10 Preparation for Topic 11	Online quiz. Workbook completion and Learning Laboratory Summary Sheet
Mid Term Break				
Mid Term Break				
11	9 Oct	Oscillations	Review Lecture Topic 10 Learning Laboratory 11 Preparation for Topic 12	Online quiz. Workbook completion and Learning Laboratory Summary Sheet

12	16 Oct	Waves	Review Lecture Topic 11 Learning Laboratory 12	Online quiz. Workbook completion and Learning Laboratory Summary Sheet.  Class Test 2 during lecture on topics 5, 6, 7, 8, 9, 10, 11 and 12
13	23 Oct	Course Review	Review Lecture Topic 12	
<b>Examination Period</b>				
<b>Examination Period</b>				

## ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Quizzes	Online quizzes (10%): By 5 pm on the Monday prior to the topic workshop Class Test 1 and 2 (15%): Class Test 1 will be held in the Lectorial of week 5 Class Test 2 will be held in the Lectorial of week 12	Individual	25%	1, 2
2	Reports	To be submitted in the Learning Laboratory on the day of completion	Combination	25%	3, 4, 5
3	Formal Examination	During formal Examination Period	Individual	50%	1, 2

### 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 - Quizzes

### Assessment Type

Quiz

### Purpose

The purpose and benefit of the quizzes is to provide the students with regular feedback on their learning. These quizzes will help you understand which pieces of each topic you need to concentrate on in the workshop. They will also inform the lecturer of what he needs to cover in the next lectorial review

### Description

There are two forms of quizzes:

1. Online quizzes (10% of course mark) based on the preparation work required for the next weeks workshop. Each topic quiz is to be completed before the workshop on that topic. The best 9 of 11 on-line quiz scores will contribute to your final grade.
2. In class quizzes (15% of course mark): two longer in class quizzes will be held.
  - PA quiz 1 will be all multiple choice questions
  - PA quiz 2 will be long answer questions

### Weighting

25%

### Due Date

Online quizzes (10%): By 5 pm on the Monday prior to the topic workshop  
Class Test 1 and 2 (15%):  
Class Test 1 will be held in the Lectorial of week 5  
Class Test 2 will be held in the Lectorial of week 12

### Submission Method

Specific Location  
Online quizzes will be submitted online through Canvas  
Class tests will be submitted online through Canvas

### Assessment Criteria

Ability to understand basic concepts and do fundamental calculations

### Return Method

In Class

### Feedback Provided

In Class - In the topic review lectorial. Feedback will be in the form of explaining fundamental

misconceptions in the lecture. Individual feedback after the review is also possible.

## Assessment 2 - Reports

<b>Assessment Type</b>	Tutorial / Laboratory Exercises
<b>Purpose</b>	These workshop exercises provide the core learning experience in the course. You will have an opportunity to develop your understanding and skills in physics together with your peers and instructors
<b>Description</b>	<p>There are two components:</p> <ol style="list-style-type: none"> <li>1. Workbook activities: 15% of course grade: a record of all activities performed will be written in this Course Workbook in the spaces provided. Each student must write their work in their own words.</li> <li>2. Learning Laboratory Summary Sheet: 10% of course grade: Questions in the Learning Laboratory Summary Sheet may include: <ul style="list-style-type: none"> <li>- Results of measurements and/or calculations performed during the Learning Laboratory</li> <li>- MCQ and short answer questions to demonstrate understanding of activities conducted during Learning Laboratory.</li> <li>- Worked problems similar to those completed during Learning Laboratory.</li> </ul> </li> </ol> <p>The best 10 of 12 Learning Laboratory scores will contribute to your final grade.</p>
<b>Weighting</b>	25%
<b>Due Date</b>	To be submitted in the Learning Laboratory on the day of completion
<b>Submission Method</b>	In Class
<b>Assessment Criteria</b>	
<b>Return Method</b>	In Class
<b>Feedback Provided</b>	Returned Work. Check with your Laboratory Demonstrator

## Assessment 3 - Formal Examination

<b>Assessment Type</b>	Formal Examination
<b>Description</b>	It will be 2 hours in duration and consist of two sections which are equally weighted. Section A contains multiple choice questions and Section B contains long answer problems. Each section will be of equal weight: Section A is worth 25% of your final grade and Section B is also worth 25% of your final grade. They will be similar in style to the questions in the on-line quizzes and PA tests.
<b>Weighting</b>	50%
<b>Due Date</b>	During formal Examination Period
<b>Submission Method</b>	Formal Exam
<b>Assessment Criteria</b>	
<b>Return Method</b>	Not Returned
<b>Feedback Provided</b>	No Feedback. Final Mark

# 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: For WH&S purposes attendance will be recorded with swipe card access.  
In addition, all students attendance will be recorded using the myUON App.)

Lab induction must be done prior to first attendance in the Laboratory sessions - this is a Workplace Health and safety requirement. Closed in shoes must be worn at all times in the Laboratories.

Attendance at 80% of laboratories is compulsory for commencing students.

You can check in using the App and your attendance is also recorded with the swipe card.

All students attendance will be recorded using the myUoN App, but the 80% attendance requirement does not apply to continuing students.

## 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>

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**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.

**Other Information**

If a student misses an assessment item or requires an extension for an item worth 20% or more of the final grade an application must be made and dealt with through the online special circumstances system. (<https://dotnet.newcastle.edu.au/sc/Pages/Login.aspx>). In this course the only individual item worth more than 20% is the final exam which is worth 50%.

**If you miss a lab or quiz you must submit a “Missed/Late Assessment Form” immediately to the Physics Administration Officer (Cheryl James, P106) either in person or by email [Science-MAPS-Admin@newcastle.edu.au](mailto:Science-MAPS-Admin@newcastle.edu.au) with supporting documentation as per the Adverse Circumstances Policy which can be viewed at <http://www.newcastle.edu.au/policy/000939.html>.**

**This must be done within three calendar days of the missed assessment unless your circumstances do not permit it.**

**Missed/Late Assessment Forms are available on Canvas or from the Physics Administration Officer. If possible consult with the course coordinator before making your formal request.**

*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.*

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