School of Information and Physical Sciences

PHYS4110: Physics Honours 411

Callaghan

Semester 1 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

The Honours Program in Physics is designed to give students an advanced understanding of specific topics in modern physics through coursework and a research project. PHYS4110 and PHYS4210 comprise coursework related to current research interests in Physics - Surface Physics, Near-Earth Space Physics, Solid State Physics and Medical Physics. PHYS4110 and PHYS4210 together comprise 90 hours of lectures which must include three compulsory core topics from Quantum Mechanics, Solid State Physics, Electromagnetism and Classical & Modern Optics, and three elective topics. As a part of PHYS4110 and PHYS4210, students will complete work on research methodology.

Requisites

This course is only available to students enrolled in the Bachelor of Science (Honours) program.

Assumed Knowledge

A major in Physics with a Credit grade average in at least 40 units of 3000 level physics courses.

Contact Hours

Callaghan
Integrated Learning Session *
Face to Face On Campus
50 hour(s) per Term Full Term
Each content topic runs for 15 hours per semester. Actual contact hours will depend on the number of topics chosen per semester.
The research methodology topic will be run by flexible delivery equivalent to 10 hours of contact per semester.

* This contact type has a compulsory requirement.

Unit Weighting

20

Workload

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

CONTACTS

Course Coordinator

Callaghan
Dr Lachlan Rogers
Lachlan.Rogers@newcastle.edu.au
(02) 40557574
Consultation: by appointment

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

PHYS4110 is a 20 unit course in the BSc(Phys)(Honours) program which incorporates coursework covered by a selection of the topics listed below:
Core Topics (3 topics from):

- Quantum Mechanics
- Solid State Physics
- Electromagnetism
- Classicial and Modern Optics

Elective Topics (3 topics from)*

- Advanced Optical Fibres
- Application of Numerical Techniques in Physics
- Digital Signal Processing
- Magnetohydrodynamics & Astrophysics
- Medical Physics
- Organic Electronics
- Space/Ionospheric Physics
- Surface Physics

Research Methodology

1. Occupational Health and Safety requirements associated with research projects
2. Project management skills
3. Experimental design and data analysis
4. Thesis writing skills
5. Seminar presentation skills
6. Professional conduct and practice

* This list of optional topics may vary from year to year. The fourth core topic can also be taken as an elective topic
Students may replace one physics elective topic with an appropriate mathematics or chemistry topic subject to approval by the Physics Honours Coordinator.

Course Learning Outcomes

On successful completion of this course, students will be able to:
1. An understanding at an advanced level of the principles and techniques underlying many of the important areas of contemporary physics

2. Competence in researching the scientific literature

3. A significantly enhanced understanding of how to apply their knowledge of physics to real physical systems independently and collaboratively

4. The capacity to devise and employ effective and creative strategies in problem solving, in conducting research, and in analysing and modelling the behaviour of physical systems.

5. Mastery of a range of experimental, theoretical and/or computational techniques

6. An enhanced ability to effectively communicate their knowledge of physics to a wide variety of audiences

7. Awareness of appropriate professional conduct and practice

Course Materials

COMPULSORY REQUIREMENTS

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

Contact Hour Requirements:

Integrated Learning Session 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.

Course Assessment Requirements:

Pre-Placement Requirements:

ASSESSMENTS

This course has 2 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Written Assignments		Individual	Formative	1, 2, 3, 4, 5, 6, 7
2	Final Examinations		Individual	Formative	no Learning Outcomes

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 - Written Assignments

Assessment Type Written Assignment
Description
Weighting This is a formative assessment and will not contribute to your final grade.
Due Date
Submission Method
Assessment Criteria

Return Method
Feedback Provided

Assessment 2 - Final Examinations

Assessment Type Formal Examination
Description
Weighting This is a formative assessment and will not contribute to your final grade.
Due Date
Submission Method
Assessment Criteria
Return Method
Feedback Provided

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.

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

Communication Methods Communication methods used in this course include:

Course Evaluation

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 for Students' tab in UoNline contains important information that all students should be familiar with, including various systems, policies and procedures.

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.