UNSW Course Outline

PHYS4141 Quantum Mechanics (Honours) - 2024

Published on the 28 Feb 2024

General Course Information

Course Code : PHYS4141
Year : 2024
Term : Term 1
Teaching Period : T1
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Physics
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This advanced Quantum Mechanics course is designed to provide students with a solid foundation needed to understand relativistic quantum mechanics, quantum electrodynamics, the standard model, and quantum information and computation. Topics include: The spin-statistics

relationship; second quantisation; angular momentum; the density matrix; relaxation and decoherence; the Klein-Gordon equation; the Dirac equation; second quantisation of the Dirac field.

Course Aims

This is the highest undergraduate course in quantum mechanics and will provide students with a broad and comprehensive understanding and a foundation for further study and research.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : recall and demonstrate understanding of core principles of quantum mechanics
CLO2 : Develop an understanding of, and ability to solve, a wide range of problems in quantum mechanics
CLO3 : Understand and develop facility with all syllabus material as a foundation for future research and professional activity.

Course Learning Outcomes	Assessment Item
CLO1 : recall and demonstrate understanding of core principles of quantum mechanics	• Final Exam • Assignments
CLO2 : Develop an understanding of, and ability to solve, a wide range of problems in quantum mechanics	• Final Exam • Assignments
CLO3 : Understand and develop facility with all syllabus material as a foundation for future research and professional activity.	• Final Exam • Assignments

Learning and Teaching Technologies

Moodle - Learning Management System

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Final Exam	60%	
Assignments	40%	

Assessment Details

Final Exam

Assessment Overview

Final exam. 2 hour closed book exam. This will consist of a number of quantative problems relating to the theory and applications of quantum mechanics.

Student advised of marks

Course Learning Outcomes

- CLO1 : recall and demonstrate understanding of core principles of quantum mechanics
- CLO2 : Develop an understanding of, and ability to solve, a wide range of problems in quantum mechanics
- CLO3 : Understand and develop facility with all syllabus material as a foundation for future research and professional activity.

Assignments

Assessment Overview

Two quantitative assignments, each worth 20%. Each assignment should require a maximum of 10 hours out-of-class work to complete.

Marked assignments returned with comments

Course Learning Outcomes

- CLO1 : recall and demonstrate understanding of core principles of quantum mechanics
- CLO2 : Develop an understanding of, and ability to solve, a wide range of problems in quantum mechanics
- CLO3 : Understand and develop facility with all syllabus material as a foundation for future research and professional activity.

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
Convenor	Oleg Sushkov					No	Yes
Lecturer	Dipan Sengupta					No	No
Year coordinator	Michael Schmidt					No	No
Administrator	Zofia Krawczyk-Bernotas					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 Plagarism

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