UNSW Course Outline

PHYS6183 Contemporary Physics A for SQA - 2024

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General Course Information

Course Code : PHYS6183
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Physics
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Students will take our honours modules on quantum matter, information and computing.

Quantum Matter, Information and Computing will introduce students to quantum computing, the

physics of superconducting devices, the Quantum Hall and other topological effects in materials, and the basics of Fermi liquid theory. Advanced topics will include Andreev scattering at semiconductor-superconductor interfaces and Majorana fermions, fractional quantum Hall effect, graphene and the two-dimensional Dirac equation.

Course Aims

Students in this course will study a topic important to modern physics. This will provide students with a broad and comprehensive understanding in this area and a foundation for further study and research. Students will gain skills in analysing current research literature.

Relationship to Other Courses

This course is aimed at SQA students.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Recall and demonstrate understanding of the core principles of Quantum Matter, Information and Computing
CLO2 : Develop an ability to analyze and solve a wide range of problems in the topic of Quantum Matter, Information and Computing
CLO3 : Analyze and evaluate selected peer reviewed journal articles; demonstrate an ability to recognize the important points and explain these in written form.

Course Learning Outcomes	Assessment Item
CLO1 : Recall and demonstrate understanding of the core principles of Quantum Matter, Information and Computing	• Literature Review • Assignments • Final Exam
CLO2 : Develop an ability to analyze and solve a wide range of problems in the topic of Quantum Matter, Information and Computing	• Assignments • Final Exam
CLO3 : Analyze and evaluate selected peer reviewed journal articles; demonstrate an ability to recognize the important points and explain these in written form.	• Literature Review

Learning and Teaching Technologies

Moodle - Learning Management System

Additional Course Information

The material about the topics covered on this page is incorrect. The actual topics are:

Quantum Matter, Information and Computing will introduce students to selected topics relevant to modern condensed matter physics and to the development of quantum computation. Specific topics include topological phases in simple models, quantum entanglement, matrix product states, stabiliser quantum error correcting codes, the renormalisation group, the Quantum Hall effect, fractional quantum Hall effect, and other topological effects in materials, physical implementations of quantum computing, and quantum error correction. Advanced topics will include projection operators and their applications, tensor networks, and Majorana fermions.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Literature Review Assessment Format: Individual	10%	
Assignments Assessment Format: Individual	30%	
Final Exam Assessment Format: Individual	60%	

Assessment Details

Literature Review

Assessment Overview

Students will submit a literature review analysing current research in an area of modern physics. Marked assignments returned with comments.

Course Learning Outcomes

- CLO1 : Recall and demonstrate understanding of the core principles of Quantum Matter, Information and Computing
- CLO3 : Analyze and evaluate selected peer reviewed journal articles; demonstrate an ability to recognize the important points and explain these in written form.

Assignments

Assessment Overview

Two quantitative assignments, worth 30% in total. 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 the core principles of Quantum Matter, Information and Computing
- CLO2 : Develop an ability to analyze and solve a wide range of problems in the topic of Quantum Matter, Information and Computing

Final Exam

Assessment Overview

A 2 hour closed book exam, which will contribute 60% to the final grade. The exam will consist of a number of quantative problems relating to Quantum Matter, Information and Computing.

Student advised of marks.

Course Learning Outcomes

- CLO1 : Recall and demonstrate understanding of the core principles of Quantum Matter, Information and Computing
- CLO2 : Develop an ability to analyze and solve a wide range of problems in the topic of Quantum Matter, Information and Computing

General Assessment Information

Grading Basis

Satisfactory

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	Susan Copper smith					No	Yes
Lecturer	Michelle Sim mons					No	No
Administrator	Zofia Krawczy k					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