PHYS3910
Advanced Physics III
Full year 1, Weekday attendance, North Ryde 2021
Department of Physics and Astronomy

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Notice
As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.
General Information

Unit convenor and teaching staff
Dominic Berry
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Alexei Gilchrist
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Credit points
10

Prerequisites
(PHYS188 or PHYS1910) and (PHYS201(D) or PHYS2010(D)) and (PHYS202(D) or PHYS2020(D))

Corequisites

Co-badged status
This unit is co-badged with phys2910

Unit description
This unit offers extended insight into unifying core principles of physics. Alternate years will focus on two key concepts that permeate nearly all of physics - probability (even years) and symmetry (odd years). These two key concepts affect much of modern physics including quantum mechanics, astronomy and astrophysics, lasers and photonics, and biophysics. Students are expected to engage in a research-related activity and produce a report in scientific format on their findings.

Important Academic Dates
Information about important academic dates including deadlines for withdrawing from units are available at https://students.mq.edu.au/important-dates

Learning Outcomes
On successful completion of this unit, you will be able to:

ULO1: identify how symmetry/probability is used in many sub-areas of physics, in sometimes vastly different contexts.

ULO2: explain how symmetry/probability unifies many sub-areas of physics and provides a common structure.

ULO3: use symmetry/probability concepts to solve problems from particular sub-areas of
Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 assignments</td>
<td>15%</td>
<td>No</td>
<td>Regularly during S1</td>
</tr>
<tr>
<td>Problem-set creation</td>
<td>5%</td>
<td>No</td>
<td>Week 13 S1</td>
</tr>
<tr>
<td>Mid-unit exam</td>
<td>30%</td>
<td>No</td>
<td>S1 exam period</td>
</tr>
<tr>
<td>S2 Assignments</td>
<td>20%</td>
<td>No</td>
<td>Regularly during S2</td>
</tr>
<tr>
<td>Research project</td>
<td>30%</td>
<td>No</td>
<td>Week 13 S2</td>
</tr>
</tbody>
</table>

**S1 assignments**

Assessment Type 1: Problem set
Indicative Time on Task 2: 15 hours
Due: **Regularly during S1**
Weighting: **15%**

A series of problem-solving assignments undertaken in session 1.

On successful completion you will be able to:

- identify how symmetry/probability is used in many sub-areas of physics, in sometimes vastly different contexts.
- explain how symmetry/probability unifies many sub-areas of physics and provides a common structure.
- use symmetry/probability concepts to solve problems from particular sub-areas of physics.

**Problem-set creation**

Assessment Type 1: Problem set
Indicative Time on Task 2: 5 hours
Due: **Week 13 S1**
Weighting: **5%**

Each student supplies five solved problems related to the material taught in session 1, suitable for use as a learning resource for the rest of the class.

On successful completion you will be able to:

- identify how symmetry/probability is used in many sub-areas of physics, in sometimes
vastly different contexts.

- explain how symmetry/probability unifies many sub-areas of physics and provides a common structure.
- use symmetry/probability concepts to solve problems from particular sub-areas of physics.

Mid-unit exam

Assessment Type: Quiz/Test
Indicative Time on Task: 20 hours
Due: S1 exam period
Weighting: 30%

An examination on the content from the first half of the unit (end of session 1).

On successful completion you will be able to:
- identify how symmetry/probability is used in many sub-areas of physics, in sometimes vastly different contexts.
- explain how symmetry/probability unifies many sub-areas of physics and provides a common structure.
- use symmetry/probability concepts to solve problems from particular sub-areas of physics.

S2 Assignments

Assessment Type: Problem set
Indicative Time on Task: 15 hours
Due: Regularly during S2
Weighting: 20%

A series of problem-solving assignments undertaken in session 2.

On successful completion you will be able to:
- identify how symmetry/probability is used in many sub-areas of physics, in sometimes vastly different contexts.
- explain how symmetry/probability unifies many sub-areas of physics and provides a common structure.
- use symmetry/probability concepts to solve problems from particular sub-areas of physics.

Research project

Assessment Type: Project
Indicative Time on Task: 30 hours
Due: Week 13 S2
Weighting: 30%

A research project on a topic agreed with the lecturer that fits the theme of the unit, completed in session 2.

On successful completion you will be able to:

- identify how symmetry/probability is used in many sub-areas of physics, in sometimes vastly different contexts.
- explain how symmetry/probability unifies many sub-areas of physics and provides a common structure.
- use symmetry/probability concepts to solve problems from particular sub-areas of physics.

1 If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Learning Skills Unit for academic skills support.

2 Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation.

Delivery and Resources
Course notes will be available for download on ilearn. There is no textbook for this course though suggested readings will be given on ilearn.

Unit Schedule
This is a full-year 3 cpt unit, offering extended insight into unifying core principles of physics. Alternate years will focus on two key concepts that permeate nearly all of physics - probability (even years) and symmetry (odd years). These two key concepts affect much of modern physics including quantum mechanics, astronomy and astrophysics, lasers and photonics, and biophysics. Students are expected to engage in a research-related activity and produce a report in scientific format on their findings.

Policies and Procedures
Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:
• Academic Appeals Policy
• Academic Integrity Policy
• Academic Progression Policy
• Assessment Policy
• Fitness to Practice Procedure
• Grade Appeal Policy
• Complaint Management Procedure for Students and Members of the Public
• Special Consideration Policy (Note: The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)

Students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

• Getting help with your assignment
• Workshops
The Library provides online and face to face support to help you find and use relevant information resources.

- StudyWise
- Academic Integrity Module
- Subject and Research Guides
- Ask a Librarian

Student Enquiry Service
For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

Equity Support
Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

IT Help
For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.