



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

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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

physics.

Assessment Tasks

Name	Weighting	Hurdle	Due
S1 assignments	15%	No	Regularly during S1
Problem-set creation	5%	No	Week 13 S1
Mid-unit exam	30%	No	S1 exam period
S2 Assignments	20%	No	Regularly during S2
Research project	30%	No	Week 13 S2

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 ¹: Quiz/Test

Indicative Time on Task ²: 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 ¹: Problem set

Indicative Time on Task ²: 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 ¹: Project

Indicative Time on Task ²: 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 \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). 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](#)

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

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

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](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant

information resources.

- [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.