



# PHYS1910

## Advanced Physics I

Full year 1, Weekday attendance, North Ryde 2020

*Department of Physics and Astronomy*

### Contents

|                                |   |
|--------------------------------|---|
| <u>General Information</u>     | 2 |
| <u>Learning Outcomes</u>       | 2 |
| <u>Assessment Tasks</u>        | 3 |
| <u>Delivery and Resources</u>  | 3 |
| <u>Policies and Procedures</u> | 3 |

#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

|   |
|---|
| Unit convenor and teaching staff<br>Alexei Gilchrist<br><a href="mailto:alexei.gilchrist@mq.edu.au">alexei.gilchrist@mq.edu.au</a>  |
| Credit points<br>10   |
| Prerequisites<br>Admission to BAdvSc and [(HSC Mathematics Band 4 and above or Extension 1 Band E2 and above or Extension 2) or MATH1000 or MATH130 or MATH1900 or WFMA003 or WFMA0003]   |
| Corequisites  |
| Co-badged status  |
| Unit description<br>This full-year unit is the first component of the Advanced Science degrees in Physics, and Astronomy and Astrophysics, and offers accelerated learning via lectures, discussions, homework, and a literature-based research project. Topics include: Estimation, order-of-magnitude methods, scaling laws, Euler-Lagrange equations, central-force motion, angular momentum, rotational stability, and non-inertial reference frames. Students are also expected to observe and participate in various activities introducing them to research within the department. |

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

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

**ULO1:** apply general approximation and estimation techniques for physics: order-of-magnitude estimation, dimensional analysis, scaling laws and Taylor expansions.

**ULO2:** use estimation techniques in key physical examples from fluid dynamics, atomic theory and material science.

**ULO3:** employ scalars, vectors and tensors.

**ULO4:** apply the Euler-Lagrange equations of motion as an alternative to Newton's laws.

**ULO5:** solve problems using angular velocity, angular momentum, torque and moment of inertia both in 2D and 3D.

**ULO6:** understand rigid body rotations: rotating reference frames, gyroscopes, precession, stability of rotation and boomerangs.

## Assessment Tasks

### Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult [iLearn](#) for revised unit information.

[Find out more about the Coronavirus \(COVID-19\) and potential impacts on staff and students](#)

## Delivery and Resources

### Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

The first semester will comprise of informal meetings and lab visits which are not assessed. The informal meetings will introduce approximation and calculation techniques that are useful across all physics units. In the first semester, this unit will provide opportunities for students to visit research labs and talk to researchers to order to start developing their professional contacts and a view of where their physics career could take them.

The delivery of the advanced material in the second semester will be through blended lecture-tutorials with an emphasis on problem solving. This material will be assessed.

In general, unit materials, reading suggestions, announcements etc will be available on the units iLearn page.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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) (<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](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://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/study/getting-started/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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## 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](http://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 Services and 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.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.