



# MOLS7011

## Research Topic: Advanced Biomolecular Analysis

Session 2, Weekday attendance, North Ryde 2020

*Department of Molecular Sciences*

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#### Disclaimer

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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 learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online 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

Admission to MRes

Corequisites

Co-badged status

Unit description

This unit addresses some advanced methods of analysis utilised in the biomolecular sciences. Biomolecular sciences spans the study of individual molecular structures and biochemical reactions to also encompass the 'omics' sciences of genomics, proteomics, metabolomics and glycomics. These sciences all generate large and complex datasets that require specialized software and methods to assemble and analyse. The analyses are challenging, as they not only require a good knowledge of biochemistry, molecular biology, and cell and developmental biology, but also an understanding of limitations of both the software and the data quality. This unit will provided a background to the data acquisition methods, quality control of the datasets, and analysis methods within a number of these areas. Most importantly it will provide hands-on experience in the analysis of real large-scale datasets and the correct use of appropriate analysis tools.

## 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:** Demonstrate knowledge of appropriate techniques used in acquiring large biomolecular datasets and the limitations of the use of these methods

**ULO2:** Demonstrate understanding of experiment design and ability to critically assess the quality of large biomolecular datasets prior to in-depth analysis

**ULO3:** Analyze large datasets and compare it with established information about the system under investigation

**ULO4:** Process datasets using specific software, providing a broad overview of data in terms of size, quality and utility for further analysis

**ULO5:** Demonstrate ability to effectively report, communicate and draw new conclusions about a biomolecular system from large analytical datasets.

## General Assessment Information

Analysis Report 2 (40%) will be a report on a genomic analysis and dataset.

Analysis Report 1 (20%) will be a report on a Proteomic data set.

Analysis Report 3 (40%) will be a report on a Proteomic/Glycomic data set.

Full details, expectations and format of these reports/assessment items will be given in iLearn.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Analysis Report 2</a>	40%	No	Week 5
<a href="#">Analysis Report 1</a>	20%	No	Week 9
<a href="#">Analysis Report 3</a>	40%	No	Week 13

### Analysis Report 2

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 45 hours

Due: **Week 5**

Weighting: **40%**

Students will be given a biomolecular data set during the workshops and will be required to

analyse this dataset using methods presented during the workshops. The analysis results relevant for the particular data set provided will be presented as a report. Some parts of the analysis will need to be conducted in the students own time between workshops. The type of dataset and analysis methods will be different from those used for report 1.

On successful completion you will be able to:

- Demonstrate knowledge of appropriate techniques used in acquiring large biomolecular datasets and the limitations of the use of these methods
- Demonstrate understanding of experiment design and ability to critically assess the quality of large biomolecular datasets prior to in-depth analysis
- Analyze large datasets and compare it with established information about the system under investigation
- Process datasets using specific software, providing a broad overview of data in terms of size, quality and utility for further analysis
- Demonstrate ability to effectively report, communicate and draw new conclusions about a biomolecular system from large analytical datasets.

## Analysis Report 1

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 24 hours

Due: **Week 9**

Weighting: **20%**

Students will be given a biomolecular data set during the workshops and will be required to analyse this dataset using methods presented during the workshops. The analysis results relevant for the particular data set provided will be presented as a report. Some parts of the analysis will need to be conducted in the students own time between workshops.

On successful completion you will be able to:

- Demonstrate understanding of experiment design and ability to critically assess the quality of large biomolecular datasets prior to in-depth analysis
- Analyze large datasets and compare it with established information about the system under investigation
- Process datasets using specific software, providing a broad overview of data in terms of size, quality and utility for further analysis

- Demonstrate ability to effectively report, communicate and draw new conclusions about a biomolecular system from large analytical datasets.

## Analysis Report 3

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 45 hours

Due: **Week 13**

Weighting: **40%**

Students will be given a biomolecular data set during the workshops and will be required to analyse this dataset using methods presented during the workshops. The analysis results relevant for the particular data set provided will be presented as a report. Some parts of the analysis will need to be conducted in the students own time between workshops. The type of dataset and analysis methods will be different from those used for report 1 and 2.

On successful completion you will be able to:

- Demonstrate knowledge of appropriate techniques used in acquiring large biomolecular datasets and the limitations of the use of these methods
- Demonstrate understanding of experiment design and ability to critically assess the quality of large biomolecular datasets prior to in-depth analysis
- Analyze large datasets and compare it with established information about the system under investigation
- Process datasets using specific software, providing a broad overview of data in terms of size, quality and utility for further analysis
- Demonstrate ability to effectively report, communicate and draw new conclusions about a biomolecular system from large analytical datasets.

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<sup>1</sup> 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 [Writing Centre](#) for academic skills support.

<sup>2</sup> 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

This unit uses team-based teaching in the form of 'lectorials' that encompass both lectures and

hands-on experiences in using various data analysis software programs and tools. The tutors are actively involved in research activities to bring knowledge from real-world experiences in their respective fields. All class sessions take place in a 3 hr weekly timeslot as detailed in iLearn. Tutorials will NOT be recorded. You must attend these tutorials to gain practical experience with data analysis. As some of the assessment is based on your practical use of specific software it is essential that you attend these classes.

**It is expected that each student will bring to class a laptop computer to install data analysis software, or prior arrangements must be made with the convenor.**

## 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](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>).

## 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](https://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.