MOLS7011

Research Topic: Advanced Biomolecular Analysis

Session 2, Special circumstances 2021

Department of Molecular Sciences

Contents

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff Robert Willows robert.willows@mq.edu.au
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://students.mq.edu.au/important-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

See iLearn for details.

Assessment Tasks

Name	Weighting	Hurdle	Due
Analysis Report 1	20%	No	Week 9
Analysis Report 3	40%	No	Week 13
Analysis Report 2	40%	No	Week 5

Analysis Report 1

Assessment Type [1]: Report
Indicative Time on Task [2]: 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

Analysis Report 3

Assessment Type [1]: Report
Indicative Time on Task [2]: 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

Analysis Report 2

Assessment Type [1]: Report
Indicative Time on Task [2]: 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 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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[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

This unit uses team-based teaching that encompass both short (10-15 min) lectures coupled with 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 (preferably in person but online is available) 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 <u>laptop computer</u> 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://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). 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) 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

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.