



CBMS785

Laboratory Skills for Molecular Science Research

S1 Day 2019

Dept of Molecular Sciences

Contents

| | |
|---------------------------------------|----|
| <u>General Information</u> | 2 |
| <u>Learning Outcomes</u> | 3 |
| <u>Assessment Tasks</u> | 3 |
| <u>Delivery and Resources</u> | 5 |
| <u>Unit Schedule</u> | 6 |
| <u>Policies and Procedures</u> | 6 |
| <u>Graduate Capabilities</u> | 8 |
| <u>Changes from Previous Offering</u> | 11 |
| <u>Changes since First Published</u> | 11 |

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General Information

Unit convenor and teaching staff

ARC Future Fellow

Alf Garcia-Bennett

alf.garcia@mq.edu.au

Contact via 8115

CBMS Level 3 337

please arrange by email

Louise Brown

louise.brown@mq.edu.au

Matthew McKay

matthew.mckay@mq.edu.au

Indrek Pernik

indrek.pernik@mq.edu.au

Lindsay Parker

lindsay.parker@mq.edu.au

Deepa Varkey

deepa.varkey@mq.edu.au

Alison Rodger

alison.rodger@mq.edu.au

Paul Jaschke

paul.jaschke@mq.edu.au

Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Unit description

This unit will provide hands-on experience of several of the sophisticated technologies currently utilised in molecular science. Students will select a portfolio of techniques across chemistry, biochemistry, biophysics, genomics or microbiology, according to their discipline background and interest. Independent skills and technical competency in a minimum of three contemporary methodologies or instrumentation types will be developed through intensive practical sessions with Macquarie researchers. This is a skills-focused unit designed to practically enrich methods encountered from a more theoretical standpoint in other units.

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:

At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.

At the end of this unit students will be able to generate individual technical skills in sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.

At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement the correct methodology to characterise a specific type of sample.

At the end of this unit students will be able to analyse experimental data gathered from a range of research technologies and communicate the outcomes of this analysis in written and oral form.

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|----------------------------------|-----------|--------|---------|
| Module 1: Report | 33% | No | April 5 |
| Module 2: Report | 33% | No | May 17 |
| Module 3: Report | 34% | No | June 14 |

Module 1: Report

Due: **April 5**

Weighting: **33%**

Report, Standard Operating Procedure (SOP) or skills evaluation; as appropriate

On successful completion you will be able to:

- At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.
- At the end of this unit students will be able to generate individual technical skills in sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.
- At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement the correct methodology to characterise a specific type of sample.
- At the end of this unit students will be able to analyse experimental data gathered from a range of research technologies and communicate the outcomes of this analysis in written and oral form.

Module 2: Report

Due: **May 17**

Weighting: **33%**

Report, Standard Operating Procedure (SOP) or skills evaluation; as appropriate

On successful completion you will be able to:

- At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.
- At the end of this unit students will be able to generate individual technical skills in sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.
- At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement

the correct methodology to characterise a specific type of sample.

- At the end of this unit students will be able to analyse experimental data gathered from a range of research technologies and communicate the outcomes of this analysis in written and oral form.

Module 3: Report

Due: **June 14**

Weighting: **34%**

Report, Standard Operating Procedure (SOP) or skills evaluation; as appropriate

On successful completion you will be able to:

- At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.
- At the end of this unit students will be able to generate individual technical skills in sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.
- At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement the correct methodology to characterise a specific type of sample.
- At the end of this unit students will be able to analyse experimental data gathered from a range of research technologies and communicate the outcomes of this analysis in written and oral form.

Delivery and Resources

This unit will provide hands-on experience in advanced contemporary technologies/instrumentation currently used in molecular science. Students will select three techniques from a portfolio of training modules offered by skilled researchers within CBMS. Independent skills and technical competency will be developed through intensive small-group laboratory training.

Each module is of 4 weeks in duration (weeks 2-5; weeks 6-9; weeks 10-13). Scheduling of tasks will be dependent on instrument and staff availability.

5pm deadline for electronic submission of all reports and/or SOP via the Turnitin portal on the iLearn site. Late submissions will be subject to penalty.

Technologies Used and Required: Specialist scientific equipment, computers and software will be made available to you under supervision, but you will require your own laptop with basic software installed to prepare your reports and SOP documentation.

Unit Schedule

Module 1 Mar 7 to Mar 29 (weeks 2-5):

- Protein visualisation using pyMOL - Dr Bhumika Shah
- LC-MS/proteomics - Dr Matthew McKay
- Physical Adsorption -Dr. Garcia-Bennett

Module 2 Apr 4 to May 10 (weeks 7-10):

- Flow Cytometry - Dr Martin Ostrowski
- NMR Spectroscopy for Synthetic Chemistry - Dr Indrek Pernik

Module 3 May 17-Jun 7 (weeks 10-13):

- Microscopy -Dr Lindsay Parker
- Synthetic Biology- Dr. Paul Jaschke
- CD Spectroscopy- Prof. Alison Rodgers

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.*)

Undergraduate 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 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 improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

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

If you are a Global MBA student contact 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/.

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.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcome

- At the end of this unit students will be able to analyse experimental data gathered from a range of research technologies and communicate the outcomes of this analysis in written and oral form.

Assessment tasks

- Module 1: Report
- Module 2: Report
- Module 3: Report

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.
- At the end of this unit students will be able to generate individual technical skills in sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.

Assessment tasks

- Module 1: Report
- Module 2: Report
- Module 3: Report

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.
- At the end of this unit students will be able to generate individual technical skills in sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.
- At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement the correct methodology to characterise a specific type of sample.

Assessment tasks

- Module 1: Report
- Module 2: Report
- Module 3: Report

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- At the end of this unit students will be able to develop practice and procedural knowledge in a range of advanced methods utilised in contemporary molecular research and understand how they are used to solve contemporary problems in the respective field.
- At the end of this unit students will be able to generate individual technical skills in

sample handling and instrumentation relevant to the research (as distinct from classroom) setting for their chosen methods.

- At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement the correct methodology to characterise a specific type of sample.

Assessment tasks

- Module 1: Report
- Module 2: Report
- Module 3: Report

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcome

- At the end of this unit students will be able to analyse experimental data gathered from a range of research technologies and communicate the outcomes of this analysis in written and oral form.

Assessment tasks

- Module 1: Report
- Module 2: Report
- Module 3: Report

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcome

- At the end of this unit students will be able to execute independent analytical and critical skills required for scientific experimentation and research design allowing to implement

the correct methodology to characterise a specific type of sample.

Changes from Previous Offering

Two new modules are offered

Changes since First Published

| Date | Description |
|------------|-------------------------------------------------------------------------|
| 05/03/2019 | Module Staff have been added so that they can access the unit on ILearn |