



# CBMS797

## Research Topic: Advanced Physical and Analytical Chemistry

S1 Day 2018

*Dept of Chemistry & Biomolecular Sciences*

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#### Disclaimer

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## General Information

Unit convenor and teaching staff

Unit Convenor

Ian Jamie

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Contact via [ian.jamie@mq.edu.au](mailto:ian.jamie@mq.edu.au)

F7B 236

No formal consultation hours but making an appointment is advisable

To Be Determined

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Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Unit description

This unit will build on fundamental concepts in physical and analytical chemistry to explore themes emerging in the field of chemistry and its global impacts. It will connect the underpinning physical chemistry topics (e.g., spectroscopy, quantum chemistry, kinetics) to the application methods employed by analytical chemistry.

The unit will be taught extensively through the primary literature and will provide students with hands on experience in cutting edge tools required to understand and analysis fundamental chemical processes. Exemplars of current applications of physical and analytical chemistry include the global impacts of, for instance, greenhouse gas detection and quantification, distribution of persistent organic pollutants, and the determination of the structures of novel nanomaterials.

## 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 completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;

At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;

At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;

At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Essay 1</u>	15%	No	Week 6
<u>Oral Presentation 1</u>	8%	No	Week 7
<u>Essay 2</u>	15%	No	Week 12
<u>Oral Presentation 2</u>	7%	No	Week 13
<u>Problem sets</u>	30%	No	~ Fortnightly
<u>Literature Review</u>	25%	No	Week 12

### Essay 1

Due: **Week 6**

Weighting: **15%**

Topic of current interest in physical or analytical chemistry.

On successful completion you will be able to:

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;

- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## Oral Presentation 1

Due: **Week 7**

Weighting: **8%**

Presentation on topic from the primary literature.

On successful completion you will be able to:

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## Essay 2

Due: **Week 12**

Weighting: **15%**

Topic of current interest in physical or analytical chemistry.

On successful completion you will be able to:

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry

and related disciplines.

## Oral Presentation 2

Due: **Week 13**

Weighting: **7%**

Presentation on topic from the primary literature

On successful completion you will be able to:

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## Problem sets

Due: ~ **Fortnightly**

Weighting: **30%**

Workshops and assigned question sets which involve providing short answers or short reports, relating to the topics being covered.

On successful completion you will be able to:

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## Literature Review

Due: **Week 12**

Weighting: **25%**

A literature review on a chosen topic in physical or analytical chemistry.

On successful completion you will be able to:

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## Delivery and Resources

Lectures/tutorials, 2 hour duration, will be held in Weeks 2-13 (week 1 will be used for administrative matters).

Lectures/tutorials will be presented as a combination of formal lectures and interactive discussion sessions. Students in this unit are expected to demonstrate a high level of self-directed learning. This means reading the required materials (and beyond), searching in primary literature, working through problems outside of lectures. Working through the material with your peers is encouraged. In the tutorials the students will present their seminars on assigned topics and all students will be expected to participate in discussions.

There is no recommended text for this unit. The main source of materials will be from the primary literature (i.e. journal articles, reviews, and sections of research books). Examples of starting points are the journals "*Annual Review of Analytical Chemistry*" and "*Annual Review of Physical Chemistry*",

Students are expected to use iLearn and access the web pages regularly for announcements, relevant links downloadable course material, and other supporting information. The staff will be available for consultations in person.

## 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](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 shown in *iLearn*, 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).

## 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 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](http://ask.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.

## 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 outcomes

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;

### Assessment tasks

- Essay 1
- Oral Presentation 1
- Essay 2
- Oral Presentation 2
- Problem sets
- Literature Review



## 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 completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

### Assessment tasks

- Essay 1
- Oral Presentation 1
- Essay 2
- Oral Presentation 2
- Problem sets
- Literature Review

## 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 completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary

literature relevant to current advances in physical and analytical chemistry;

- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## **Assessment tasks**

- Essay 1
- Oral Presentation 1
- Essay 2
- Oral Presentation 2
- Problem sets
- Literature Review

## **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 completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

## **Assessment tasks**

- Essay 1
- Oral Presentation 1

- Essay 2
- Oral Presentation 2
- Problem sets
- Literature Review

## 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 outcomes

- At the completion of this unit you will be able to discuss, in a coherent manner, aspects of principles and concepts of current research areas of physical and analytical chemistry;
- At the completion of this unit you will be able to critically analyse concepts in the primary literature relevant to current advances in physical and analytical chemistry;
- At the completion of this unit you will be able to illustrate, in written and oral presentations, methodologies used in current advanced research in physical and analytical chemistry and their applications and limitations;
- At the completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

### Assessment tasks

- Essay 1
- Oral Presentation 1
- Essay 2
- Oral Presentation 2
- Problem sets
- Literature Review

## 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 completion of this unit you will be able to convey to an audience the role of physical and analytical chemistry in addressing current research topics in the chemistry and related disciplines.

### **Changes from Previous Offering**

Due to staff changes the topics may differ from those given in 2016.