



CBMS797

Research Topic: Advanced Physical and Analytical Chemistry

S1 Day 2016

Dept of Chemistry & Biomolecular Sciences

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General Information

Unit convenor and teaching staff

Unit Convenor

Ian Jamie

ian.jamie@mq.edu.au

Contact via ian.jamie@mq.edu.au

F7B 236

No formal consultation hours but making an appointment is advisable

Lecturer

Christopher McRae

christopher.mcrae@mq.edu.au

Contact via christopher.mcrae@mq.edu.au

F7B 328

Students are encouraged to arrange a meeting via email.

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	Due
Current Topics Essays	25%	Mid session and end-of-session
Problem sets	25%	Throughout Semester
Oral presentations	25%	TBD
Literature Review	25%	Week 12

Current Topics Essays

Due: **Mid session and end-of-session**

Weighting: **25%**

Two essays on topics of current interest in physical and 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.

Problem sets

Due: **Throughout Semester**

Weighting: **25%**

Approximately five problem sets which involve providing short answers and calculations stemming from current 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.

Oral presentations

Due: **TBD**

Weighting: **25%**

Three presentations in total, each of about ~20 minutes, on topics 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.

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 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](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of 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/support/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.

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

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 - 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

- Current Topics Essays
- Problem sets
- Oral presentations
- 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;
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Assessment tasks

- Current Topics Essays
- Problem sets
- Oral presentations
- 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

- Current Topics Essays
- Problem sets
- Oral presentations

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

- Current Topics Essays
- Oral presentations
- Literature Review

Changes from Previous Offering

This is the first offering of this unit.