



CBMS302

Chemistry Capstone

S2 Day 2017

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

ian.jamie@mq.edu.au

Contact via 9850 8293

F7B 236

Anytime

Credit points

3

Prerequisites

Corequisites

6cp from (CBMS303 or CBMS304 or CBMS306 or CBMS307 or CBMS308 or CBMS332)

Co-badged status

Unit description

This unit investigates some areas of current chemistry, such as developments in green chemistry, development of organic solar cells, alternative fuels, and similar areas. You will be able to apply your chemistry knowledge and skills to issues relevant to our current and future society. We will look at the idea of the 'ethical chemist', and through workshops with industry employers and recruiters we will get you ready to apply for positions in industry and academia. An important part of the unit will be a self-directed laboratory investigation into a topic of current interest, for example, biodiesel synthesis and characterisation, development of novel materials, and new synthesis methods. You will plan and carry out the investigation, and report on the outcomes. You will have the opportunity to use sophisticated research instruments and to refine your laboratory skills.

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 conclusion of this unit students will be able to identify and discuss issues of relevance to society, using the context of contemporary chemistry.

At the conclusion of this unit students will be able to exhibit mastery of broad chemical

knowledge concerning the fundamentals in the basic areas of the discipline, and be able to use the knowledge and skills gained during their studies to analyse issues of current interest and relevance.

At the conclusion of this unit students will be able to exhibit problem-solving skills by identifying the essential parts of a research problem and formulating a strategy for solving the problem.

At the conclusion of this unit students will be able to undertake research, including understanding and articulating the objective of the project, carry out appropriate experiments, and record, analyse and present the results of the study.

At the conclusion of this unit students will be able to place the activities of chemists in a professional ethics context.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Employment</u>	10%	No	Week 7
<u>Essay</u>	10%	No	Week 8
<u>Class Presentation</u>	10%	No	Week 9/10
<u>Assignments</u>	10%	No	Week 13
<u>Research Project</u>	60%	No	Week 13

Employment

Due: **Week 7**

Weighting: **10%**

A cover letter and response to a typical interview question.

On successful completion you will be able to:

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Essay

Due: **Week 8**

Weighting: **10%**

Essay on an area of current chemistry

On successful completion you will be able to:

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Class Presentation

Due: **Week 9/10**

Weighting: **10%**

Short Presentations on Paper of Interest

On successful completion you will be able to:

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Assignments

Due: **Week 13**

Weighting: **10%**

A range of multiple choice questions covering the sub-disciplines of chemistry.

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- At the conclusion of this unit students will be able to exhibit problem-solving skills by identifying the essential parts of a research problem and formulating a strategy for

solving the problem.

- At the conclusion of this unit students will be able to place the activities of chemists in a professional ethics context.

Research Project

Due: **Week 13**

Weighting: **60%**

The research project is the primary activity in CBMS302. You will work on a topic that is related to the overall themes of CBMS302, being contemporary chemistry, environmental sustainability and the place of chemistry in society.

The research project has

Grant Application or Action Plan (10%): An individually written proposal that emulates a typical grant application employed in academic research or an action plan employed in industry

- Due: End of Week 3

Execution of the Project (5%): Assessment of project preparation, conduct in the laboratory and contribution to the group effort, general knowledge and skills associated with the research project.

- Due: Continually assessed over the semester.

Written Report (25%): Formal written report on the research project. Group prepared and submitted.

- Due: End of Week 13

Poster (10%): Group preparation and presentation of a Poster on the research work

- Due: End of Week 13

Reflections (5%): A weekly reflection on your research experience.

- Due: Weekly starting in Week 3

Debrief (5%): A discussion with the unit convenor and a self-evaluation of your research experience

- Due: Week 14 or 15

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Delivery and Resources

Classes

Timetable: Please check <http://www.timetables.mq.edu.au/> for the official timetable of the unit. Note that this unit is meant to have a high degree of flexibility and the official timetable is a guide only.

Lectures/Tutorial/Seminars: The coursework component of this unit will be used to explore topics of relevance to contemporary chemistry and employment in the Chemistry field. Attendance is compulsory. At times we may use the time allocated to lectorials for work related to the research project and vice-versa.

Laboratory Work: This is a large component of CBMS302. Your self-directed research project will help you to understand which techniques you have learnt over the past few years can be used in a given practical situation. You will design the project, using literature procedures as a guide. Considerable preparation is therefore needed. Practical sessions will be organised in a semi-formalised manner, with sufficient flexibility to allow individualised investigations.

Required and Recommended Texts and/or Materials

None prescribed. This unit will draw upon the recent chemical literature, accessed through journals (paper and electronic) as source material for the topics being studied.

Technology Used and Required

You will be using modern and sophisticated research instrumentation when conducting your research. This will be provided by the Department.

You will acquire current scientific literature using database search tools such as SciFinder Scholar, Reaxys, PubMed and Scirus.

You will be giving seminars and submitting documents. It is expected that these will be prepared in a professional manner. Access to presentation software, such as Powerpoint, and word processing software will be necessary.

Unit Web Page

The URL of the CBMS302 web site is: ilearn.mq.edu.au

You will be asked for a username and password. Your username is your student MQID. Your MQID and password have been mailed to you by the University. If you have lost them go to the student portal: my.mq.edu.au

Teaching and Learning Strategy

This unit is designed to have a flexible, open and self-directed learning environment. Much of the learning in the coursework component of the course will involve readings and discussion of those readings. You will be expected to exhibit a grasp of contemporary chemistry through application of your previous and current learning in the units that comprise your Major, by in class discussions and presentations and through essays and the final examination.

The essays provide a mechanism developing your level of understanding of the topic and your ability to communicate to others. They also provide, to some extent, a method of providing objective assessment of your level of attainment.

Active participation by you in the lectures/tutorial, seminars and laboratory sessions is expected. This means that you are expected to ask questions and contribute to the discussions during lectures/tutorials, seminars and in the laboratory.

The research project is intended to provide you with the opportunity to act as a real research chemist. It will be your responsibility to understand the problem, first through the literature and then in the lab. You will be expected to justify your research plan, and to present your research results to your peers. The research project consists of planning, execution and communication of results. These sections will be assessed through a written proposal for the project, performance in the laboratory, a written report (journal article format), and an oral presentation on the project. Some of these may be given as group work (to be determined by consensus).

Unit Schedule

Classes, including labs, will begin in Week 1

The schedule below is tentative and may be changed as circumstances require.

		Lectorial Schedule	Lab Schedule	Submissions
Week Num	Date	6 Eastern Rd - E4B 308 9 am – 11 pm	E7B 346 2 - 6 pm	
1	2-Aug-17	Graduate Capabilities, Project Discussion	Lab	
2	9-Aug-17	Ethics + Good Laboratory Practice	Lab	
3	16-Aug-17	Ethics, continued 2017 STEM Careers Day	Lab	Research Proposal Due
4	23-Aug-17	APESMA	Lab	
5	30-Aug-17	Employment	Lab	

6	6-Sep-17	Lecture	Lab	
7	13-Sep-17	Lecture	Lab	Cover Letter + Interview Question
	20-Sep-17	Recess		
	27-Sep-17			
8	4-Oct-17	Lecture	Lab	Essay Due
9	11-Oct-17	Presentation	Lab	
10	18-Oct-17	Presentation	Lab	
11	25-Oct-17	Internal Guests	Lab	
12	1-Nov-17	External Guests	Lab	
13	8-Nov-17	-	Lab Poster Presentation	Report Due
14	15-Nov-17			Reflection Interviews
15	22-Nov-17			Reflection Interviews

Learning and Teaching Activities

Lectorials (Lectures + Tutorials)

Active participation by you in the lectorials and seminars is expected. This means that you are expected to ask questions and contribute to the discussions during lectures/tutorials, seminars and in the laboratory.

Research Project

The research project is intended to provide you with the opportunity to act as a real research chemist, with an academic or industrial context. It will be your responsibility to understand the problem, first through the literature and then in the lab. You will be expected to justify your research plan, and to present your research results to your peers. The research project consists of planning, execution and communication of results. These sections will be assessed through a written proposal for the project, performance in the laboratory, a written report (journal article format), a poster presentation, and an interview on the project. The report and poster presentation will be group submission. You will also be reflecting on your experience as a researcher, through a personal blog.

Essays, Presentations, Assignments, Employment Exercises

These provide a mechanism to help you develop an understanding of the topics, your own level of attainments and preparedness for the step beyond the degree, and your ability to communicate to others. They also provide, to some extent, a method of providing an objective

assessment of your level of attainment. The employment exercises are designed to give you some insight into expectations of employers and interviewers, and how you might meet those expectations. The essay and presentation allow you to focus on communication in the science field.

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

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.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 (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

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

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- At the conclusion of this unit students will be able to identify and discuss issues of relevance to society, using the context of contemporary chemistry.
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- At the conclusion of this unit students will be able to place the activities of chemists in a professional ethics context.

Assessment tasks

- Essay
- Class Presentation
- Research Project

Learning and teaching activities

- Active participation by you in the lectorials and seminars is expected. This means that you are expected to ask questions and contribute to the discussions during lectures/ tutorials, seminars and in the laboratory.
- The research project is intended to provide you with the opportunity to act as a real research chemist, with an academic or industrial context. It will be your responsibility to understand the problem, first through the literature and then in the lab. You will be expected to justify your research plan, and to present your research results to your peers. The research project consists of planning, execution and communication of results. These sections will be assessed through a written proposal for the project, performance in the laboratory, a written report (journal article format), a poster presentation, and an interview on the project. The report and poster presentation will be group submission. You will also be reflecting on your experience as a researcher, through a personal blog.
- These provide a mechanism to help you develop an understanding of the topics, your own level of attainments and preparedness for the step beyond the degree, and your ability to communicate to others. They also provide, to some extent, a method of providing an objective assessment of your level of attainment. The employment exercises are designed to give you some insight into expectations of employers and interviewers, and how you might meet those expectations. The essay and presentation allow you to focus on communication in the science field.

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

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Assessment tasks

- Employment
- Assignments
- Research Project

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Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

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- Essay
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Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

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Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

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Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

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Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

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- Active participation by you in the lectorials and seminars is expected. This means that you are expected to ask questions and contribute to the discussions during lectures/ tutorials, seminars and in the laboratory.
- The research project is intended to provide you with the opportunity to act as a real research chemist, with an academic or industrial context. It will be your responsibility to understand the problem, first through the literature and then in the lab. You will be expected to justify your research plan, and to present your research results to your peers. The research project consists of planning, execution and communication of results. These sections will be assessed through a written proposal for the project, performance in the laboratory, a written report (journal article format), a poster presentation, and an interview on the project. The report and poster presentation will be group submission. You will also be reflecting on your experience as a researcher, through a personal blog.
- These provide a mechanism to help you develop an understanding of the topics, your own level of attainments and preparedness for the step beyond the degree, and your ability to communicate to others. They also provide, to some extent, a method of providing an objective assessment of your level of attainment. The employment exercises are designed to give you some insight into expectations of employers and interviewers, and how you might meet those expectations. The essay and presentation

allow you to focus on communication in the science field.

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- At the conclusion of this unit students will be able to identify and discuss issues of relevance to society, using the context of contemporary chemistry.
- At the conclusion of this unit students will be able to exhibit mastery of broad chemical knowledge concerning the fundamentals in the basic areas of the discipline, and be able to use the knowledge and skills gained during their studies to analyse issues of current interest and relevance.
- At the conclusion of this unit students will be able to exhibit problem-solving skills by identifying the essential parts of a research problem and formulating a strategy for solving the problem.
- At the conclusion of this unit students will be able to undertake research, including understanding and articulating the objective of the project, carry out appropriate experiments, and record, analyse and present the results of the study.
- At the conclusion of this unit students will be able to place the activities of chemists in a professional ethics context.

Assessment tasks

- Essay
- Class Presentation
- Research Project

Learning and teaching activities

- Active participation by you in the lectorials and seminars is expected. This means that you are expected to ask questions and contribute to the discussions during lectures/tutorials, seminars and in the laboratory.
- The research project is intended to provide you with the opportunity to act as a real research chemist, with an academic or industrial context. It will be your responsibility to

understand the problem, first through the literature and then in the lab. You will be expected to justify your research plan, and to present your research results to your peers. The research project consists of planning, execution and communication of results. These sections will be assessed through a written proposal for the project, performance in the laboratory, a written report (journal article format), a poster presentation, and an interview on the project. The report and poster presentation will be group submission. You will also be reflecting on your experience as a researcher, through a personal blog.

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Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- At the conclusion of this unit students will be able to identify and discuss issues of relevance to society, using the context of contemporary chemistry.
- At the conclusion of this unit students will be able to exhibit mastery of broad chemical knowledge concerning the fundamentals in the basic areas of the discipline, and be able to use the knowledge and skills gained during their studies to analyse issues of current interest and relevance.
- At the conclusion of this unit students will be able to exhibit problem-solving skills by identifying the essential parts of a research problem and formulating a strategy for solving the problem.
- At the conclusion of this unit students will be able to undertake research, including understanding and articulating the objective of the project, carry out appropriate experiments, and record, analyse and present the results of the study.
- At the conclusion of this unit students will be able to place the activities of chemists in a

professional ethics context.

Assessment tasks

- Essay
- Class Presentation
- Research Project

Learning and teaching activities

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Changes from Previous Offering

There have been no significant changes from the previous offering.