



Course Outline

CHEM3998

Advanced Special Project in Chemistry

School of Chemistry

Faculty of Science

Terms 1-3 and Summer, 2021 onwards

1. Staff

Position	Name	Email	Consultation times and locations	Contact Details
Course Convenor	Neeraj Sharma	Neeraj.sharma@unsw.edu.au	By appointment	Room 129, Dalton Building
Lecturer	Research supervisor			

2. Course information

Units of credit: 6

Pre-requisite(s):

Completion of at least 72 UoC

Completion of at least 18 UoC of Level II Chemistry OR 36 UoC of Level II Science or Engineering Courses

A Weighted Average Mark (WAM) of at least 65

A Chemistry WAM of at least 65

Teaching times and locations:

7 hrs per week over 10 weeks arranged with research supervisor and in supervisor's laboratories or at group meetings. *This is a flexible course and time is to be made through arrangement with the principal research supervisor. It is the students responsibility to organise time between coursework and research.*

1 hr per week of timetabled meetings with course convenor or representative, see below for times and locations

<http://www.timetable.unsw.edu.au>

2.1 Course summary

This course provides a more sophisticated introduction to the university research environment than CHEM2999 through undertaking a more complex short research project which utilises the skills and knowledge obtained by students in their early undergraduate degree. The project will be conducted under the direction of a Chemistry academic member of staff taking advantage of UNSW's world-class researchers and research facilities. Student engage directly with academics and their research group, becoming involved with the group's regular activities such as group meetings, while learning important research and transferable graduate skills prized throughout academia, industry and business.

2.2 Course aims

The course aims expand the student's knowledge of chemistry research in a research specialisation chosen by the student. This will include understanding the process through which research is

planned, carried out and reported. There is also significant interaction with the research group of the supervisor chosen for the project.

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Demonstrate professional behaviour in research by preparing risk assessments, maintaining research progress and keeping appropriate records that enable replication of research results
2. With growing independence, investigate and solve qualitative and quantitative problems in chemical sciences by applying relevant research methods
3. Access and evaluate peer reviewed literature using information technologies
4. Communicate research in the written and graphical format aimed at a scientific audience in the format of a discipline journal and identify potential future research direction
5. Identify and articulate the skills acquired during the research experience and relate these to employability and graduate attributes

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	Related Program Learning Outcomes based on Teaching Learning Outcomes (TLOs) from RACI Chemistry Tertiary Academic Standards Statement	Related Tasks & Assessment
CLO 1	Focuses on TLO 5, taking personal, professional and social responsibility, and TLO 3.2, undertaking experiments in a safe and responsible manner.	Assessments 1 and 2 (Summary document and Notebook)
CLO 2	Focuses on TLO 3, investigating and solving qualitative and quantitative problems in the chemical sciences.	Research work throughout course and all assessment tasks.
CLO 3	Focuses on TLO 3.1, synthesising and evaluating information from a range of sources.	Assessment 3, 4.
CLO 4	Focuses on TLO 4, communicating chemical knowledge, and TLO 1.2, recognising the role of chemistry in society.	Assessment 3, 4.
CLO 5	Focuses on TLO 3.3, applying recognised methods and appropriate practical techniques and tools, and being able to adapt these techniques when necessary.	Research work, Assessment Task 3.

3. Strategies and approaches to learning

3.1 Learning and teaching activities

The dominant learning mode for this course is regular approximately 7 hrs per week engagement with an authentic research project within one of UNSW's Chemistry research groups. This project should be determined through consultation between the primary supervisor and the student. This project will give students the opportunity to experience various aspects of the day-to-day life of a research student, expose them to the motivations, goals and key methodologies of the research group as well as teach them valuable research skills and transferable skills.

Students will also participate in a one-hour compulsory group meeting each week. This meeting will provide a venue for reflection by students on their project, research in general and the realities of being a scientist.

3.2 Expectations of students

To complete this course successfully, students must:

- engage with the research project for 7 hours / week as directed by their supervisor, including, for example, attending group meetings, discussing the project with the supervisor or other members of the group and performing research;
- attend at least 80% of group meetings unless appropriate special considerations is given;
- follow appropriate safety guidelines, particularly in research labs, and behave courteously and respectfully to all staff and students.

4. Course schedule and structure

This course consists of 8 hours per week of a combination of contact and non-contact hours.

Week	Topic	Activity	Related CLO
Week 1	Research	Research	1-5
Week 2	Research	Research	1-5
Week 3	Research	Research	1-5
Week 4	Research	Research	1-5
Week 5	Research	Research	1-5
Week 6	Research	Research	1-5
Week 7	Research	Research	1-5
Week 8	Research	Research	1-5
Week 9	Research	Research	1-5
Week 10	Research	Research	1-5

5. Assessment

5.1 Assessment tasks

Definitions

Research Activity: Task performed by the student that produces original material or data to contribute to the project objectives. This original material or data may include chemicals, computer programs, spectra, interview transcripts, calculation results, questions, analysis, collation of literature or results, preparation of teaching or outreach material and more.

Research Work: Task performed by the student in order to fulfil the project objectives. This includes both research activities as defined above and those tasks required to prepare for research activities, for example, literature review, learning new synthetic, instrumental or computational technique and learning new scientific content knowledge.

Assessment task	Length	Weight	Mark	Due date (normally midnight on due date)
Assessment 1: Summary Document Summary of Research Work and Activity often in spreadsheet form , which must include identification of Date, Activity, Research Skills demonstrated/acquired and Transferable Skills/Graduate Attributes demonstrated/acquired.	As required by discipline	Pass/Fail	Pass/Fail	Friday Week 5 and 10
Assessment 2: Notebook The laboratory notebook or equivalent research progress documentation must contain <ul style="list-style-type: none">• SDS forms or equivalent risk assessments for the beginning of the project and where necessary as the project continues;• methodologies used in research activities, with enough detail that	As required by discipline	Pass/Fail	Pass/Fail	Friday Week 5 and 10

<p>someone could repeat it;</p> <ul style="list-style-type: none"> • brief description of other research work; • results from all research activities, or clear links to these results • in cases where the research activity did not work, discussion of why this might have occurred; • in cases where the research activity did work, discussion of what the evidence for this is? <p>consideration of what next once the research activity has succeeded</p>				
<p>Assessment 3: Report Students must write a report aimed at the scientifically literate general public. It must contain Abstract, Literature Review and/or Introduction, Project Aims, Methodology, Results, Discussion, Conclusions, References.</p> <p>These points are:</p> <ul style="list-style-type: none"> • Did the abstract adequately summarise the project describing the accomplishments and significance? • Did the introduction (literature review) detail the literature and explain the rationale for the project? • Did the research project explain what the goal was, and then what was accomplished? <p>Are the techniques/methodology used in the project described and justified?</p>	Up to 15 pages	Pass/Fail	Pass/Fail	Friday Week 11

Assessment 4: Focus Area: Future Work	Up to 2 pages	Pass/Fail	Pass/Fail	Friday Week 11
Students need to write a 1-2 page article dedicated to explaining potential future work, aimed at first year undergraduates. This report will be due in Week 11.				

Further information

UNSW grading system: <https://student.unsw.edu.au/grades>

UNSW assessment policy: <https://student.unsw.edu.au/assessment>

5.2 Assessment criteria and standards

Assessment 1:

To be awarded as satisfactory, the summary document must contain evidence that the student has:

- learnt new research skills during the project;
- identified relevant transferable skills that you have developed and/or strengthened during the project;
- completed research work each week;
- explained why you have performed the particular piece of research work.

Assessment 2:

The notebook will be assessed as satisfactory or unsatisfactory based on inclusion of all the required elements and evidence of an adequate amount of work.

Assessment 3:

These required elements of the report are:

- Did the abstract adequately summarise the project describing the accomplishments and significance?
- Did the introduction (literature review) detail the literature and explain the rationale for the project?
- Did the research project explain what the goal was, and then what was accomplished?
- Are the techniques/methodology used in the project described and justified?

Assessment 4:

To be awarded as satisfactory in the course, student must satisfactorily explore potential future work avenues by presenting a scientifically sound report without substantial typographic or grammatical mistakes.

5.3 Submission of assessment tasks

Assessments should be submitted via the appropriate Moodle portal. In the cases of paper notebooks, these should be scanned and put on Moodle as a pdf.

For Assessment 1 and 2, students are initially assessed at Week 5, where they will be given a warning if they are not on track. During the final assessment in Wk 10, students will be graded as unsatisfactory if the above criteria are not demonstrated.

Assessments 3 and 4 should be submitted in Week 11. For any areas which are judged unsatisfactory, students will be given one opportunity to prepare an improved report (to be submitted by the end of the exam period), otherwise an unsatisfactory grade will be awarded. Students may also be asked to redo part of their report if there is inadequate referencing, poor representation of data in figures or tables or excessive typos or grammatical errors.

5.4. Feedback on assessment

Written feedback will be given on Assessment 1 and 2 in Week 6 via Moodle.

Written feedback will be given on Assessment 3 and 4 in Week 12 via Moodle.

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at <https://student.unsw.edu.au/referencing>

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage.¹ At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The *Current Students* site <https://student.unsw.edu.au/plagiarism>, and
- The *EL/SE* training site <http://subjectguides.library.unsw.edu.au/elise/presenting>

The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student: <https://student.unsw.edu.au/conduct>.

7. Readings and resources

These should be discussed with the project supervisor.

¹ International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

8. Administrative matters

See School of Chemistry and UNSW Science website.

9. Additional support for students

- The Current Students Gateway: <https://student.unsw.edu.au/>
- Academic Skills and Support: <https://student.unsw.edu.au/academic-skills>
- Student Wellbeing, Health and Safety: <https://student.unsw.edu.au/wellbeing>
- Disability Support Services: <https://student.unsw.edu.au/disability-services>
- UNSW IT Service Centre: <https://www.it.unsw.edu.au/students/index.html>