School of Environmental and Life Sciences

CHEM4001: Research Methodologies I

Callaghan
Semester 1 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

Research Methodologies I forms part of the Honours Program in Chemistry. This course covers advanced approaches to research methodology, with relevance to Honours projects undertaken by students at the 4000 level. Students enrolled in this course will explore contemporary perspectives in Chemistry research and focus specifically on; developing research skills; formulating research proposals; framing research questions; reviewing existing research; and choosing appropriate methodologies for different types of study. Methodologies are examined in the context of their application to their project (and associated research grouping), such as Physical Chemistry, Medicinal and Biological Chemistry, Organic Chemistry, and Applied Analytical Chemistry.

Academic Progress Requirements

Nil

Contact Hours

Callaghan
Workshop
Face to Face On Campus
2 hour(s) per term

Unit Weighting Workload

10
Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Callaghan
Dr Robert Chapman
Robert.Chapman@newcastle.edu.au
(02) 4985 4260
Consultation: By appointment

Teaching Staff

Other teaching staff will be advised on the course Canvas site.

School Office

School of Environmental and Life Sciences
Room C228 Chemistry Building
Callaghan
Science-SELS@newcastle.edu.au
+61 2 4921 5080
9am-5pm (Mon-Fri)

SYLLABUS

Course Content

- Development and discussion of advanced understandings of Chemistry-related knowledge, Work Health and Safety and Quality Assurance knowledge. Development of skills appropriate to (and up to date for) Chemistry.
- Development of advanced experimental techniques, analysis, and report of the experimental methodology relevant to the proposed research project area.

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Apply discipline specific theoretical and practical research skills.

2. Demonstrate skills in information searching, selection, retrieval, and interpretation.

3. Identify appropriate methods of quantitative and/or qualitative data collection as relevant to the research project undertaken.

4. Design and develop a structured research plan using cognitive skills and critical thinking.

5. Interpret, summarise, and synthesise the literature of academic and professional literature.

6. Undertake scientific experimentation from the generation of a hypothesis through to the publishing of results including ethics and safety considerations.

7. Work safely in a variety of laboratory and/or field contexts.

Course Materials

Required Reading:

- Scholarly literature (journal articles & reviews) as determined by the chosen topic

ASSESSMENTS

This course has 2 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Reading List	End of week 7	Individual	80%	1, 2, 3, 4, 5
2	Experimental Assessment	N/A	Individual	20%	1, 2, 3, 4, 5, 6, 7

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Reading List

Assessment Type Participation
Purpose The purpose of the two reading lists (one in each semester) is to broaden your knowledge of chemistry at an advanced level in areas not directly related to your project.
Description In S1, students complete the first reading list by writing a perspective, based on the scientific literature, on a topic assigned by their primary research supervisor.
Weighting 80%
Length <3000 words
Due Date End of week 7
Submission Method Online
Assessment Criteria According to the categories provided in the honours handbook
Return Method Online
Feedback Provided Online - 3 weeks after submission.
Opportunity to Reattempt Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 2 - Experimental Assessment

Assessment Type Tutorial / Laboratory Exercises
Purpose This component is aimed to assess your laboratory practice and research methodology throughout your honours project.
Description Your experimental assessment is split across all of the 4 honours courses (adding up to a total of 20% of your overall honours grade). It is designed to assess your individual experimental and interpretive skills. Whether your project involves synthetic chemistry, physical measurements or molecular modelling, it is expected that your skills as an independent researcher will grow and flourish during the course of your project. This vital part of research training can only be assessed by those you work closely with. The experimental assessment will therefore be graded by your supervisor(s) whether this be a single academic within the Discipline of Chemistry, or a partnership either within or outside the Discipline (including external to the University). There is no written requirement for this component.
Weighting 20%
Length N/A
Due Date N/A
Submission Method Ongoing Assessment
Assessment Criteria The student's supervisor(s) will assess this component and an average mark calculated. The Project Work Assessment Criteria (in the honours handbook) will be used as a guideline for grading this component.
Return Method In Person
Feedback Provided In Person - Over the course of the semester, from your supervisor.
Opportunity to Reattempt Students WILL NOT be given the opportunity to reattempt this assessment.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

- Students will receive communications via the posting of content or announcements on the Canvas course site.

The course coordinator will communicate via the canvas site, however you will also have regular face to face meetings with your academic supervisor

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances

system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:
https://policies.newcastle.edu.au/document/view-current.php?id=236

Important Policy Information

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.