



CHEM11044 Chemical Reactions

Term 2 - 2019

Profile information current as at 18/04/2024 12:04 pm

All details in this unit profile for CHEM11044 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

Overview

In this unit, you will learn practical chemistry applications including sample acquisition, chain-of-custody, storage, analysis and reporting. You will become familiar with laboratory compliance procedures, identify risks and appropriate risk-minimisation approaches. The theoretical concepts will include naming of compounds, electrochemistry and its applications, pH, acidity and buffering capacity of solutions, reaction rates and kinetics, organic reaction mechanisms, and basic atomic and molecular spectroscopy. This unit will set a strong foundation for studies in analytical and materials sciences, physical and interface chemistry. You will also be able to examine the energies associated with electrochemical reactions that underpin important processes such as electricity generation, renewable energies, corrosion and electroplating. Accompanying the theory, you will enhance your practical skills by learning the operation and maintenance of common instrumentation in the laboratory, and perform advanced titrations, measure soil acidity, and synthesise, and determine yield and purity of, organic products. On-campus students will attend regular laboratory sessions and there is a compulsory residential school for distance students.

Details

Career Level: *Undergraduate*

Unit Level: *Level 1*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Prerequisite: CHEM11043 Atoms, Molecules and Matter

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

Offerings For Term 2 - 2019

- Bundaberg
- Mixed Mode
- Rockhampton

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

[Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

[Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Written Assessment**

Weighting: 20%

2. **Practical Assessment**

Weighting: 30%

3. **Examination**

Weighting: 50%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the [CQUniversity Policy site](#).

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Apply concepts of chemical bonding and reaction energies to chemical synthesis and processes
2. Use critical reasoning to apply chemical theories to reactions
3. Demonstrate an understanding of buffer chemistry with regard to preparation, buffer capacity and pH
4. Synthesise organic compounds and examine these for purity
5. Interpret a range of spectra, including infrared, nuclear magnetic resonance and mass spectroscopy, to identify compounds
6. Demonstrate competency in laboratory compliance procedures, experimental techniques, data generation, analysis and report writing.

Alignment of Learning Outcomes, Assessment and Graduate Attributes



Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Written Assessment - 20%	•	•			•	
2 - Practical Assessment - 30%			•	•		•
3 - Examination - 50%	•	•	•		•	

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
1 - Communication				•	•	•
2 - Problem Solving		•	•	•		
3 - Critical Thinking		•	•		•	
4 - Information Literacy						
5 - Team Work				•	•	•
6 - Information Technology Competence						•
7 - Cross Cultural Competence						
8 - Ethical practice						
9 - Social Innovation						

Graduate Attributes**Learning Outcomes**

1 2 3 4 5 6

10 - Aboriginal and Torres Strait Islander Cultures

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks**Graduate Attributes**

1 2 3 4 5 6 7 8 9 10

1 - Written Assessment - 20%

	•	•								
	•	•			•	•				
	•	•	•							

2 - Practical Assessment - 30%**3 - Examination - 50%**

Textbooks and Resources

Textbooks

CHEM11044

Prescribed**Chemistry**

Edition: 4th (2019)

Authors: Allan Blackman, Steven Bottle, Siegbert Schmid, Mauro Mocerino, Uta Willie

Wiley

Milton , QLD , Australia

ISBN: 0-471-47811-3

Binding: Paperback

[View textbooks at the CQUniversity Bookshop](#)

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: [Vancouver](#)

For further information, see the Assessment Tasks.

Teaching Contacts

Mani Naiker Unit Coordinatorm.naiker@cqu.edu.au

Schedule

Week 1 - 15 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Sampling and Spectroscopic Techniques/Chemical Reactions	3, to be advised	

Week 2 - 22 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Chemical Thermodynamics	8	

Week 3 - 29 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Chemical Equilibrium	9	

Week 4 - 05 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Electrochemistry	12	

Week 5 - 12 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reaction Kinetics	12	

Vacation Week - 19 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 26 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Acids and Bases	11	

Week 7 - 02 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Stereochemistry	17	Written Assessment Due: Week 7 Friday (6 Sept 2019) 11:45 pm AEST

Week 8 - 09 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reactions of Organic Compounds	16, 18	

Week 9 - 16 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reactions of Organic Compounds	19, 21, 23	

Week 10 - 23 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Spectroscopy	20	

Week 11 - 30 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Spectroscopy	20	

Week 12 - 07 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Review

Unknown Report due: Week
12, Friday 11th October
11.55pm AEST

Review/Exam Week - 14 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Exam Week - 21 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Assessment Tasks

1 Written Assessment

Assessment Type

Written Assessment

Task Description

This assessment will require you to interpret and attempt short answer questions covered in the content from weeks 1, 2 and 3. You will be required to type your solutions and clearly show any calculations where appropriate.

Assessment Due Date

Week 7 Friday (6 Sept 2019) 11:45 pm AEST

Return Date to Students

Week 10 Monday (23 Sept 2019)

Weighting

20%

Minimum mark or grade

20 %

Assessment Criteria

Marks for each question will be awarded as indicated on the assessment item.

Marks will be awarded for:

- application and explanation of relevant content pertaining to chemical thermodynamics and equilibrium
- relevance and clarity of diagrams where appropriate
- clarity of explanations where appropriate
- correct calculations and use of significant figures and units

Referencing Style

- [Vancouver](#)

Submission

Online

Learning Outcomes Assessed

- Apply concepts of chemical bonding and reaction energies to chemical synthesis and processes
- Use critical reasoning to apply chemical theories to reactions
- Interpret a range of spectra, including infrared, nuclear magnetic resonance and mass spectroscopy, to identify compounds

Graduate Attributes

- Communication
- Problem Solving
- Information Technology Competence

2 Practical Assessment

Assessment Type

Practical Assessment

Task Description

To enable students to gain the necessary practical skills required in basic laboratories. There are 8 practicals selected which are designed to coincide with the lecture material and as such performing the practicals should reinforce topics being covered. Students will be required to participate in laboratory practicals, collect results, analyse data and present their findings in an appropriate manner.

Students are expected to attend and participate in the scheduled practicals. Recommended pre-readings and/or exercises must be completed prior to the practical. During each practical session experiments must be set-up, and results collected and analysed. Students will be required to submit a completed **proforma** for all practicals (except the **Unknown Practical**) at the end of each session to be assessed. Furthermore, students will be required to submit a report based on the Unknown Practical they have submitted for assessment.

The practicals will be conducted in the chemistry laboratory and will require adherence to safety procedures. Students will be required to procure a pair of safety glasses and a laboratory coat.

All students are expected to adhere to the University's OH&S policy, especially Section 3.12, which outlines the responsibility of the student to "take reasonable care for their own health and safety". Therefore, it is a condition of entry into the Chemistry laboratories for students to have proper, closed-in shoes, safety glasses and a laboratory coat. Students are expected to wear these at ALL times in the laboratory, except where otherwise directed by a member of the supervising team.

Laboratory coats and safety glasses are available for purchase from the University Bookshop, however, students are also welcome to purchase these outside of the Bookshop if they prefer.

Prices for both items in the Bookshop will be available on Moodle.

Assessment Due Date

Proforma will be due at the end of each practical session. The Unknown Practical report will be due in Week 12, Friday 11th October 11:45 pm AEST. For more details refer to the Moodle site.

Return Date to Students

Proformas will be assessed and returned in the following practical session. The Unknown Report will be returned by Monday of Exam Week

Weighting

30%

Minimum mark or grade

30 %

Assessment Criteria

This task will be assessed in the following ways:

Proformas

These will be **collected and assessed and returned** at the beginning of the following practical session

Students will be required to clearly outline the results, data interpretation and analysis including calculations for each of the practicals (except the Unknown Practical) they have performed

Weighting - Each proforma will be worth 3 % (21 % in total)

Unknown Practical (To be submitted Online)

Students will be required to carry out a series of chemical tests in conjunction with provided spectroscopic data in view of identifying two unknown organic compound they are given

Students will be required to complete a full report clearly describing with logic on how they identified the unknown compounds

Weighting - 9 %

Referencing Style

- [Vancouver](#)

Submission

Online

Learning Outcomes Assessed

- Demonstrate an understanding of buffer chemistry with regard to preparation, buffer capacity and pH
- Synthesise organic compounds and examine these for purity
- Demonstrate competency in laboratory compliance procedures, experimental techniques, data generation, analysis and report writing.

Graduate Attributes

- Communication
- Problem Solving
- Team Work
- Information Technology Competence

Examination

Outline

Complete an invigilated examination.

Date

During the examination period at a CQUniversity examination centre.

Weighting

50%

Length

120 minutes

Minimum mark or grade

Examination

Exam Conditions

Open Book.

Materials

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?



Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem