

CHEM11043 *Atoms, Molecules and Matter*

Term 1 - 2025

Profile information current as at 08/06/2026 03:40 pm

All details in this unit profile for CHEM11043 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

Atoms, Molecules and Matter will provide you with an understanding of the basic principles of chemistry and how they apply to daily life. This unit will present fundamental chemical principles that are central to all sciences, including healthcare, biology, environmental science and agriculture. This unit will provide the foundation for further study in chemistry, biochemistry and molecular sciences. You will learn about matter and atomic structure, chemical bonding and the forces and chemical interactions between molecules. You will be introduced to the chemistry of electrolytes, acids, bases and buffers and enabled to perform calculations relating concentrations to the pH of strong and weak acids, bases and buffers. Understanding the naming and classification of chemical compounds will allow you to communicate effectively and precisely with your colleagues in science and industry. Basic nuclear radiation safety will be presented. This unit has a compulsory residential school. The residential school will emphasise laboratory safety and introduce you to skills relating to the preparation of standard solutions and volumetric procedures, titrimetric and spectrophotometric analyses and scientific report writing.

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

Anti-requisite: CHEM11041

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 1 - 2025

- Mixed Mode

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).

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. Online Quiz(zes)

Weighting: 30%

2. Written Assessment

Weighting: 40%

3. Practical Assessment

Weighting: Pass/Fail

4. Online Test

Weighting: 30%

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](#).

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from SUTE

Feedback

The residential school in this unit was very helpful in applying theoretical knowledge to real-world situations.

Recommendation

I recommend that the chemistry teaching team continue to uphold the residential school requirement as part of the unit's profile.

Feedback from SUTE

Feedback

Students appreciate all the teaching efforts for this unit and have learned a great deal. Their only constructive feedback is to reduce the number of students per class for the residential schools.

Recommendation

I recommend that the unit coordinator and the chemistry teaching team continue to collaborate with the Head of Course to develop an effective strategy for managing residential school arrangements in the event of increased enrolment. Potential strategies include reducing the maximum capacity of the chemistry laboratory classes from 60 students per class to 50 students per class, providing additional laboratory assistants for larger classes, and scheduling more residential school classes.

Feedback from Direct Email

Feedback

Some students struggled with certain aspects of chemistry in high school, but the unit coordinator's explanations and the provided resources have been incredibly helpful.

Recommendation

I recommend that the unit coordinator and the chemistry teaching team continue to refresh teaching methods, learning materials, and support students to meet all students' needs and enrich their learning experience in this unit.

Feedback from SUTE

Feedback

Recorded lectures and tutorial videos need to be updated and refreshed on the Moodle site.

Recommendation

I recommend that the unit coordinator and the chemistry teaching team collaborate with the Head of Course to develop a strategic approach for updating the lecture and tutorial videos as soon as possible.

Unit Learning Outcomes

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

1. Describe the structure of the atom including its sub-atomic particles and relate these to the design of the Periodic Table
2. Determine the nature of chemical bonding and intermolecular forces present in molecules and ions
3. Identify types of chemical reactions, and balance and interpret chemical equations
4. Perform chemical calculations relating to reaction equilibrium, yield and the pH of acids, bases and buffers
5. Identify functional groups and use the International Union of Pure and Applied Chemists (IUPAC) nomenclature to name organic molecules and indicate their potential chemical interactions
6. Outline the process of nuclear decay and discuss measures used to ensure safety when working with radiation
7. Work safely in the laboratory to prepare samples and standards and perform titrimetric and spectrophotometric analysis.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level ● Introductory Level ● Intermediate Level ● Graduate Level ● Professional Level ● Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes						
	1	2	3	4	5	6	7
1 - Online Quiz(zes) - 30%	●	●					
2 - Written Assessment - 40%			●	●		●	
3 - Practical Assessment - 0%							●
4 - Online Test - 30%					●		

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes						
	1	2	3	4	5	6	7
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							
10 - First Nations Knowledges							
11 - Aboriginal and Torres Strait Islander Cultures							

Textbooks and Resources

Textbooks

There are no required textbooks.

Additional Textbook Information

A study guide will be provided for this unit via the Moodle site. The study guide is the key reference material for this unit.

IT Resources

You will need access to the following IT resources:

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

Referencing Style

All submissions for this unit must use the referencing style: Vancouver
For further information, see the Assessment Tasks.

Teaching Contacts

Catherine Jones Unit Coordinator
c.e.jones@cqu.edu.au

Schedule

Week 1 - 10 Mar 2025

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Chemistry Matter Atoms and Molecules The Periodic Table	Chemistry Foundations Study Guide - Topics 1, 2 and 3	Please visit https://my.cqu.edu.au and register to attend one of the compulsory residential schools (4-day blocks).

Week 2 - 17 Mar 2025

Module/Topic	Chapter	Events and Submissions/Topic
Ion Formation Bonding Intermolecular Forces	Chemistry Foundations Study Guide - Topics 4, 5, 6 and 7	Assessment 1 - Online Quiz Opens: Week 2 Friday (21 March 2025) 12:00 pm AEST.

Week 3 - 24 Mar 2025

Module/Topic	Chapter	Events and Submissions/Topic
The Mole Mole-Mass Conversions Solutions and Dilutions	Chemistry Foundations Study Guide - Topics 8 and 9	

Week 4 - 31 Mar 2025

Module/Topic	Chapter	Events and Submissions/Topic
Chemical Reactions 1	Chemistry Foundations Study Guide - Topics 10 and 11	Assessment 1 - Online Quiz Closes: Week 4 Monday (31 March 2025) 11:55 pm AEST.

Week 5 - 07 Apr 2025

Module/Topic	Chapter	Events and Submissions/Topic

Assessment 2 - Questions Document available on Moodle: Week 5 Wednesday (9 April 2025) 10:00 am AEST.

Chemical Reactions 2

Chemistry Foundations Study Guide - Topics 11 and 12

Vacation Week - 14 Apr 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 21 Apr 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Electrolytes Acids and Bases	Chemistry Foundations Study Guide - Topics 13 and 14	
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Week 7 - 28 Apr 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Buffers Introduction to Nuclear Chemistry	Chemistry Foundations Study Guide - Topics 15 and 16	
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Week 8 - 05 May 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Introduction to Organic Chemistry Saturated Hydrocarbons	Chemistry Foundations Study Guide - Topics 17 and 18	Assessment 2 - Calculations and Short Answer Questions Due: Week 8 Wednesday (7 May 2025) 11:55 pm AEST
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Week 9 - 12 May 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Unsaturated Hydrocarbons Aromatic Compounds	Chemistry Foundations Study Guide - Topics 19 and 20	Assessment 3 - Laboratory Competency will be assessed during the residential school you registered for. Assessment 3 - Laboratory Quizzes must be completed within a week of attending the residential school you registered for.
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Week 10 - 19 May 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Alcohols Ethers Alkyl Halides Thiols and Amines	Chemistry Foundations Study Guide - Topics 21, 22 and 23	Assessment 3 - Laboratory Competency will be assessed during the residential school you registered for. Assessment 3 - Laboratory Quizzes must be completed within a week of attending the residential school you registered for.
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Week 11 - 26 May 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Aldehydes and Ketones Carboxylic Acids and their Derivatives	Chemistry Foundations Study Guide - Topics 24 and 25	Assessment 3 - Laboratory Competency will be assessed during the residential school you registered for. Assessment 3 - Laboratory Quizzes must be completed within a week of attending the residential school you registered for.
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Week 12 - 02 Jun 2025

Module/Topic	Chapter	Events and Submissions/Topic
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Prepare for Assessment 4	Review Topics 17-25	Assessment 4 - Timed 3-h Online Test Opens: Week 12 Thursday (5 June 2025) 10:00 am AEST. Assessment 4 - Timed 3-h Online Test Closes: Week 12 Friday (6 June 2025) 10:00 am AEST.
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Review/Exam Week - 09 Jun 2025

Module/Topic

Chapter

Events and Submissions/Topic

Exam Week - 16 Jun 2025

Module/Topic

Chapter

Events and Submissions/Topic

Assessment Tasks

1 Assessment 1 - Online Quiz

Assessment Type

Online Quiz(zes)

Task Description

Assessment 1 - Online Quiz, has been designed to assess your understanding of Topics 1-7 (weeks 1 & 2 lectures and tutorials) presented in this unit. This assessment requires you to apply concepts presented in lectures and tutorials to determine the answers for a series of multiple-choice questions.

The quiz is not timed, and you are allowed two attempts. The highest score of the two attempts will be recorded.

Note: Quiz questions are generated randomly, and you will receive different questions on subsequent attempts.

Gen AI use: All quiz responses must be your own. Collusion with others or the use of Gen AI to produce any part of the answers to this assessment is not permitted. You may be required to provide further information to demonstrate that the answers provided are your own and that you understand the concepts being assessed.

Number of Quizzes

1

Frequency of Quizzes

Other

Assessment Due Date

Assessment 1 - Online Quiz, opens Week 2 Friday (21 March 2025) at 12:00 pm AEST and closes Week 4 Monday (31 March 2025) 11:55 pm AEST

Return Date to Students

Marks will be released after the completion of each attempt.

Weighting

30%

Minimum mark or grade

50%

Assessment Criteria

All questions are of equal weighting. One mark will be awarded for each correct response.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Complete the Online Quiz by following the link on the CHEM11043 Moodle site.

Learning Outcomes Assessed

- Describe the structure of the atom including its sub-atomic particles and relate these to the design of the Periodic Table
- Determine the nature of chemical bonding and intermolecular forces present in molecules and ions

2 Assessment 2 - Calculations and Short Answer Questions

Assessment Type

Written Assessment

Task Description

Assessment 2 - Calculations and Short Answer Questions, has been designed to assess your understanding of Topics 8-16 (weeks 3-7 lectures and tutorials) presented in this unit. This assessment requires you to demonstrate comprehension of concepts presented in the unit, and to apply those concepts to answer a series of questions.

All workings must be provided for answers to calculation questions. Inclusion of correct units and chemical notation is required. Short answer questions may require you to explain, reason, describe, analyse, or evaluate information, and to provide an appropriately detailed written response. Written responses must be appropriately referenced.

Gen AI use: With the exception of in-built MS-Word grammar, punctuation and syntax checking tools, Gen AI tools should not be used to complete this assessment. All written responses, calculations, workings and other details presented in your assessment submission must be your own work. It is a requirement that you include detailed workings and that they clearly demonstrate your understanding of the unit content. Collusion with others or the use of Gen AI to produce any part of the answers to this assessment is not permitted. You may be required to provide further information to demonstrate that the answers provided are your own and that you understand the concepts being assessed.

Assessment Due Date

Week 8 Wednesday (7 May 2025) 11:55 pm AEST

Return Date to Students

Week 11 Friday (30 May 2025)

Marks and feedback file will be returned to students via the unit Moodle site.

Weighting

40%

Minimum mark or grade

50%

Assessment Criteria

Maximum marks available for each question will be indicated in the Assessment 2 - Questions Document, which will become available on the CHEM11043 Moodle site during week 5. Marks will be awarded for each question or partial question as indicated on the Questions Document. No marks will be given for incorrect answers, formulas, incorrect units, or explanations.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Upload your submission as a Microsoft Word document by following the instructions on the unit Moodle site.

Learning Outcomes Assessed

- Identify types of chemical reactions, and balance and interpret chemical equations
- Perform chemical calculations relating to reaction equilibrium, yield and the pH of acids, bases and buffers
- Outline the process of nuclear decay and discuss measures used to ensure safety when working with radiation

3 Assessment 3 - Laboratory Competency and Quizzes

Assessment Type

Practical Assessment

Task Description

Assessment 3 - Laboratory Competency and Quizzes, consists of a series of practical competencies (assessed during the laboratory sessions at the residential school) and two (2) associated laboratory theory and calculation quizzes (completed online).

Please visit MyCQU and register to attend one of the compulsory residential school blocks.

Assessment 3, has been designed to introduce and assess essential skills in chemistry laboratory work, including the associated chemical calculations. The laboratory sessions will be undertaken in a four-day residential school. The techniques and experiments conducted during these sessions have been designed to develop excellence in laboratory practices and to provide a solid foundation for future laboratory work. These skills scaffold into 2nd and 3rd year chemistry units, and into the workplace.

Laboratory Competency: During the laboratory sessions, you will develop skills in working safely in the laboratory; correctly using top pan and analytical balances; sample preparation including quantitative transfers; correctly using pipettes and volumetric flasks; preparing dilution series for spectroscopic analysis; using a spectrophotometer; graphing techniques with consideration of interpolation and extrapolation; performing relevant calculations to process data from spectroscopic analysis; correctly using a burette; calibrating a pH meter; choosing an appropriate indicator for a neutralisation reaction titration; conducting titrations with good technique and accuracy; performing relevant calculations to process titration data; maintaining data records.

Laboratory Quizzes: The quizzes will be available on the Moodle site for you to access during and after your respective residential school sessions. The topics of the quizzes are:

- Laboratory Quiz 1 - Laboratory Introduction, Safety, and Spectroscopy

- Laboratory Quiz 2 - pH and Titrations

Gen AI use: Gen AI tools are not permitted to be used to complete this assessment. Work presented in your laboratory notebook and answers selected to quiz questions must be your own work. You may be required to provide further information to demonstrate that the answers provided are your own and that you understand the concepts being assessed.

Assessment Due Date

Laboratory competency will be assessed during the residential school. Both online laboratory quizzes must be completed within a week of attending the residential school.

Return Date to Students

Feedback on laboratory competencies will be given throughout the residential school. Quiz results will be released after the completion of each attempt. A Pass/Fail grade will be recorded for this assessment following completion of the Residential School and the online quizzes.

Weighting

Pass/Fail

Minimum mark or grade

All components are Pass/Fail. To pass Assessment 3, you must achieve a Pass grade for the laboratory competency component, and you must pass (achieve a minimum mark of 50%) in each of the associated online laboratory quizzes.

Assessment Criteria

All students are required to attend and participate in all laboratory sessions scheduled for the four-day residential school. The specific assessment criteria for components of this task are as follows:

1. Laboratory notebook must show records of laboratory data, calculations, and completion of discussion questions. Instructors will inspect notebooks randomly throughout the course of the residential school.
2. Demonstration of competency in specific laboratory skills is required. This includes the correct usage of burettes, volumetric flasks, pipettes, balances, and pH meters. Competency will be assessed by instructors during the laboratory sessions.
3. Two online practical laboratory quizzes must be completed by the due date. The quizzes will relate to associated theory and techniques (such as spectrophotometry and titration) that are used during the laboratory sessions.
4. To pass the overall assessment, you must achieve a minimum mark of 50% in each of the quizzes and a Pass grade for the practical competencies.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Laboratory competency will be assessed during the residential school. Complete the Online Quizzes by following the links on the CHEM11043 Moodle site.

Learning Outcomes Assessed

- Work safely in the laboratory to prepare samples and standards and perform titrimetric and spectrophotometric analysis.

4 Assessment 4 - Timed Online Test

Assessment Type

Online Test

Task Description

Assessment 4 - Timed Online Test, has been designed to assess your comprehension of concepts presented in this unit. This assessment relates to Topics 17-25 (weeks 8-11 lectures and tutorials). The test is timed. The maximum time to complete the test is 3 hours (180 minutes).

The Timed Online Test will be available on the unit Moodle site for a 24-hour period. You can complete the test at any time within the 24-hour period. The timer begins when you start the test.

The test may include multiple-choice questions, questions with drag and drop style answers, or questions requiring short written (typed) answers. You may be required to upload files to answer some questions. You must follow all instructions given on the Moodle site and within the test itself. Where indicated, you must show your working.

A practice test, to familiarise you with the online functionalities of Moodle quizzes, will be available prior to the real test.

Gen AI use: Gen AI tools are not permitted to be used to complete this assessment. All answers to the Online Test must be your own. Collusion with others or the use of Gen AI to produce any part of the answers to this assessment is not

permitted. You may be required to provide further information to demonstrate that the answers provided are your own and that you understand the concepts being assessed.

Assessment Due Date

The 3-hour Timed Online Test will be available on the unit Moodle site for a 24-hour period. It will be available from 10 am AEST Thursday 5 June 2025 and will close 3 hours after commencing the test or at 10 am AEST Friday 6 June 2025 (whichever is sooner).

Return Date to Students

Marks will be returned via the unit Moodle site.

Weighting

30%

Minimum mark or grade

50%

Assessment Criteria

Maximum marks available for each question will be indicated in the Online Test. Marks will be awarded for each question or partial question as indicated on the Online Test. No marks will be given for incorrect answers, formulas, explanations, organic nomenclatures, or incorrect organic structures.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Complete the Timed Online Test by following the link on the CHEM11043 Moodle site.

Learning Outcomes Assessed

- Identify functional groups and use the International Union of Pure and Applied Chemists (IUPAC) nomenclature to name organic molecules and indicate their potential chemical interactions

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