



CHEM11043 Atoms, Molecules and Matter

Term 1 - 2024

Profile information current as at 14/05/2024 08:42 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 - 2024

- 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).

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. **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 Student evaluation

Feedback

The CQU produced teaching notes were very well received.

Recommendation

These are under constant review and an updated version has been completed in July 2023.

Feedback from Student evaluation and direct communication from students

Feedback

The residential school and online tutorials helped cement learning.

Recommendation

Persist in providing Q&A sessions and intensify efforts to promote the package alongside the ALC to support students. Identifying strategies to motivate greater student participation in face-to-face opportunities remains a top priority.

Feedback from Student evaluation

Feedback

Residential school staff were extra helpful, especially as many had not done chemistry previously and struggled with math.

Recommendation

Staff constantly work to assist all students. Continue to offer the additional maths focused Q&A in addition to the chemistry focused Q&A's. Continue to use the ALC for student assistance.

Feedback from Student evaluation

Feedback

Res School was crowded.

Recommendation

Numbers in each res school could be revised to more adequately house the student numbers. The number of students per bench could be revised.

Feedback from Student evaluation

Feedback

The students felt that the unit lacked significance for those who excelled in high school chemistry.

Recommendation

Consider a review of the unit's content.

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
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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 - Aboriginal and Torres Strait Islander Cultures							

Textbooks and Resources

Textbooks

There are no required textbooks.

Additional Textbook Information

No.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Access to Microsoft Word or other word processing package

Referencing Style

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

Teaching Contacts

Ty Jones Unit Coordinator
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Schedule

Week 1 - 04 Mar 2024

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	

Week 2 - 11 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Ion Formation Bonding Intermolecular Forces	Chemistry Foundations Study Guide - Topics 4, 5, 6 and 7	

Week 3 - 18 Mar 2024

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 - 25 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Chemical Reactions 1	Chemistry Foundations Study Guide - Topics 10 and 11	Assessment 1 - Online Quiz Due: Week 4 Monday (25 Mar 2024) 11:55 pm AEST

Week 5 - 01 Apr 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Chemical Reactions 2

Chemistry Foundations Study Guide -
Topics 11 and 12**Vacation Week - 08 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 15 Apr 2024

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 - 22 Apr 2024

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 - 29 Apr 2024

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 - Written Assessment (Calculations and Short Answer Questions) Due: Week 8 Friday (3 May 2024) 11:55 pm AEST
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Week 9 - 06 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Unsaturated Hydrocarbons Aromatic Compounds	Chemistry Foundations Study Guide - Topics 19 and 20	
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Week 10 - 13 May 2024

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	
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Week 11 - 20 May 2024

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 - Practical assessment Due: Week 11 Friday (24 May 2024) 11:55 pm AEST
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Week 12 - 27 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Review		Assessment 4 - Online Test (Final Term Assessment) Due: Week 12 Wednesday (29 May 2024) 11:55 pm AEST
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Review/Exam Week - 03 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Exam Week - 10 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Term Specific Information

For all assessments, no answers and showing your work parts with generative artificial intelligence capabilities are to be used (e.g., ChatGPT, BERT, T5, etc.). To avoid academic misconduct, this work must be your own original work.

Assessment Tasks

1 Assessment 1 - Online Quiz

Assessment Type

Online Quiz(zes)

Task Description

This Assessment Task is designed to assess your understanding of topics 1-7 (Weeks 1 & 2 Lectures) 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.

Number of Quizzes

1

Frequency of Quizzes

Other

Assessment Due Date

Week 4 Monday (25 Mar 2024) 11:55 pm AEST

Return Date to Students

Week 5 Monday (1 Apr 2024)

Marks will be released after the completion of each attempt. Answers to the quiz questions will be released after each quiz has closed.

Weighting

30%

Minimum mark or grade

50%

Assessment Criteria

All questions are of equal weighting. One mark will be awarded for each correct response. Incorrect responses will not incur a penalty.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Complete each 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 - Written Assessment (Calculations and Short Answer Questions)

Assessment Type

Written Assessment

Task Description

Assessment 2 - Calculations and Short Answer Questions, has been designed to assess your comprehension of the concepts presented in the unit through their application to answer a series of questions. This assessment relates to Weeks 3-6 Lectures and Tutorial contents, and Study Guide topics 8-14. All workings must be provided for answers to calculation questions. Inclusion of correct units and chemical notation is expected. Short answer questions may require

you to explain, reason, describe, analyse, or evaluate information and provide an appropriately detailed written response. Marks will be awarded for each question as indicated in the Assessment 2 - Questions Document which will be available on the CHEM11043 Moodle site. The Assessment 2 will be available on the Moodle site from Week 5, starting Monday, 1 April, 2024.

Assessment Due Date

Week 8 Friday (3 May 2024) 11:55 pm AEST

Return Date to Students

Week 8 Friday (3 May 2024)

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

Weighting

40%

Minimum mark or grade

50%

Assessment Criteria

Maximum marks available for each question will be indicated in the Assessment 2 Written Assessment (Question document), which will be available on the CHEM11043 Moodle site. Marks will be awarded for each question or partial question as indicated in Assessment 2. No marks will be given for incorrect answers, incorrect units, or explanations.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Upload your submission as a Microsoft Word document only by following the instructions on the Moodle site for CHEM11043.

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 - Practical assessment

Assessment Type

Practical Assessment

Task Description

Assessment 3 Practical Assessment consists of two (2) online laboratory quizzes and the competencies at the residential school:

1. **Laboratory Quiz 1:** Laboratory Introduction Safety and Spectroscopy.
2. **Laboratory Quiz 2:** pH and Titrations.

These laboratory quizzes will be available on the Moodle site for students to access from **2 May 2024 to 24 May 2024**.

The practical component of CHEM11043 has been designed to provide and scaffold essential laboratory skills in chemistry for 2nd and 3rd year chemistry units and the workplace. The practical skills and associated theory for CHEM11043 will be supported with eight (8) laboratory sessions. Assessment 3 will be graded as **Pass/Fail**. In order to Pass, students must achieve a "Pass" grade for the practical component.

The practical sessions will be undertaken in a four-day residential school. The experiments have been designed to allow you to develop excellence in laboratory practices and provide a solid foundation for future laboratory work. During the practical sessions, you will develop skills in the following: • 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

Assessment Due Date

Week 11 Friday (24 May 2024) 11:55 pm AEST

The laboratory component will be completed during term as per the residential school schedule for all students. Both online laboratory quizzes must be submitted by 11.55 pm (AEST), Friday, May 24, 2024.

Return Date to Students

Week 11 Friday (24 May 2024)

Feedback on laboratory competencies will be given throughout the course of the scheduled residential schools. Quiz results will be released after the completion of each attempt. Answers to the quiz questions will be released after the quiz has closed. 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. It is a requirement to achieve a Pass grade for the Practical Assessment to be eligible to pass CHEM11043.

Assessment Criteria

All students are required to attend and participate in all laboratory exercises 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 schools.
2. Two online practical laboratory quizzes must be completed during the unit. The quizzes will relate to associated theory and techniques used in the two blocks of practicals (spectrophotometric and titration focused). You will have unlimited attempts to complete each quiz. However, to pass this assessment, you are required to achieve a "Pass" grade for the practical component.
3. Demonstration of competency in specific laboratory skills is required. This includes the correct usage of burettes, volumetric flasks, pipettes, balances, and pH meters, which will be assessed during the laboratory sessions.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Follow the Assessment 3's Online Quizzes instructions on the Moodle site.

Learning Outcomes Assessed

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

4 Assessment 4 - Online Test (Final Term Assessment)

Assessment Type

Online Test

Task Description

This assessment will cover content you have studied throughout this term. It will be presented in a written format accessible via the Moodle site during Week 12, with a *48-hour time window for assessment access*. It is essential to attempt and submit your work within a **9-hour period after downloading the assessment questions file**. Ensure your completed Assessment 3 - Final Term Assessment is uploaded to the Moodle site in the form of a Microsoft Word document.

When completing this assessment, please take note of the following:

- Attempt all questions.
- All submissions should be typed and saved as a Microsoft Word document.
- Display all calculations and detailed workings as required.
- Chemical reactions should undergo balancing
- Provide correct units for your answers.
- The completed assessment is to be submitted via upload on the Moodle site as a Microsoft Word document only.

The breakdown of topics to be covered in Assessment 3 will be made available on the Moodle site prior to the Assessment 3 date.

Assessment Due Date

Week 12 Wednesday (29 May 2024) 11:55 pm AEST

Assessment 3 - Online Test (Final Term Assessment) is due within a 9-hour period after downloading the assessment questions file.

Return Date to Students

Exam Week Friday (14 June 2024)

Marks and feedback files will be returned via the Moodle site.

Weighting

30%

Minimum mark or grade

50%

Assessment Criteria

Marks will be awarded for each question or partial question as indicated in Assessment 4 (Question document), available on the CHEM11043 Moodle site. No marks will be given for incorrect answers, formulas, explanations, organic nomenclatures, or incorrect organic structures.

Referencing Style

- [Vancouver](#)

Submission

Online

Submission Instructions

Upload your submission as a Microsoft Word document only by following the instructions on the Moodle site for CHEM11043

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