



# CHEM11043 Atoms, Molecules and Matter

## Term 1 - 2023

Profile information current as at 11/04/2024 07:01 am

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 and 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. On-campus students will attend regular laboratory sessions and there is a compulsory residential school for distance students. These laboratory sessions will emphasise laboratory safety and introduce you to skills relating to 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 - 2023

- 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: 20%

#### 3. **Practical Assessment**

Weighting: Pass/Fail

#### 4. **Take Home Exam**

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](#).

## 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

Students enjoyed the residential school but some commented that it was poorly organised.

##### Recommendation

Continue residential schools. Review staffing and organisation.

#### Feedback from SUTE

##### Feedback

Video quality was a problem in some lecture/tutorial recordings.

##### Recommendation

Review recordings and update as necessary.

#### Feedback from SUTE, email, Moodle

##### Feedback

Students appreciate the study guide, but continue to find issues and errors.

##### Recommendation

Continue use of study guide but ensure continual updates and checks.

## 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



### 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 - 20%			•	•			

Assessment Tasks	Learning Outcomes						
	1	2	3	4	5	6	7
3 - Practical Assessment - 0%							•
4 - Take Home Exam - 50%	•	•	•	•	•	•	

## 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							

## Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Online Quiz(zes) - 30%		•	•	•		•				
2 - Written Assessment - 20%	•	•	•	•		•				
3 - Practical Assessment - 0%			•		•	•				
4 - Take Home Exam - 50%	•	•	•							

## Textbooks and Resources

### Textbooks

CHEM11043

#### Supplementary

##### Chemistry

Edition: 4th (2018)

Authors: Blackman , Bottle , Schmid , Mocerino & Wille

Wiley Australia

Milton , Queensland , Australia

ISBN: 9780730363286

Binding: Paperback

CHEM11043

#### Supplementary

##### CQUni Laboratory Notebook ( A4 with Periodic Table )

(2019)

Authors: CQUniversity

Rockhampton , QLD , Australia

Binding: Spiral

#### Additional Textbook Information

A "Foundations of Chemistry" Study Guide will be provided for this unit via the Moodle site. This Study Guide will be your key reference material for this unit.

A limited number of copies of "Chemistry, 4th Edition" (the recommended but not prescribed textbook) are available to read online through the CQU library website or the unit eReading List. This supplementary text is also available for purchase in hardcopy/ ebook at the CQU Bookshop.

It is strongly recommended you purchase the laboratory notebook to record your work during the compulsory residential school.

[View textbooks at the CQUniversity Bookshop](#)

### 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

**Ray Marshall** Unit Coordinator

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**Amie Anastasi** Unit Coordinator

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## Schedule

### Week 1 - 06 Mar 2023

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 - 13 Mar 2023

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

#### Week 3 - 20 Mar 2023

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 - 27 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
Chemical Reactions 1	Chemistry Foundations Study Guide - Topics 10 and 11	<b>Online Quiz 1</b> Due: Week 4 Monday (27 March 2023) 11:55 pm AEST

#### Week 5 - 03 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
Chemical Reactions 2	Chemistry Foundations Study Guide - Topics 11 and 12	

#### Vacation Week - 10 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
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#### Week 6 - 17 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
Electrolytes Acids and Bases	Chemistry Foundations Study Guide - Topics 13 and 14	

#### Week 7 - 24 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
Buffers Introduction to Nuclear Chemistry	Chemistry Foundations Study Guide - Topics 15 and 16	

#### Week 8 - 01 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Organic Chemistry Saturated Hydrocarbons	Chemistry Foundations Study Guide - Topics 17 and 18	<b>Written assessment</b> Due: Week 8 Monday (1 May 2023) 11:55 pm AEST

#### Week 9 - 08 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
Unsaturated Hydrocarbons Aromatic Compounds	Chemistry Foundations Study Guide - Topics 19 and 20	

#### Week 10 - 15 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
Alcohols Ethers Alkyl Halides Thiols and Amines	Chemistry Foundations Study Guide - Topics 21, 22 and 23	

#### Week 11 - 22 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
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### Week 12 - 29 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
Review		<b>Laboratory Quiz 1 &amp; 2</b> Due: Week 12 Thursday (1 June 2023) 11:55 pm AEST <b>Online Quiz 2</b> Due: Week 12 Friday (2 June 2023) 11:55 pm AEST

### Review/Exam Week - 05 Jun 2023

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Take Home Exam</b> (Exact date TBA)

### Exam Week - 12 Jun 2023

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Take Home Exam</b> (Exact date TBA)

## Term Specific Information

A "Foundations of Chemistry" Study Guide will be provided for this unit via the Moodle site. This Study Guide will be your key reference material for this unit. For an additional recommended (not prescribed) textbook, please refer to the Textbooks and Resources section of this unit profile. All lectures and tutorials will be pre-recorded and uploaded to Moodle. Live Q&A Zoom sessions will be available during the term.

## Assessment Tasks

### 1 Online quiz(zes)

#### Assessment Type

Online Quiz(zes)

#### Task Description

This assessment is comprised of 2 online quizzes which will assess your understanding of the topics presented in this unit. This assessment requires you to apply the concepts presented in lectures and tutorials to answer a series of multiple-choice questions. All questions in each quiz are of equal value.

- Quiz 1 will contribute 10% to your unit grade
- Quiz 2 will contribute 20% to your unit grade

The two online quizzes will contribute a total of 30% of the assessment for this unit. The quizzes are not timed, and you are allowed two attempts. The highest score of the two attempts will be recorded. Note that quiz questions are generated randomly and you will receive different questions on subsequent attempts.

#### Number of Quizzes

2

#### Frequency of Quizzes

Other

#### Assessment Due Date

- Online Quiz 1 will be due at 11:55 pm (AEST), Monday March 27, 2023
- Online Quiz 2 (Part A & Part B) will be due at 11:55 pm (AEST), Friday June 2, 2023

#### Return Date to Students

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%

**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
- 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
- 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
- Outline the process of nuclear decay and discuss measures used to ensure safety when working with radiation

**Graduate Attributes**

- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

## 2 Written assessment

**Assessment Type**

Written Assessment

**Task Description**

This assessment is designed to assess your comprehension of the concepts presented in the unit through their application to answer a series of questions. Marks will be awarded for each question as indicated in the assessment item (please see the Moodle site for further details). Explanations for each answer must be provided and if calculations are required all workings must be provided.

**Assessment Due Date**

Week 8 Monday (1 May 2023) 11:55 pm AEST

**Return Date to Students**

Week 10 Friday (19 May 2023)

**Weighting**

20%

**Assessment Criteria**

Marks will be awarded for each question as indicated in the assessment item (please see the Moodle site for further details).

**Referencing Style**

- [Vancouver](#)

**Submission**

Online

**Submission Instructions**

Upload assessment in WORD FORMAT 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

**Graduate Attributes**



- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

### 3 Practical assessment

#### Assessment Type

Practical Assessment

#### Task Description

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 8 laboratory sessions. Assessment is with a Pass/Fail grade. To be eligible to pass CHEM11043, it is a requirement to 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

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), Thursday June 1, 2023.

#### Return Date to Students

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.

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. Notebooks will be inspected randomly throughout the course of the residential schools.
2. Two online practical theory tests must be completed. 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, but you are required to achieve 90% minimum to pass.
3. Competency in specified laboratory skills must be demonstrated. Competency in the correct use of burettes, volumetric flasks, pipettes, balances and pH meters will be assessed during the laboratory sessions.
4. Completion of two practical tests where you will be required to conduct experiments to demonstrate your competency in spectrophotometric and titrimetric analyses. To be awarded a Pass grade for each practical test, your results must be within a given range of the actual results. Should your result be outside of this range, you will be required to show cause or provide evidence from previous sessions that you are competent in the skills being assessed.

#### Referencing Style

- [Vancouver](#)

#### Submission

No submission method provided.

### Learning Outcomes Assessed

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

### Graduate Attributes

- Critical Thinking
- Team Work
- Information Technology Competence

## 4 Take home exam

### Assessment Type

Take Home Exam

### Task Description

The take home exam will cover all the content you have studied this term. This assessment will be in the form of a written assessment that will be made available via Moodle during exam week. You will be allowed 48 hours to complete and upload this take-home exam via Moodle as a word document.

In completing this assessment, you should note the following:

- Attempt all questions
- All submissions should be typed and saved as a word document
- Show all calculations as required
- Completed assessment is to be submitted via upload on Moodle page.

The breakdown of topics to be covered in the take home exam and associated marks will be made available on Moodle in week 12 prior to the exam.

### Assessment Due Date

The take-home exam will be available for download on a specific day during the university's standard exam period. More details on the due date and time will be provided later via Moodle. This exam will be available for 48 hours ONLY and should be submitted via upload to Moodle NO LATER than 48 hours after it is made available.

### Return Date to Students

Marks will be returned 7-14 days after the take-home exam is submitted via Gradebook in Moodle.

### Weighting

50%

### Minimum mark or grade

50%

### Assessment Criteria

The assessment marking criteria will be based on the marks allocated for each question in the take home exam.

### Referencing Style

- [Vancouver](#)

### Submission

Online

### Submission Instructions

Word processed files (that are scanned into an electronic format within the timeframe of the assessment) are acceptable formats for submission. Completed assessment is to be submitted via upload on Moodle page.

### 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
- 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
- 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
- Outline the process of nuclear decay and discuss measures used to ensure safety when working with radiation

### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking

## 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