CHEM12079 *Inorganic Chemistry*
Term 1 - 2022

Profile information current as at 29/04/2024 08:11 am

General Information

Overview
In this unit, you will advance your theoretical knowledge of chemical synthesis with a focus on the structural aspects and energy requirements of bond formation. You will study lattice structures and layers and predict the geometry and bonding properties of molecules using Valence Bond and Molecular Orbital Theories. You will examine the unique properties of the D-block elements and the formation of coordination compounds. You will study interfacial chemistry, for example at solid-liquid boundaries, which lay the foundation for solute transport and is key element of chemical kinetics. Completing this unit will significantly advance your standing as an inorganic chemist and prepare you for the study of advanced topics such as nanotechnology, analytical spectroscopy and materials development.

Details
Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Pre-requisites: CHEM11044 Chemical Reactions OR CHEM11045 Chemical Investigation and Theory or permission of Head of Course
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 - 2022

- Online

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. **Written Assessment**
Weighting: 25%
2. **Written Assessment**
Weighting: 25%
3. **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 Student Unit and Teaching Evaluation Survey and direct feedback to Unit Coordinator.

Feedback

Students commented that the lectures were delivered at a suitable pace and promoted understanding of new or complex topics.

Recommendation

Continue with a similar approach to content delivery in 2022.

Feedback from Student Unit and Teaching Evaluation Survey.

Feedback

Some students recommended mapping tutorial style problems to specific unit learning outcomes.

Recommendation

Provide a further targeted list of tutorial style problems and consider highlighting the links to unit learning outcomes in 2022.

Unit Learning Outcomes

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

1. Predict the chemistry of coordination compounds as a result of the electronic structure
2. Analyse and compare electron transitions in molecules and compounds using existing theories
3. Relate the unique properties of the D-Block elements and characteristics of coordination compounds to their atomic structure
4. Compare solute transport processes at the liquid interface, and their influences on chemical reactions.

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
1 - Written Assessment - 25%	•		•	
2 - Written Assessment - 25%		•		•
3 - Take Home Exam - 50%	•	•	•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
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 - Written Assessment - 25%		•	•	•						
2 - Written Assessment - 25%		•	•	•						
3 - Take Home Exam - 50%		•	•	•						

Textbooks and Resources

Textbooks

CHEM12079

Prescribed

Inorganic Chemistry
Edition: 5 (2018)
Authors: Catherine E. Housecroft, Alan G. Sharpe
Pearson Education Limited
Harlow , United Kingdom
ISBN: 978-1-292-20496-3
Binding: eBook

Additional Textbook Information
Either the eBook or physical copy of the textbook are suitable.

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

Andrew Irving Unit Coordinator
a.irving@cqu.edu.au
Joel Johnson Unit Coordinator
j.johnson2@cqu.edu.au

Schedule

Week 1 - 07 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Introduction and revision of inorganic chemistry concepts	1.2-1.3, 1.5-1.10; 2.1-2.3, 2.7; 3.1-3.6	

Week 2 - 14 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Bonding in polyatomic molecules	5.1-5.3, 5.5-5.6	

Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Spectroscopic properties and techniques	4.7, 4.12	

Week 4 - 28 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic

Structures and energetics of metallic and ionic solids	6.1-6.8	

Week 5 - 04 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Redox chemistry (Eo values; thermodynamics of redox reactions)	8.3, 8.7, 8.8, 8.10, 8.15	

Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Descriptive chemistry of the elements	10.4; 11.1-11.4; 12.1-12.4; 13.1-13.4; 16.1-16.4; 17.1-17.4	**Written Assessment 1 - Short Answer Questions and Research Question** Due: Week 6 Monday (18 Apr 2022) 12:00 pm AEST

Week 7 - 25 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
d-block metal chemistry general considerations	19.1-19.5, 19.6-19.8	

Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
d-block metal chemistry: coordination chemistry	2.9; 3.8; 19.6-19.8; 20.1-20.5, 20.7, 20.11	

Week 9 - 09 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
d-Block metal chemistry: the first row metals	21.1-21.3; 21.4-21.13	

Week 10 - 16 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
d-Block metal chemistry: the heavier metals	22.1-22.3; 22.4-22.13	**Written Assessment 2 - Problem Solving and Interpretation** Due: Week 10 Monday (16 May 2022) 12:00 pm AEST

Week 11 - 23 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Organometallic compounds of d-block elements	24 (sections to be advised) See eReading list for supplementary readings	

Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Review of all content		

Review/Exam Week - 06 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
		Take Home Exam - End of Term Assessment Due: This week or next (exact date to be advised on Moodle)

Exam Week - 13 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Written Assessment 1 - Short Answer Questions and Research Question

Assessment Type
Written Assessment

Task Description
In Written Assessment 1 you will be required to:
1. Answer a series of short answer questions to demonstrate your knowledge of election transitions and bonding in polyatomic molecules
2. Research the terms: interfacial chemistry, chemical reactions at interfaces, solute transport
3. Locate two recent examples from the literature that have addressed the concepts listed at step 2
4. Summarise the major findings of the journal articles you located at step 3
More information on this assessment task will be made available on Moodle

Assessment Due Date
Week 6 Monday (18 Apr 2022) 12:00 pm AEST

Return Date to Students
Week 8 Monday (2 May 2022)
Assessment marks and feedback will be returned via Moodle

Weighting
25%

Minimum mark or grade
50%

Assessment Criteria
Short answer questions
40% of total marks for this assessment
Marks will be awarded for:

- Correctly addressing the questions (20%)
- Demonstrating understanding of the key concepts (20%)

Research question
60% of total marks for this assessment
Marks will be awarded for:

- Quality, depth and accuracy of research (20%)
- Demonstrated understanding of the concepts (30%)
- Correct referencing, including in-text (10%)

More information on this assessment task will be made available on Moodle

Referencing Style

- Vancouver

Submission
Online

Submission Instructions
Assessment must be submitted as a Word document via Moodle

Learning Outcomes Assessed

- Predict the chemistry of coordination compounds as a result of the electronic structure
- Relate the unique properties of the D-Block elements and characteristics of coordination compounds to their atomic structure

Graduate Attributes

- Problem Solving
- Critical Thinking
- Information Literacy

2 Written Assessment 2 - Problem Solving and Interpretation

Assessment Type
Written Assessment

Task Description
In Written Assessment 2 you will be required to:
1. Complete a series of problem-solving questions in order to:

- Evaluate and interpret information related to d-block elements and coordination compounds
- Accurately predict the chemistry of coordination compounds
- Examine the electron distribution within d-block elements
- Predict stable oxidation states and associate these to physical properties

2. Conduct research to locate credible information to support the predictions and interpretations made in step 1.
More information on this assessment task will be made available on Moodle

Assessment Due Date
Week 10 Monday (16 May 2022) 12:00 pm AEST

Return Date to Students
Week 12 Monday (30 May 2022)
Assessment marks and feedback will be returned via Moodle

Weighting
25%

Minimum mark or grade
50%

Assessment Criteria
Problem solving and interpretation
Marks will be awarded for:

- Correct evaluation and interpretation of data (30%)
- Demonstrated understanding of the key concepts (40%)
- Quality research to support predictions (20%)
- Correct referencing, including in-text (10%)

More information on this assessment task will be made available on Moodle

Referencing Style

- Vancouver

Submission
Online

Submission Instructions
Assessment must be submitted as a Word document via Moodle

Learning Outcomes Assessed

- Analyse and compare electron transitions in molecules and compounds using existing theories
- Compare solute transport processes at the liquid interface, and their influences on chemical reactions.

Graduate Attributes

- Problem Solving
- Critical Thinking
- Information Literacy

3 Take Home Exam - End of Term Assessment

Assessment Type
Take Home Exam

Task Description
In Take Home Exam - End of Term Assessment you will be required to:
1. Download the assessment on the specified day
2. Complete the problem solving and critical thinking questions
3. Upload your answers within the allocated (24 hour) time period
A scientific calculator and Periodic Table may be required for some questions.

Please ensure you have a good, stable internet connection during the assessment period.
More information on this assessment task will be made available on Moodle.

Assessment Due Date

The take-home test will be available for download on a specific day during the university's standard exam period, it will be available for 24 hours ONLY and should be submitted via upload to Moodle NO LATER than 24 hours after it is made available.

Return Date to Students

Marks will be returned via Moodle 7-14 days after the Take Home Exam is submitted

Weighting
50%

Assessment Criteria
Marks will be awarded for:

- Demonstrating understanding of the key concepts (50%)
- Correctly solving the problems (show all workings for full marks) (50%)

Referencing Style

- Vancouver

Submission
Online

Submission Instructions
Word processed or hand-written documents (that are scanned into an electronic format within the timeframe of the assessment) are acceptable formats for submission.

Learning Outcomes Assessed

- Predict the chemistry of coordination compounds as a result of the electronic structure
- Analyse and compare electron transitions in molecules and compounds using existing theories
- Relate the unique properties of the D-Block elements and characteristics of coordination compounds to their atomic structure
- Compare solute transport processes at the liquid interface, and their influences on chemical reactions.

Graduate Attributes

- Problem Solving
- Critical Thinking
- Information Literacy

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