

## EPCHEM 137: Foundation Concepts for Chemistry

Online

Semester 1 - 2024



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

*The Pathways and Academic Learning Support Centre recognises and respects the unique history and culture of Aboriginal and Torres Strait Islander peoples and their unbroken relationship with the lands and the waters of Australia over millennia. We are dedicated to reconciliation and to offering opportunities for Aboriginal and Torres Strait Islander peoples to access and succeed in higher education. The Centre is committed to providing a culturally safe and inclusive environment for all.*

## OVERVIEW

<b>Course Description</b>	This course provides an introduction to fundamental chemical concepts of relevance to the physical and life sciences. Topics covered include: pure substances and mixtures; atoms, molecules and ions; simple atomic models; the periodic table; chemical compounds: chemical formulae; bonding; basic shapes of molecules; states of matter; the mole concept and stoichiometry; solutions; acids and bases; organic chemistry and simple chemical reactions. Students will develop skills in observation, critical thinking, research and communication.
<b>Academic Progress Requirements</b>	Nil
<b>Requisites</b>	You cannot enrol in this course if you have successfully completed or are enrolled in EPCHEM314 or EPHLTH370.
<b>Contact Hours</b>	<b>Self-Directed Learning</b> Self-Directed 2 hour(s) per week(s) for 12 week(s) starting Week 1 Self-Directed learning is equivalent to face-to-face contact hours. It involves engagement with course materials that are delivered at a time that suits you via short videos, course notes, podcasts, readings and other activities.  <b>Tutorial</b> Online 1 hour(s) per week(s) for 12 week(s) starting Week 1
<b>Unit Weighting</b>	10
<b>Workload</b>	Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

# COURSE OUTLINE

[www.newcastle.edu.au](http://www.newcastle.edu.au)

CRICOS Provider 00109J

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# CONTACTS

<b>Course Coordinator</b>	<b>Dr Jennifer Irwin</b> <a href="mailto:Jennifer.Irwin@newcastle.edu.au">Jennifer.Irwin@newcastle.edu.au</a> 02 43484217 Consultation: Please email to schedule an appointment.	
<b>Teaching Staff</b>	Other teaching staff will be advised on the course Canvas site.	
<b>School Office</b>	<b>Callaghan</b> Ground Floor, General Purpose Building (GP) Ph: 02 4921 5558 <a href="mailto:enabling@newcastle.edu.au">enabling@newcastle.edu.au</a>	<b>Ourimbah</b> HO 168, Humanities Building Ph: 02 4348 4076 <a href="mailto:enabling@newcastle.edu.au">enabling@newcastle.edu.au</a>

# SYLLABUS

<b>Course Content</b>	<ul style="list-style-type: none"><li>• Atoms and elements</li><li>• Electrons and the periodic table</li><li>• Compounds and chemical bonds</li><li>• Chemical reactions and equations</li><li>• The mole and chemical formulas</li><li>• Stoichiometry</li><li>• Molecular shape</li><li>• Organic chemistry</li><li>• Solids, liquids and phase changes</li><li>• Solutions</li><li>• Acids and bases</li></ul>
<b>Course Learning Outcomes</b>	<p><b>On successful completion of this course, students will be able to:</b></p> <ol style="list-style-type: none"><li>1. Identify and explain how a knowledge of chemistry relates to everyday life, living organisms and technology in general.</li><li>2. Describe atoms, elements, molecules and compounds and how they react using chemical language.</li><li>3. Solve simple chemical problems in both a practical and theoretical context.</li><li>4. Apply theoretical knowledge and laboratory based experimental observation to predict and describe chemical change.</li><li>5. Identify and choose appropriate sources of chemical information using the library catalogue.</li><li>6. Prepare a scientific report to address a chemical question, citing the sources of chemical information used in APA 7th referencing format.</li><li>7. Apply chemical knowledge in an examination setting.</li></ol>
<b>Course Materials</b>	Students will require a non-programmable scientific calculator. All other course materials will be provided on the course Canvas site. Students may choose to, but are not required to, purchase a textbook. Information regarding the recommended textbook will be provided in Canvas and discussed in Week 1 of the course.

# SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	26 Feb	Atoms and Elements (Ch 1) Atomic model, Periodic table, Isotopes, Relative Atomic mass	Tutorial 1	Quiz 1 opens
2	4 Mar	Electrons and the Periodic Table (Ch. 2) Bohr model, Atomic orbitals, Electron configurations, Lewis Dot Symbols, Periodic Trends, Ions	Tutorial 2	Quiz 2 opens
3	11 Mar	Compounds and Chemical Bonds (Ch 3) Ionic & covalent bonding and naming compounds, Polyatomic ions; Classification & properties of matter (Ch 7, 7.1) Mixtures, Chemical and physical properties.	Tutorial 3	<b>Quizzes 1 &amp; 2 due Sunday 17<sup>th</sup> March 11:59pm</b> Quiz 3 opens
4	18 Mar	Chemical Reactions and Equations (Ch 10) Reading, writing, and balancing chemical equations (including ionic equations), Types of chemical reactions.	Tutorial 4	Quiz 4 opens
5	25 Mar	The Mole and Chemical Formulas (Ch 5, 5.1 and 5.2) Moles, Molar mass, Interconverting mass, moles and number of atoms, molecules, formula units.	Tutorial 5	<b>Quizzes 3 &amp; 4 due Sunday 31<sup>st</sup> March 11:59pm</b> Quiz 5 opens
6	1 Apr	Stoichiometry: Using Balanced Chemical Equations I (Ch 11, 11.1-11.3) Mole to mole, mass to mass, limiting reagent and theoretical yield.	Tutorial 6	<b>Mid-semester test due Sunday 7<sup>th</sup> April 11:59pm</b> Quiz 6 opens
7	8 Apr	Stoichiometry: Using Balanced Chemical Equations II (Ch 5, 5.3-5.5, Ch 11, 11.3) Chemical composition, empirical formulae, % yield.	Tutorial 7	<b>Quizzes 5 &amp; 6 due Sunday 14<sup>th</sup> April 11:59pm</b> Quiz 7 opens
<b>Recess</b>				
<b>Recess</b>				
8	29 Apr	Molecular Shape (Ch 6). Lewis structures, Formal charges, Molecular shape, Bond polarity, Molecular polarity, Intermolecular forces. Solid, Liquids, Phase changes (Ch 7, 7.1)	Tutorial 8	Quiz 8 opens
9	6 May	Organic Chemistry (Ch 14) Hydrocarbons (alkanes, alkenes, alkynes and reactions), Isomers, Functional groups; Naming and drawing (14.4 – 14.8).	Tutorial 9	<b>Quizzes 7 &amp; 8 due Sunday 12<sup>th</sup> May 11:59pm</b> <b>Research Assignment due Sunday 12<sup>th</sup> May 11:59pm</b> Quiz 9 opens
10	13 May	Solids, Liquids and Phase Changes (Ch 7, 7.2 – 7.5) Types of solids, Properties of solids, Properties of liquids. Physical Properties of Solutions (Ch 9) Properties of Solutions, Aqueous solubility Concentration, Colligative properties.	Tutorial 10	Quiz 10 opens
11	20 May	Solutions (Ch 9) Reactions in aqueous solutions, solubility rules, neutralisation reactions & dilution calculations.	Tutorial 11	<b>Quizzes 9 &amp; 10 due Sunday 26<sup>th</sup> May 11:59pm</b> Quiz 11 opens
12	27 May	Acids and Bases (Ch 12). Properties and definitions of acids and bases, Strong acids and bases, pH/pOH, Weak acids and bases, Buffers (not calculations).	Tutorial 12	Quiz 12 opens <b>Laboratory Report due Sunday 2<sup>nd</sup> June 11:59pm</b>
13	3 Jun	Laboratory		<b>Quizzes 11 &amp; 12 due Sunday 9<sup>th</sup> June 11:59pm</b>
<b>Examination Period</b>				
<b>Examination Period</b>				

# ASSESSMENTS

This course has 5 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Online Quizzes	Sunday 11:59pm Weeks 3, 5, 7, 9, 11, 13	Individual	15%	1, 2, 3, 4
2	Mid-Semester Test	Sunday 7 <sup>th</sup> April 11:59 pm	Individual	15%	1, 2, 3, 4, 7
3	Research Assignment	Sunday 12 <sup>th</sup> May 11:59 pm	Individual	20%	5, 6
4	Laboratory Report	Sunday 2 <sup>nd</sup> June 11:59 pm	Combination	10%	2, 3, 4
5	Final Examination	Examination Period	Individual	40%	1, 2, 3, 4, 7

**Late Submissions** The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 5% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

## Assessment 1 - Online Quizzes

<b>Assessment Type</b>	Quiz
<b>Description</b>	The quizzes consist of multiple-choice questions based on that week's lectures and text readings.
<b>Weighting</b>	15%
<b>Due Date</b>	Sunday 11:59pm Weeks 3, 5, 7, 9, 11, 13
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	Correct answers
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Feedback will be provided in Canvas upon completion of each quiz

## Assessment 2 - Mid-Semester Test

<b>Assessment Type</b>	In Term Test
<b>Description</b>	The mid-semester test will be held online in Week 6. This is an open book test. It will consist of multiple choice and short answer questions based on the first 5 weeks of course content.
<b>Weighting</b>	15%
<b>Due Date</b>	Sunday 7 <sup>th</sup> April 11:59pm
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	Correct answers
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Feedback will be provided in Canvas

## Assessment 3 - Research Assignment

<b>Assessment Type</b>	Written Assignment
<b>Description</b>	Students will prepare a written report addressing a chemical question. All assignments must be fully referenced using APA 7th referencing style and are submitted online. Referencing notes are included in Canvas and Library sessions on referencing and researching will be available for students.
<b>Weighting</b>	20%
<b>Due Date</b>	Sunday 12 <sup>th</sup> May 11:59pm
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	Rubric provided in Canvas
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Feedback will be provided in Canvas

## Assessment 4 - Laboratory Report

<b>Assessment Type</b>	Tutorial / Laboratory Exercises
<b>Description</b>	This laboratory exercise is designed to give students the opportunity to develop observational and reporting skills in preparation for undergraduate study.
<b>Weighting</b>	10%
<b>Due Date</b>	Sunday 2 <sup>nd</sup> June 11:59pm
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	Correct answers
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Feedback will be provided in Canvas

## Assessment 5 - Final Examination

<b>Assessment Type</b>	Online Open Book Formal Examination
<b>Description</b>	The final exam is designed to give students the opportunity to demonstrate an understanding of fundamental chemical concepts, solve simple problems and apply chemical knowledge in an examination setting.
<b>Weighting</b>	40%
<b>Due Date</b>	During Examination Period
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	Correct answers
<b>Return Method</b>	This assessment will not be returned
<b>Feedback Provided</b>	No feedback will be provided for this assessment.

## ADDITIONAL INFORMATION

### Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

### Communication Methods

**Email** is the principal form of communication at the university and within this course. Always use your student email (NUmail), rather than a private email address, and check this regularly. As Course Coordinator I will try to respond to your email within three (3) working days. I will not normally respond to emails over the weekends. Please be courteous in your email communication and in the online space.

**Canvas** is used to distribute course material, announcements and other information. It is also used for online quizzes and to allow students to track their individual progressive assessment results throughout the semester via Grades.

**Discussions forums** in Canvas can be used to ask questions about minor issues. Students are strongly encouraged to use these to communicate with each other, discuss issues relating to the course, and solve minor problems.

### Attendance and Engagement

In addition to face-to-face hours in class, out-of-class study and related work will require an additional commitment of up to 10 hours per week of reading, preparation, and study time over the semester. Students are required to spend on average 120-140 hours of effort (contact and non-contact hours including assessment) per semester per 10 unit course.

To maximise your learning opportunities, you should read all relevant material prior to attending class.

It is strongly recommended that you attend your classes every week. Our data shows that you will get better results if you attend class with your peers. If you do have to miss a class, you should catch up on any missed work by accessing lecture recordings if you are enrolled face-to-face. While online tutorials are recorded, on-campus tutorials are not, so you should view other resources available on your Canvas site and contact your course coordinator if you would like advice on how to best catch up on any material that was missed. **If you are unable to attend classes regularly you should reach out to your course coordinator as soon as possible to discuss ways that you can continue to engage with the learning material.**

A plan of regular revision throughout the semester is also strongly recommended to help you manage your time, consolidate information and retain that knowledge for the duration of the course and beyond.

Assessment items have been designed to reinforce and revise the course material, and ensure you are up to date with course content. You are required to submit all assessable items by the due dates unless prior arrangements have been made.

### Additional Contact Details

If you have any questions about your course, please speak with your course coordinator, lecturer or tutor first. For general enquiries, please contact the Pathways and Academic Learning Support Centre Office or your Student Liaison Officer. Contact details for both the office and Student Liaison Officers can be found [here](#).

Yapug students can also contact your Indigenous Enabling Learning Advisor [Hannah Pipe](#) or your Program Convenor [Dan Collins](#).

### Final Examination

This course has a formal examination. All formal examinations will be held during the [University's Examination Period](#). Your [exam timetable](#) will be available approximately 4 weeks before the exam period and you must ensure that you are available to undertake your exam at any time during the Examination Period.

If you are unable to attend a scheduled examination due to illness or you have another significant, verifiable reason, contact the Pathways and Academic Learning Support Office and advise your lecturer at the earliest opportunity. Completion of an [online Adverse Circumstances application](#) including appropriate documentation is required.

If you have a permanent or temporary disability or medical condition that means you may need adjustments made during your examination, you must register with [AccessAbility](#) at the start of semester so that these arrangements can be made.

If you have a Reasonable Adjustment Plan (RAP), your examination will be scheduled in accordance with it. If you are unable to attend your scheduled examination due to illness or other circumstance, you will need to submit an online Adverse Circumstances application and supply appropriate documentation to support your application. Your RAP is not able to be used as your documentation.

### Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for Adverse Circumstances must be lodged via the online Adverse

Circumstances system for all individual assessment items worth 30% or greater **by 11:00pm on the day the assessment is due**. For assessment items less than 30%, you will need to contact your Course Coordinator by 11:00pm on the due date of the assessment item.

Before applying you must refer to the [Adverse Circumstances Affecting Assessment Items Procedure](#) and the [Adverse Circumstances Affecting Assessment Items Policy](#).

Please note that students must submit their adverse circumstances application via the online Adverse Circumstances system by 11:00pm on the due date of the assessment item, even if you are using a [Reasonable Adjustment Plan \(RAP\)](#) as your supporting documentation.

**Written Assessment Word Limits**

If this course includes written assessments, the word limit listed will include headings, sub-heading, in-text citations, quotes and referencing but does not include the list of references, appendices and footnotes. You will not receive a penalty for exceeding the word limit (there is a tolerance of up to 10%), but any work after the maximum word limit may not be included within the allocation of marks.

**Academic Misconduct**

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. Please refer to the [Student Academic Integrity Policy](#).

**Oral Interviews (Vivas)**

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

**Workplace Health and Safety Requirements**

There are no specific WH&S requirements for this course.

**Software**

Free Microsoft Office software is available to enrolled students [here](#) and includes 5 TB of free cloud storage with OneDrive.

**Timetable**

Your timetable for this course is available via the myUni Student Portal and can also be found [here](#).

**Course Evaluation**

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

**Important Policy Information**

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the [policies and procedures](#) that support a safe and respectful environment at the University.

*This course outline was approved by the Director, PALS. No alteration of this course outline is permitted without Director approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.*  
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