



Subject:	Chemistry
Subject Outline	<p>This subject is designed to provide an understanding of all the major concepts of Chemistry, investigate some of the applications of these concepts in everyday life and discuss the role of science and technology in society.</p> <p>The Chemistry subject provides the experimental and theoretical basis for understanding the structure and function of all forms of matter. The Chemistry subject introduces students to the basic principles, processes and skills of analytical, physical, inorganic and organic chemistry. It has been designed to help students understand how chemical principles and concepts are developed and to assist with their entry into further studies in chemistry or other courses of study with a significant chemistry content.</p>
Online Subject Delivery	<p>Students studying Chemistry will complete blocks of learning, which consist of four interactive lessons and checkpoint tasks. These are completed on Moodle. Students will be supported in completing these blocks of learning by live classes and live question and answer sessions via Zoom web-conferencing. Teachers monitor student's progress and provide individualised feedback on checkpoint tasks. Students access the Chemistry forum regularly to post questions and review discussions.</p>
Face to Face Subject Delivery	<p>Chemistry students participate in a blended learning approach that includes class time supported by activities online via Moodle. Classes are student-focused and communicative with learners being expected to contribute to group discussion. Participation in online learning before class prepares students for in-class activities and maximises the value of face to face learning. Students can prepare for class, review content and skills learned as well as complete checkpoints online.</p>
Graduate Attributes (GA)	<p>On completion of the Foundation Program, students will be able to:</p> <ol style="list-style-type: none">1. Communicate effectively in English in a variety of contexts, circumstances and modes2. Demonstrate relevant, practical and theoretical knowledge in a subject area3. Apply relevant academic literacy skills in a subject area4. Apply relevant numeric literacy skills in a subject area5. Apply critical, analytical thinking, and problem solving skills for academic contexts6. Work independently and collaboratively in a cross-cultural context7. Demonstrate academic integrity
Objectives	<p>On successful completion of this subject, students will be able to:</p> <ol style="list-style-type: none">1. Apply knowledge of chemical facts and principles to solve problems (GA 2, 5);2. Analyse, evaluate and present information on chemical science topics (GA 1, 2, 7);3. Solve problems in chemical science using complex reasoning (GA 2, 5);



	<ol style="list-style-type: none">4. Deliver a presentation on a chemistry topic and contribute to group discussion (GA 1, 2, 6);5. Evaluate the strengths and limitations of scientific work in relation to chemical science (GA 2, 5, 7);6. Operate safely and proficiently while conducting chemical science activities (GA 2, 6).
Attendance	<p>Attendance is a visa requirement. Attendance contributes directly to the academic success of the student. Attendance is monitored as described in the Attendance Policy.</p> <ul style="list-style-type: none">• Face to face: Students are expected to attend all classes and complete all Moodle checkpoints.• Online: Students are expected to attend all live online classes and complete all Moodle checkpoints. Engagement with question and answer sessions and Moodle lessons is highly recommended.
Learning Resources	<ul style="list-style-type: none">• IES Subject Moodle site• Online Research Databases: Informit• Chemistry Online Manual• OpenStax Chemistry

Students are assessed through the following assessment activities:

Assessment Activity	Description	Weighting
TERM 1		
Project 1: Seminar (Vlogs) (Part 1)	<p>Students will have a unique opportunity to develop core research skills relevant to a wide spectrum of chemical research, including written and oral communication, by participating in an individual research project associated with a discipline of interest to them. The project is divided into two parts; Part 1 (Seminar (Vlog) to be completed in Term 1) and Part 2 (Essay to be completed in Term 3). Students may select the same topic for Parts 1 and 2.</p> <p>In Part 1, students will need to conduct research and record a 3-minute video blog (Vlog) of their presentation and upload it on Moodle as outlined in the submission method section of this task sheet. In summary, students will be required to deliver a presentation on a chemical science topic and contribute to group discussion.</p>	10%



Workshops and Online quizzes	<p>This assessment activity is worth 10% and is divided into two parts; (1) workshops and (2) online quizzes and runs over four Terms (each term is worth 2.5%).</p> <p>(1) Workshops The workshop activities will be used as the weekly checkpoints to equip students with the tools and strategies they require to revise and reinforce a range of study skills, assisting students to study more effectively and to consolidate their understanding in preparation for exams. The workshops will also assist students to improve their critical thinking skills and to increase students' confidence in their ability to do well. Students have unlimited attempts and must achieve a satisfactory grade in Weeks 2 and 5 of each term to be able to proceed to the next lesson.</p> <p>(2) Online Quizzes Students must read the relevant pages in their Chemistry Online manual and complete a set of online quizzes. The "Pre-class Quiz" is designed to prepare students for their upcoming lessons. The "Check your understanding" quiz is designed to review what has been covered in the lessons and help students to test their knowledge and understanding of a topic. Students have unlimited attempts to complete the quizzes.</p>	10%
TERM 2		
Mid-Course Exam	<p>The mid-course exam is based on the following topics: Classification of Matter (Chapter 1), Atomic Structure (Chapter 2), Chemical Names & Formulae (Chapter 3), The Mole Concept (Chapter 4), Chemical reactions (Chapter 5), Stoichiometry (Chapter 6), Electrons in Atoms (Chapter 7), Chemical Periodicity (Chapter 8), Ionic Bonding (Chapter 9), Covalent Bonds (Chapter 10), States of Matter (Chapter 11) and Thermochemistry (Chapter 12)</p> <p>The examination will consist of 5 sections:</p> <ul style="list-style-type: none">• Section A assesses students' recall of information and has both multiple choice and short answer questions.• Section B assesses students' abilities to apply their knowledge to solve routine problems and has both multiple choice and short answer questions.• Section C assesses students' abilities to draw, label and interpret various tables and diagrams and has short answer questions only.• Section D assesses students' abilities to apply their knowledge to solve more complex problems and requires more extended responses.• Section E assesses students' abilities to integrate and evaluate learned information to solve a novel problem in Chemistry and requires more extended responses.	20%



TERM 3		
Project 1: Essay (Part 2)	<p>In Part 2, students will need to conduct research and write an essay of approximately 1000 words, using a variety of primary and secondary sources to identify a contemporary issue in chemical sciences relating to a topic of interest (similar to Part 1 or may select a new topic). Students will be required to:</p> <ul style="list-style-type: none">Analyse, evaluate and present information on chemical science topics.Evaluate the strengths and limitations of scientific work in relation to chemical science.	15%

TERM 4		
UQ Labs	<p><u>Face to Face Subject delivery</u> The experimental component of this task is completed in the first year Chemistry laboratories at the University of Queensland. Students are required to complete 4 of the 5 experiments that have been devised by UQ lecturers in consultation with IES teachers. Each experiment is complex and novel in nature and takes approximately 2.5 - 3 hours. Students must follow a written procedure, collect data, draw graphs and/or flowchart from the data collected, and then perform calculations/ interpret the information to address the aims of the experiments.</p> <p>Experiment 1: Identify two (2) unknown metal ions using metal ion speciation Experiment 2: Synthesise and separate an organic compound, benzhydrol Experiment 3: Thermochemistry Experiment 4: Determine the unknown concentrations of a sodium oxalate solution using UV/Vis Spectroscopy Experiment 5: Determine the unknown concentrations of two acid solutions, hydrochloric acid and acetic acid, using potentiometric titration</p> <p>Students work in pairs/groups to complete the experiments but each student needs to individually record, interpret and analyse the results. UQ tutors and IES teachers keep records of students' abilities to work together and their individual compliance with safe and correct procedures during the conducting of the experiments.</p> <p>Prior to going to UQ, students must complete a series of Pre-lab questions and exercises at IES; these must be checked by IES teachers before commencing any practical work at UQ. Back at IES, after completion of the Practical, each student must present a written record detailing whether they met the aims of the experiments (including reasons) as well any problems they faced.</p>	15%



	<p><u>Online Subject delivery</u> Online students will be completing the Online Chemistry Labs designed by the University of Queensland. The assessment will contain the same information and practicals as those delivered face to face.</p>	
Final Exam	<p>The final exam is based on the following topics: Gas Laws (Chapter 13), Water & Aqueous Solutions (Chapter 14), Properties of Solutions (Chapter 15), Reaction Rates and Equilibrium (Chapter 16), Acids & Bases (Chapter 17), Neutralisation (Chapter 18), Redox Reactions (Chapter 19), Stoichiometry (Chapter 20), Hydrocarbon Compounds (Chapter 21) and Organic Functional Groups and Reactions (Chapter 22).</p> <p>The examination will consist of 5 sections:</p> <ul style="list-style-type: none">• Section A assesses students' recall of information and has both multiple choice and short answer questions.• Section B assesses students' abilities to apply their knowledge to solve routine problems and has both multiple choice and short answer questions.• Section C assesses students' abilities to draw, label and interpret various tables and diagrams and has short answer questions only.• Section D assesses students' abilities to apply their knowledge to solve more complex problems and requires more extended responses.• Section E assesses students' abilities to integrate and evaluate learned information to solve a novel problem in Chemistry and requires more extended responses.	30%



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