Course Code:	1022SCG
Course Name:	Chemistry 1B
Trimester:	Trimester 2, 2019
Program:	Diploma of Science
Credit Points:	10
Course Coordinator:	Dr Gretel Heber
Document modified:	17 June 2019

Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Name	Email
Dr Gretel Heber	Gretel.Heber@staff.griffthcollege.edu.au
Donya Ramimoghadam	Donya.Ramimoghadam@staff.griffthcollege.edu.au

---

Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week

of lectures. A list of times and rooms will be published on the Griffith College Portal under the “myTimetable” link.

Prerequisites

To successfully enrol in this Course, you must provide evidence that you have completed one of the following courses:

- 1021SCG - Chemistry 1A

Brief Course Description

This course covers a range of basic physical and chemical concepts relevant to the study of chemistry and the biosciences. Topics include basic organic chemistry with emphasis on functional group chemistry and its relevance to the functional properties; physical chemistry and spectroscopy; and, basic inorganic chemistry, focusing on the properties of p-block elements and transition metal complexes.

Rationale

Chemistry is known as the central science, in that it is important to our understanding interactions that occur in all the other scientific disciplines through the study of matter; its properties, reactions and associated energies. Chemistry 1B extends the knowledge gained in Chemistry 1A, introducing students to concepts, experimental methodologies and problem solving in organic systems (organic molecules, their properties and reactions), physical chemistry, spectroscopy and inorganic chemistry. These fundamental concepts underpin understanding and problem solving in biomolecular, biological, biotechnical, chemical, environmental, engineering, forensic and medicinal sciences. Consequently, Chemistry 1B is a core course in the study of these fields.

Aims

1. To introduce students to the basic concepts, theory and experimental methods of organic and inorganic chemistry;
2. To build on knowledge of physical chemistry obtained in Chemistry 1A, extending thermodynamics into redox chemistry, weak acid/base chemistry and developing knowledge of chemical kinetics;
3. To establish core concepts and approaches to problem solving in nuclear chemistry and the spectroscopy of molecular structures;
4. To encourage and facilitate chemical problem solving in a variety of contexts, including practical applications;

5. To apply chemical knowledge in other fields, such as the medical, biological, environmental and biomolecular science;
6. To engage students in chemistry, chemical problem solving and the application of chemistry to a range of scientific disciplines.

Learning Outcomes

By the end of this course students should be able to...
1. Identify and explain chemical concepts, reactions and properties in the organic, physical and inorganic chemistry fields,
2. Demonstrate effective communication and sound critical analysis skills in a range of contexts,
3. Apply effective quantitative and qualitative problem solving skills in organic chemistry, physical chemistry and inorganic chemistry, as follows:

Module 1: identify functional groups, nucleophiles, electrophiles and stereoisomers and their properties; predict the products of organic reactions; calculate the pH of weak acid/base and buffer solutions.

Module 2: conduct redox calculations and describe the operation of a galvanic cell; identify factors that affect rates of reaction, predict rate laws and mechanisms from experimental data and demonstrate knowledge of collision theory; interpret basic NMR and FTIR spectra and be able to match molecules to their NMR spectrum; identify nuclear particles, construct nuclear equations and solve radionuclide decay problems;

Module 3: use crystal field theory to explain the structure and properties of transition metal complexes and demonstrate knowledge of the relationship between chemical properties of inorganic substances and their roles in the world around us (element cycles, pollution, greenhouse gases, etc.).

All modules: link chemical knowledge to concepts in other areas of science.

4. Demonstrate competence in practical procedures and workplace health and safety in the laboratory and undertake critical analysis and evaluation of experimental data.

Texts and Supporting Materials

Learning Resources

You are provided with a variety of learning resources and teaching and learning activities to assist you in engaging this course and in gaining a thorough understanding of the course material. While all these resources are provided, you need to take responsibility for your own learning by first learning how to utilise these resources to maximum benefit in terms of developing your understanding of the course material. A brief guide to the resources and teaching is provided below.

Required
Blackman, Bottle, Schmid, Mocerino and Wille (2016), Chemistry 3rd ed., John Wiley &

Sons, Australia as used for Chemistry 1A.
Lecture notes and supplementary material will be available on the portal.

The textbook should be used in conjunction with lecture notes and other materials provided in lectures and via the course web site as a major source of detailed information about the course material. It provides detailed diagrams, illustrations and problems that should be valuable aids in your learning.

Supplementary notes:
Supplementary notes, including lecture notes and tutorial questions for each module will be available to be downloaded from the portal during the trimester.

Laboratory Manual: Griffith College 1022SCG Chemistry 1B Laboratory Manual 2019 available from the Campus Bookshop Mt Gravatt.

Web Sites & Literature References:

The course Web site is available via Griffith College Portal. The Portal and email will be used by the convenor as the main means of communicating information to you about the running of the course e.g. workshop quiz results, any timetable changes etc. consult your email and the Griffith College Portal regularly.

Links to other sites are provided on the course site and also in the Study Guide. Your lecturer may provide further resources such as recommended literature references and other useful Web sites and these are to be used to further develop your understanding of particular topics.

Organisation and Teaching Strategies

The course consists of 3 Modules and a Laboratory Component.

MODULES TOPICS TEACHING & LEARNING ACTIVITIES
Module 1 Weeks 1 - 4 Organic Chemistry 12 hr lectures, 4 tutorials, 4 workshops,
Module 2 Weeks 5 - 8 Physical chemistry and spectroscopy 12 hr lectures, 4 tutorials, 4 workshops,
Module 3 Weeks 9 - 11 Inorganic chemistry 9 hr lectures, 3 tutorials, 3 workshops.
Week 12 will be reserved for revision of the course content covered from week 1 to week 11.

PLEASE NOTE: Lab classes for this course will be 4 hours each over five weeks in room N44_3.16A (Nathan Campus). Experiments in organic chemistry, inorganic chemistry, buffers, energetics and spectroscopy will be undertaken.

The Course is taught using a variety of teaching and learning activities, including lectures, and intensive, facilitated workshops, tutorials and laboratory activities. Course material will be presented in three (3) Learning Modules as detailed above.

The Teaching and Learning Activities used in the different modules are

Lectures:
For each module, lecture classes will be provided highlighting the main points covered by the module topics and explaining the key concepts developed in the module. Approaches to problem solving are modelled. Detailed content is provided by the Textbook and other sources. The purpose of the lectures is to explain and discuss concepts based on the knowledge of content. To gain maximum benefit from the lectures you should have some general knowledge of that content before participating in the lecture class.

Tutorials:
During tutorials, problem solving approaches will be modelled and group participation is required. Tutorials will focus on conceptual hurdles and challenging material for the course. You are expected to attempt the focus tutorial questions before the tutorial.

Workshops:
Workshops help to develop further understanding of course content through discussion of relevant topics and examples using a problem solving approach.

IMPORTANT:
To gain the most from this course, attendance at all tutorials and workshops is strongly advised.

Laboratory:
For the Laboratory Component the class is divided into groups. You will do five laboratory sessions as per the timetable. Laboratory attendance at **ALL** laboratory sessions is compulsory and students will need to arrive prepared and with the required equipment (lab manual, lab coat, safety glasses, appropriate footwear and pre-lab assignments completed).

Class Contact Summary

Attendance

To gain maximum benefit from this course, it is important that you are present for all lectures, tutorials and workshops.

Participation

You are expected to have pre-read the lecture notes and relevant chapters in the textbook before coming to lectures each week and to actively participate in all class activities.

Consultation times

Attendance during consultation times is optional but you are encouraged to use this extra help to improve your learning outcomes.

Laboratory Sessions

Punctuality is always important but especially so for the laboratory classes. It is important that you arrive prepared for each laboratory session and are ready to start at the time given in the timetable. Failure to arrive on time and/or prepared (with required equipment) will result in a loss of marks as a minimum and possible exclusion from that lab session. Deferral of laboratory assignments is not possible.

Preparation for lab sessions involves reading through the relevant chapters in the laboratory manual and completing pre-lab exercises. You are also responsible for bringing your lab coat, safety glasses and wearing appropriate footwear that covers the whole foot. Marks will also be deducted for failure to come adequately prepared.

Independent Learning

In addition to the 5 hours of contact each week, you are also expected to undertake a minimum of 6-7 hours each week in undertaking learning and project activities related to this course.

Content Schedule

Module 1: Organic Chemistry
Bonding and structure identification in organic chemistry; basic organic chemistry with emphasis on functional group chemistry -
alkanes, alkenes, alkynes, haloalkanes, aromatics, alcohols, carboxylic acids and derivatives, and amines. Stereochemistry and weak acid/base concepts are also covered.

Module 2: Physical chemistry and spectroscopy
Revision of spontaneous processes, entropy, free energy. Introduction to electrochemistry and galvanic cells. Introduction to reaction kinetics, catalysis and reaction mechanisms. Introduction to structural spectroscopy for organic systems, especially ^{1}H NMR, ^{13}C NMR and mass spectroscopy. Nuclear chemistry, equations and carbon dating.

Module 3: Inorganic Chemistry
Introduction to transition metal coordination chemistry, crystal field theory for octahedral complexes, and applications in a biological and environmental context. Chemistry of the elements in groups 15 to 17 with emphasis on the period 2 and 3 elements (carbon and silicon; nitrogen and phosphorus, oxygen and sulphur).

Laboratory Component
Five Laboratory sessions on Organic Chemistry, Inorganic Chemistry, Buffers, Physical chemistry and Spectroscopy

PLEASE NOTE: Lab classes for this course will be in room N44_3.16A (Nathan Campus) as advised in your timetable.

Weekly Teaching Schedule

Week	Topic	Activity	Readings
1	Module 1: organic chemistry introduction (functional groups)	Lecture	Textbook ch. 16, 21; class notes
	Organic chemistry	T/W	Textbook and study guide
2	Module 1: stereochemistry and arenes	Lecture	Textbook ch. 17, 18; class notes
	Organic chemistry	T/W	
3	Module 1: organic properties, nucleophiles and electrophiles, reactions (electrophilic Markovnikov addition)	Lecture	Textbook ch. 11, 19; class notes
	Organic chemistry	T/W	
	Module 1.1 online quiz	Online quiz 1	
4	Module 1: organic reactions continued (nucleophilic addition, nucleophilic substitution, electrophilic substitution, esterification, redox)	Lecture	Textbook ch. 21, 23; class notes
	Organic chemistry	T/W	
5	Module 2: Redox (Galvanic cells, potentials and the Nernst equation)	Lecture	Textbook ch. 12 and class notes
	Organic chemisty	T/W	
	Module 1.2 online quiz	Online quiz 2	
6	Module 2: Chemical kinetics (Rate laws, orders, initial rates analysis, mechanisms)	Lecture	Textbook ch. 15 and class notes
	Redox	T/W	
	Module 1 in-class quiz	In-class quiz 1	
7	Module 2: Spectroscopy (MS, FTIR, NMR and UV/Vis. Solving NMR spectra for simple molecules)	Lecture	Textbook ch. 20 and class notes
	Kinetics	T/W	
	Module 2.1 online quiz	Online quiz 3	
8	Module 2: Nuclear chemistry (decay types, equations, properties and rates)	Lecture	Textbook 27 and class notes
	Spectroscopy	T/W	
9	Module 3: Transition metal complexes (ligands, oxidation state, electron configurations and stereoisomerism)	Lecture	Textbook ch 13 and class notes
	Nuclear chemistry	T/W	

	Module 2.2 online quiz	Online quiz 4	
10	Module 3: Transition metal complexes continued (CFT for octahedral complexes, applications)	Lecture	Textbook ch 13 and class notes
	Inorganic chemistry	T/W	
	Module 2/3 in-class quiz	In-class quiz 2	
11	Module 4: p-block chemistry (groups 14 to 17)	Lecture	Textbook ch 14 and class notes
	Inorganic chemistry	T/W	
12	Course revision	Lecture	

Assessment

This section sets out the assessment requirements for this course.

Summary of Assessment

Item	Assessment Task	Weighting	Relevant Learning Outcomes	Due Date
1	Online Quizzes 1 and 2, Module 1 Online Quizzes 3 and 4, Module 2	10%	1, 2,3	3, 5, 7, 9
2	Laboratory - *Students must pass this assessment with a mark of at least 15 out of 25 to pass the course*	20%	1,2,3,4	Progressive 1-12
3	In-class test 1, Module 1 (weeks 1-4) In-class test 2, Modules 2-3 (weeks 5-9)	12.5% 12.5%	1,2,3	6, 10
4	End of Trimester Exam - *Students must pass this assessment with a mark*	45%	1,2,3	14

	of at least 40% to pass the course			

Assessment Details

Online Quiz 1-4 (2.5% each)

These quizzes will test students' understanding, interpretation and application of the relevant course materials and problem solving skills. The WileyPlus system will be used for these online quizzes. Also, these quizzes will help students to prepare better before undertaking the in-class tests.

In-class tests 1 and 2 (12.5% each)

These tests will assess students' understanding, interpretation and application of the relevant course materials and problem solving skills under normal (closed book) exam conditions.

Laboratory Assessment (20 %):

Attendance and participation in **ALL** the Laboratory sessions is compulsory. Attendance and participation will be recorded.

Students must attend **ALL laboratory sessions** and gain an overall pass on the Laboratory component in order to gain any credit for the course.

For further instructions on the laboratory component and for details on laboratory assessment please refer to the separate "Griffith College 1022SCG Chemistry 1B Laboratory Manual". Failure to attend an allocated Laboratory session at the specified time will result in non-attendance being recorded and zero marks being allocated for the specific Laboratory component, unless documentary evidence of medical or other extenuating circumstances is provided to the Laboratory Convenor (Dr Gretel Heber) within three (3) days of the laboratory session. Where satisfactory evidence is so provided, final attendance and laboratory marks will be proportionately adjusted to account for the approved absence(s).

STUDENTS ARE REMINDED THAT PUNCTUALITY IS EXTREMELY IMPORTANT - THIS IS PARTICULARLY SO WITH LABORATORY EXPERIMENTS. IF STUDENTS ARE LATE, MARKS WILL BE DEDUCTED FROM THIER MARK FOR THAT EXPERIMENT - THIS WILL BE EXPLAINED DURING LECTURES PRIOR TO STARTING THE LABORATORY SESSIONS

End of Trimester Exam (45%)

The purpose of this exam is to assess comprehension and application of the course material from Modules 1 - 3 by answer to multiple choice and problem based assessment items. Students are required to gain a mark of 40% or greater in this exam to pass the course.

Submission and Return of Assessment Items

Examination papers will not be returned. Marked laboratory reports will be distributed in the laboratory classes.

Retention of Originals

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the course.

Extensions

To apply for an extension of time for an assignment, you must submit the application for Extension of Assignment form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. Griffith College Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

Assessment Feedback

Laboratory performance will be graded on an ongoing basis.

Final grades for the course will be released as per normal Griffith College process.

Generic Skills

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

Studies in this course will give you opportunities to begin to develop the following skills:

Generic Skills	Taught	Practised	Assessed
Written Communication	Yes	Yes	Yes
Oral Communication	Yes	Yes	
Information Literacy		Yes	
Secondary Research			
Critical and Innovative Thinking		Yes	
Academic Integrity	Yes	Yes	Yes
Self-directed Learning		Yes	
Team Work	Yes	Yes	
Cultural Intelligence			
English Language Proficiency			

Additional Course Generic Skills

Specific Skills	Taught	Practised	Assessed
Laboratory skills	Yes	Yes	Yes

Additional Course Information

Students should refer to the Griffith College portal for further information about this course.

Teacher and Course Evaluations

In response to students' feedback to make lectures more interactive, they are now encouraged to participate in lectures by both answering questions and trying examples of problems for themselves.

Your feedback is respected and valued by your lecturers and tutors. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your lecturer and tutor or by completing course and lecturer evaluations on the Griffith College portal whenever these are available.

Academic Integrity

Griffith College is committed to maintaining high academic standards to protect the value of

its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of any allegation of academic misconduct made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the Griffith College Academic Integrity Policy; this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Academic Integrity Policy on the Griffith College website – Policy Library.

Risk Assessment Statement

Laboratory safety training is compulsory prior to participate in laboratory classes.

Note: For all Diploma level programs, Griffith College acknowledges content derived from Griffith University.