

1013ENV

Chemistry of Biological Systems 1

Semester 1 2009

Academic Organisation:	Griffith School of Environment
Faculty:	Science, Environment, Engineering and Technology
Credit point value:	10
Student Contribution Band:	Band 4A (Nat Priority Band)
Course level:	Undergraduate
Campus/Location/Learning Mode:	Gold Coast / On Campus / In Person
Convenor/s:	Mr William Wen (Gold Coast)
Enrolment Restrictions:	Nil
This document was last updated:	3 February 2009

BRIEF COURSE DESCRIPTION

This course introduces the basic physical and chemical principles that underlie biological systems. Upon completion of this course, students will be able to demonstrate knowledge of selected chemical concepts, principles and theories, with some application to biological phenomena. Laboratory sessions will develop competency in analytical laboratory skills and the application of chemical principles for solving problems. Topics covered are: measurement, atoms and elements, compounds and their bonds, energy and states of matter, chemical reactions, chemical quantities, solutions, acids and bases, gases and nuclear radiation. Emphasis will be given to basic bio-analytical and bio-inorganic chemistry.

Incompatible: 1013EAS Chemistry of Biological Systems I

SECTION A – TEACHING, LEARNING AND ASSESSMENT

COURSE AIMS

Chemistry of Biological Systems I is a first year core course for students of the Griffith Foundation Year-Health.

The purpose of this course is to introduce students to the basic physical and chemical principles that underlie biological systems.

The course provides prerequisite knowledge for the subsequent course, Chemistry of Biological Systems II, in addition to the health science-related courses which follow.

The foundation provided in this course will allow students to be able to further develop their chemistry knowledge and skills relevant to health and medical sciences in later years.

LEARNING OUTCOMES

Upon completion of this course students will be able to:

1. Demonstrate knowledge and understanding of selected chemical concepts, principles and theories, with some application to chemical and biological phenomena;
2. Demonstrate competency in simple analytical laboratory skills;
3. Apply chemical principles to problem solving tasks;
4. Undertake other science courses with chemistry requirements.

CONTENT, ORGANISATION AND TEACHING STRATEGIES

Contact Summary:

The teaching methods aim to provide students with the necessary tools to develop a strong foundation in chemical principles.

Teaching of the course will include lectures, laboratories and tutorials throughout the semester.

Lectures (3 hours per week) are primarily to provide students with guidance toward an understanding of the qualitative concepts of foundation chemistry, although all requisite quantitative principles are also introduced. Students will gain practical skills, and develop competence in problem solving in a hands-on practical manner through three (3 hour) laboratory sessions. Tutorials (1 hour per week, from week 2 to week 13) are designed to assist students in understanding weekly teaching content of the fundamental chemistry (stoichiometry/chemical calculations etc) and also to assist students with reviewing of key course concepts in preparation for examinations.

Activity summary:

Activity	Hours per week	Total Hours
Lectures (3×1 hr each week for 13 weeks)	3	39
Lab classes (3 hr on week 5, 10 and 11)		9
Tutorial (1 hour each week)	1	13
Mid semester examination (45 min)		45min
Final examination (3 hours)		3
Quiz (45 min, week 11)		45min

CONTENT SUMMARY

Week 1	Measurements
	Introduction Measurement, accuracy and precision, SI Units Scientific notation and sig. figures
Week 2	Atoms and Elements
	Atoms, molecules, ions and isotopes Atomic and molecular mass Electron energy levels and structure
Week 3	Chemical Reactions and Quantities
	Compounds and nomenclature Chemical equations, types of reactions Molar mass and stoichiometry
Week 4	Solutions
	Limiting reactant and percent yield Solutes, solvents and solutions, solubilities Concentration of solutions
Week 5	Chemical Bonding and Molecular Geometry
	Colloids, suspensions and osmosis Chemical bonding, Octet rule and Lewis structures Molecular geometry and polarity
Week 6	Energy and States of Matter
	Energy and units Energy in chemical reactions

Week 7	Gases
	Forces between particles and change of states Properties of gases
Week 8	Reaction Rate and Equilibrium
	Gas laws and partial pressures Reaction rate and collision theory
Week 9	Reaction Rate and Equilibrium
	Equilibrium and equilibrium constant K_c Calculation of K_c and concentration Le Châtelier's Principle
Week 10	Acids and Bases
	Arrhenius and Bronsted-Lowry acids and bases Strengths of acids and bases, ionisation of water, pH of a solution Buffer solutions
Week 11	Nuclear Chemistry
	Nuclear equations -----Review ----- Quiz
Week 12	Introduction to Analytical Chemistry
	Introduction to analytical chemistry Introduction to analytical chemistry Introduction to analytical chemistry
Week 13	Preparation of Final Exam
	Measurement and applications

----- Review
----- Review

ASSESSMENT

Item	Assessment Task	Length	Weighting	Total Marks	Due Date and Time
1.	Laboratory Quizzes (x3)	30min	20%	20x3	Chemistry labs are run at week 5, 10 and 11. Lab Quizzes will be a week after each lab class.
2.	Mid-semester Examination	45 min	15%	50	Week 7
3.	Quiz	45 min	10%	50	Week 11
4.	Final examination	3 hours	55%	200	Final examination period

Students who are absent from exams (including the quiz) for medical reasons will require a proper medical certificate, as indicated by the Griffith University assessment policy, with evidence that the nature of the condition is serious enough to warrant consideration.

A simple statement from a Medical Practitioner that the patient, in opinion of the patient, is not well enough to attend an exam (or quiz) is insufficient and will not be accepted.

The medical certificate must clearly state the patient is ***unwell in the opinion of the Medical Practitioner***, and it *must* state that the patient is sufficiently unwell to sit an examination.

Absence for reasons other than illness or bereavement may be permitted, but only under special circumstances, for example, representing the State or Nation in high profile sporting events (and only if permission is ***requested at least 2 weeks*** before the exam date).

Assessment Details

A total of 3 laboratory reports will be required to be submitted on the templates provided. The mid-semester examination, the quiz and final exam will be in the form of multiple choice and/or short answer questions

Assessment Rationale

The laboratory reports will develop the student's technical writing skills, in particular their ability to interpret and present scientific data, and carry out appropriate statistical analysis on the data to assess its validity. They are largely designed to introduce the student to the requirements of scientific report writing.

The examinations (i.e. mid-semester exam, quiz and final exam) are intended to test the student's understanding, interpretation and application of the chemical principles studied and developed in the course.

Notification of Availability of Feedback on Assessment

Results for exams will be available on Learning@Griffith approximately two weeks after the exams.

Minimum Achievement to Pass this Course

To be eligible to pass the course, students are required to complete all forms of assessment and must demonstrate a reasonable degree of competence in the required course objectives as examined in each form of assessment.

In order to pass this course, students must normally obtain a result of at least 40% in the final examination, and:

1. Achieve a result of at least 50% for their laboratory reports and
2. Achieve a result of at least 50% on their overall grade

In any case, non-submission of any piece of assessment will incur a fail grade for this course.

Shared Effort

Students may work together to the laboratories, but the accompanying report is to be prepared by the submitting student only.

Dishonest Assignments

Any dishonest assignments or reports will be dealt with under the rules applying in "Policy on Academic Misconduct" (Academic Committee Resolution 2/2001, Approved Document number 01/0035).

Dishonest assignments includes:

- deliberate copying, or attempting to copy, the work of other students.
- submitting the work of another as your own.
- plagiarism: taking and using as your own, the thoughts and writing of another with the intent to claim the work as your own.

Duplicate Copies of Submitted Work

Students must be able to produce a copy of all work submitted, including disk files and computer printout results, if so required.

Submission Deadlines

Collections and reports MUST be submitted by the due date and time. Extensions may be granted in exceptional circumstances by a written "Application for Extension" and must be applied for BEFORE the due date. "Application for Extension" forms are available from the Administration Office of the School. No extension will be allowed if requested after the due date or without approval of the Head of School. Submission of an application for extension does not imply approval.

Late Submission

Assessment items submitted after the due date and time, without prior authorised extension, will be penalised as follows:

One day (or part thereof) late	10% of maximum marks deducted from awarded mark
two days late	20% of marks deducted
three days late	30% of marks deducted
four days late	40% of marks deducted
five or more days late	50% of marks deducted and fail.

GRADUATE SKILLS

The [Griffith Graduate Statement](#) lists the graduate skills that students should develop during their degree programs at Griffith University.

Graduate Skills (select appropriate boxes)	Taught	Practised	Assessed
Effective communication (written, oral and interpersonal)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Information literacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Problem solving	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Critical evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work autonomously / in teams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creativity and innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ethical behaviour in social / professional / work environments	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Responsible, effective citizenship	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Generic Skills

The key generic skills, listed below, are addressed and developed in this course in the following manner:

Generic Skill	Representation in this Course
Written communication	Students prepare 3 laboratory reports
Oral communication	There are no oral presentations in this course
Problem solving	Developed and tested in both laboratory and tutorial sessions
Quantitative skills	Developed and tested in both laboratory and tutorial sessions
Qualitative skills	Developed through the lecture material and tested in the quiz/exams
Deductive logic	This course does not explicitly include logical analysis
Teamwork	The practical work associated with some of the laboratories involves the students working in pairs and/or sharing equipment/resources. This encourages students to seek assistance from other students and to contribute to the development of their fellow students. No formal teams are assigned in this course, however.

TEACHING TEAM

Course Convenor

Convenor Details	Gold Coast
Campus Convenor	Mr William WEN
Email	w.wen@griffith.edu.au
Office Location	Science 1 Building (G 24) room 4.10
Phone	555 28147
Fax	555 28067
Consultation times	To be advised

Additional teaching team members

Tutors/demonstrators will be announced when funds are confirmed and contracts can be issued, before the first lecture.

COURSE COMMUNICATIONS

The Course Convenor can be contacted:

Room 4.10, level 4, Science I Building (G 24) Gold Coast campus, and by telephone on 555 281475, or e-mail at w.wen@griffith.edu.au

Consultation hours will be posted on the noticeboard outside the School office before week 1 of semester

TEXTS AND SUPPORTING MATERIALS

Specified texts

Timberlake, General, Organic, and Biological Chemistry, 2th, Structures of Life, Pearson.

Support materials required

Laboratory coat

Laboratory kit

Recommended Readings/References

1. Ebbing and Gammon, General Chemistry, 7th and 8th editions.
2. Brown, LeMay and Bursten, Chemistry, the central science, 9th and 10th edition
3. Blackman, Bottle, Schmid, Mocerino and Wille, Chemistry, John Wiley & Sons Australia, Ltd 2008

Lecturer Support

Students may consult with the lecturer in their offices at mutually agreed times, and locations shown in section 1 of this Outline.

SECTION B – ADDITIONAL COURSE INFORMATION

SECTION C – KEY UNIVERSITY INFORMATION

ACADEMIC MISCONDUCT

Students must conduct their studies at the University honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is academic misconduct and is unacceptable.

Some students engage deliberately in academic misconduct, with intent to deceive. This conscious, pre-mediated form of cheating is one of the worst forms of fraudulent academic behaviour, for which the University has zero tolerance and for which penalties, including exclusion from the University, will be applied.

However the University recognises many students commit academic misconduct without intent to deceive. These students may be required to undertake additional educational activities to remediate their behaviour.

Specifically it is academic misconduct for a student to:

- **Cheat in examinations and tests** by communicating, or attempting to communicate, with a fellow individual who is neither an invigilator or member of staff; by copying, or attempting to copy from a fellow candidate; attempting to introduce or consult during the examination, any unauthorised printed or written material, or electronic calculating or information storage device; or mobile phones or other communication device, or impersonates another.
- **Fabricate results** by claiming to have carried out tests, experiments or observations that have not taken place or by presenting results not supported by the evidence with the object of obtaining an unfair advantage.
- **Misrepresent themselves** by presenting an untrue statement or not disclosing where there is a duty to disclose in order to create a false appearance or identity.
- **Plagiarise** by representing the work of another as their own original work, without appropriate acknowledgement of the author or the source. This category of cheating includes the following:
 1. collusion, where a piece of work prepared by a group is represented as if it were the student's own;
 2. acquiring or commissioning a piece of work, which is not his/her own and representing it as if it were, by
 - purchasing a paper from a commercial service, including internet sites, whether pre-written or specially prepared for the student concerned
 - submitting a paper written by another person, either by a fellow student or a person who is not a member of the University;
 3. duplication of the same or almost identical work for more than one assessment item;
 4. copying ideas, concepts, research data, images, sounds or text;
 5. paraphrasing a paper from a source text, whether in manuscript, printed or electronic form, without appropriate acknowledgement;
 6. cutting or pasting statements from multiple sources or piecing together work of others and representing them as original work;
 7. submitting, as one own work, all or part of another student's work, even with the student's knowledge or consent.

A student who willingly assists another student to plagiarise (for example by willingly giving them their own work to copy from) is also breaching academic integrity, and may be subject to disciplinary action.

Visit the University's Institutional Framework for Promoting Academic Integrity Among Students for further details.

PLAGIARISM DETECTION SOFTWARE

The University uses plagiarism detection software. Students should be aware that your Course Convenor may use this software to check submitted assignments. If this is the case your Course Convenor will provide more detailed information about how the detection software will be used for individual assessment items.

HEALTH AND SAFETY

Griffith University is committed to providing a safe work and study environment, however all students, staff and visitors have an obligation to ensure the safety of themselves and those whose safety may be affected by their actions. Staff in control of learning activities will ensure as far as reasonably practical, that those activities are safe and that all safety obligations are being met. Students are required to comply with all safety instructions and are requested to report safety concerns to the University.

General health and safety information can be obtained from http://www.griffith.edu.au/hrm/health_and_safety/

Information about Laboratory safety can be obtained from http://www.griffith.edu.au/ots/secure/health/content_labsafety.html

KEY STUDENT-RELATED POLICIES

All University policy documents are accessible to students via the University's Policy Library website at: www.griffith.edu.au/policylibrary. Links to key policy documents are included below for easy reference:

[Academic Calendar](#)

[Academic Standing, Progression and Exclusion Policy](#)

[Assessment Policy](#)

[Examinations Timetabling Policy and Procedures](#)

[Guideline on Student E-Mail](#)

[Health and Safety Policy](#)

[Institutional Framework for Promoting Academic Integrity Among Students](#)

[Policy on Student Grievances and Appeals](#)

[Student Administration Policy](#)

[Student Charter](#)

UNIVERSITY SUPPORT RESOURCES

The University provides many facilities and support services to assist students in their studies. Links to information about University support resources available to students are included below for easy reference:

[Learning Centres](#) - the University provides access to common use computing facilities for educational purposes. For details visit www.griffith.edu.au/cuse

[Learning@Griffith](#) - there is a dedicated website for this course via the Learning@Griffith student portal.

[Student Services](#) facilitate student access to and success at their academic studies. Student Services includes: Careers and Employment Service; Chaplaincy; Counselling Service; Health Service; Student Equity Services (incorporating the Disabilities Service); and the Welfare Office.

[Learning Services](#) within the Division of Information Services provides learning support in three skill areas: computing skills; library skills; and academic skills. The study skills resources on the website include self-help tasks focusing on critical thinking, exam skills, note taking, preparing presentations, referencing, writing, proof reading, and time management.