



<b>Course Code:</b>	1015MSC
<b>Course Name:</b>	Chemistry of Biological Systems II
<b>Trimester:</b>	Trimester 1, 2019
<b>Program:</b>	Diploma of Health Sciences
<b>Credit Points:</b>	10
<b>Course Coordinator:</b>	Tessa Daal
<b>Document modified:</b>	14 December 2018

### Teaching Team

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

Tessa Daal - [tessa.daal@staff.griffithcollege.edu.au](mailto:tessa.daal@staff.griffithcollege.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:

- 1013ENV - Chemistry of Biological Systems I
- 1001MSC - Essentials of Chemistry & Physics
- 1001GRC- Chemistry of Biological Systems I

## Brief Course Description

Chemistry of Biological Systems II is a 10 Credit Point course situated within the second trimester of the Diploma of Health Science. The Diploma of Health Science is designed to provide students with a pathway to:

- further university studies in the Health Sciences, or
- direct employment.

This course builds on material presented in Chemistry of Biological Systems I and Essentials of Chemistry and Physics, by introducing organic and biological chemistry, which underpins all biochemical processes and the molecular basis of life. The knowledge obtained will provide a solid foundation for following courses in biomedical science, health science, oral health, physiotherapy & exercise science, and pharmaceutical science.

The course has an emphasis on practical laboratory skills. This, with the other components of the course, will allow students to develop problem solving skills relevant to the scientific method, competency in laboratory methods, and an ability to interpret laboratory results. The course covers the following topics: introductory organic chemistry, an overview of carbohydrate, lipid, nucleic acid, amino acid and protein chemistry, the chemistry of food, exercise & medicine, and fundamentals of bioenergetics.

## Rationale

### Aims

The purpose of the course is to provide essential knowledge and understanding of introductory general and organic, analytical chemistry, then to build an understanding of biochemical processes; hence the molecular basis of life.

### Learning Outcomes

After successfully completing this course you should be able to:

1. Demonstrate an understanding of selected chemistry related concepts, principles and theories;
2. Solve problems competently by identifying the essential parts of a problem, formulating a strategy for solving the problem, logically estimating a solution, applying appropriate techniques to arrive at a solution, test the correctness of the solution, and interpret the results;
3. Use library search tools to locate and retrieve scientific information about a chemical or topic relating to chemistry;

4. Demonstrate basic chemistry laboratory skills;
- 5 Competently interpret laboratory results, integrating the laws, concepts, and principles of chemistry;
6. Communicate the concepts and results of your laboratory experiments through effective writing skills;
7. Identify the academic integrity policy and forms of academic misconduct, understand what skills you need to maintain academic integrity, and learn about the processes of referencing styles;
8. Present a LinkedIn profile and ePortfolio to demonstrate your skills and experience.

## **Texts and Supporting Materials**

### **Required Text:**

Either of the two editions of the text by Hein et al., are acceptable:

1. Hein M., Pattison S. and Arena S. (2015) Introduction to general, organic, and biochemistry (11th ed.).. Hoboken, NJ: Wiley Or
2. Hein M., Pattison S. and Arena S. (2012) Introduction to general, organic, and biochemistry (10th ed.).. Danvers, MA: Wiley.
3. Printed Griffith College laboratory manual for Chemistry of Biological Systems II.
4. Printed Griffith College laboratory workbook for Chemistry of Biological Systems II.
5. Printed Griffith College lecture notes for Chemistry of Biological Systems II.

### **Recommended Text/References:**

The Laboratory Rules document available on the course site via the Griffith College Student Portal.

### **Required Support Materials** (available from Griffith University Campus Bookshop G40):

- Laboratory gown
- Timer
- Marker pens
- Safety Glasses

**Please Note:** It is only necessary to purchase one set of laboratory support materials for use across your Diploma program.

## Organisation and Teaching Strategies

The course is taught through lectures, laboratories and problem-based learning (PBL) workshops. These classes will discuss questions related to the lecture material. In addition, workshop sessions are conducted each week where material from the lectures is explored in greater depth. Comprehensive lecture notes will be available on the course site on the Griffith College Student Portal.

By conducting the series of experiments that comprise the laboratory component of this course, students will develop practical skills and competencies for biochemistry laboratory science, thereby integrating the taught content of the course into the context of the working environment.

### ***Class Contact Summary***

- \* **Lectures:** 4 hours per week. (week 1 - 12)
- \* **Workshops:** 1 hour per week (week 1 - 12).
- \* **Laboratories:** 5 x 2 hour laboratory sessions (week 2, 3, 4, 5, 6).

Note: **ATTENDANCE AT LABORATORIES IS COMPULSORY.**

**Students who are absent from laboratory classes for medical reason will require a proper medical certificate as indicated by Griffith College policy. If the student does not have an appropriate evidence for their absence to the laboratory class, they will still have to complete the workbook but will not be awarded marks for the laboratory class they have missed.**

These practical sessions provide learning activities that are essential to the learning outcomes in this course. Students will work in small groups to conduct experiments and develop problem solving skills. Students are expected to attend their scheduled laboratory class except in extenuating circumstances.

An attendance roll will be maintained for all laboratories. Students must read the Laboratory Safety requirements prior to attending their first laboratory, and comply with the dress and behaviour codes as described; Students **MUST WEAR LABORATORY COATS AND CLOSED IN SHOES FOR ALL LABORATORIES**. Students will be required to bring their laboratory manuals to laboratories. Content covered in these laboratories complements lecture material and hence will be assessed in both laboratory reports and examinations.

**IMPORTANT: All students must undertake the on-line health and safety training prior to being permitted entry into laboratories.a**

### **Attendance**

100% attendance is expected for all classes. You are reminded that your attendance in class will be marked for all elements. To receive full attendance, you must be present in the classroom on all occasions.

You are expected to bring work done at home to class for group and individual discussion. Further development of ideas is expected during workshop time.

### **Preparation and Participation in Class**

You are expected to read your text book and the lecture notes plus attempt any tutorial/workshop exercises before class so that each week you can actively contribute to your learning and the learning of others in your classes. You are expected to ask and answer questions and to initiate discussions and stimulate debate in group and class situations.

### **Consultation Times**

Attendance during consultation times is optional but you are encouraged to use this extra help to

improve your learning outcomes.

### **Course Materials**

Lecture notes will be made available to you on the Learning @ Griffith College website and you are advised to print these out and bring them to each class so that extra notes can be added.

### **Independent Study**

Independent study requires that you spend time outside classes engaged in research necessary to complete your assignments. Research includes reading the required text books, using library and internet facilities. For this 10 CP course, you will need to spend at least 10 hours per week engaged in activities that will help your learning and fulfil the course objectives. Thus, provided you have well used the formal contact hours each week, you would then complete any remaining hours engaged in independent study.

### **Program Progression**

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.5 in any trimester [please see Griffith College Policy Library - Program Progression Policy - for more information].

## **Content Schedule**

The course covers the following topics: basic general, organic and bioinorganic chemistry, biological macromolecules and fundamentals of bioenergetics.

### **Laboratory aims and contents:**

The laboratory practical series aims to teach students basic practical laboratory skills and competencies in presenting and analysing experimental data and is designed to illustrate and extend the lecture content.

Week 2: Identification of Aldehydes and Ketones

Week 3: Synthesis of Aspirin and Molecular Model

Week 4: Chemistry of Food

Week 5: Chemistry of Medicine

Week 6: Glucose Content of Drinks

### ***Weekly Teaching Schedule***

<b>Week</b>	<b>Topic</b>	<b>Activity</b>	<b>Readings</b>
1	Introduction to Chemistry of Biological Systems II	Lecture	
	Saturated Hydrocarbons	Lecture	Chapter 19
	LinkedIn Profile and ePortfolio	Workshop	
2	Unsaturated Hydrocarbons	Lecture	Chapter 20

	Workshop	Workshop	
	Identification of Aldehydes and Ketones	Laboratory	
3	Alcohols, phenols, ethers & thiols	Lecture	Chapter 22
	Workshop	Workshop	
	Synthesis of Aspirin and Molecular Models	Laboratory	
4	Stereoisomers	Lecture	Chapter 26
	Workshop	Workshop	
	Chemistry of Food	Laboratory	
5	Aldehydes and Ketones, Carboxylic Acids, Esters	Lecture	Chapter 23 & Chapter 24
	Workshop	Workshop	
	Chemistry of Medicine	Laboratory	
6	Chemistry of Food, Exercise & Medicine	Lecture	Lecture Notes
	Workshop	Workshop	
	Glucose Content of Drinks	Laboratory	
7	Carbohydrates	Lecture	Chapter 27
	Workshop	Workshop	
8	Lipids & Amines and Amides	Lecture	Chapter 28 & Chapter 25
	Workshop	Workshop	
9	Amino Acids and Proteins	Lecture	Chapter 29
	Workshop	Workshop	
10	Metals in biological systems	Lecture	Lecture Notes
	Workshop	Workshop	
11	Nucleic Acids & Bioenergetics	Lecture	Chapter 31 & Chapter 33
	Workshop	Workshop	
12	Revision and Exam preparation	Lecture	
	Workshop	Workshop	
13-14	Final Examination	Examination	

## Assessment

This section sets out the assessment requirements for this course.

### *Summary of Assessment*

Item	Assessment Task	Weighting	Relevant Learning Outcomes	Due Date
1	e-Portfolio & LinkedIn Profile	10%	7&8	Week 5
2	Mid trimester exam	25%	1 & 2	Week 7
3	Laboratory report (Glucose experiment practical write-up)	13%	1,2,3,4,5	Week 9
4	Laboratory workbook	12%	1, 2, 3, 4, 5 & 6	Week 10
5	End of trimester exam; The exam will cover material from weeks 6 - week 12 - <i>Students must pass this assessment with a mark of at least 80 out of 200 to pass the course</i>	40%	1 & 2	Week 13-14

### **Assessment Details**

#### **1. ePortfolio & LinkedIn Profile:**

Rationale: In developing and presenting the ePortfolio and LinkedIn Profile students are able to demonstrate their skills and experience.

Assessment details: Students are to develop a LinkedIn Profile, and an ePortfolio, and then link the two. As part of this assessment item, students must complete the Academic Integrity module and the Consent Matters module on Learning @Griffith. The academic integrity module aims to enable the students to identify the academic integrity policy and forms of academic misconduct, understand what skills are needed to maintain academic integrity, and learn about the processes of referencing styles. There is no limit to the number of times students may attempt these quizzes. Students will have to write a reflection on academic skills by following the template provided. This reflection should be entered on the academic skills page of the ePortfolio. The Consent Matters module aims to help students understand sexual consent and how to recognise situations when consent can and can't be given, whatever their gender or sexuality. The last component of this assessment item is a pipetting competency. Students must pipette two volumes of water with correct mass.

Marking criteria: The marking criteria sheet for the ePortfolio and LinkedIn profile will be provided on

the course site on the Griffith College Student Portal in advance of the submission date.

### **2. Mid-trimester Examination:**

Rationale: The aim of the exam is to assess comprehension of the subject matter and will cover material from weeks 1 to 5.

Assessment details: This 90 minute exam will be in the form of multi-choice questions (approx. 75%) and short answer questions (approx. 25%).

Marking criteria: The mid trimester examination will be marked against established model answers and undergo a full moderation process.

### **3. Laboratory Report: Glucose Experiment practical write-up:**

Rationale: The laboratory practical series aims to teach students basic practical laboratory skills and competencies in presenting and analysing experimental data and is designed to illustrate and extend the lecture content.

Assessment details: Students are to complete a laboratory report following the criteria outlined on the marking criteria sheet provided on the course site on the Griffith College Student Portal. Reports must contain: an abstract, and introduction, a very brief description of how the experiment was done; the results; a discussion of the results obtained in the lab as they relate to the literature; and a reference.

Marking criteria: The marking criteria sheet will be provided on the course site on the Griffith College Student Portal in advance of the submission date.

### **4. Laboratory Workbook:**

Rationale: The laboratory practical series aims to teach students basic practical laboratory skills and competencies in presenting and analysing experimental data and is designed to illustrate and extend the lecture content.

Assessment details: Students are to do a reasonable attempt of completing each of the results sections and the corresponding calculations for the four laboratory classes in their laboratory workbook.

Marking criteria: Marks will be awarded for completing all parts of the lab workbook, with each section being marked against established criteria.

### **5. End-of-trimester Examination:**

Rationale: The aim of the exam is to assess comprehension of the subject matter through answers to multi-choice questions and short answer questions and will cover material from week 6 to week 12

Assessment details: This two hour exam will be in the form of multi-choice questions and short answer questions and will cover material from weeks 6 to 12.

Marking criteria: The final examination will be marked against established model answers and undergo a full moderation process.

Further detailed explanations of assessment expectations will be provided during class and where necessary on the course site on the student portal.

### **Requirements to pass this course:**

In addition to meeting the laboratory requirements, students must:

- 1. attend and attempt all assessment items; AND**
- 2. obtain at least 40% (80/200) in the final examination, AND**
- 3. achieve an overall course result (sum of all assessments) of at least 50%.**

*Submission and Return of Assessment Items*



Normally you will be able to collect your assignments in class within fourteen [14] days of the due date for submission of the assignment.

### **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 an 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.

### **Penalties for late submission without an approved extension**

Penalties apply to assignments that are submitted after the due date without an approved extension. Assessment submitted after the due date will be penalised 10% of the TOTAL marks available for assessment (not the mark awarded) for each day the assessment is late. Assessment submitted more than five days late will be awarded a mark of zero (0) For example:

- > 5 minutes and <= 24 hours 10%
- > 24 hours and <= 48 hours 20%
- > 48 hours and <= 72 hours 30%
- > 72 hours and <= 96 hours 40%
- > 96 hours and <= 120 hours 50%
- > 120 hours 100%

Note:

- Two day weekends will count as one day in the calculation of a penalty for late submission.
- When a public holiday falls immediately before or after a weekend, the three days will count as one day in the calculation of a penalty for late submission.
- When two public holidays (e.g. Easter), fall immediately before or after, or one day either side of a weekend, the four days will count as two days in calculating the penalty for late submission.
- When a single public holiday falls mid-week, the day will not be counted towards the calculation of a penalty.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

### **Assessment Feedback**

Your assessment will be marked so that you can learn from your work. Feedback will be provided so that you can see the level you have reached in any skill. Your tutor will give you comments on your work and will be happy to discuss your assessment further, if you wish. You may see your tutor in his/her consultation time.

Marks awarded for in-trimester assessment items, except those being moderated externally with Griffith University, will be available on the Student Portal within fourteen [14] days of the due date. This does not apply to the final piece of assessment in this course - marks for this item will be provided with the final course result.

### 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	
Information Literacy		Yes	Yes
Secondary Research		Yes	Yes
Critical and Innovative Thinking	Yes	Yes	Yes
Academic Integrity	Yes	Yes	Yes
Self Directed Learning		Yes	Yes
Team Work	Yes	Yes	Yes
Cultural Intelligence	Yes	Yes	
English Language Proficiency			Yes

### ***Additional Course Generic Skills***

N/A

### **Additional Course Information**

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.

Student feedback on their courses can be found by going to 'Student Feedback' under Support in the Griffith College Student Portal.

### **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 a breach of academic integrity 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 <http://policy.griffithcollege.edu.au/print.php?vdoc=tree-Students/Assessment%20and%20Examinations/Academic%20Integrity>; 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***

This course follows Griffith College and Griffith University Workplace Health and Safety Laboratory guidelines.

The aim of workplace health and safety is to make sure that people do not get sick or injured at the workplace. The legislation dealing with this in Queensland is called the Workplace Health and Safety Act, 1995. Anyone who can affect workplace health and safety has an obligation under this Act.

As a student, you have an obligation to yourself and others to undertake activities in a safe manner. You must follow instructions which are provided for safety. You must not put yourself or anyone else at risk. Care especially needs to be taken when you are performing activities which can affect others. **Students must wear closed in shoes to all laboratory sessions for workplace health and safety reasons.**

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