



# BMSC12010 *Clinical Biochemistry*

## Term 2 - 2017

Profile information current as at 20/04/2024 09:25 pm

All details in this unit profile for BMSC12010 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

### General Information

#### Overview

This unit provides students with an understanding of the role of the clinical biochemistry laboratory in the diagnosis and management of human diseases and disorders. The unit focuses on quality control in the pathology laboratory setting, the biochemical rationale for the diagnosis, prognosis, and monitoring of blood electrolyte balance, blood gases, blood acid-base balance, hormones, diabetes mellitus, jaundice, cardiac and liver disease, gout, inherited metabolic disorders, renal dysfunction and malignant diseases. Students will be instructed on correct procedures for preparing blood and urine samples for analysis, and for interpreting results in a clinical biochemistry laboratory.

#### Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

#### Pre-requisites or Co-requisites

Pre-requisites BMSC11004 Introductory Biochemistry OR BMSC11005 Foundations of Biochemistry OR BMED19010 Macromolecules

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

#### Offerings For Term 2 - 2017

- Cairns
- Distance
- Rockhampton
- Townsville

#### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

#### Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are: Click here to see your [Residential School Timetable](#).

#### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Written Assessment**

Weighting: 15%

#### 2. **Practical and Written Assessment**

Weighting: 25%

#### 3. **Examination**

Weighting: 60%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

#### Feedback from Course evaluations

**Feedback**

Fantastic lecturing and laboratory staff

**Recommendation**

Continue delivery model

#### Feedback from Course evaluations

**Feedback**

Fair but challenging assessment items

**Recommendation**

Continue assessment style - continue enhanced communications with students

#### Feedback from Course evaluations

**Feedback**

Assessment return

**Recommendation**

Assessment items were returned before the stated dates - continue enhanced communication with students

## Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**

1. Describe basic cell signalling, communication and metabolism (breakdown of proteins, fats and carbohydrates under aerobic conditions).
2. Recall, classify and evaluate significant pathological conditions which occur in the human body and their respective biochemical tests and assays.
3. Recall and describe the major functions of a clinical pathology laboratory.
4. Demonstrate competency in biochemical laboratory methods, test and techniques.
5. Appraise the scientific literature and communicate this knowledge and understanding via scientific writing tasks such as practical reports and case study PBL assessment items.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
<b>1 - Written Assessment - 15%</b>	•	•	•		•
<b>2 - Practical and Written Assessment - 25%</b>	•	•	•	•	•
<b>3 - Examination - 60%</b>	•	•	•		

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Communication		•	•	•	•
2 - Problem Solving	•	•	•	•	•
3 - Critical Thinking	•	•	•	•	•
4 - Information Literacy		•	•	•	•
5 - Team Work				•	
6 - Information Technology Competence				•	•
7 - Cross Cultural Competence					•
8 - Ethical practice				•	•
9 - Social Innovation					
10 - Aboriginal and Torres Strait Islander Cultures					

## Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Written Assessment - 15%	•	•	•	•				•		
2 - Practical and Written Assessment - 25%	•	•	•	•	•	•	•	•		
3 - Examination - 60%	•	•	•							

## Textbooks and Resources

### Textbooks

BMSC12010

#### Prescribed

##### Clinical Chemistry

Edition: 8th edn (2017)

Authors: Bishop, Fody and Schoeff

Wolters Kluwer

Philadelphia , PA , USA

ISBN: 9781496335586

Binding: Hardcover

BMSC12010

#### Prescribed

##### Medical Biochemistry

Edition: 4th edn (2014)

Authors: Baynes and Dominiczak

Saunders Elsevier

Philadelphia , PA , USA

ISBN: 9781455745807

Binding: Paperback

#### Additional Textbook Information

Students please note - there is **no need** to purchase both textbooks - choose one only. If you are enrolled in the CG93 Medical Science course (Clinical Investigations OR Pathology specialisations) then it may be advantageous to acquire the "Clinical Chemistry textbook by Bishop" . These courses use the same textbook in the 3rd level unit BMSC13002 Advanced Clinical Biochemistry so my suggestion is to only purchase the one textbook to cover both units in your course. For the other courses, I would recommend acquiring the Baynes textbook "Medical Biochemistry".

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

## Referencing Style

**All submissions for this unit must use the referencing styles below:**

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)
- [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Andrew Fenning** Unit Coordinator

[a.fenning@cqu.edu.au](mailto:a.fenning@cqu.edu.au)

## Schedule

**Week 1 - 10 Jul 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Cell Biochemistry - signalling (receptor and cell-cell communication)	PowerPoint lecture notes with references (provided in the unit Moodle site)	

### Week 2 - 17 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Haemostasis and protein metabolism/disorders	PowerPoint lecture notes with references (provided in the unit Moodle site)	

### Week 3 - 24 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Protein metabolism, disorders and purine metabolism	PowerPoint lecture notes with references (provided in the unit Moodle site)	

### Week 4 - 31 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Carbohydrates during health and disease, diabetes and Lipids 1	PowerPoint lecture notes with references (provided in the unit Moodle site)	

### Week 5 - 07 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Lipids 2 and diagnostic enzymology	Powerpoint lecture notes with references (provided in the unit Moodle site)	

### Vacation Week - 14 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic

### Week 6 - 21 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Liver function, blood gas and pH	PowerPoint lecture notes with references	<b>Written Assessment</b> Due: Week 6 Monday (21 Aug 2017) 11:45 pm AEST

### Week 7 - 28 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Renal function and failure, electrolytes	PowerPoint lecture notes with references (provided in the unit Moodle site)	

### Week 8 - 04 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Hormones and tumor markers	Powerpoint lecture notes with references (provided in the unit Moodle site)	

### Week 9 - 11 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
No lectures		

### Week 10 - 18 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
No lectures		

### Week 11 - 25 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
No lectures		

## Week 12 - 02 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
No lectures		<b>Practical and Written Assessment</b> Due: Week 12 Friday (6 Oct 2017) 11:45 pm AEST

## Review/Exam Week - 09 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
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## Exam Week - 16 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
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## Assessment Tasks

### 1 Written Assessment

#### Assessment Type

Written Assessment

#### Task Description

##### DETAILS - CLINICAL CASE STUDY

This task is a little bit of basic clinical biochemistry and a pinch of clinical diagnosis/medical detective work in a case study format. For those of you familiar with the TV series "House M.D." this is your opportunity to be a "Dr House". The task will hopefully provide some "time on task" focussed learning on several important sections of clinical biochemistry. This assessment task covers elements of unit learning outcomes 1, 2, 3 and 5.

##### OUR PATIENT

Peter Notsowell presented to Dr Magoo feeling generally unwell. Peter indicated he has recently experienced several fainting episodes and loss of consciousness (paramedics attended but following several minutes he stabilised). He also indicated he was experiencing general nausea, weight loss, weakness, several minor colds and a craving for salty foods. Peter has yet to change his diet excessively and has been resisting the craving for salt because he thought eating too much salt would be bad for him. Peter has also experienced a DVT (deep vein thrombosis) event recently, however it was managed in emergency and didn't migrate from the leg vein. Dr Magoo clearly needs your help with this patient. He started by using Google and Wikipedia (not good) and progressed to ordering some tests and clinical measurements (better). Dr Magoo also placed a note in Peter's file "that the patient looked ok - even had a slight tan". In the initial round of testing he has missed some important clinically relevant indicators! You should explore several possibilities. Peter may have more than one cause for his symptoms with several possibilities. Your task has two parts:

1. Discuss each biometric/biochemical marker provided under the "Clinical measurements" heading below and indicate if a value is outside the typical reference range and what an elevated or decreased reading for each of these markers could indicate. (25 marks) (1500 words)
2. Diagnose Peter's symptoms (combining the "Clinical Measurements" and patient description) and provide a recommendation on what further tests you would require to confirm your diagnosis if any. You will need to explain your reasoning and your answer will require at least five primary references (original journal articles). (25 marks) (1500 words)

Total = 50 marks (3000 words)

#### Clinical measurements

- blood pressure - 90/60 mmHg
- blood glucose - 2.0 mmol/L
- blood pH - 7.38
- erythrocyte count -  $3.5 \times 10^{12}/L$
- haemoglobin - 128 g/L
- serum calcium (total) - 3.2 mmol/L
- serum potassium - 6.1 mmol/L
- urinary potassium (24hr) - 20 mmol/d
- serum sodium - 110 mmol/L
- urinary sodium (24hr) - 225 mmol/d
- serum T3 - 1.1 mmol/L
- serum cortisol - 70 nmol/L

## Where to start/structure?

A suggested layout is as follows -

### Part 1 (1500 words)

- brief introduction paragraph to the assignment and scenario.
- dedicate a paragraph to each of the "Clinical measurements" and use textbook referenced content to examine the diagnostic importance of the measurements and what an elevated or decreased reading for each of these markers could indicate.

### Part 2 (1500 words)

- written assignment/review format in paragraphs.
- combine the "Clinical measurements" and patient symptoms/description to form a rational and supported diagnosis using primary reference material (5 journal articles).
- clearly state and articulate your diagnosis.
- conclude this section and the assignment with suggestions for Dr Magoo on further testing to correctly confirm Peter's diagnosis and typical treatments for this condition.

## Assessment Due Date

Week 6 Monday (21 Aug 2017) 11:45 pm AEST

## Return Date to Students

Week 8 Friday (8 Sept 2017)

## Weighting

15%

## Assessment Criteria

The case study questions will be out of a total of 50 marks (3000 word limit). Clarity of expression (spelling and grammar), the inclusion of key facts, accurate up-to-date research (i.e. in the last ten years), correct referencing, and clear diagrams will also be key criteria in performing well in this assignment. The use of information contained solely within the notes will result in the awarding of a passing grade at best. In order to obtain higher marks, information from other sources will be required. Students who use relevant information from other sources in their assignments will be looked upon favourably. The failure to cite references in your assignment will result in your not achieving full value for your efforts. Those students, who plagiarise material from textbooks, Internet sites or other student's work will automatically be given a failing grade and will be subject to the standard plagiarism procedures in operation at CQUniversity (remember that such plagiarism will easily be detected using electronic software). Please refer to the CQUniversity Library website for correct referencing information. Further details will be available in the Assessment block for this item in the unit Moodle site. Total = 50 marks (3000 words) (to achieve full marks, aim for the following) -

### Part 1 (25 marks) (1500 words)

- correct clinical description of the twelve (12) "Clinical measurements" provided, indicating what a decreased or increased level of each would indicate (one paragraph for each); correctly referenced from either textbook or primary reference material (journal articles); correctly written paragraphs. (2 marks for each "Clinical measurement" = 2 x12 = 24 marks)
- correctly written and proofed. (1 mark)

### Part 2 (25 marks) (1500 words)

- demonstrated scientific review format with a supported clinical diagnosis (primary reference articles). (15 marks)
- referencing (contextual use of 5 primary journal articles). (5 marks)
- written expression and proofing. (5 marks)

## Referencing Style

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)
- [Harvard \(author-date\)](#)

## Submission

Online

## Learning Outcomes Assessed

- Describe basic cell signalling, communication and metabolism (breakdown of proteins, fats and carbohydrates under aerobic conditions).
- Recall, classify and evaluate significant pathological conditions which occur in the human body and their respective biochemical tests and assays.
- Recall and describe the major functions of a clinical pathology laboratory.
- Appraise the scientific literature and communicate this knowledge and understanding via scientific writing tasks such as practical reports and case study PBL assessment items.



## Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Ethical practice

## 2 Practical and Written Assessment

### Assessment Type

Practical and Written Assessment

### Task Description

You will be required to write a report from **your choice of selected laboratory experiments (provided to you) in basic scientific journal format (potentially from data previously collected)**. Please refer to the following assessment criteria for successful completion. Clarity of expression (spelling and grammar), the inclusion of key facts, accurate research, correct referencing, and clear diagrams will be important general criteria for performing well in this assignment (see below for more detailed criteria and in the associated Assessment item block in the unit Moodle site). The use of information contained solely within the Study Notes/Practical support information will result in the awarding of a passing grade at best. In order to obtain higher marks information from other sources will be required. Students who use relevant information from other sources in their reports will be looked upon favourably. As a guide, between 8 to 10 journal articles should be used! The failure to cite references in your assignments will result in you not achieving full value for your efforts. Those students, who plagiarise material from textbooks, Internet sites or other student's work will automatically be given a failing grade. Please be familiar with the following criteria and marking scheme in order to generate a complete report (IMRAD format - Introduction, Methods, Results and Discussion).

### Assessment Due Date

Week 12 Friday (6 Oct 2017) 11:45 pm AEST

### Return Date to Students

Review/Exam Week Friday (13 Oct 2017)

### Weighting

25%

### Assessment Criteria

**Introduction (20 marks):** The introduction should be between 500-700 words in length and should provide the reader with sufficient information to understand why this study was performed and also provide any essential background information (with references to journal articles or text books) that is needed for interpretation of the results and discussion. It should conclude with a specific aim of the study. As a general guide—approximately 3-6 paragraphs with important and interesting background information correctly referenced.

**Methods (10 marks):** There is no need to completely rewrite the methods section in detail. This section should be a brief summary approximately 1 paragraph in length or 100 words.

**Results (20 marks):** This section should contain the experimental results in summary form (means), presented in either tables or graphs, not both. It is not enough just to use tables and graphs—you must also state the results referring to the table or figure. All tables and figures must be labelled appropriately. There should be no interpretation of results here—just state the results observed! Leave any interpretation to the discussion (100-200 words).

**Discussion (20 marks):** This section should be between 500-700 words in length and should provide an analysis and interpretation of the results of the study. The implication of your results should be discussed, referring back to statements made in your introduction. Alternative explanations should be offered if necessary especially for negative or unexpected results. Errors could also be discussed. Remember not to repeat any data presented in the results section!

**References (5 marks):** All articles or texts referred to in the report need to be listed in this section. Referencing style should follow the "Harvard" style as described in the website listed in the Faculty Guide.

**Writing Style/Presentation (25 marks):** Reports should be clearly written in full sentences (not point form) using correct spelling and grammar. Abbreviations should be explained when first used. Any diagram (added from reference material) must be of good quality and sources must be acknowledged appropriately. The use of scientific writing style is important—peruse scientific journal entries. Of particular importance is clarity of written expression (clearly stated ideas and outcomes). The document should be in scientific journal format with well designed figures, graphs and tables where appropriate.

### Referencing Style

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)
- [Harvard \(author-date\)](#)

### Submission

Online

## Learning Outcomes Assessed

- Describe basic cell signalling, communication and metabolism (breakdown of proteins, fats and carbohydrates under aerobic conditions).
- Recall, classify and evaluate significant pathological conditions which occur in the human body and their respective biochemical tests and assays.
- Recall and describe the major functions of a clinical pathology laboratory.
- Demonstrate competency in biochemical laboratory methods, test and techniques.
- Appraise the scientific literature and communicate this knowledge and understanding via scientific writing tasks such as practical reports and case study PBL assessment items.

## Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## Examination

### Outline

Complete an invigilated examination.

### Date

During the examination period at a CQUniversity examination centre.

### Weighting

60%

### Length

180 minutes

### Minimum mark or grade

50%

### Exam Conditions

Closed Book.

### Materials

Calculator - non-programmable, no text retrieval, silent only

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem