



The University of Southern Queensland

## Course specification

### Description: Biochemistry 1

| Subject | Cat-nbr | Class | Term    | Mode | Units | Campus    |
|---------|---------|-------|---------|------|-------|-----------|
| BIO     | 2201    | 40294 | 1, 2005 | ONC  | 1.00  | Toowoomba |

|                                   |        |
|-----------------------------------|--------|
| <b>Academic group:</b>            | FOSCI  |
| <b>Academic org:</b>              | FOS002 |
| <b>Student contribution band:</b> | 2      |
| <b>ASCED code:</b>                | 010901 |

### STAFFING

Examiner: Bernadette McCabe

Moderator: Mark Sutherland

### REQUISITES

Pre-requisite: CHE2120

### RATIONALE

This course provides an introduction to the major classes of biochemical compounds, their metabolism, and laboratory techniques used to study biochemical processes. The course also forms a basis for studies in other courses in the fields of biology, chemistry, biotechnology, biomedical science and bioinformatics.

### SYNOPSIS

Biochemistry may be considered as the description of life at the molecular level. The chemical and physical nature of structures and functions within living cells is studied. This course allows students to develop an understanding of the major classes of biochemical compounds found in living organisms and the metabolism of these compounds. Study of biochemistry is central to studies in biology, and in particular is related to units in plant and mammalian physiology, microbiology, genetics, cell and molecular biology, organic and natural product chemistry and bioinformatics. A series of practical classes is integrated with the lectures to allow students to further develop concepts covered in the lectures, and also to become familiar with use of materials and equipment commonly used in biochemistry laboratories.

### OBJECTIVES

On completion of this course students will be able to:

1. demonstrate a knowledge of the major classes of biochemical compounds, including carbohydrates, lipids and proteins;
2. describe the action of enzymes and their application in the metabolism of carbohydrates, lipids and proteins;

3. demonstrate an awareness of the core metabolic processes which occur in different species (including animals, plants and micro-organisms);
4. demonstrate familiarity with the integration of metabolic pathways in an organism;
5. demonstrate an awareness of the applications of biochemistry in contemporary science, particularly in biotechnology;
6. demonstrate familiarity with and competence in applying a range of laboratory techniques and instrumentation used to identify, quantify and study biochemical substances;
7. demonstrate an ability to carry out qualitative biochemical tests, and quantify reliably a range of common biochemical substances in biological specimens;
8. demonstrate the ability to generate, analyse, summarise and report biochemical data.

## TOPICS

|    | Description  | Weighting (%) |
|----|--|---------------|
| 1. | Biological Macromolecules: structure and chemistry, carbohydrates, lipids, proteins.   | 25.00         |
| 2. | Enzymes: structure, mechanisms of action. enzyme kinetics, allosteric enzymes.   | 10.00         |
| 3. | Bioenergetics: energetics of reactions, ATP and other high energy compounds, energy content of carbohydrates, lipids, proteins.  | 10.00         |
| 4. | Metabolism: metabolic regulation, glycolysis, gluconeogenesis, Krebs cycle, electron transport chain, oxidative phosphorylation. | 47.00         |
| 5. | Photosynthesis: light reactions, Calvin cycle.   | 8.00          |

## TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Learmonth, R P 2005, *Biochemistry - Practical Manual*, University of Southern Queensland, Toowoomba.

Nelson, D L & Cox, M M 2005, *Lehninger Principles of Biochemistry*, 4th edn, WH Freeman, New York.

Pechenik, J A 2004, *A Short Guide to Writing about Biology*, 5th edn, Longman, Boston.

## REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Berg, JM, Tymoczko, JL & Stryer, L 2002, *Biochemistry*, 5th edn, WH Freeman, Basingstoke, Palgrave.

Elliott, W H & Elliott, D C 2001, *Biochemistry and Molecular Biology*, 2nd edn, Oxford University Press, Oxford.

Mathews, CK, Van Holde, KE & Ahern, KG 2000, *Biochemistry*, 3rd edn, The Benjamin/Cummings Publishing Company, California.

Osgood, M & Ocorr, K 2005, *The Absolute, Ultimate Guide of Lehninger Principles of Biochemistry - Study Guide & Solutions Manual*, 4th edn, WH Freeman, New York.

Voet, D, Voet, J G & Pratt, C W 1998, *Fundamentals of Biochemistry*, John Wiley and Sons, New York.

## STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY                        | HOURS  |
|---------------------------------|--------|
| Examinations                    | 4.00   |
| Laboratory or Practical Classes | 24.00  |
| Lectures                        | 26.00  |
| Private Study                   | 111.00 |

## ASSESSMENT DETAILS

| Description       | Marks out of | Wtg(%) | Due date                    |
|-------------------|--------------|--------|-----------------------------|
| PRACTICAL REPORTS | 20.00        | 20.00  | 01 Mar 2005<br>(see note 1) |
| 1 HR CLOSED TEST  | 20.00        | 20.00  | 01 Mar 2005<br>(see note 2) |
| 2 HR CLOSED EXAM  | 100.00       | 60.00  | END S1<br>(see note 3)      |

### NOTES

1. Appearance of fructose bisphosphatase during germination of fatty seeds report due date 04/05/05 Glycolysis and fermentation of grape juice report due date 25/05/05
2. The mid-semester test will be timetabled in a lecture timeslot of Semester 1, week 11 (9-13 May 2005)
3. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

## IMPORTANT ASSESSMENT INFORMATION

### 1 Attendance requirements:

It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration. To maximize their chances of satisfying the objectives of the practical component of the course, students should attend and actively participate in the laboratory sessions in the course.

### 2 Requirements for students to complete each assessment item satisfactorily:

To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item. To complete the practical component satisfactorily, students must submit all of the nominated practical reports and obtain at least 50% of the marks for the reports submitted.

- 3 Penalties for late submission of required work:  
If students submit assignments after the due date without prior approval then a penalty of 5% of the total marks available for the assignment will apply for each working day late.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of a passing grade, students must demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by: (i) satisfactorily completing the examination and assignments; and (ii) obtaining at least 50% of the total weighted marks available for all summative assessment items. Students who do not qualify for a Passing grade may, at the discretion of the Examiner, be awarded a Supplementary Examination and/or assigned additional work to demonstrate to the Examiner that they have achieved the required standard. It is expected that such students will have gained at least 45% of the total marks available for all summative assessment items.
- 5 Method used to combine assessment results to attain final grade:  
The final grades for students will be assigned on the basis of the weighted aggregate of the marks obtained for each of the summative assessment items in the course.
- 6 Examination information:  
In a Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination.
- 7 Examination period when Deferred/Supplementary examinations will be held:  
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester three (3) following this course.
- 8 University Regulations:  
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

## **ASSESSMENT NOTES**

- 9 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This shall include a laboratory coat, closed in shoes, and safety glasses. Such equipment must be approved by supervising staff. Failure to provide and wear the appropriate safety equipment will result in students being excluded from classes.
- 10 Students must retain a copy of each item submitted for assessment. If requested by the Examiner, students will be required to provide a copy of the assignments submitted for assessment purposes. Such copies should be despatched to USQ with 24 hours of receipt of a request being made. In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.