

2005MSC Biochemistry

Semester 1 - 2007

Academic Organisation:	School of Medical Science
Faculty:	Griffith Health
Credit point value:	10
Student Contribution Band:	Band 2
Course level:	Undergraduate
Campus/Location/Learning Mode:	Gold Coast / On Campus / In Person
Convenor/s:	Dr Dean Pountney (Gold Coast)
Enrolment Restrictions:	Restricted: Course must be listed in Program
This document was last updated:	25 January 2007

BRIEF COURSE DESCRIPTION

This course aims to provide an understanding of the major biosynthetic (anabolic) and biodegradative (catabolic) pathways in cells and tissues, along with the principal mechanisms used for the integration and regulation of these pathways. This course covers structural and functional aspects of the biochemical generation of energy (inc. enzymology and bioenergetics) as well as the key aspects of carbohydrate metabolism, the oxidation and synthesis of lipids, amino acid metabolism, nucleic acids and gene expression (transcription & translation).

Incompatible: 2011MSC Metabolic Biochemistry

Advised Prerequisite: Prerequisite: 1501EAS Chemistry I or equivalent course

SECTION A – TEACHING, LEARNING AND ASSESSMENT

COURSE AIMS

This course aims to provide an understanding of the major biosynthetic (anabolic) and biodegradative (catabolic) pathways in cells and tissues, along with the principal mechanisms used for the integration and regulation of these pathways. This course covers structural and functional aspects of the biochemical generation of energy (inc. enzymology and bioenergetics) as well as the key aspects of carbohydrate metabolism, the oxidation and synthesis of lipids, amino acid metabolism, nucleic acids and gene expression (transcription & translation).

LEARNING OUTCOMES

Upon completion of 2005MSC Biochemistry, students with a passing or above grade will:

(A) have an understanding of the following content areas:

1. structure/function of carbohydrates
2. lipids and proteins
3. enzymology
4. an overview of metabolic processes
5. glycolysis, citric acid cycle
6. biological oxidations and oxidative phosphorylation
7. carbohydrate metabolism
8. lipid metabolism
9. amino acid metabolism
10. protein metabolism
11. gene expression

(B) be able to apply the above content to:

12. the integration and regulation of metabolism
13. the role of hormones in metabolic regulation
14. the role nucleic acids and gene expression (transcription & translation) in metabolism within health, exercise and disease.

(C) demonstrate practical skills and problem based learning via:

15. the use of modern information technology to search and reference biochemical material
16. analyse and evaluate examples of common biochemical homeostatic problems
17. undertaking and reporting formulated biochemical enzymatic and molecular experiments
18. demonstrate effective team work approaches to analysing biochemical case studies
19. effectively communicate introductory level biochemical facts in oral or written format
20. demonstrate correct health and safety practices and procedures in a biochemical laboratory

CONTENT, ORGANISATION AND TEACHING STRATEGIES

The course is taught through 36 lectures, 12 Workshops and five laboratory classes.

- 3 hours of lectures per week for 12 weeks.
- 5 x 3 hr laboratory classes
- 12 x 1 hr Workshops (Weeks 2-13)

LECTURE TIMES:	Monday	11.00-12.00	G03_Theatre 2
	Wednesday	11.00-12.00	G03_Theatre 2
	Friday	9.00-10.00	G03_Theatre 2

WORKSHOPS:	No.	Time	Venue
	1	Monday	15.00 G30_2.11/2.12
	2	Monday	16.00 G30_2.11/2.12
	3	Wednesday	16.00 G30_2.11/2.12

LABORATORY CLASSES: All classes will be held in G16_4.24.

Class Times:

Monday	8.00-11.00	Group 1
Monday	12.00-15.00	Group 2
Tuesday	8.00-11.00	Group 3
Tuesday	12.00-15.00	Group 4

Clothing: All students must be appropriately attired for each and every laboratory class. Students may be excluded from laboratory classes should their clothing/footwear be deemed unsuitable. Note: Solid, enclosed footwear (including “upper” and heel) and lab coat are mandatory. Loose clothing, hair, jewellery etc should be arranged to avoid injury. Goggles to be worn as appropriate. No caps or sunglasses are to be worn.

Safety Procedures: Most laboratory classes will involve the use of combinations of potentially hazardous chemicals and human blood products. Students must thoroughly read the appropriate sections of the laboratory manual prior to each class. **A flow-diagram of the experimental procedures should, in most cases, be developed prior to class and be available for review by your Demonstrator.** When dealing with blood products, students should follow “universal precautions” and assume that all such products are **potentially infectious**. Gloves and lab coat should be worn at all times when handling blood products. Goggles should be worn when required. If in doubt, ask your Demonstrator. Incidents in which there are spills of blood, plasma, serum, saliva or chemicals are to be immediately communicated to your Demonstrator for disinfection and/or removal.

Contact Summary

1. Students in this course are strongly encouraged to take responsibility for their own learning. The main responsibility of the teaching staff will be to create an environment that facilitates and assists student learning.
2. Students are strongly encouraged to attend all prescribed lecture, laboratory and Workshop sessions.
3. Involvement in Workshop and Laboratory sessions, particularly the acquisition of additional practical skills, is regarded as an extremely important part of this course.
4. Students who are absent from laboratory or Workshop classes should provide documentation (eg: Medical certificate – as per Griffith University guidelines; see attachment) explaining their absence. Provision of such documentation does NOT remove the requirement to submit all laboratory reports, quizzes or other assessment pieces.
5. The following extract is taken from the Griffith University Undergraduate Studies Handbook and relates to deferred assessment. This policy will be strictly enforced.

Students may apply for Deferred Assessment if they were prevented from performing an assessment item on the grounds of illness, accident, bereavement or other compassionate circumstances. Students applying for deferred assessment on medical grounds must submit a medical certificate from a registered medical or dental practitioner stating the:

date on which the practitioner examined the student.

severity and duration of the complaint.

practitioner's opinion of the effect of the complaint on the students ability to undertake the assessment item.

A statement that the students was "not fit for duty" or was suffering from a "medical condition" will not be accepted unless information required in (i), (ii), (iii) above is included.

6. It is the responsibility of students who miss lectures to obtain the material covered as lecture notes/overhead transparencies will not be provided by staff. However, all students may avail themselves of assistance from lecturers, tutors and demonstrators as required, throughout the semester. *(Please note that staff will have specific contact times supplemented by procedures for additional contact).*
7. Any changes to the lecture, laboratory or tutorial schedule will be announced in lectures and posted on Learning@Griffith. Students are advised to consult these notice boards on a regular basis.
8. Refer to the Faculty Assignment Writing & Study Guide for information regarding the preparation, presentation and submission of laboratory reports.

9. Email Policy: The Course Convenor will attempt to reply to all emails in a timely fashion, however, cannot undertake to answer all emails from students. Response to an email may be delayed or an email may not be answered at all by the Convenor if the email is deemed to be trivial (ie: Answerable by the student themselves with a little effort). For a rapid response, particularly to an urgent enquiry, speak to the Convenor in the first instance after lectures/tutorials or make an appointment to see the Convenor within the weekly, allotted consultation period.

CONTENT SUMMARY

Lecture Program:

Week 1	Introduction / Biomolecules (carbohydrates).
Week 2	Biomolecules (amino acids, proteins)
Week 3	Biomolecules (lipids, nucleic acids)
Week 4	Enzymes and Enzyme Kinetics
Week 5-6	Introduction to Metabolism and Glycolysis
Week 6-7	Citric Acid Cycle
Week 8	Electron Transport and Oxidative Phosphorylation.
Week 9	Carbohydrate metabolism (Pentose phosphate pathway, glycogen metabolism)
Week 10	Carbohydrate metabolism (Gluconeogenesis) / Lipid Metabolism
Week 11	Lipid Metabolism
Week 12	Amino Acid Metabolism / Integration of Metabolism
Week 13	Review & revision / Laboratory quiz

* It is expected that students will read the relevant chapter(s) of the text-book PRIOR to attending lectures.

Laboratory Program:

This course also contains a laboratory component, which comprises five laboratory sessions of 3 hours each.

Week 3	Introduction to the biochemistry laboratory
Week 5	Spectrophotometry
Week 7	Enzyme Kinetics
Weeks 9 & 11	Anaerobic glycolysis and 30s maximal cycling test (Lab Report)
	Glucose and sucrose in sports drinks

ASSESSMENT

Summary of Assessment

Item	Assessment Task	Length	Weighting	Relevant Learning Outcomes	Due Date and Time
1	Mid-semester Exam (Covers all lecture material Weeks 1-8)	2 hr	30%	1-6	6 pm Friday 27 April, 2007
2	End of Semester Exam (Covers all lecture material Weeks 9-13)	2 hr	30%	7-14	End of Semester Exam Period

3	Laboratory Quiz	1 hr	10%	17,19,20	Week 13
4	Laboratory Reports (5)		20%	15, 16, 18	See below
5	Quizzes (3)		10%	1-14	Weeks 4, 8 & 12

Assessment Details

Rationale for assessment

The theoretical components of the course will be assessed via two, 2hr examinations (Mid + EOS). These exams will focus heavily on student understanding of the lecture material. The Laboratory Examination will assess student knowledge of both theoretical and practical issues relating to the laboratory program. Quizzes will allow students (and staff) to receive ongoing "feed-back" regarding their understanding (or presentation) of the lecture material. (*Note: Poor performance in these quizzes is related to a greatly increased likelihood of failing this course*). Laboratory Reports will assess laboratory skills, the ability of students to write in a scientific style as well as their ability to critically examine their results in the context of relevant literature.

3. LABORATORY REPORTS:

Laboratory 1: To be submitted prior to leaving the first laboratory session (Week 3). This compulsory session will introduce students to fundamental laboratory procedures, techniques and equipment. Students will undertake simple laboratory tasks and answer a series of questions. Successful completion of this session is required prior to students undertaking subsequent laboratory exercises.

Laboratory 2 & 3: Completed laboratory manual sections to be submitted by Friday 4 pm of following weeks.

Laboratory Report (High Intensity Cycling): Due 4pm Monday Week 13. Students are to prepare a laboratory report with the following format:

Title page with title, student's name, student number and lab group (Time & Day).

Introduction: This section is to provide an essay-style introduction to the experiments undertaken and the techniques employed. This section should be supported by reference to relevant literature and explain the purpose of the experiment and provide justification for the use of the laboratory techniques employed.

Materials & Methods: Only detail differences from the Laboratory Manual.

Results – including a brief, quantitative, written description of the results and containing appropriate graphs (called "figures") and tables.

Discussion: A well written, essay-style discussion of your results in the context of relevant literature (including that relating to exercise and to fundamental biochemistry).

Reference list: A single, alphabetical list of all of the references used within the report.

A NOTE ON REFERENCING:

In writing their reports, students should ensure that use of supporting materials (eg: journal articles) is appropriately referenced. A reference list (alphabetical by surname of first author and including all authors) **MUST** be included at the end of each laboratory report. In the body of your report, use the term “*et al.*” when referring to three (3) or more authors.

Please use the following format when composing a reference list in this subject:

Journal: Surname, Initials (1st author); Initials, Surname (2nd author), Initials, Surname (3rd author). (Year of publication). Title of journal article (with first word beginning with a capital letter). Name of journal (either full name or a standard abbreviation). Volume: Inclusive page numbers.

Book: Surname, Initials (1st author); Initials, Surname (2nd author), Initials, Surname (3rd author). (Year of publication). Book Title (with main words beginning with a capital), Publisher, City of publication, Inclusive page numbers.

Notes:

1. Within the body of your report indicate the author, year AND specific page number(s) when providing a reference (eg: Smith, 1995, 14)
2. Include all of the authors (ie: if more than the three indicated above) for each book/journal article within the reference list.
3. Do not have separate reference lists for books and journals. Integrate all references into a single, alphabetical list at the end of each report.

A NOTE ON PLAGIARISM:

Plagiarism refers to the unauthorised use of information. Students should take great care in ensuring that ALL work other than their own to which they refer is correctly referenced. Any attempt to use results of other students (including results from the laboratory program) without appropriate acknowledgment will be regarded very seriously. **Penalties will be applied if plagiarism is detected.**

GRADUATE SKILLS

The [Griffith Graduate Statement](#) states the characteristics that the University seeks to engender in its graduates through its degree programs.

Graduate Skills	Taught	Practised	Assessed
Effective communication (written)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Effective communication (oral)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Effective communication (interpersonal)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Information literacy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Problem solving	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Critical evaluation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Work autonomously	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Work in teams	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Creativity and innovation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ethical behaviour in social / professional / work environments	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Responsible, effective citizenship	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TEACHING TEAM

Course Convenor

Convenor Details	Gold Coast
Campus Convenor	Dr Dean L. Pountney
Email	d.pountney@griffith.edu.au
Office Location	GO5_3.04
Phone	(07) 5552 8970
Fax	(07) 5552 8908
Consultation times	Friday 11.00 – 13.00

Additional teaching team members

Assoc. Prof. Tony Perkins

Email: A.perkins@griffith.edu.au

Dr. Joanne Lewohl

Email: J.lewohl@griffith.edu.au

Mr Jacob Goodwin (tutor)

Email: j.Goodwin@griffith.edu.au

Mr Luke De Beus (demonstrator)

Email: luke.debeus@griffith.edu.au

Mr Kane Puglisi (demonstrator)

Contact details: To be advised

Ms. Stacey Scott (demonstrator)

Email: s.scott@griffith.edu.au

COURSE COMMUNICATIONS

Communication with the Course Convenor may occur via either email, telephone (as above), immediately after a lecture or during student contact time. Please note that the Convenor is contactable at most times via mobile phone via automatic diversion from the office phone number. The Convenor will attempt to answer emails as soon as possible but may not do so where the information sought has been supplied previously or is readily available. Course information and announcements will be provided via learning@griffith.

TEXTS AND SUPPORTING MATERIALS

Text:

Prescribed Text: Smith, Marks, Lieberman. *Basic Medical Biochemistry: A clinical approach*,
Lippincott, Williams & Wilkins, 2005.
ISBN 0-7817-2145-8

Laboratory manuals and other support materials will be provided.

SECTION B – ADDITIONAL COURSE INFORMATION

Grading Scheme

This course will use the following scheme for determination of grades:

	%
High Distinction	85
Distinction	75
Credit	65
Pass	50
PC	45
FAIL	< 45

Course Evaluation

This subject will be evaluated in Week 13 to assess the general student response.

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, for which the University may penalise a student. Specifically it is academic misconduct for a student to:

present copied, falsified or improperly obtained data as if it were the result of laboratory work, field trips or other investigatory work;

include in the student's individual work material that is the result of significant assistance from another person if that assistance was unacceptable according to the instructions or guidelines for that work;

assist another student in the presentation of that student's individual work in a way that is unacceptable according to the instructions or guidelines for that work;

cheat; (Cheating is dishonest conduct in assessment);

plagiarise (Plagiarism is knowingly presenting the work or property of another person as if it were one's own.)

Visit the University's [Policy on Academic Misconduct](#) for further details.

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:

[Student Charter](#)

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

[Student Administration Policy](#)

[Policy on Student Grievances and Appeals](#)

[Assessment Policy](#)

[Examinations Timetabling Policy and Procedures](#)

[Academic Calendar](#)

[Guideline on Student E-Mail](#)

[Health and Safety Policy](#)

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.