Description: Biochemistry 1

Subject | Cat-Nbr | Class | Term | Mode | Units | Campus  
--- | --- | --- | --- | --- | --- | ---  
BIO | 2201 | 20345 | 1, 2003 | ONC | 1.00 | TWMBA

Academic Group: FOSCI
Academic Org: FOS002
HECS Band: 2
ASCED Code: 010901

STAFFING
Examiner: Robert Learmonth
Moderator: Mark Sutherland

PRE-REQUISITES
Pre-requisite: CHE2120 or USQ61613

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:
• demonstrate a knowledge of the major classes of biochemical compounds, including carbohydrates, lipids and proteins;
• understand and describe the action of enzymes and their application in the metabolism of carbohydrates, lipids and proteins;
• demonstrate an awareness of the core metabolic processes which occur in different species (including animals, plants and micro-organisms);
• demonstrate familiarity with the integration of metabolic pathways in an organism;
• demonstrate an awareness of the applications of biochemistry in contemporary science, particularly in biotechnology;
• demonstrate familiarity with and competence in applying a range of laboratory techniques and instrumentation used to identify, quantify and study biochemical substances;
• demonstrate an ability to carry out qualitative biochemical tests, and quantitate reliably a range of common biochemical substances in biological specimens;
• demonstrate the ability to generate, analyse, summarise and report biochemical data.

TOPICS

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

TEXT and MATERIALS required to be PURCHASED or ACCESSED:

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at http://bookshop.usq.edu.au by entering the author or title of the text.


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.


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examinations</td>
<td>4</td>
</tr>
<tr>
<td>Laboratory or Practical Classes</td>
<td>30</td>
</tr>
<tr>
<td>Lectures</td>
<td>39</td>
</tr>
<tr>
<td>Private Study</td>
<td>76</td>
</tr>
<tr>
<td>Report Writing</td>
<td>16</td>
</tr>
</tbody>
</table>

ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks Out of</th>
<th>Wtg(%)</th>
<th>Required</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPORTS ON LAB WORK</td>
<td>20.00</td>
<td>20.00</td>
<td>Y</td>
<td>04 Mar 2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(see note )</td>
</tr>
<tr>
<td>1 HR CLOSED TEST</td>
<td>20.00</td>
<td>20.00</td>
<td>Y</td>
<td>09 May 2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(see note )</td>
</tr>
<tr>
<td>3 HR CLOSED EXAMINATION</td>
<td>60.00</td>
<td>60.00</td>
<td>Y</td>
<td>END S1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(see note )</td>
</tr>
</tbody>
</table>

NOTES:

- Absorption spectra of haemoglobin derivaties report due date 28/3/03 Appearance of fructose biophosphatase during germination of fatty seeds report due date 9/5/03 Glycolysis and fermentation of grape juice report due date 13/6/03
- The 1hr closed test will be held on 9/5/03 during the practical class time.
- 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 each report 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/SECARIAT/calendar/Part5/ or in the printed version of the
   current USQ Handbook.
ASSESSMENT NOTES

9  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.