BCH 301—Intermediary Metabolism

**COURSE PARTICULARS**

Course Code: BCH 301  
Course Title: Intermediary Metabolism  
No. of Units: 3  
Course Duration: Three hours of theory and one hour of tutorial per week for 15 weeks.  
Status: Compulsory  
Course Email Address: bch301@futa.edu.ng  
Course Webpage: http://www.bch.futa.edu.ng/courseschedule.php?bch301=BCH%20301  
Prerequisite: NIL

**COURSE INSTRUCTORS**

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and

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**COURSE DESCRIPTION**

This course is very pivotal to Biochemistry. It is a course that describes all reactions concerned with the storage and generation of metabolic energy required for the biosynthesis of low-molecular weight compounds and energy storage compounds. The course outline includes Degradation and digestion of carbohydrates - sugars, storage polysaccharides and cell walls; Glycolysis, the Tricarboxylic Acid Cycle (TCA), the Phosphogluconate pathway, the Pentose Phosphate pathway, the Glyoxylate pathway, the Cori cycle, the Calvin pathway; Gluconeogenesis and glycogenolysis; Disorders of carbohydrate metabolism; Amino acids as building blocks of proteins, biological functions of proteins; Oxidative degradation of amino acids and metabolism of one carbon unit, biosynthesis of amino acids and some derivatives; The Urea cycle, metabolism of inorganic nitrogen and disorders of amino acid metabolism.
The objectives of this course are to:

- give students understanding of the reactions involved in the breaking down and building up of biomolecules; and
- afford students opportunity to appreciate the relevance/applications of biochemistry in our daily activities.

**COURSE LEARNING OUTCOMES / COMPETENCIES**

The course is essentially theoretical. Hence upon successful completion of the course, the students will be able to explain some of the molecular events that occur during normal and abnormal biomolecular activities.

**GRADING SYSTEM FOR THE COURSE**

This course will be graded as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Attendance</td>
<td>05%</td>
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<tr>
<td>Quiz/Assignments</td>
<td>15%</td>
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<tr>
<td>Mid-Semester Test</td>
<td>20%</td>
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<tr>
<td>Examination</td>
<td>60%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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**GENERAL INSTRUCTIONS**

_Attendance_: Students are expected to be in class for lectures. Attendance records will be kept and used to determine each person’s qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with either of the Lecturers, indicating the reason for the absence.

_Academic Integrity_: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person’s work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students’ misconduct as spelt out in the Students’ Handbook.

_Assignments and Group Work_: Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn the student zero for that assignment. Only under extenuating circumstances, for which a student has notified either of the Lecturers in advance, will late submission of assignments be permitted.
**Code of Conduct in Lecture Room:** Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures.

**READING LIST**


**Legend**

1- Available in the University Library
2- Available in Departmental/School Libraries
3- Available as Personal Collection
4- Available in local bookshops.
## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>Module I</td>
<td>General Introduction- Metabolism (Anabolism and catabolism), overview of aerobic oxidation, regulation of intermediary metabolism</td>
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<td>Students will be requested to submit an assignment explaining the details of lactate formation and alcoholic fermentation starting from pyruvate.</td>
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| 2 - 4| Module II | Degradation and digestion of carbohydrates - sugars, storage polysaccharides and cell walls.  
Glycolysis  
The Tricarboxylic Acid Cycle |
| 5 - 7| Module III | The Phosphogluconate pathway  
The Pentose phosphate pathway  
The Glyoxylate pathway  
The Cori cycle  
The Calvin pathway |
|      |        | Students will be requested to compute the stoichiometry of coenzyme reduction and ATP formation in the aerobic oxidation of glucose via glycolysis, the pyruvate dehydrogenase complex reaction, the Citric Acid Cycle, and Oxidative Phosphorylation using 1 NADH = 3 ATP and 1 FADH<sub>2</sub> = 2 ATP. |
| 8 & 9| Module IV | Gluconeogenesis and glycogenolysis.  
Disorders of carbohydrate metabolism. |
| 10 & 11| Module V | Amino acids as building blocks of proteins  
Biological functions of protein.  
Oxidative degradation of amino acids and metabolism of one carbon unit. |
| 12 - 14| Module VI | Biosynthesis of amino acids and some derivatives  
The urea cycle, metabolism of inorganic nitrogen.  
Disorders of amino acid metabolism. |
| 15 | Lecture free | Revision of the entire course |