LIFS 2220 (2022/23 Spring Semester)
BIOCHEMISTRY II

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Time: Mon, Wed (10:30 – 11:50 am)
Venue: LT-D

Course Description:
Credit Points: 3
Prerequisite(s): LIFS 1902
Exclusion: Nil

The student will learn the principle of bioenergetics as well as major biochemical pathways and regulatory mechanisms involved in intermediary metabolism. The course encompasses the following topics: Energetics of life, introduction to metabolism and experimental analysis of metabolism; Carbohydrate metabolism; Lipid metabolism; Metabolism of nitrogenous compounds; Nucleotide metabolism; Integration and control of metabolic processes

Learning outcomes:
At the end of this course, the student is able to:

1. explain the general design of metabolic pathways based on the bioenergetic principle;
2. describe how carbohydrates (glucose and glycogen), lipids (fatty acids and triglycerides) and nitrogenous compounds (amino acids and nucleotides) are synthesized and degraded, and more importantly, how metabolic pathways are regulated and recognize the biochemical basis of some diseases arising defects in metabolism;
3. have a holistic view of metabolism, and recognize how different pathways are functionally interlinked and how they are regulated by extracellular and intracellular signals
4. recognize how metabolism can be related to issues in lifestyle, health, and diseases
**Assessment Scheme:**

(a) Examination: Two Exams with MC questions and True/False statements

(b) Percentage of exam and coursework

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Assessing Course ILOs</th>
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<tbody>
<tr>
<td>90% by Exam</td>
<td>(1), (2), (3)</td>
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<tr>
<td>10% by a short essay (300 words) with a topic on metabolism-related issues in lifestyle, health, and diseases.</td>
<td>(1), (2), (3), (4)</td>
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(c) The grade is assigned based on students’ performance in all assessments.

**Student Learning Resources:**

Recommended Reading:

Textbooks
Benjamin/Cummings
W.H. Freeman and Company

**Teaching and Learning activity:**

The student will need to attend lectures and understand some important details of metabolic pathways as well as create an integrated view of intermediary metabolism. To assist the student in achieving these learning goals, a web-based learning platform (CANVAS) is made available to students. As such, students can review lecture videos and PowerPoint slides, as well as Q&A session of each topic.
Class Schedule

Chemical Logic and Introduction to Metabolism

Carbohydrate Metabolism I - Glycolysis
Oxidative Process I - Citric Acid Cycle
Electron Transport, Oxidative Phosphorylation, and Oxygen
   - Oxidative Phosphorylation
Oxidative Process II - Pentose Phosphate Pathway
Carbohydrate Metabolism II
   Gluconeogenesis
   Glycogen Metabolism

Exam I  12 April  (covering lectures from Feb 6 – Mar 20)

Lipid Metabolism
   Fatty acid Oxidation and Biosynthesis
   Metabolism of Glycerophospholipids
   Eicosanoids

Metabolism of Nitrogenous Compounds
   Nucleotide Metabolism

Integration and Control of Metabolic Processes
   Interdependence of Major Organs in Fuel Metabolism
   Hormonal Regulation of Fuel Metabolism
   Extracellular Signaling

Exam II  (TBA)  (covering lectures from Mar 22 – May 8)