

## LIFS 2220 (2016/17 Spring Semester)

### BIOCHEMISTRY II

**Faculty Instructor:** Prof. Robert Ko

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**Supporting Instruction Assistant:** Bobby Yim

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**Time:** 9:00 – 10:20 (MON)

9:00 – 10:20 (WED)

**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 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 on 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 issues in lifestyle, health and disease

**Assessment Scheme:**

- (a) Examination duration: Exam I (120 min); Exam II (120 min); comprised of multiple choice questions, short answer questions.
- (b) Percentage of exam and coursework

<u>Assessment</u>	<u>Assessing Course ILOs</u>
45% by Exam I	(1), (2), (3)
45% by Exam II	(1), (2), (3)
10% by a short essay (300 words) with a topic on metabolism related issues in lifestyle, health, and disease.	(1), (2), (3), (4)

- (c) The grade is assigned based on students' performance in 3 assessments.

**Student Learning Resources:**

## Recommended Reading:

## Textbooks

Biochemistry, Mathews, van Holde, Appling & Athony-Cahill (4<sup>rd</sup> Edition) 2012 (Text book)

## Benjamin/Cummings

Biochemistry, Berg, Tymoczko, Stryer (7<sup>th</sup> Edition) 2012 (reference book)

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 to create an integral view on intermediary metabolism. To assist student in achieving these learning goals, a web-based learning platform (LMES) is made available to students. In addition to attending lectures, students can get access to self-directed learning aids for all topics.

## Class Schedule

**Prof. Robert Ko ([bcrko@ust.hk](mailto:bcrko@ust.hk); Rm 5534)**

**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***

**Feb 1-Mar 20**

**Prof. Raymond SC Wong ([bcrayw@ust.hk](mailto:bcrayw@ust.hk); Rm 5516)**

**Lipid Metabolism**

*Fatty acid Oxidation and Biosynthesis*

*Metabolism of Glycerophospholipids*

*Eicosanoids*

**Mar 22-29**

**Exam I (covered up to Mar 20) April 3**

**Prof. Robert Ko**

**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*

**Apr 5-May 8**

**Examination II (covering from Mar 22)**

**TBA**