



Isfahan University of Medical Sciences



Course Plan

Course Title: **Biochemistry of Discipline**

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| Degree: MBBS | Course Code: 3114039 |
| Academic Year: 2023-24 (Term 2)(1402-03_2) | Classroom Location: Shahid Soleimani Bldg. |
| Course credit: 1.3 unit | Days & hours of Class Time: Monday 10-12a.m. |
| Starting Date: Mon 25yh September 2023 | Lecturer: Professor Pourfarzam (Office Phone: 7045) |
| Email: pourfarzam@pharm.mui.ac.ir | Office Address: Dept of Clinical Biochem, School of Pharmacy, IUMS |

The General Purpose of the Course:

Metabolism represents the sum of the chemical changes that convert nutrients, the “raw materials” necessary to nourish living organisms, into energy and the chemically complex finished products of cells. Metabolism consists of literally thousands of enzymatic reactions organized into discrete but interconnected pathways. These pathways proceed in a stepwise fashion, transforming substrates into end products through many specific chemical intermediates. Metabolism is sometimes referred to as intermediary metabolism to reflect this aspect of the process. Although metabolism embraces many hundreds of different enzyme catalyzed reactions, our major concern in this course is the central metabolic pathways, which are few in number and remarkably similar in all forms of life.

The course aims to provide an advanced understanding of the concept of Biochemistry regarding the metabolism (anabolism & catabolism) of biomolecules such as carbohydrates, proteins, amino acids, lipids, nucleic acids, enzymes, vitamins and cofactors. You’ll learn about the principles governing the control of metabolism and learn how these interconnects with human disease and clinical care.

References:

Harper’s Illustrated Biochemistry. 31st ed. (2018)
Lehninger Principles of Biochemistry, 7th ed. (2017)
Lippincott Illustrated Reviews: Biochemistry, 7th Edition (2017)

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| Session | Topic | Reading Source | |
|---------------------|---|----------------|-----------|
| | | Harper | Lehninger |
| 1 | Course Introduction; Bioenergetics: Energy Producing and Energy Utilizing Systems, Thermodynamic Relationships and Energy Rich Components, The Role of ATP | Chap 11 | Chap 13 |
| 2 | Biologic Oxidation | Chap 12 | Chap 13 |
| 3 | The Respiratory Chain & Oxidative Phosphorylation | Chap 13 | Chap 19 |
| 4 | The Citric Acid Cycle | Chap 16 | Chap 16 |
| 5 | Carbohydrate Metabolism (Part I): Glycolysis, The Pentose Phosphate Pathway & Other Pathways of Hexose Metabolism & the Oxidation of Pyruvate | Chap 17 | Chap 14 |
| 6 | Carbohydrate Metabolism (Part II): Metabolism of Glycogen; Clinical Correlations | Chaps 18 & 19 | Chap 14 |
| 7 | Carbohydrate Metabolism (Part III): Gluconeogenesis & the Control of Blood Glucose | Chap 20 | Chap 14 |
| Midterm Exam | | | |
| 8 | Amino Acid Metabolism (part I); Catabolism of Proteins & of Amino Acid Nitrogen; Urea Cycle; Catabolism of the Carbon Skeletons of Amino Acids, Clinical Correlations | Chaps 28 & 29 | Chap 18 |
| 9 | Amino Acid Metabolism (part II); Biosynthesis of the Nutritionally Nonessential Amino Acids; Conversion of Amino Acids to Specialized Products, Clinical Correlations | Chaps 27 & 30 | Chap 22 |
| 10 | Lipid Metabolism (Part I): Digestion, Mobilization, and Transport of Fats, Oxidation of Fatty Acids & Ketogenesis, Biosynthesis of Fatty Acids & Eicosanoids | Chaps 22 & 23 | Chap 17 |
| 11 | Lipid Metabolism (Part II): Cholesterol Synthesis, Regulation, Transport, & Excretion. Bile Acids Metabolism, Transport, & Excretion. Cholesterol & Lipoprotein Metabolism, Clinical Correlations | Chaps 25 & 26 | Chap 21 |
| 12 | Metabolism of Purine & Pyrimidine Nucleotides: Metabolic Functions of Nucleotides, Chemistry of Nucleotides, Metabolism of Purine Nucleotides, Metabolism of Pyrimidine Nucleotides, Clinical Correlations | Chap 33 | Chap 22 |
| 13 | Porphyryns & Bile Pigments: Heme Biosynthesis, Heme Catabolism, Clinical Correlations | Chap 31 | |
| 14 | Integration of Metabolism & Metabolic Interrelationships: Starve–Feed Cycle, Mechanisms Involved in Switching the Metabolism of Liver between the Well-Fed State and the Starved State, Metabolic Interrelationships of Tissues in Various Nutritional and Hormonal States | Chap 14 | Devlin 21 |
| Final Exam | | | |

| Evaluation and Exams | | |
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| Midterm | 40% | Exam Date is scheduled at the first session |
| Final Exam | 60% | Exam Date is scheduled by the University |
| | Up to %20 | Classroom & active learning activities |

INFORMATION AND POLICIES

1. The Department of Biochemistry upholds and enforces the University's policies on, plagiarism and cheating. These policies are available from International students office. All students are advised to read these policies.
2. Absences will be treated according to the university's vice-chancellor for education policies.
3. Late arrival more than 5 minutes is considered absence.
4. Mobile phones, Tablets, and other electronic devices must be turned off at all times unless being used for a purpose relevant to the class. Students having a Mobile phone, tablet, or computer on their person during an exam will be assumed to have it for the purpose of cheating.
5. Any recordings of lectures may only be performed with written permission of the lecturer, and are for personal use only. The instructor retains copyright to such recordings and all lecture materials provided for the class (electronic and otherwise); these materials must not be shared or reposted on the Internet.
6. Course materials, such as notes, problem sheets, examinations, example sheets, or review sheets, may not be redistributed without the explicit written permission of the instructor.