**UNIVERSITY OF SARGODHA**

**COLLEGE OF PHARMACY**

**FACULTY OF PHARMACY**

COURSE OUTLINE **SPRING 2020**

Course Title: **Biochemistry**

Course Code: **PHRM 5115**

Credit Hours: **3**

Instructor: **Ayisha Khalid**

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DESCRIPTION& OBJECTIVES

Biochemistry, sometimes called biological chemistry, is the study of [chemical processes](https://en.wikipedia.org/wiki/Chemical_process) within and relating to living [organisms](https://en.wikipedia.org/wiki/Organism). By controlling information flow through biochemical signaling and the flow of chemical energy through [metabolism](https://en.wikipedia.org/wiki/Metabolism), biochemical processes give rise to the complexity of [life](https://en.wikipedia.org/wiki/Life). Over the last decades of the 20th century, biochemistry has become so successful at explaining living processes that now almost all [areas of the life sciences](https://en.wikipedia.org/wiki/List_of_life_sciences) from [botany](https://en.wikipedia.org/wiki/Botany) to [medicine](https://en.wikipedia.org/wiki/Medicine) to [genetics](https://en.wikipedia.org/wiki/Genetics) are engaged in biochemical research.

READINGS

1. HARPER'S ILLUSTRATED BIOCHEMISTRY.
2. Lippincott's Biochemistry.
3. Essentials of Biochemistry by Dr. Mushtaq

CONTENTS

1. Carbohydrates: Brief introduction to the digestion and absorption of carbohydrates, Aerobic and anaerobic breakdown of Glucose, Glycolysis, Pentose Phosphate Pathway, Glycogenolysis, Glycogenesis, Gluconeogenesis, Citric acid cycle, Energetics of various metabolic processes.
2. Lipids: Brief introduction to the digestion and absorption of lipids, Oxidation of fatty acids through β-oxidation, Biosynthesis of fatty acids, neutral lipids and cholesterol.
3. Proteins and Amino acids: Brief introduction to the digestion and absorption of proteins and amino acids, Metabolism of essential and non-essential amino acids, Biosynthesis and catabolism of Haemins and porphyrin compounds.
4. Bioenergetics: Principles of bioenergetics, Electron transport chain and oxidative phosphorylation.
5. Role of Vitamins: Physiological role of Fat-soluble (A, D, E and K) and Watersoluble (Thiamin, Riboflavin, Pantothenic acid, Niacin, Pyridoxal phosphate, Biotin, Folic acid, Cyanocobalamin-members of B-complex family and Ascorbic acid), Coenzymes and their role in the regulation of metabolic processes.
6. Receptor Mediated regulation (Hormones): Mechanism of action of hormones, Physiological roles of various hormones, Site of synthesis and target sites of hormones.
7. Secondary Messengers: Role of cAMP, Calcium ions and phosphoinositol in the regulation of metabolic processes.
8. Gene Expression: Replication, Transcription and Translation (Gene expression) Introduction to Biotechnology and Genetic Engineering, Basic principles of Recombinant DNA technology, Pharmaceutical applications, Balance of Catabolic, Anabolic and Amphibolic processes in human metabolism, Acid-Base and Electrolyte Balance in Human body.
9. Introduction and importance of the clinical chemistry. Laboratory tests in diagnosis of diseases including Uric acid, Cholesterol, Billirubin and Creatinine

COURSE SCHEDULE

|  |  |  |
| --- | --- | --- |
| **Week**  | Topics and Readings | Books  |
| 1. | Carbohydrates Metabolism |  |
| 2. | Carbohydrates Metabolism |  |
| 3. | Carbohydrates Metabolism |  |
| 4. | Carbohydrates Metabolism |  |
| 5. | Bioenergetics |  |
| 6. | Bioenergetics |  |
| 7. | Receptor Mediated regulation (Hormones) |  |
| 8. | Secondary Messengers |  |
|  | **MID TEARM EXAMINATION**  |  |
| 9. | Proteins and Amino acids |  |
| 10. | Proteins and Amino acids |  |
| 11. | Proteins and Amino acids |  |
| 12. | Lipid Metabolism |  |
| 13. | Lipid Metabolism |  |
| 14. | Gene Expression |  |
| 15. | Role of Vitamins |  |
| 16. | Introduction and importance of the clinical chemistry |  |
|  | **FINAL TEARM EXAMINATION**  |  |

RESEARCH PROJECT

 NA

ASSESSMENT CRITERIA

Sessional: 20% (short project or assignment and class participation)

Mid exam: 30%

Final exam: 50%

RULESANDREGULATIONS

Following are the rules and regulations that students have to abide by in my class

* Class attendance. (80% class attendance)
* Study of course materials as specified by the instructor
* Completion of given task on time