Birla Institute of Technology & Science, Pilani
Hyderabad Campus

Second Semester 2023-2024
Course Handout

09.01.2024

Course No. **: PHA F242**
Course Title **: Biological Chemistry**
Instructor in-charge **: Prof. Balaram Ghosh**

1. Course Description: Biochemistry has been undergoing transition, stimulated by new experimental findings and new insights. Therefore, this course focuses upon chemistry and functions of constituents of cells and tissues; introduction to enzymes; metabolism of carbohydrates, lipids, amino acids; nucleic acids and protein synthesis; vitamins and hormones.

2. Scope and Objective of the Course: The aim of this course is to describe and explain all biochemical processes of living organisms and their interactions with their networking both in health and disease conditions.

3. Text Books: Robert K. Murray, et.al, Harper's Illustrated Biochemistry, McGraw Hill Medical Publishers, 29th edition (TB)

4. Reference Books:

a) David L. Nelson, Michael M. Cox. Lehninger Principles of Biochemistry, W.H. Freeman Publishers, 6th edition, 2012 (RBa)

b) Donald Voet , et.al, Biochemistry, Wiley, 3rd Edition (RBb)

***Apart from text books and reference books refer class notes**

3. Course Plan:

Lectures	Learning Objectives	Topic to be covered	Reference
1	Overview of Biochemistry	Introduction to Biochemistry	TB Ch. 1
2-9	Chemistry of Biomolecules a. b. c. d.	1. Carbohydrates 2. Lipids 3. Amino acids and Proteins 4. Nucleic acids	TB Ch. 14 TB Ch. 15 TB Ch. 3,4,5 TB Ch. 32 RBa Ch7,Ch10,Ch3.Ch8
10-11	Vitamins e. f. g.	1. Classification of Vitamins 2. Structure and functions of some important vitamins 3. Deficiency disorders	T Ch. 32 Class notes
12-14	Enzymes h.	1. Classification and mechanism of action 2. Enzyme kinetics 3. Enzyme: regulation of activities	T Ch. 7,8,9 (RBa 6)

15-18	Carbohydrate Metabolism k. m. n.	1. Glycolysis and the oxidation of pyruvate 2.The Citric acid cycle : The catabolism of Acetyl CoA 3. The Pentose phosphate pathway 4. Glycogen metabolism	TB Ch. 18 (RBb Ch16) TB Ch. 17 TB Ch. 21
19-23	Lipid metabolism o. p. q. r.	1. Oxidation of fatty acids 2. Biosynthesis of fatty acids 3. Cholesterol biosynthesis, transport and excretion 4. Metabolism of unsaturated fatty acids	TB Ch. 21 TB Ch. 22 TB Ch. 23 RBb Part IV
24-25	Amino acid and protein metabolism	1.Catabolism of amino acid and nitrogen 2.Catabolism of carbon skeleton of amino acids 3. Conversion of Amino Acids to Specialized Products 4. Porphyrins & Bile Pigments	TB Ch. 28 TB Ch. 29 RBb Part IV
26-28	Nucleic acids metabolism	1.Metabolism of purine and pyrimidine nucleotides	TB Ch. 33 RBa Ch18

*- Apart from text books refer class notes and reference books

4. Evaluation Scheme:

Component	Duration	Weightage	Date	Time	Remarks
Pre Midsem surprise Quiz	2x 10 min	10 %			OB
Midsem Test	90 min	30 %	11/03 - 2.00 - 3.30PM		CB
Post Midsem surprise Quiz	2x10 min	10%			OB
Compre. Exam.	180 min	35 %	07/05 FN		10% OB and 30% CB
Laboratory Component					
Day to day work (Includes marks for regularity, Lab Record & Viva-voce)	Continuous evaluation	15 %	-		…

OB: open book; There will be no make up for surprise quiz

List of the experiments (Laboratory Components)

1a. Identification test for amino acids.
1b. Identification test for amino acids.
1c. Identification test for different proteins.
2. Identification test for different proteins.
3. Identification test for carbohydrates.
4. Identification test for carbohydrates.
5. Preparation of osazones with different carbohydrates.
6. Identification test for cholesterol.
7. Isolation of DNA and RNA.
8. Characterization of isolated DNA and RNA.
9. Assay of Ascorbic acid.
10. Identification of normal constituents in normal urine.

5. Mid-Semester Grading: Will be announced after Mid-term test.

6. Make-up: Prior approval or intimation to take a make-up is mandatory. It is solely at the discretion of the instructor-in-charge, depending upon the genuineness of the circumstances, to allow or disallow a student to appear for a make-up evaluation component. No makeup will be granted for Assignments/Quizzes under any circumstances.

7. Grading Procedure:

- Grading will be done by "bunching" procedure. Total marks obtained by the students will be arranged in descending order, 'bunches' will be identified and grades awarded accordingly. Fine grading system (A, A-, B, B-….) will be followed.
- It is not mandatory for the instructor-in-charge to award all the grades (A to E); subjective judgment will be used for awarding the grades.
- As specified in Handout – Part I, appended to the timetable, the instructor in-charge reserves the right to award a NC report in case the student does not make himself/ herself available for any of the evaluation component mentioned above.
- Borderline cases during grading will be judged on the basis of regularity to classes and consistency or progress in the performance in evaluation components.

8. Common Hours: To be announced in class.

9. Notices: All the notices pertaining to this course will be circulated in google classroom only.

10 Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no academic dishonesty is acceptable.

Instructor-in-Charge

PHA F242