Birla Institute of Technology & Science, Pilani
Hyderabad Campus

Second Semester 2018-2019
Course Handout

07/01/2019

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

1a. Scope & Objective of the Course:

Biological chemistry or Biochemistry may be defined as the science concerned with the chemical basis of life. The cell is the structural unit of living systems. Therefore, biological chemistry can also be described as the science involved with the chemical constituents of living cells and also the reactions and procedures they undergo. Biological chemistry can also be the science in which chemistry is employed to the study of living organisms and the atoms and molecules which constitute living organisms

This course focuses on:

- Chemistry and functions of constituents of cells and tissues (Biomolecules);
- Introduction to enzymes;
- Metabolism of carbohydrates, lipids, amino acids;
- Nucleic acids and protein synthesis;
- Vitamins.

1b. Learning Outcomes (course benefits): Students who have undergone the course are expected to

- Understand the chemical structure and chemical reactivity of the biomolecules such as amino acids, carbohydrates, nucleic acids.
- Understand the nomenclatures and kinetics of different enzymes. Will be able to understand the different types of enzyme inhibition.
- be aware of the challenges in chemical synthesis of amino acids and peptides in laboratory.
- develop the understanding of biosynthesis of biomolecules such as amino acids, peptides and proteins.
- Understand the metabolism of carbohydrates, amino acids, peptides and nucleic acids.
- Know the chemical structures of vitamins, their cellular functions and deficiency syndromes.

2a. Text Book (TB):

Robert K.Murray, et.al, Harper's illustrated biochemistry, Mc Graw Hill, edition 26/27

2b. Reference Books (RB):

a. Lehninger, A.L.Biochemistry, Worth Publishers (RBa)

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

3. Course Plan:

Lectures	Learning Objectives	Topic to be covered	Reference
1	Overview of Biochemistry	Introduction to Biochemistry	TB Ch. 1
2-11	Chemistry of Biomolecules	a. 1. Carbohydrates b. 2. Lipids c. 3. Amino acids and Proteins d. 4. Nucleic acids	TB Ch. 14 TB Ch. 15 TB Ch. 3,4,5 TB Ch. 32 RBa Ch7,Ch10,Ch3.Ch8
12-13	Vitamins	e. 1. Classification of Vitamins f. 2. Structure and functions of some important vitamins g. 3. Deficiency disorders	T Ch. 32 Class notes
14-16	Enzymes	h. 1. Classification and mechanism of action i. 2. Enzyme kinetics j. 3. Enzyme: regulation of activities	T Ch. 7,8,9 (RBa 6)
17-20	Carbohydrate Metabolism	k. 1. Glycolysis and the oxidation of pyruvate l. 2.The Citric acid cycle : The catabolism of Acetyl CoA m. 3. The Pentose phosphate pathway n. 4. Glycogen metabolism	TB Ch. 18 (RBb Ch16) TB Ch. 17 TB Ch. 21
21-25	Lipid metabolism	o. 1. Oxidation of fatty acids p. 2. Biosynthesis of fatty acids q. 3. Cholesterol biosynthesis, transport and excretion r. 4. Metabolism of unsaturated fatty acids	TB Ch. 21 TB Ch. 22 TB Ch. 23 RBb Part IV
26-28	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	TB Ch. 28 TB Ch. 29 RBb Part IV

		Products 4. Porphyrins & Bile Pigments	
29-32	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 Mid-term surprise Quiz	3x 5 min	7 %	Will be announce in class		CB
Mid-term Test	90 min	20 %	TBA	11/3 9.00 - 10.30AM	CB
Post Mid-term surprise Quiz	3x 5 min	8 %	Will be announce in class		CB
Compre. Exam.	3 h	35 %	TBA	01/05 FN	CB (15%) OB (20%)
Laboratory Component					
Day to day work (Includes marks for regularity, Lab Record & Viva-voce)	-	15 %	-		-
Lab. Compre.	-	15 %	Will be announced in Lab		-

OB: open book; CB: closed book

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. Chamber Consultation Hours: To be announced in class.

9. Notices: All the notices pertaining to this course will be displayed only on Dept. of Pharmacy Notice Board.

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

Instructor-in-Charge
PHA F242