First semester 2016-17

Date: 02/08/2016

COURSE HANDOUT (PART-II)

In addition to part-I (General Handout for all courses) printed on page 1 of the timetable book, this portion gives further specific details regarding the course.

Course no. : **BIO F211**

Course title : **Biological Chemistry**

Instructor in charge : **PANKAJ KUMAR SHARMA**

Instructor : **Rajesh Mehrotra**

1. Course description: This course is intended to offer an introduction to the world of biochemistry. The course deals with the structure, properties, and significance of the major groups of biochemical compounds (amino acids, proteins, carbohydrates, nucleic acids, and lipids), the bioenergetic principles, enzyme mechanisms and regulation of the central metabolic pathways. Efforts will be made to include the recent advances and methodologies related to biochemistry. This would help students going for higher level activities, appreciation of biochemical problems, evaluation and problem solving.

2. Text Book (T): Mary K. Campbell and Shawn O. Farrell, Biochemistry, 7th edition, International edition, copyright 2012 (Thompson Brooks/Cole, Cengage Learning).

3. Reference Books (RF)

a. D. Nelson & M Cox., Lehninger, Principles of Biochemistry, Palgrave, 4th Ed.

b. Donald Voet et al., Biochemistry,Wiley,1993

c. Lubert Stryer et al., Biochemistry,W H Freeman and company, 2007

4. Course plan:

Lec. No.	Learning objective	Topics to be covered	Reference/Chapter/sec#/ book
1-3	Biochemistry and organization of cells	Chemical nature of Biomolecules, organization of Prokaryotes and Eukaryotes, how cells use energy	T1
4-7	Carbohydrates	Structure and stereochemistry, reactions, some important oligosaccharides and polysaccharides and their biological roles	T16
8-10	Nucleic acids	Nucleic acid structure, Nucleic acid chemistry, other functions of nucleotides.	RF (a) 8, T9
11-13	Lipids and Membranes	Lipids and proteins are associated in membranes, membrane structure	T8
14-17	Amino acids, Peptides and Proteins	Amino acids and peptides, three dimensional structure of proteins, protein purification and characterization techniques	T3, T4, T5
18-20	Enzymes	Classification, Enzymes Kinetics and mechanism of actionInhibitors and regulators, Allosteric enzymes, Isoenzymes	T6,T7
21-22	Bioenergetics and Biochemical reaction types	Bioenergetics and thermodynamics, chemical logic and common biochemical reactions, phosphoryl groups transfer and ATP, biological oxidation-reduction reactions	RF (a) 13
23-28	Carbohydrate metabolism	Glycolysis, Reversal of Glycolytic sequence Utilization of carbohydrates, Regulation of glycolysis, Pentose phosphate pathway, Citric acid cycle, Glyoxylic acid cycle	T16, T17, T18, T19,
29-30	Biological oxidations	Components involved in ETC, Respiratory chain, Oxidative phosphorylation and its mechanisms	T20
31-33	Lipid metabolism	Hydrolysis and transport of fats, β-oxidation, Oxidation of unsaturated fatty acids, Formation of Ketone bodies, Biosynthesis of fatty acids.	T21
34-35	Photosynthesis	Introduction, Path of carbon-Calvin cycle, C4 pathway	T22
36-38	Metabolism of nitrogen	Catabolism of amino acids, Assimilation of ammonia, Urea cycle and formation of uric acid, Purine Biosynthesis, Pyrimidine Biosynthesis, Salvage pathway.	T23

Evaluation Scheme:

EC No	Evaluation component	Duration	Weightage (%)	Date	Remarks
1	Mid Semester Test	1 ½ hrs.	25	<TEST_1>	CB
2	Quizzes/Assignments	Variable	35	-	Announced/Surprise
3	Comprehensive Exam	3 hrs.	40	<TEST_C>	Partly OB

Chamber consultation Hours: Will be announced in class

Notices: Would be displayed on the Biological Sciences department notice board (New Science Block).

Make up Policy: Make up will be given only for genuine cases, with prior permission of the course IC. No make up will be given for quizzes/assignments.

Instructor - In charge
BIO F211