BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI, HYDERABAD CAMPUS
INSTRUCTION DIVISION, FIRST SEMESTER 2016-2017
Provisional Course Handout (Part-II)

Date : 01/08/2016

In addition to part I (General Handout for all courses appended to the time table this portion gives further specific details regarding the course.

Course No. **: BIO F211**
Course Title **: Biological Chemistry**
Instructor-in-Charge **: S. Swaminathan**
Co-Instructor **: D. Bandyopadhyay**

1. **Course Description**: This course is an introduction to the molecular process of life and focuses upon bio-macromolecules, their energy yielding and energy requiring processes, the flow of genetic information and an overview of tools & techniques that have enabled our current understanding of the field.

2. **Text Book (T):** Biochemistry: A short course. Tymoczko, Berg & Stryer; 2nd Edition, 2013.

3. **Reference Books**
   R1: Biochemistry. Berg, Tymoczko, Gatto & Stryer. 6th Edition, 2007.
   R2: Lehninger Principles of Biochemistry. Nelson & Cox. 6th Edition, 2013.

4. **Course Plan:**

Lec. No.	Topic	Learning Objective	Text/Ref Book chapters
1-2	Introduction	Molecular design of life; atoms & molecules of living systems; basic concepts: cells and the 4 major biomolecules; the Central Dogma; water as the solvent for biological reactions, buffers & pH	T, Chapters 1,2
3-7	Major biomolecules	Protein structure & function: amino acids as building blocks of proteins; functional groups of amino acids; essential and non-essential amino acids; different levels of protein structural organization; protein function	T, Chapters 3, 4
8-10		Enzymes: basic concepts & kinetics; catalytic strategies; regulation of enzyme action; vitamins, coenzymes, inhibitors	T, Chapters 6-8
11-14		Carobohydrates: monosaccharides & polysaccharides; glycoproteins and proteoglycans; lipids: Fatty acids, triglycerides, membrane lipids (glycolipids & phospholipids); membrane structure & function	T, Chapters 10-12
15-17		Informational macromolecules: The structure of DNA and RNA	T, Chapter 33
18-19	Transducing & storing energy, biological oxidation	Basic concepts & design of metabolism; ATP as the energy currency of the cell	T, Chapters 15
20-23		Glycolysis, TCA cycle, Electron transport and oxidative phosphorylation	T, Chapters 16, 18-21
24-26		Glycogen metabolism, fat metabolism, protein turnover and amino acid catabolism	Chapters 24, 27, 30
27-28		Light reactions of photosynthesis; Calvin cycle; PPP	Chapters 22, 23, 26

29	Synthesizing biomolecules	Biosynthesis of amino acids	Chapter 31
30-31		Nucleotide biosynthesis	Chapter 32
32-33		Synthesis of lipids and steroids	Chapters 28, 29
34		Gluconeogenesis and glycogen synthesis	Chapters 17, 25
35-38		DNA, RNA and protein synthesis; control of gene expression	Chapter 34-40
39-40	Integration of metabolism	Interconnected metabolic pathways; Gluc-6P, Pyruvate & Acetyl-CoA	Lecture notes R1, Chapter 27
41-42	Tools & techniques in biochemistry	Overview of tools and techniques to explore genes & genomes; and proteins & proteomes.	T1 Chapters 5, 41; Lecture Notes

5. Evaluation Scheme:

Evaluation Component	Duration	Weightage (%)	Date & Time	Remarks
Test 1	1 hour	20	13.9.16 (4-5 pm)	Closed Book
Test 2	1 hour	20	21.10.16 (4-5 pm)	Closed Book
Surprise quizzes*		20	Various	During lecture and/or tutorial classes
Comprehensive	3 hours	40	13.12.16 (FN)	Open Book (20%)**+Closed Book (20%)

*Average of n-1 quizzes conducted will be taken (please see make-up policy below)
**Compre Open Book: This will be concept and understanding-based drawing mostly on actual topics discussed during both lecture and tutorial classes.

6. Chamber Consultation Hour: Will be announced in the Class.

7. Notices: All notices, concerning the course will be displayed on CMS and/or the Biological Sciences Department Notice Board.

8. Grading policy: Students missing one or more component of evaluation completely will be considered as having not cleared the course (NC grade).

9. Make-up policy: For T-1, T-2 and Compre, make-up will be granted only if candidate is sick and hospitalized. No make-up will be granted for surprise quizzes under any circumstances.

INSTRUCTOR-IN-CHARGE
BIO F211