**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI, HYDERABAD CAMPUS**

**FIRST SEMESTER 2023-2024**

**Course Handout (PartII)**

**Date : 11/08/2023**

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* : Debashree Bandyopadhyay**

**Instructor(s) : Debashree Bandyopadhyay (L), Ali Akbar Safdari (T)**

**1.Course Description & Objective**: Biochemistry is an introductory course to explain basic biochemical and structural features of different bio-macromolecules. This describes cellular and molecular processes and biochemical pathways emphasizing the energetics within living systems. Biochemistry course will help the students to relate the biochemical processes with clinical insights.

**2.Text Book (T):**

Campbell, Marry K and Farell, Biochemistry, Thomson Learning ,5th Edition, Copyright 2006

**3.Reference Books**

R1. Biochemistry. Berg, Tymoczko, Gatto & Stryer. 6th Edition, 2007

**R2**. Nelson and Cox. Principles of Biochemistry (Lehninger), 5th Edition. W.H. Freeman Publishers.

**R3**. Donald Voet et. al., Biochemistry, Wiley, 1993.

**4 Course Plan:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Lec. No.** | **Topic** | **Learning Objective** | **Reference to Text /Ref. Books** |
| 1 | Cellular Organization | 1. Cellular organization, Spontaneity in biochemical reactions | T1, |
| 2-13 |  | 1. Amino Acids, Protein- structure & function, protein folding & conformation,  2. Protein purification and characterization  3. Lipids  4. Nucleic acids  5. Carbohydrates | T3, T4, T5, T8, T9, T10, T16 Class Notes |
| 14-18 | Enzymes | 1. Classification 2. Enzyme kinetics and Mechanism of action 3. Enzyme inhibitors and regulators 4. Allosteric enzymes 5. Isoenzymes 6. Vitamins and coenzymes | T6, T7 |
| 19-20 | Biochemical Energetics | 1. Concept of Free Energy 2. Energy Rich Compounds 3. Coupling Reactions 4. Oxidation-Reduction | R2(13), T15, Lecture Notes |
| 21-28 | Carbohydrate Metabolism | 1. Glycolysis 2. Gluconeogenesis 3. Regulation of Glycolysis 4. TCA cycle 5. Glyoxylic acid cycle 6. Glycogen breakdown | T17, T18, T19, |
| 29-31 | Biological Oxidations | 1. Components involved in ETC 2. Respiratory chain 3. Oxidative phosphorylation and its mechanisms. | T20 |
| 32-35 | Lipid Metabolism | 1. Hydrolysis and transport of fats 2. β Oxidation 3. Oxidation of Unsaturated Fatty acids 4. Formation of Ketone bodies 5. Biosynthesis of Fatty acids | T21 |
| 36-38 | Amino acid and protein metabolism | 1. Catabolism of Amino acids 2. Assimilation of Ammonia 3. Urea cycle and formation of Uric acid | T23 |
| 39-40 | Nucleic acid metabolism | 1. Purine biosynthesis 2. Pyrimidine biosynthesis 3. Salvage pathway | T23 |

**5.Evaluation Scheme:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Evaluation Component** | Duration | Weightage (%) | Date & Time | Remarks |
| Mid semester Exam | 90 min | 30 | 11/10 - 9.30 - 11.00AM | Closed Book |
| Assignments/Quizzes. (continuous evaluation/Announced in the class). Assignments can be in-class or take home) |  | 30 | Announced | Open Book (10%) (20M)  Closed Book 20% (40 M) |
| Comprehensive Exam | 180 min | 40 | 12/12 (FN) | Open Book (10%) 20M  Closed Book ( 30%) 60M |

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

**7.Notices: All** notices, concerning the course will be displayed on CMS. Announcements for assignments/quizzes can be made in the class.

**8.Make-up Policy:** Prior permission of the instructor-in-Charge is necessary for any make-up. No make-ups for continuous evaluation will be granted. May be considered for medical/hospitalization situations.

**9. Grading:** Award of grades will be guided by the histogram of marks. Decision for cases on the borderline of two grades will be based on the student’s promptness and participation in classroom activities as well as satisfactory attendance in lecture and tutorial classes. If a student misses even a single component entirely or does not give sufficient opportunity for being assessed, he/she may be awarded ‘NC’ report regardless of his/her final total score in the course (see Clause 4.19 of *BITS Academic Regulations*).

**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.