**PCTE Group of Institutes**

**Course Module**

**Course: Biochemistry – I**

**Sem: II (2013-2016)**

**Subject Code: BSBT-108**

**Course Instructor: Romica Badhan**

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**No. of Lectures: 52**

**No. of Case study: One**

**No. of Tests: Two**

**No. of Assignments: Two**

**Course Objectives : :**

This is the subject enabling the students to gain basic background of the structure and functions of biomolecules and relate their involvement in the cellular organization. This knowledge will be of great help in understanding the biotechnological principles and their applications in different areas of biotechnology.

**Module outline** **:**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. NO.** | TOPICS TO BE COVERED | **No. of lectures** | **ASSIGN.** | **CASE STUDY** | **CLASS**  **TEST** | **EDUCATIONAL TRIP/ INDUSTRIAL VISIT** | **GUEST LECTURE** |
| 1. | **Unit I** - Introduction | 1 |  |  |  |  |  |
| 2. | Biomolecules of the cell | 1 |  |  |  |  |  |
| 3. | Structure and functions of carbohydrates | 3 |  |  |  |  |  |
| 4. | Stereoisomerism | 1 |  |  |  |  |  |
| 5. | Properties of monosaccharides | 2 |  |  |  |  |  |
| 6. | Glycoproteins | 1 |  |  |  |  |  |
| 7. | **Unit II:**  Structure and functions of Lipids | 2 |  |  |  |  |  |
| 8. | Structure and functions of fatty acids | 2 |  |  |  |  |  |
| 9. | Structure and functions of Phospho- and glycolipids | 2 |  |  |  |  |  |
| 10. | Structure and functions of sphingolipids | 1 |  |  |  |  |  |
| 11. | Structure and functions of Lipoproteins, liposomes | 2 |  |  |  |  |  |
| 12. | Biological membranes and micelles | 2 |  |  |  |  |  |
| 13. | EDUCATIONAL TRIP / INDUSTRIAL VISIT |  |  |  |  | Visit to Mrs. Bector’s food specialities ltd. |  |
| 14. | Assignment |  | 1 |  |  |  |  |
| 15. | Class tests |  |  |  | 1 |  |  |
| 16. | **Unit III**: Proteins – Classification of proteins | 1 |  |  |  |  |  |
| 17. | Functions of proteins | 1 |  |  |  |  |  |
| 18. | General structure of amino acids | 2 |  |  |  |  |  |
| 19. | Classification of amino acids | 1 |  |  |  |  |  |
| 20. | Properties of amino acids | 2 |  |  |  |  |  |
| 21.. | Non-standard and non-protein amino acids | 1 |  |  |  |  |  |
| 22. | Protein structure – different levels | 2 |  |  |  |  |  |
| 23. | Degradation of proteins | 1 |  |  |  |  |  |
| 24. | Properties of proteins | 2 |  |  |  |  |  |
| 25. | Biologically important peptides | 1 |  |  |  |  |  |
| 26. | Assignment |  | 1 |  |  |  |  |
| 27. | Class tests |  |  |  | 1 |  |  |
| 28. | Unit IV: Nucleic acids: Structure and functions | 2 |  |  |  |  |  |
| 29. | Properties of nucleic acids | 1 |  |  |  |  |  |
| 30. | Purine and pyrimidine, Nucleosides and nucleotides | 1 |  |  |  |  |  |
| 31 | Biological functions of DNA and RNA | 2 |  |  |  |  |  |
| 32 | Double helical models of DNA | 1 |  |  |  |  |  |
| 33 | Forces responsible for DNA double helix | 2 |  |  |  |  |  |
| 34 | Shorthand notation of nucleic acid backbone | 1 |  |  |  |  |  |
| 35 | Conformation of DNA double helix | 1 |  |  |  |  |  |
| 36 | Denaturation of DNA | 1 |  |  |  |  |  |
| 37 | Methods for the isolation of nucleic acids | 2 |  |  |  |  |  |
| 38 | Purification of nucleic acids | 2 |  |  |  |  |  |
| 39 | CASE STUDY |  |  | Effects of artificial sweetnener |  |  |  |
| 40 | GUEST LECTURE |  |  |  |  |  | Dr. Seema Garcha  ( Punjabi university, Patiala) |
| 41 | Assignment |  | 1 |  |  |  |  |
| 42 | Class tests |  |  |  | 1 |  |  |
|  | **Total hours** | 52 | 2 |  | 2 |  |  |

Mid semester examination will be held as per schedule (To be fixed). Assignments will be submitted on the fixed date and time, otherwise the internal assessment will be affected. The topics of assignments will be given on the basis of status of the class from time to time. Performance in the class will be added to your overall score.

**Class Room policies:**

1. Be punctual for the class .Late comers are allowed in class at any time but without attendance.
2. While lecture is being delivered any one creating nuisance or is unnecessarily disturbing the class will be liable for punishment.
3. 75% attendance is compulsory for all in order to sit for final exam.
4. Using mobile phones is strictly prohibited in class. But if there is any emergency you can always ask me politely.
5. During lecture delivery, if you have any kind of query, just raise your hand. do ask queries but make sure they are relevant to the subject.

**Marks Distribution:**

The subject contains 100 marks; 40 for internal and 60 for external. External marks will be evaluated on the basis of university theory examination. And internal 40 marks will be evaluated by teacher. The distribution of internal marks is as follow:

|  |  |
| --- | --- |
| **Modes of Assessment** | **Score** |
| **Mid semester exam** | **15** |
| **1st Hourly test** | **05** |
| **2nd Hourly test/Viva** | **05** |
| **Presentation** | **05** |
| **Assignments** | **05** |
| **Class participation** | **05** |
| **Total** | **40** |

**Presentation topics**

|  |
| --- |
| 1. Structure and functions of carbohydrates |
| 1. Properties of carbohydrates |
| 1. Glycoproteins |
| 1. Stereoisomerism of carbohydrates |
| 1. Structure and functions of neutral lipids |
| 1. Structure and functions of Phospholipids |
| 1. Structure and functions of sphingolipids |
| 1. Structure and functions of fatty acids |
| 1. Biological membranes and micelles |
| 1. Fluid mosaic model of Biomembrane |
| 1. Functions of proteins |
| 1. Secondary and tertiary structure of protein |
| 1. Structure and functions of amino acids |
| 1. Lipoproteins |
| 1. Liposomes |
| 1. Structure and functions of nucleosides and nucleotides |
| 1. Structure and functions of different types of DNA |
| 1. Watson and Crick Model of DNA |
| 1. Denaturation of DNA |
| 1. Structure and functions of different types of RNA |
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**Books Recommended:**

1. Principles of Biochemistry 4 edition, 2007 : Lehninger, Nelson & Cox.

2. Biochemistry, 6 edition, Berg et al., W.H. Freeman and Company, New York. 2006,

3. Fundamentals of Biochemistry, 2007- Voet, Voet and Pratt, John Wiley & Sons.