

**B. Tech. (Biotechnology) II Year 3<sup>rd</sup> Semester**  
**TBT-301 Biochemistry**

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Unit- I

Role of water in biological process, General Structure and functions of amino acids, carbohydrates, fats, vitamins and hormones. [08]

Unit-II

Structure and function of cell wall and membrane, membrane lipid, protein and carbohydrate, transport across membrane: active, passive and facilitated, signal transduction. [08]

Unit- III

Catabolic and anabolic metabolism of carbohydrates (Photosynthesis, Glycolysis, TCA cycle, ETS etc.), nitrogen fixation. [08]

Unit-IV

Metabolism of amino acids, nucleic acids, lipids, vitamins. [08]

Unit-V

Thermodynamical principles: free energy, secondary and tertiary structure of protein, Structure and function of Hemoglobin and myoglobin. [08]

Test books and references

1. Hames and Hooper; Instant Notes on Biochemistry; Viba Books PVT. LTD.
2. Nelson, Cox; Lehninger's Principle of Biochemistry; Macmillan Worth Publication
3. L. Stryer, Biochemistry; Freeman WH and Co., New York
4. Mathews et al; Biochemistry; Pearson Education.
5. S C Rastogi Biochemistry, Tata McGraw Hill;

Unit- I

Introduction and classification of microbes, isolation and identification of microorganism, culture techniques and their maintenance, cell counting methods.

[08]

Unit- II

Microbial growth kinetics, cell cultivation system, Screening, physical and chemical methods for control of microorganisms, strain development, Industrial scope microbiology.

[08]

Unit- III

Characteristics of prokaryotes and eukaryotes, cell organelles; Cell wall and membrane, Mitochondria, Nucleolus, Ribosome, Golgi bodies, Endoplasmic reticulum, Motile organelles, Cytoskeleton.

[08]

Unit-IV

Cell Division, Protein Targetting and post translational modification.

[08]

Unit-V

Nerve Cells and excitation, Cell aging, Biology of cancerous cells.

[08]

Test books and references

1. Prescott Harley and Klein; Microbiology 2<sup>nd</sup> Ed.
2. Roger Y. Satiner et al General Microbiology PHI Publication
3. P. Tauro KK Kapoor, K S Yadav; An Introduction to Microbiology
4. Schegal H G General Microbiology, 8<sup>th</sup> Ed.
5. Murray Moo Young- Comprehensive Biotechnology I vol.,
6. Wistreich and Lechman microbiology, Macmillan Co.

## TAS-303 Statistical Techniques

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### **Unit- I**

Data type, classification and summarization of data, diagrams and Graphs, Measures of Dispersion, Skewness and kurtosis. [08]

### **Unit – II**

Introduction to probability, Laws of probability, Baye's theorem, Binomial distribution, Poison distribution, Normal distribution and Gaussian distribution [08]

### **Unit- III**

Positive and negative correlation, Pearson and Mathew correlation coefficient, Non parametric tests, Receiver operating characteristics (ROC) curve, Linear and non linear regression, multiple regression [08]

### **Unit- IV**

Hypothesis test, Chiu square test and F-test, Variant, One way and two way analysis of variants, ANOVA [08]

### **Unit- V**

Principles of experimental design and analysis [08]

### Text book and references

1. Geogr W and William G; Statistical methods, IBH Publication.
2. Ispen et al; An introduction to Biostatistics, Harper and Row Publication
3. NTJ Baily Statistical Methods in Biology; English University Press
4. R. Rangaswami; A Text book of Agricultural Statistics; New Age Int. Pub.
5. PSS Sudar Rao; An Introduction of Biostatistics, Prentice Hall
6. Zar J; Biostatsistics, Prentice Hall London.

**Unit- I Introduction to data structure and Algorithms**

Performance analysis of Algorithms, Time complexity, Big-oh notation, Elementary data organization. Data structure and operations, Recurrences, Arrays, Operation on arrays, representation of arrays in memory, single dimensional and multi dimensional arrays, Sparse matrices. Character storing in C, String operations. [08]

**Unit-II Stacks, Quesues and Linked Lists**

Stack operation, PUSH and POP, Array representation of stacks, Operation associated with stacks Application of stacks, Recursion, Polish expression, Representation quesues operation on quesues, Priority quesues, Dquesuws, Singly and circularly linked list, List operations List implementation [08]

**Unit-III Tree**

Basic terminology, Binary trees, binary tree reperesntaion. Algebraic/expressions, Complete Binary trees, Extended binary trees, representing binary trees in memory, link representation of binary trees, Traversing binary trees & Searching in binary tress, inserting in binary search trees, Complexity of searching algorithm, Heaps, general tress, Threaded binary trees. [08]

**Unit-IV Graphs**

Terminology and representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, adjacency Matrices, Transversal, connected component and spanning trees, minimum cost spanning tree, Prims and Krusul Algorithm, BFS, DFS, Shortest path and transitive closure, Activity network, Toplogical sort and critical paths. [08]

**Unit- V Searching and Sorting**

Linear search, Binary search, internal and external sorting, Bubble sorting, selection sort, insert sort, Quick sort, Two way merge sort, Heap sort, sorting on different keys, practical consideration for internal sorting, External sorting, Storage Devices: Magnetic taps disk storage, sorting with disks and Indexing techniques Introduction fo B tree and B+ tree, File organization and storage management, introduction to hoisting. [08]

**Text books and references**

1. Horowitz and Sahani Fundamentals of Data Structures, Galgotia Publication.
2. Coreman, Rivest Lisserson, Algorithms PHI Publications
3. Weiss Data structure and Algorithms analysis in C, Addision Wesley
4. BAsse, Computer Algorithms: Introduction to DEassign and analysis: Addision Weseley
5. Lipschutz,"Data Structure" Schaum Series
6. Aho, Hopcropt, Ullman, "Data Structure and Algorithms, Addision Weseley

## TBT-351 Biochemistry Lab

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1. Estimation of carbohydrate
2. Estimation of proteins
3. Estimation of nucleic acids
4. Isoelectric precipitation of proteins
5. Separation of amino acids by paper chromatography
6. Extraction of lipids
7. Thin layer chromatography
8. Gel electrophoresis
9. Assay of enzyme activities and enzyme kinetics

### Practical books and references

1. S K Sawhney and Singh Introduction Practical Biochemistry; narosa Publication
2. J Jayaraman, Lab Manual in Biochemistry, Cambridge Publication
3. Wilson and Walker, Practical Biochemistry; Cambridge Pub
4. David T plumer; An introduction to practical Biochemistry

## TBT-352 Microbiology Lab

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1. Preparation of nutrient agar slants, plates and nutrient broth and their sterilization. (Microwave oven, Heating mantles, Fridge, Heating oven, Tube racks)
2. Inoculation of agar slants, agar plates and nutrient broth (Incubator, water bath, Laminar hood, dry heat sterilization ie bead sterilizer)
3. Culture of microorganisms using various techniques. (shakers, i e cooling and open shaker)
4. Simple and differential staining procedures, endospore staining, flagelleer staining, cell wall staining, capsular staining, negative staining. (Moist chamber, sprit lamps, slide loops & microscopes, haemocytometer)
5. Bacterial colony counting (Moist chamber, sprit lamps, slide loops & microscopes, haemocytometer)
6. Observation of different vegetative, capsular and spore forms of bacteria & Fungus (under various microscopes).
7. Isolation of microbes from soil samples and determination of the number of colony forming units. (UV Spectrophotometer, Colony counters etc)
8. Study of growth curve of E. coli.

### **Practical Books and References:**

1. Lab Manual In Microbiology by P. Gunasekaran (New Age Publications).

## TCH- Fluid Mechanics Lab

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Experiments related to measurement of flow by venturimeter, orifice meter, notch rotameter, velocity measurement by Pilot tube, Verification of Beernaulli's theorm, Vortex, friction factor, equivalent length of fittings, pump characterstics, Streamlines.