

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction		
Program: Bachelor in Life Sciences (Certificate/Diploma/Degree/Honors)	Semester: I Sem	Session: 2024-2025
1	Course Code	BTSC-01-T
2	Course Title	Cell Biology and Biochemistry
3	Course Type	Discipline Specific Course (DSC)
4	Pre-requisite (if any)	As per program
5	Course Learning Outcomes (CLO)	After completing this course, the students will be able to – <ul style="list-style-type: none"> • Explore and validate the Indian knowledge system and its significance in the field of biotechnology. • Understand cellular organization, their division for the continuation of life, and the natural cellular death mechanism. • Understand the basic biochemicals for organizational and functional expression of life. • Understand the metabolic regulations for survival and continuation of life.
6	Credit Value	03 Credits (Credit = 15 Hours - learning & observation)
7	Total Marks	Max. Marks: 100 Min Passing Marks: 40

Part B: Content of Course (Theory)

Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topic (Course content)	No. of Period
I	Basics and IKS <ol style="list-style-type: none"> 1. The modern concept of the origin of life. 2. Contribution of Indian scientists in biology. 3. Significance of ancient Indian knowledge system in medical science. 4. Structure of cell. 	12 (12 Hrs)
II	Cell structure and division <ol style="list-style-type: none"> 1. Ultrastructure of cell organelles. 2. Ultrastructure of chromosomes. 3. Cell division- Mitosis and meiosis. 4. Biology of cancer cells and apoptosis. 	11 (11 Hrs)
III	Basics of biochemistry <ol style="list-style-type: none"> 1. Carbohydrates- Structure and classification. 2. Lipid- Structure and classification. 3. Amino acids - Structure and classification. 4. Three-dimensional structure of proteins. 	11 (11 Hrs)
IV	Metabolism <ol style="list-style-type: none"> 1. Enzymes- Nomenclature and classification, mechanism of action, and factors affecting enzyme action. 2. Carbohydrate metabolism- Glycolysis, Krebs cycle, gluconeogenesis, glycogenesis. 3. Lipid metabolism- Beta oxidation of fatty acids, fatty acid biosynthesis. 4. Protein metabolism- Transamination, deamination, and synthesis of amino 	11 (11 Hrs)

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Keywords	Cell, Biomolecules, Cell Division.	

• Part C - Learning Resource

Text Books, Reference Books, Other Resources -

- Text Book-
- Biotechnology- U Satyanarayana.
- Cell Biology- C B Powar
- Cell and Molecular Biology- P K Gupta

Reference Book-

- Practical Biochemistry- Wilson & Walker.
- o Cell biology – C.B.Powar
- o Molecular Biology of the Cell – Alberts
- o Molecular Cell Biology – Lodish
- o Cell and Molecular Biology – Gerald Karp
- o The Cell – Cooper
- o Lehninger- Principles of Biochemistry
- o Nelson & Cox. - Biochemistry
- o Voet& Pratt. - Biochemistry

Online resources-

- https://onlinecourses.nptel.ac.in/noc22_cy06/preview
- <https://nptel.ac.in/courses/104105076>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks