BBIT100N	Biology	L	T	P	C
		3	0	0	3
Pre-requisite	**Nil**	**Syllabus version**			
		1.0			

Course Objectives

1. To build a basic understanding of origin and evolution of biological beings
2. To inculcate fundamental concepts of organization and principles of living systems
3. To demonstrate applications of biology in engineering disciplines

Course Outcomes

1. Conceive the basic concepts of biology including diversity, evolution, and ecology
2. Outline the design principles of cell, its biochemistry, and biophysics
3. Interpret and analyze biological flow of information at molecular and hereditary level
4. Describe the organismal complexities in animals and plants
5. Identify the importance of biology in different engineering disciplines

Module:1	**Introduction to biology and evolution**	**7 hours**

Bioscience fundamentals; diversification of life including viruses; Chemical basis of life, early origin of life experiments; Concept of evolution and natural selection; Levels of ecological study; Biotic and abiotic factors in ecosystem

Module:2	**Cell structure and functions**	**5 hours**

Cell as fundamental unit of life; prokaryotic cell structures; Eukaryotic cell structures; Nuclear transport; Endomembrane system; Dynamic cytoskeleton

Module:3	**Chemistry and complexity of life**	**6 hours**

Structure and functions of bio macromolecules – carbohydrates, proteins, lipids, and nucleic acids

Module:4	**Metabolism and energy transformation**	**5 hours**

Driving force for metabolic reactions, ATP energy-coupling; Electrochemical processes-ATP-synthesis and electron transport chain

Module:5	**Molecular information**	**6 hours**

DNA and gene; DNA synthesis; Cell division- mitosis and meiosis; Central dogma of molecular biology; Transcription, RNA processing, and translation; Post-translational modifications

Module:6	**Overview of animal and plant systems**	**6 hours**

Plant forms and functions; Plant cells and tissue systems; Animal tissues, organs, and systems; Animal forms and functions; Animal homeostasis

Module:7	**Genetics and genomics**	**5 hours**

Mendel's experiment-monohybrid cross and dihybrid cross; Linkage and crossing-over; Mendel's rules and human diseases; Gene sequencing and genomics

Module:8	**Engineering in biology**	**5 hours**

Biology and engineering needs; Bio-inspired design and bio-robotics; Biology and wellness e.g. retinal prosthetics and biosensor, bio-chips, bio-pesticides, nanoparticles.

	Total Lecture hours:	**45 hours**

Text Book(s)	
1.	Biological Science. By Scott Freeman, Kim Quillin, Lizabeth Allison, Michael Black, Emily Taylor, 6th edition 2017, Prentice Hall, NJ, USA.
2.	Biology for Engineers, by G. K. Suraishkumar, 1st Edition, 2019, Oxford University Press, India.
Reference Books	
1.	Campbell Biology. By Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Rebecca Orr. 12th edition, 2021. Pearson publisher, USA
2.	Concepts in Biology. By Eldon D. Enger, Frederick C. Ross, David B. Bailey, Edition 14th, 2017 (Indian Edition). Tata McGraw-Hill publication, India
Mode of Evaluation: CAT, Application oriented assignment, Quiz, and FAT	

Recommended by Board of Studies	28.06.2021		
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