

15BT101	BIOLOGY FOR ENGINEERS	L	T	P	C
	Total Contact Hours - 30	2	0	0	2
	Prerequisite				
	Nil				
PURPOSE					
The purpose of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.					
INSTRUCTIONAL OBJECTIVES					
1.	To familiarize the students with the basic organization of organisms and subsequent building to a living being				
2.	To impart an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities.				
3.	To provide knowledge about biological problems that require engineering expertise to solve them				

UNIT I- BASIC CELL BIOLOGY (6 hours)

Introduction: Methods of Science-Living Organisms: Cells and Cell theory Cell Structure and Function, Genetic information, protein synthesis, and protein structure, Cell metabolism-Homoeostasis- Cell growth, reproduction, and differentiation.

UNIT II- BIOCHEMISTRY AND MOLECULAR ASPECTS OF LIFE (5 hours)

Biological Diversity --Chemistry of life: chemical bonds--Biochemistry and Human biology--Protein synthesis—Stem cells and Tissue engineering.

UNIT III- ENZYMES AND INDUSTRIAL APPLICATIONS (5 hours)

Enzymes: Biological catalysts, Proteases, Carbonic anhydrase, Restriction enzymes, and Nucleoside monophosphate kinases—Photosynthesis

UNIT IV- MECHANOCHEMISTRY (7 hours)

Molecular Machines/Motors—Cytoskeleton—Bioremediation—Biosensors

UNIT V- NERVOUS SYSTEM, IMMUNE SYSTEM, AND CELL SIGNALING (7 hours)

Nervous system--Immune system- General principles of cell signaling

TEXT BOOK

1. S. ThyagaRajan, N. Selvamurugan, M. P. Rajesh, R. A. Nazeer, Richard W. Thilagaraj, S. Barathi, and M. K. Jaganathan, “*Biology for Engineers,*” Tata McGraw-Hill, New Delhi, 2012.

REFERENCES

1. Jeremy M. Berg, John L. Tymoczko and Lubert Stryer, “*Biochemistry,*” W.H. Freeman and Co. Ltd., 6th Ed., 2006.
2. Robert Weaver, “*Molecular Biology,*” MCGraw-Hill, 5th Edition, 2012.
3. Jon Cooper, “*Biosensors A Practical Approach*” Bellwether Books, 2004.
4. Martin Alexander, “*Biodegradation and Bioremediation,*” Academic Press, 1994.
5. Kenneth Murphy, “*Janeway's Immunobiology,*” Garland Science; 8th edition, 2011.
6. Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, “*Principles of Neural Science,* McGraw-Hill, 5th Edition, 2012.

15BT101 BIOLOGY FOR ENGINEERS												
Course designed by		Department of Biotechnology										
1	Student Outcome	a	b	c	d	e	f	g	h	i	j	k
		x			x						x	
2	Mapping of instructional objectives with student outcome	1			2						3	
3	Category	General (G)		Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)			
				x								
4	Broad area (For 'P' category)	Electrical Machines		Circuits & Systems		Electronics			Power Systems		Intelligent Systems	
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5	Approval	23 rd meeting of Academic Council, May 2013										