

18CY301	BIOLOGY FOR ENGINEERS	L	T	P	C
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<b>Course Objectives:</b>					
To introduce students to modern biology with an emphasis on evolution of biology as a multi-disciplinary field and to make them aware of biological principles. The course will facilitate the students to:					
1.	Realize that all forms of life have the same building blocks.				
2.	Convey that without catalysis life would not have existed on earth.				
3.	Know the analysis of biological processes at the reduction level				
4.	Comprehend the fundamental principles of energy transactions are the same in physical and biological world.				
5.	Understand the fundamentals about the molecular basis of coding and decoding				
<b>UNIT I</b>	<b>BIOMOLECULES</b>	<b>6</b>	<b>+</b>	<b>3</b>	
Carbohydrates- classification - Glucose properties and structural elucidation –fructose, sucrose, starch - structure only; Amino acids- classification- amphoteric nature of amino acids - zwitter ion - isoelectric point reactions of amino acids; Vitamins - general characteristics- classification- function and deficiency diseases					
<b>UNIT II</b>	<b>ENZYMES</b>	<b>6</b>	<b>+</b>	<b>3</b>	
Nomenclature - structure of enzymes – enzyme cofactors- properties of enzymes(catalytic properties, specificity, reversibility, sensitiveness to heat and inhibitors, colloidal nature)- mechanism of the enzyme action- lock and key mechanism and koshland induced fit mechanism -Factors affecting rate of enzyme reaction( temperature, pH, substrate concentration, enzyme concentration, water inhibitors, end product accumulation)- enzyme kinetics –michaelis-menten equation.					
<b>UNIT III</b>	<b>MACROMOLECULES</b>	<b>6</b>	<b>+</b>	<b>3</b>	
Proteins- classification- structure of proteins- primary, secondary, tertiary and quaternary structure-properties of proteins- physical and chemical properties- colour reaction of proteins (biuret reaction, millions reaction, xanthoproteic reaction, ninhydrin reaction, azo dye reaction Hopkins Cole reaction) -Protein synthesis- mechanism of protein synthesis.					
<b>UNIT IV</b>	<b>METABOLISM</b>	<b>6</b>	<b>+</b>	<b>3</b>	
Thermodynamics as applied to biological systems - exothermic and endothermic versus endergonic and exergonic reactions- concept of equilibrium constant and its relation to standard free energy- spontaneity - structure of ATP; Glycolysis- definition- flow chart- steps involved in glycolysis- preparatory phase and pay off phase- kinds of reactions in glycolysis; Photosynthesis- definition- significance photosynthetic- pigments types- structure of pigments factors affecting photosynthesis- external and internal factors.					
<b>UNIT V</b>	<b>NUCLEIC ACIDS</b>	<b>6</b>	<b>+</b>	<b>3</b>	
Types-Structural components of nucleic acids- acid, pentose sugar and nitrogenous base- nucleoside – nucleotide and its functions - single and double helical structure of DNA-comparison between DNA and RNA- types of RNA- transcription -mRNA, tRNA and rRNA and their function - replication of DNA- genetic code characteristics					
<b>Total (L+T) = 45 Hours</b>					
<b>Course Outcomes:</b>					

Upon completion of this course, the students will be able to:	
CO1	: Appreciate that all types of life have the identical structural units.
CO2	: Highlight the idea that without catalysis, living beings would not have existed on earth.
CO3	: Be familiar with the investigation of biological processes at the reduction level.
CO4	: Figure out that the primary principles of energy transactions are alike in physical and chemical
<b>Text Books:</b>	
1.	F.J.L.Jain, Sanjay jain and Nitin jain- "Fundamentals of Biochemistry" - Sixth edition, S.Chand and company Ltd., Ram nagar, 2005.
2.	Dr.A.V.S.S.Rama Rao-" Text book of Biochemistry"- Text book of Biochemistry- First edition- UBS Publishers' Distributors Pvt. Ltd., 2008.
3.	U. Satyanarayana –" Biochemistry"-5th edition – Sri Padmavathi Publications Ltd.,2017.
<b>Reference Books:</b>	
1.	Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M,L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B.-" Biology: A global approach"- Pearson Education Ltd
2.	Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H-" Outlines of Biochemistry"- John Wiley and Sons
3.	By Nelson, D. L.; and Cox- "Principles of Biochemistry"- V Edition- M. M.W.H. Freeman and Company
4.	Stent, G. S.; and Calender-" Molecular Genetics"- Second edition - R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher