

**CURRICULUM FOR BIOTECHNOLOGY
IN UNDER GRADUATE DEGREE PROGRAMME**

CBCS SYLLABUS SCHEDULE 2016 – 2017



By

**Chairperson,
Board of Studies,
Department of Biotechnology,
Kakatiya University,
Warangal**

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1	Semester	Course category	Title of the Paper	No. of Credits	HPW	Max. Marks			Total Marks
						I.A	End Exam	Total	
FIRST YEAR									
BS104	I	DSC-1A (Theory)	Cell Biology & Genetics	4	4	20	80	100	125
		DSC-1A (Practical)		1	2	-	25	25	
BS204	II	DSC-1B (Theory)	Nucleic Acids- Biostatistics - Bioinformatics	4	4	20	80	100	125
		DSC-1B (Practical)		1	2	-	25	25	
SECOND YEAR									
BS304	III	DSC-1C (Theory)	Biological Chemistry	4	4	20	80	100	125
		DSC-1C (Practical)		1	2	-	25	25	
		SEC - I	Computer Basics and Automation	2	2	-	50	50	50
BS404	IV	DSC-1D (Theory)	Microbiology and Immunology	4	4	20	80	100	125
		DSC-1D (Practical)		1	2	-	25	25	
		SEC - II	Multimedia and Applications	2	2	-	50	50	50
THRID YEAR									
BS502	V	GE-1 (Theory)	Public Health and Hygiene (Interdisciplinary)	4	4	-	100	100	150
		GE-1		-	-	50	-	50	
BS503	V	DSC-1E (Theory)	Molecular Biology & rDNA Technology	3	3	15	60	75	100
		DSC-1E (Practical)		1	2	-	25	25	
BS506	V	DSC-1F (Theory)	Subject Electives: A- Plant Biotechnology or B- Medical Biotechnology	3	3	15	60	75	100
		DSC-1F (Practical)		1	2	-	25	25	
		SEC - III	Verbal Reasoning For Aptitude Test	2	2	-	50	50	50
BS602	VI	GE-2 (Theory)	Water Resources Management (Interdisciplinary)	4	4	-	100	100	150
		GE-2		-	-	50	-	50	
BS603	VI	DSC-1G (Theory)	Microbial Biotechnology	3	3	15	60	75	100
		DSC-1G (Practical)		1	1	-	25	25	
BS606	VI	DSC-1H (Theory)	Subject Electives: A-Animal Biotechnology or B- Environmental Biotechnology	3	3	15	60	75	100
		DSC-1H (Practical)		1	1	-	25	25	
BS601		SEC- IV	Quantitative Aptitude Test	2	2	-	50	50	50
Summary of Credits				56		-	-	-	1400

B.Sc -II Year–Semester - III
PAPER-III

BIOLOGICAL CHEMISTRY

UNIT- I Carbohydrates

- 1.1. **Carbohydrates**-Importance, classification and physical and chemical properties of carbohydrates
- 1.2. Structure, configuration and biochemical importance of Monosaccharides (Glucose and Fructose)Oxidation, Reduction, Osazone formation, Aldose & Ketose, Glycosides (Streptomycin, Cardiac glycosides and Ouabain)
- 1.3. Structure, configuration and biochemical importance of Disachharides and glycosidic bond , Mutarotation, Haworth projection(Sucrose, Trehalose, Lactose, Maltose, Isomaltose, Cellobiose)
- 1.4. Homopolysaccharides (Starch, Glycogen, inulin, Cellulose and Chitin)
- 1.5. Hetero polysachharides (Hyaluroic acid, Chondroitin sulfate, heparin, peptidoglycan)

UNIT – II Proteins and Enzymes

- 2.1 Classification, structure and physical and chemical properties of aminoacids and synthesis of Peptide bond
- 2.2 Lipids,Fattyacids-importance, properties and classification, Simple lipids-TAG, Complex lipids, Derived lipids, sterols, Fatty acids: Saturated and Unsaturated fatty acids with examples. Biosynthesis of Fatty acids -palmitoyl-CoA, Cholesterol
- 2.3 Enzymes-classification and nomenclature. Michaelis Menton Equation-Factors influencing the enzyme reactions and Enzyme inhibition(Competitive and Non-competitive), role of co-enzymes and Enzyme Techonology.
- 2.4 Hormones, mode of action, (Thyroid gland)
- 2.5 Vitamins- classification, sources, functions and applications

UNIT – III Bioenergetics of biomolecules

- 3.1 Glycolysis
- 3.2 Gluconeogenesis and its significance
- 3.3 TCA Cycle, electron transport, Oxidative phosphorylation
- 3.4 β -oxidation of fatty acid
- 3.5 Transamination and Oxidative deamination reactions of amino acids. Amino acid catabolism (Phenyl ketonuria, albinism)

UNIT – IV Bioanalytical techniques

- 4.1. Microscopy – light, inverted, fluorescent and electron microscopy
- 4.2. Colorimetry: Beer and Lambert’s laws and UV- Vis spectrophotometry.
- 4.3. Separation techniques – Chromatography(Paper, thin layer, ion exchange and HPLC).
- 4.4 Electrophoresis (Native gels and SDS-PAGE, Agarose)
- 4.5 Basic principles of Centrifugation

Practical paper - III

1. Qualitative tests of Sugars, amino acids and lipids
2. Estimation of proteins by Biurate method
3. Estimation of total sugars by Anthron method
4. Reducing sugars DNS method
5. Separation of protein by SDS – PAGE.
6. Separation of amino acids by paper chromatography, TLC

Spotters

1. Cellulose
2. Peptidoglycan
3. Streptomycin
4. Cholesterol
5. Lock and Key model
6. Xerophthalmia
7. RUBISCO
8. Albinism
9. ATP synthase
10. Centrifuge
11. Microscope
12. Spectrophotometer

REFERENCE BOOKS

1. Lehninger Principles of Biochemistry By: David L. Nelson and Cox
2. Biochemistry By: Rex Montgomery
3. Harper's Biochemistry By: Robert K. Murray
4. Enzymes By: Trevor Palmer
5. Enzyme structure and mechanism By: Alan Fersht
6. Principles of Biochemistry By: Donald J. Voet, Judith G. Voet, Charlotte W. Pratt
7. Analytical Biochemistry By Cooper
8. Principles and techniques of Biochemistry and Molecular Biology Edited By Keith Wilson and John Walker
9. Experimental Biochemistry: A Student Companion by [Sashidhar Beedu](#) et al
10. Practical Biochemistry By Plummer

**Skill Enhancement Course – I - FOR ALL SCIENCE FACULTY
DEPARTMENTS
B.Sc., II YEAR, III Semester**

COMPUTER BASICS AND AUTOMATION

Credits: 2

Theory: 2 hours/week

Marks - 50

Unit –I BASICS OF COMPUTERS

- 1.1 Introduction to computers- Computer parts and Characteristics of computer.
- 1.2. Generations of Computers, Classification of Computers, Basic computer organization.
- 1.3. Applications of Computer. Input and Output Devices- Input Devices, Output Devices.
- 1.4. Soft Copy Devices, Hard Copy Devices. Computer Memory and Processors.

Unit – II OFFICE AUTOMATION

- 1.1. Desktop - Word - Creation of files and folders, recycle Bin.
- 1.2. Web browser, Office Automation System, need for Office Automation System.
- 1.3. Excel – Tables, graphs
- 1.4. PowerPoint, Access to files and folders.

Text Book:

1. Reema Thareja “Fundamentals of Computers” Oxford University Press 2015.

References:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. Spoken Tutorial on “Linux (Ubuntu), LibreOffice (Writer, Calc, Impress), Firefox”, as E-resource for Learning. <http://spoken-tutorial.org>