

**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- I Year, Semester – I
PAPER - I
CELL BIOLOGY & GENETICS

UNIT- I : Cell Structure and Function

- 1.1 Discovery of Cell and Cell theory.
- 1.2 Cell as basic unit of life (Viral, bacterial, fungal, plant and animal cells)
- 1.3 Ultra structure of prokaryotic cell (Extra Chromosomal Material – Plasmid)
- 1.4 Ultra structure of eukaryotic cell (Cell wall, cell membrane, Golgi Complexes, Endoplasmic Reticulum, Peroxisome, Lysosomes etc).
- 1.5 Semi- autonomous Organelles (Mitochondria & Chloroplast : Endosymbiotic theory)

UNIT-II : Chromosome Organization and Cell Division

- 2.1 Chromosome organization in Prokaryotes and Eukaryotes
- 2.2 Structure of specialized chromosomes (Polytene and Lamp Brush)
- 2.3 Cell Division , Cell Cycle control
- 2.4 Significance of Mitosis and Meiosis
- 2.5 Programmed Cell Death

UNIT- III : Mendelism & Mendel's Laws

- 3.1 Mendel's experiments – Factors contributing to success of Mendel's experiments
- 3.2 Mendel's laws - Law of segregation – Monohybrid ratio, Law of Independent assortment – Dihybrids, Trihybrids
- 3.3 Deviation from Mendel's Laws - partial or incomplete dominance, co-dominance
- 3.4 Penetrance and expressivity, Pleiotropism
- 3.5 Gene interaction – Modified dihybrid ratios (12:3:1; 9:7; 15:1; 9:3:4:, 9:6:1; 13:3), Multiple Alleles : ABO blood groups & Rh factor

UNIT-IV : Sex Determination & Recombination

- 4.1 Genes and environment – phenocopies
- 4.2 Linkage and recombination – Discovery of linkage, cytological proof of crossing over, Recombination frequency and map distance. Interference and coincidence
Mitotic crossing over in *Drosophila*
- 4.3 Mechanism of sex determination-genic balance theory - *Drosophila*
Homogametic and Heterogametic theory (Human, Mamalian, Birds)
- 4.4 X – linked inheritance (eg. Haemophilia)
- 4.5 Non-Mendelian inheritance - Cytoplasmic inheritance (Shell coiling in snail)

Recommended Books:

1. Cell Biology and Genetics - By P.K. Gupta
2. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.
3. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.
4. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
5. Becker, W.M., Kleinsmith, L.J., Hardin, J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.
6. Cell Biology, De Robertis & De Robertis, Blaze publishers & Distributors Pvt. Ltd.,
6. Cell and Molecular Biology - By De Robertis
7. Cell and Molecular Biology - By Lodish
8. Theory and Problems in Genetics - By Stransfield
9. Genetics - By Gardner (Macmillan Press)

Practical Paper – I

1. Monohybrid and dihybrid ratio in *Drosophila*/maize
2. Preparation of different stages of Mitosis and Meiosis
3. Identification of plant, fungi, bacteria and animal cells.
4. Epistasis and codominance, 2 point test cross, gene mapping.
5. Preparation of polytene chromosomes from *Drosophila* salivary gland.
6. Identification, maintenance and culturing of *Drosophila* stock.

Spotters:

1. Prokaryotic cell (Bacteria)
2. Mitochondria
3. Chloroplast
4. Histone proteins
5. Polytene
6. Lampbrush
7. Test cross
8. Blood grouping
9. Webbed foot
10. Haemophilia
11. Crossing over
12. Phenocopies