CURRICULUM FOR BIOTECHNOLOGY IN UNDER GRADUATE DEGREE PROGRAMME

CBCS SYLLABUS SCHEDULE 2016 – 2017

By

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

CURRICULUM FOR BIOTECHNOLOGY

IN UNDER GRADUATE DEGREE PROGRAMME
CBCS SYLLABUS SCHEDULE 2016 – 2017

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		DSC-1E (Theory)	Molecular Biology & rDNA Technology	3	3	15	60	75	100
		DSC-1E (Practical)		1	2	-	25	25	
BS506		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		DSC-1G (Theory)	Microbial Biotechnology	3	3	15	60	75	100
		DSC-1G (Practical)		1	1	-	25	25	
BS606		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

<u>**B.Sc- II Year, Semester – IV**</u>
PAPER-IV
MICROBIOLOGY AND IMMUNOLGY

<u>**UNIT – I Fundamentals of Microbiology**</u>

1.1 Outlines of classification of Microorganisms.

1.2.Sterilization techniques (Physical and Chemical).

1.3. Structure and general characteristics of Bacteria (Archaeobacteria, Cyano bacteria), Viruses
     (TMV, HIV),Micro algae (Clostirium,Chlamydomonas) and Fungi (Aspergillus, Pencillium)
1.4. Diseases caused by pathogenic fungi, bacteria, and viruses in humans
1.5. Isolation, identification and preservation of microorganisms (Bacteria).

<u>**UNIT – II Bacterial growth and nutrition**</u>

2.1 Bacterial nutrition , Nutritional types of bacteria, Essential macronutrients, micronutrients and growth factors.
2.2 Nutrient transport in bacteria -Simple diffusion, facilitated diffusion, passive and active transport.
2.3 Bacterial growth, Typical growth curve-batch and continuous cultures, synchronous cultures, Measurement of bacterial growth- measurement of cell number and cell mass
2.4 Factors effecting bacterial growth-Temperature, pH, water activity, oxygen concentration, salt concentration, pressure and radiation.
2.5 Measurement of cell mass by dry weight and metabolic activity.

<u>**UNIT – III Immunology – I**</u>

3.1.Introduction to immune system- organs and cells of immune system
3.2. Types of Immunity (Innate and Acquired)
3.3. Antigens, haptens physical chemical characteristics.
3.4. Structure of different immune globulins and their functions- primary and secondary antibody
     responses.
 3.5.Antigen antibody interactions and antibody diversity. Types of MHC and role in organ
     transplantation.

<u>**UNIT – IV Immunology – II**</u>

4.1. Structure and functions of cytokines
4.2. T-cell maturation, activation and differentiation
4.3. B-cell activation, differentiation and proliferation.
4.4. Monoclonal antibodies, production and applications
4.5. Hypersensitivity- Coombs classification, types of hypersensitivity and Autoimmune
     diseases- mechanism of auto immunity.

Practical paper - IV

1. Preparation of microbiological media
2. Isolation of bacteria by streak, spread, and pour plate method
3. Staining and identification of bacteria-(Gram staining and simple straining)
4. ELISA test
5. Microagglutination using microtiter plates (eg. ABO and Rh Blood grouping)
6. RBC /WBC count

Spotters

1. HIV
2. Autoclave
3. Laminar Air Flow
4. Bacterial growth curve
5. Cyanobacteria
6. Hot air oven
7. Immunoglobulin
8. Monoclonal antibody
9. Vaccine
10. Haptens
11. Macrophage
12. Haemoglobin

'
, **REFERENCE BOOKS**

1. Brock, T.D. and Madigan, M.T. Biology of Microorganisms
2. Prescott, L.M., Harley, J.P. Klein, D.A. Microbiology
3. Pelczar, M.J, Chan, E.C.S., Ereig, N.R. Microbiology
4. Benson Microbiological applications
5. Freifelder, D Physical biochemistry: application to biochemistry and molecular biology
6. Wilson & Walker Practical biochemistry
7. Upadhyaya and Upadhyaya Physical biochemistry
8. Essential Immunology - By I. Roitt, Publ: Blackwell
9. Microbial Genetics - By S.R. Maloy, J.E. Cronan & D. Freifelder, Publ: Jones & Barlett
10. Immunology - By G. Reever & I. Todd, Publ: Blackwell
11. From Genes to Clones - By E.L. Winnacker, Publ: Panima, New Delhi
12. Immuno diagnostics - By S.C. Rastogi, Publ: New Age

Skill Enhancement Course - II-
FOR ALL SCIENCE FACULTY DEPARTMENTS
B.Sc., II YEAR, IV Semester
MULTIMEDIA AND APPLICATIONS

Credits: 2

Theory: 2 hours/week   **Marks - 50**

Unit - I FONTS AND IMAGES
1.1.Multimedia: Introduction to multimedia, components, uses of multimedia, Multimedia applications, virtual reality.
1.2.Text: Fonts and Faces, Using Text in Multimedia, Font Editing and Design Tools, Hypermedia & Hypertext.
1.3.Images: Still Images – bitmaps, vector drawing, 3D drawing and rendering, natural, light and colors, computerized colors, color palettes, image file formats.

Unit – II AUDIO AND VIDEO
2.1.Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.
2.2. Video: How video works, analog video, digital video, video file formats, video shooting and editing.
2.3. Animation: Principle of animations, animation techniques, animation file formats.

References:
1. Tay Vaughan, ―Multimedia: Making it work‖, TMH, Eighth edition.2011

2. Ralf Steinmetz and KlaraNaharstedt, ―Multimedia: Computing, Communications Applications‖, Pearson.2012

3. Keyes, ―Multimedia Handbook‖, TMH,2000.
4. K. Andleigh and K. Thakkar, ―Multimedia System Design‖, PHI.2013