U.G (2019-20)

Bharatiya Vidya Bhavan

BHAVAN'S VIVEKANANDA COLLEGE OF SCIENCE, HUMANITIES AND COMMERCE, SAINIKPURI, SECUNDERABAD.

Autonomous College-Affiliated to Osmania University, Hyderabad.
(Accredited with 'A' grade by NAAC)

Department of Microbiology

B.Sc core (optional) Subject: Microbiology, CBCS(2016-17)

YEAR	SEM	PAPER	CODE	COURSE TITLE	COURSE TYPE	HPW	CREDITS
I	I	I	MB 131	Introductory Microbiology	DSC-1A	4+2	5
	II	II	MB 231	General Microbiology	DSC-1B	4+2	5
II	III	III	MB331	Microbial Physiology	DSC-1C	4+2	5
			MB301	Food adulteration	SEC-1	2	2
	IV	IV	MB431	Molecular Biology	DSC-1D	4+2	5
			MB401	Fundamentals of Bioinformatics	SEC-2	2	2
III	V	V	MB531	Agricultural and Environmental Microbiology	DSC-1E	3+2	4
		VI	MB532	A. Immunology or B. Diagnostic microbiology	DSE-1E	3+2	4
			MB501	Clinical Microbiology	SEC-3	2	2
			MB502	Microbes for human welfare	GE-1	2	2
	VI	VII	MB631	Medical Microbiology	DSC-1F	3+2	4
		VIII	MB632	A. Food and Industrial Microbiology or B. Microbial Technology	DSE-1F	3+2	4
			MB601	Mushroom Cultivation	SEC-4	2	2
			MB602	Contagious diseases and Immunisation	GE-2	2	2

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DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-2020

B.Sc SEMESTER - I Paper - I

INTRODUCTORY MICROBIOLOGY

MONTH (WORKING DAYS)	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I	**History of microbiology**		
JUNE	1		Meaning, Definition and Scope of Microbiology	2	2
			History of Microbiology– An overview till 21st century	2	4
	2		Edward Jenner, Louis Pasteur,Robert Koch, Iwanowsky, Beijerinck, Winogradsky, Selman Walksman, Paul Ehrlich, and Alexander Fleming.	6	10
JULY	3		Branches of Microbiology and Applications of Microbiology	5	15
		II	**Microscopy and Prokaryotic Cell**		
	4&5		Principles of Microscopy. Bright field, Dark field, Phase-contrast, Fluorescent and Electron microscopy (SEM and TEM). Micrometry - Units of microscopic measurements.	7	22
	5&6		Types of stains and Principles of staining - Simple stain, Differential stain, Negative stain, Structural stains - Spore, Capsule, Flagella and Storage granules	6	28
AUGUST	7		Motility in Bacteria. Hanging-drop method.	2	30
		III	**Microbial Sterilization Techniques**		
	7&8		Sterilization and Disinfection techniques. Principles and methods of Sterilization.	3	33
	8		Physical methods – Autoclave, Hot-air oven, Pressure cooker, Tyndallization	3	36
	9&10		Radiation methods – UV rays, gamma rays, Ultra sonic methods, Microwave.	6	42
SEPTEMBER	10		Chemical methods – Use of Alcohols, Aldehydes, Fumigants, Phenols, Halogens,	3	45
		IV	**General characters of viruses**		
	11&12		General characteristics, Cultivation, Maintenance and ICTV Classification of Viruses-Plant, Animal and Bacteriophage.	6	51
	12		Structure of TMV,HIV	2	53
	13&14		Structure of T2 bacteriophage	6	59
OCTOBER	15		Structure and multiplication of lambda bacteriophage	1	60

DEPARTMENT OF MICROBIOLOGY: 2019-2020

I SEMESTER PRACTICALS-Academic organizer

(INTRODUCTORY MICROBIOLOGY- Paper I)

Month	Week	B.Sc I Year Practicals	CLASSES	Total
JUNE	1	Precautions to work in Microbiology laboratory	1	1
JULY	2	Light compound microscope and its handling	1	2
	3,4	Calibration of microscopic measurements (Ocular, Stage micrometers) and Measurement	1	3
	5	Microscope observation of bacteria (Gram +ve bacilli and cocci,Gram –ve bacilli), Cyanobacteria (Nostoc, Oscillatoria, Anaebena, Spirulina), Algae (Scenedesmus Sps., Diatoms),and Fungi (Saccharomyces, Rhizopus, Aspergillus, Penicillin,	1	4
	6	Simple and Differential staining (Gram staining)	2	6
AUG	7,8,9	Spore staining, Capsule Staining and Negative staining	3	9
	10,11	Sterilization techniques : Autoclaving, Hot-Air oven and Filtration	2	11
SEP	12	Hanging drop technique for observation of motility in Bacteria.	1	12
SEP/OCT	13,14,15	Diagramatic or Electron photomicrographic observation of TMV, HIV, T2 Phage and Adeno virus)	3	15

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-20

B.Sc SEMESTER - II Paper - II

GENERAL MICROBIOLOGY

MONTH	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I	**Bacterial Taxonomy and General Characters of Prokaryotes & Eukaryotes**		
NOV	1		Outline classification of living organisms: Haeckel, Whittaker and Carl Woese System	5	5
NOV	2		Outline classification for bacteria as per the second edition of Bergey's Manual Of Systematic Bacteriology (up to section level).	3	8
			Differentiation of Prokaryotes and Eukaryotes	1	9
DEC	3		Prokaryotes - General characteristics of Bacteria, Archaebacteria, Rickettsias, Mycoplasma, Cyanobacteria and Actinomycetes	3	12
DEC	4		Eukaryotes – General characteristics and classification (up to order level) of eukaryotic microorganisms – Protozoa, Microalgae, Molds and Yeast	3	15
		II	**Pure Culture Techniques & Preservation**		
DEC	4		Concept of Pure cultures	1	16
DEC	5,6		Isolation of Pure culture techniques – Enrichment Culturing, Dilution-Plating, Streak Plate, Spread Plate, Pour Plate, Single cell isolation and Micromanipulator	8	24
JAN	7		Culturing methods- Aerobic and Anaerobic methods	2	26
JAN	8		Preservation of microbial cultures – Sub culturing, Overlaying cultures with mineral oils, Lyophilization, Sand cultures, Storage at low temperature	4	30
		III	**Biomolecules**		
JAN	9		Biomolecules of microorganisms and their significance	1	31
Jan	9		Outline Classification and Properties of Carbohydrates (MonosaccharideDisaccharides and Polysaccharides).	3	34
JAN	10		Structure and properties of Amino acids and Proteins	4	38
FEB	11,12		Structure and properties of Nitrogenous bases, Nucleotides, Nucleic acids	5	43
FEB	13		Structure and Classification of lipids	2	45

		IV	**Biochemical Techniques**		
FEB	13		Buffers- types of buffers and their use in biological reactions	3	48
FEB	14		Hydrogen ion concentration in biological fluids, pH measurement	2	50
			Principle and application of Colorimetry	3	53
MARCH	15		Chromatography - Paper and Thin layer	7	60
			Electrophoresis – Paper electrophoresis, Agarose gel electrophoresis (AGE)		

DEPARTMENT OF MICROBIOLOGY(2019-20)

II SEMESTER PRACTICALS-Academic Organizer

(GENERAL MICROBIOLOGY- Paper II)

Month	Week	B.Sc I Year Practicals	CLASSES	Total
Nov/Dec	1	Isolation of single colonies on solid media	1	1
Dec	2	Enumeration of bacterial numbers by serial dilution and plating	1	2
Dec	3	Isolation of pure cultures by streak, spread and pour plate techniques	1	3
Dec	4	Preparation of culture media: Solid / Liquid	1	4
Jan	5	Preservation of microbial cultures – Slants, Stabs, Sand cultures, Mineral oil overlay- Glycerol stocks	1	5
Jan	6,7&8	Aerobic culturing methods –Shake flask, Anaerobic method -McIntosh Jar, Pyrogallol method.	2	7
Jan	9	Paper Chromatography	1	8
Feb	10&11	Qualitative tests for Carbohydrates	2	10
Feb	12&13	Qualitative tests for amino acids	2	12
Feb	14	Absorption Maxima	2	14
Mar	15	Verification of Beer Lambert's Law	1	15

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-20

B.Sc SEMESTER - III Paper - III

MICROBIAL PHYSIOLOGY

MONTH	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I	**Nutrition and Growth**		
JUNE	1		Microbial Nutrition - Nutritional requirements and uptake of nutrients by cells	3	3
	2		Nutritional groups of microorganisms - Autotrophs, Heterotrophs, PhototrophsChemotrophs, Organotrophs, Lithotrophs, Mixotrophs, Methylotrophs. With example of each	4	7
	3		Growth media - Synthetic, Nonsynthetic, Selective, Enrichment and Differential media.	3	10
JULY	4		Microbial growth - Different phases of growth in batch cultures	2	12
	5		Synchronous, continuous, biphasic growth	2	14
			Factors influencing microbial growth		
	5&6		Methods for measuring microbial growth – Direct microscopy, Viable Count estimates, Turbidometry, Biomass. (DNA, Protein, Nitrogen content- Kjeldal method)	1	15
		II	**Enzymes**		
	7		Enzymes - properties and classification, enzyme unit ,enzyme assay methods	4	19
AUG	8,9		Biocatalysis - Induced fit, Lock and key model, Types of catalysis, Coenzymes , Cofactors, Factors affecting catalytic activity of enzymes	6	25
	9&10		Inhibition of enzyme activity –Reversible, Competitive, Non competitive, uncompetitive and Irreversible, Allosteric	5	30
		III	**Microbial Metabolism 1**		
	10		Aerobic respiration - Glycolysis, HMP pathway, ED pathway, TCA cycle	3	33
	11		Electron transport, Oxidative and Substrate-level Phosphorylation	5	38
SEP	12		β-Oxidation of fatty acids	4	42
	12&13		Glyoxylate cycle	3	45
		IV	**Microbial Metabolism 2**		

	13		Anaerobic respiration (nitrate, sulphate respiration).	2	47
	14		Fermentation - Common microbial fermentations with special reference to Ethyl alcohol, Butanol and lactic acid fermentations	6	53
	14		Photosynthetic apparatus in prokaryotes	2	55
SEP/OCT	15		Outlines of oxygenic and anoxygenic photosynthesis in bacteria	5	60

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SUBJECT -MICROBIOLOGY III SEMESTER PRACTICALS

Microbial physiology - Paper III)

Month	Week	B.Sc II Year Practicals	CLASSES	Total
JUNE	1	Preparation of media for culturing Autotrophic and Heterotrophic microorganisms - Algal medium, Mineral salts medium, Nutrient agar medium, McConkey agar, and Blood agar	1	1
	2,3	Enrichment culturing and isolation of Phototrophs and Chemoautotrophs	2	3
JUNE/JULY	4	Setting and observation of Winogradsky Column	1	4
	5	Determination of viable count of bacteria	1	5
	6,7	Turbidometric measurement of bacterial growth	2	7
	8,9	Bacterial growth curve	2	9
AUG	,10,11,12	Factors affecting bacterial growth – pH, temperature, salts	3	12
	13	Sugar fermentation	1	13
SEP/OCT	14,15	Starch hydrolysis and amylase assay (Quantitative method).	2	15

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B. Sc MICROBIOLOGY (CBCS STRUCTURE)

MB-301 SEC-1, FOOD ADULTERATION					
Month	**Week**	**UNIT**	**FOOD ADULTERATION**	**Hrs**	**Total**
JUNE	1,2	I	Definition and Introduction to food adulteration.	4	4
	3,4		Types of Food Adulteration	4	8
JUNE/JULY	5,6		Common Food adulterants	4	12
	7		Causes of Food adulteration	2	14
	8		Analysis of food	2	16
	9	II	Effects of Food Adulteration	2	18
AUG	10,11,		Prevention of Food adulteration	4	22
	12,13		Detection of Common food Adulterants.	4	26
SEP/OCT	14,15		Food Adulteration act-1954	4	30

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-20

B.Sc SEMESTER - IV Paper - IV

MOLECULAR BIOLOGY

MONTH	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I	**Fundamentals of Microbial Genetics**		
NOV	1		DNA and RNA as genetic materials	2	2
			Structure of DNA – Watson and Crick model (B), A and Z forms of DNA	2	4
	2		Super coiling of DNA (positive and negative coiling, Topoisomerases /Gyrase) Replication of DNA – Semi conservative mechanism	3	7
			Types of RNA and their functions	2	9
DEC	3&4		Outlines of RNA biosynthesis in prokaryotes Genetic code. Structure of ribosomes and a brief account of protein synthesis	6	15
		II	**Mutation and Genetic variation**		
	4		Mutations – spontaneous and induced, base pair changes, frame shifts, deletions,inversions, tandem duplications, insertions	3	18
	5		Various physical and chemical mutagens, Biological agents, Overview of Site directed Mutagenesis	4	22
	6		Outlines of DNA damage and repair mechanisms	3	25
	7		Genetic recombination in bacteria – transformation, transduction and conjugation	5	30
		III	**Microbial Gene Expression**		
JAN	8		Concept of gene and its product,gene structure - Muton, Recon and Cistron	4	34
	9		Operon concept. Regulation of gene expression in bacteria – lac operon	4	38
	10		Extra chromosomal Genetic elements:a.Plasmids : Types F, R, Col Ti, Degradative etc, Properties and Functions	4	42
	11		b.Transposons : IS, Composite, DNA , RNA and Retro transposons -b.Transposons : IS, Composite, DNA , RNA and Retro transposons -Structure and Functions	3	45
		IV	**Recombinant DNA Technology**		

FEB	11		Basic principles of genetic engineering	1	46
	12		Enzymes in Genetic engineering ,restriction endonucleases, DNA polymerases,ligases S1 nuclease ,Reverse transcriptase,Alkaline phosphatase, Methylase,	4	50
	13		Outlines of gene cloning methods-random cloning,short gun ,PCR and cDNA	4	54
	14		Genomic and c DNA libraries.- construction and applications	3	57
EB/MARCI	15		General account on application of genetic engineering in industry, agriculture ,Medicine, Environment	3	60

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SUBJECT -MICROBIOLOGY IV SEMESTER PRACTICALS

MOLECULAR BIOLOGY - Paper IV)

Month	Week	B.Sc IV Year Practicals	CLASSES	Total
NOV	1,2	Colorimetric estimation DNA by diphenylamine method.	1	1
NOV/DEC	3,4,5	Colorimetric estimation RNA by orcinol method	3	4
DEC	5,6	Colorimetric estimation of proteins by Biuret method	2	6
JAN	7,8,9	Extraction of Genomic DNA	3	9
FEB	10,11,12	Agarose gel Electrophoresis	3	12
FEB/MAR	13,14,15	Problems related to DNA and RNA characteristics, Transcription and Translation	3	15

2019-20					
B. Sc MICROBIOLOGY (CBCS STRUCTURE)					
	SEC-2: MB 401: FUNDAMENTALS OF BIOINFORMATICS				
SEMESTER (2 HPW-2Credits)					
Month	**Week**	**UNIT**		**Hrs**	**Total**
		I	**Introduction to Bioinformatics and Biological Databases**		
NOV	1,2		Human Genome Project.	4	4
DEC	3,4		. Bioinformatics and overview of genomics, transcriptomics, and proteomics	4	8
DEC	5,6		Biological Databases: primary and secondary, knowledgebases, databases for sequence, structure, metabolic pathways. interactions	4	12
JAN	7		Searching databases with text and sequence queries (BLAST)	2	14
	8		Pair-wise and multiple sequence alignment	2	16
		II	**Technologies for HTS**		
	9		1. Methods to characterize the genome: first, second and third generation sequencing techniques for DNA	2	18
	10,11,		2. Methods to characterize the transcriptome: PCR and RNA sequencing	4	22
JAN/FEB	12		3. Methods to characterize the proteome: peptide sequencing and MS methods	2	24
FEB	13,14		4. Analytical methods: Microarrays to study the genome and transcriptome	4	28
MAR	15		5. Genome engineering using ZFN, TALENs, and CRISPR	2	30

			CHOICE BASED CREDIT SYSTEM		
			AGRICUTURE AND ENVIRONMENTAL MICROBIOLOGY		
			SEMESTER V ; PAPER V MB531		
			ACADEMIC ORGANIZER YEAR 2019-20 (Batch 2017-20)		
Month	**Week**	**Unit**	**Detail/topic**	**No. of Hrs**	**Total**
JUNE		**I**	**Agricultural Microbiology**		
	1		Physical and chemical characteristics of soil	1	1
	1		Microorganisms of Soil	1	2
	1,2		Rhizosphere and Phyllosphere	2	4
	2,3		Plant growth promoting organisms		
			(mycorrhizae, rhizobia, azospirillum, azatobacter, cyanobacteria, frankia and phosphate solubilizing organisms)	5	9
	4		Outlines of biological nitrogen fixation (symbiotic, non-symbiotic)	2	11
	4		Bio-fertilizers- Production & Application of Biofertilizers-Rhizobium and Cyanobacteria	1	12
		II	**Plant Disease and Biocontrol**		
JULY	5		Concept of disease in plants	1	13
	5,6		Symptoms of plant disease caused by fungi, bacteria and viruses.	3	16
	6,7		Plant diseases caused by fungi(Groundnut rust),Bacteria(angular Leaf spot of cotton) and Viruses(Tomato leaf curl)	3	19
	7		Principles of plant disease control	1	20
	7,8		Biological control of plant diseases	3	23
			Biopesticides- bacillus thuringiensis, nuclear poly hedrosis virus (NPV),Trichoderma		
		III	**Environmental Microbiology**		
AUG	8,9,10		Role of Microorganisms in nutrient cycling- carbon, nitrogen , sulphur and phosphorus	6	29
	10,11		Microbial interactions- mutualism, commensalism, antagonism, competition, parasitism, predation	2	31
	11		Microorganisms in Air	1	32
	11,12		Air Sampling Methods	2	34
		IV	**Environmental Pollution and Bioremediation**		
	12		Microorganisms in water	1	35
SEP	12,13		Microbiology of potable and polluted waters. *Ecoli* and *Streptococcus faecalis* as indicators of water pollution	3	38
			Sanitation of potable water		
	13,14		Sewage treatment(primary, secondary and tertiary)	3	41
	14,15		Outlines of biodegradation of environmental pollutants-pesticides	2	43
OCT	15		Solid waste disposal- sanitary land fills, composting	2	45

		CHOICE BASED CREDIT SYSTEM		
		AGRICUTURE AND ENVIRONMENTAL MICROBIOLOGY PRACTICALS		
		SEMESTER V ; PAPER V MB531		
		ACADEMIC ORGANIZER YEAR 2019-20 (Batch 2017-20)		
Month	**Week**	**B.Sc Practicals**	**Hrs**	**Total**
JUNE	1,2,3,4	Isolation and enumeration of major groups of microorganisms from rhizosphere and non rhizosphere	4	4
JULY	5	Isolation and enumeration of major groups of microorganisms from phyllosphere.	1	5
	6	Study of root nodules and isolation of *Rhizobium* from legume root nodules	1	6
	7	Isolation of *Azospirillum / Azotobacter*	1	7
	8	Staining and observation of vesicular-arbuscular mycorrhizal (VAM) fungi	1	8
AUG	9	Observation of plant diseases of local importance – Rusts, smuts, powdery mildews, tikka disease of groundnut, citrus canker, bhendi yellow vein mosaic, tomato leaf curl, little leaf of brinjal	1	9
	10	Isolation of microorganisms of air by Petri plate exposure method	1	10
	11	Determination of biological oxygen demand (BOD) of polluted water	1	11
SEP/ OCT	12,13,14	Microbial testing of water by coliform test (Multiple Tube Fermentation method).	3+1	14+1 = 15

DEPARTMENT OF MICROBIOLOGY

2017-20 Batch Autonomous(Academic year 2019-20)

SEMESTER V - Immunology (THEORY) Paper VI					
MONTH	**WEEK**	**UNIT**	**TOPIC**	**NO.OF CLASSES**	**TOTAL**
		I	**History and types of Immunity**		
JUNE	1		History of Immunology	1	1
			Recent developments of immunology	1	2
	2,3		Types of immunity – innate and acquired; active and passive	6	8
	3		Humoral and Cell-mediated immunity	1	9
JUNE	4		Vaccines – natural and recombinant	2	11
		II	**Components of Immune system**		
	04-Jan		Process of Hematopoiesis	1	12
JULY	5,6		Identification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils	3	15
	6,7		Process of Phagocytosis	1	16
	6		Primary organs of immune system- Thymus, Bursa fabricus, Bone marrow	2	18
	7	3	Secondary organs of immune system –, Spleen, Lymph nodes, Mucous Associated Lymphoid Tissue (MALT).	3	21
		III	**Basics of Immunology**		
	8		Antigens – types, chemical nature, antigenic determinants, haptens.	3	24
			Factors affecting antigenicity		
AUG	9		Antibodies – basic structure, types, properties and functions of immunoglobulins	3	27
	10		Complement, Components of complement and activation of complement	3	30
	11		Role of Cytokines in Immune system	2	32
		IV	**Immunological processes**		
SEP	11,12		Types of antigen-antibody reactions – agglutination, precipitation, neutralization, complement fixation	3	35

	12,13		Labeled antibody based techniques – ELISA, RIA and Immunofluroscence,	3	38
			Western Blotting.		
	14		Polyclonal and monoclonal antibodies – production (Hybridoma Technology) and applications	1	39
	14		Types of hypersensitivity – immediate and delayed	2	41
OCT	15		MHC and its Role in graft rejection	1	42
	15		Autoimmunity and its significance	3	45

2017-20 Batch Autonomous(Academic year 2019-20)
SUBJECT -MICROBIOLOGY V SEMESTER PRACTICALS
IMMUNOLOGY-PAPER-VI

Month	**Week**	**B.Sc Practicals**	**Classes**	**Total**
JUNE	1,2	Total Count(TC)-RBC count, WBC	2	2
	3	Total Differential Count (DC)	1	3
	4	Separation of serum and plasma	1	4
JULY	5	Erythrocyte Sedimentation Rate	1	5
	6	Estimation of blood haemoglobin-	1	6
	7	Determination of blood groups and Rh typing	1	7
JULY/AUG	8,9	Widal test – Qualitative and Semi-quantitative	2	9
	10,11	VDRL test - Qualitative and Semi-quantitative	2	11
	12	Ouchterlony double diffusion test	1	12
SEP	13	Radial Immuno diffusion	1	13
OCT	14,15	ELISA	2	15

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-2020

SEC-3: MB 501: CLINICAL MICROBIOLOGY

V SEMESTER

Month	Week	S.No	TOPICS	CLASSES	Total
JUNE--UNIT 1	1	1	Overview of infectious diseases-bacterial, viral, fungal, parasitic	2	2
JULY	2	2	Collection of clinical specimens and their processing -blood sample, Separation of blood	2	4
	3,4	3	Examination of sample by staining - Gram stain, Ziehl-Neelson staining for	4	6
	5	4	Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, MacConkey agar,	2	8
UNIT 2	6	5	Kit based serological detection of Pathogens - Typhoid,	2	10
JULY/AUG	7	6	Dengue, HIV	2	12
	8,9,10	7	Swine flu, Syphilis	6	18
SEP	11	8	Molecular methods of Diagnosis - PCR	2	20
	12	9	Western blotting	2	22
SEP/OCT	13,14,15	10	Testing for Antibiotic sensitivity in Bacteria	6	30

B.Sc ACADEMIC ORGANIZER 2019-20

GE-1: MB 502: MICROBES FOR HUMAN WELFARE

V SEMESTER (2 HPW-2Credits)

MONTH	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I			
JULY	1,2		Introduction to microorganisms	3	3
	2,3		Applications of microbes in food processing.	3	6
JULY/AUG	4,5		Applications of microbes in Industry	3	9
	5,6		Applications of microbes in agriculture	3	12
	7,8		Microbes in Research & Development	3	15
		II			
	8,9		Microorganisms related to human health-Sources of infection, disease, prevention and control.	3	18
SEP	9,10		Normal flora of human body and its significance.	3	21
	11,12		Antibiotics and their use	3	24
SEP/OCT	12,13		Concept of drug resistance	3	27
OCT	14,15		Cosmetic microbiology	3	30

DEPARTMENT OF MICROBIOLOGY

2017-20 Batch Autonomous(Academic year 2019-20)

SEMESTER VI - Medical Microbiology(THEORY)					
MONTH	**WEEK**	**UNIT**	**TOPIC**	**NO.OF CLASSES**	**TOTAL**
		I	**Basics of Medical microbiology**		
JUNE	1		History of Medial microbiology	1	1
	1,2		Normal flora of human body-Definition, Effects of Antibiotics, Distribution of normal flora,Germ free life	3	4
	2		Definition and process of infection, non-specific defense mechanisms, mechanical barriers	2	6
	3		Host-pathogen interactions. Bacterial toxins, virulence and attenuation	3	9
	4		Anti-microbial substances of host – lysozyme, complement, properdin, antiviral substances, Phagocytosis ,beta lysine, leukin, lactoperoxidase	2	11
		II	**Diagnostic Microbiology & Medical Bacteriology**		
			General principles of diagnostic microbiology	1	12
JULY	5		Collection, transport and processing of clinical samples	2	14
	5,6		General methods of laboratory diagnosis – cultural, biochemical, serological and molecular methods	2	16
	6		General account of the following diseases – causal organisms, pathogenesis, epidemiology, diagnosis, prevention and control of:	1	17
	6		Air-borne diseases - Tuberculosis	1	18
	7		Food and water-borne diseases - Cholera, Typhoid.	2	20
AUG	7,8		Contact diseases - Syphilis, Gonorrhoea	2	22
	8		General account of nosocomial infections- *Staphylococcus* and *Pseudomonas*	1	23
		III	**Virology and Parasitology**		
			General account of the following diseases –		
	8		Air-borne diseases - Influenza	1	24

	9		Food and water-borne diseases - Hepatitis- A, Poliomyelitis, Amoebiasis	3	27
	10		Zoonotic diseases – Rabies	2	29
	10,11		Blood-borne diseases - Serum hepatitis, AIDS	2	31
SEP	11&12		Insect Borne: Malaria, Dengue	3	35
		IV	**Chemotherapy**		
	12		Elements of chemotherapy – therapeutic drugs	2	36
	13,14		Mode of action of cell wall inhibitors(penicillin), antimetabolites (sulpha drugs), and their clinical use	4	40
OCT	14,15		Drug resistance	3	43
	15		Tests for antimicrobial susceptibility	1	44
	15		General account of antiviral drugs	1	45

DEPARTMENT OF MICROBIOLOGY

2017-20 Batch Autonomous(Academic year 2019-20)

SUBJECT - VI SEMESTER PRACTICALS

MEDICAL MICROBIOLOGY

Month	**Week**	**B.Sc Practicals**	**Hrs**	**Total**
JUNE	1,2,3	Media for isolation of bacterial pathogens: McConkey, Mannitol Salt agar, Cetrimide, Simmon Citrate Media	3	3
	4	Acid fast staining of Mycobacteria(stained/permanant slide)	1	4
AUGUST	5,6,7,8,9,10	Isolation and identification of medically important bacteria (*E. coli, Klebsiella* , *Pseudomonas, Staphylococcus*) by cultural, microscopic and biochemical tests.	6	10
SEP	11	Antibiotic sensitivity testing – disc diffusion method	1	11
	12	Parasites – Malarial parasite, *Entamoeba* (study of permanent slides).	1	12
	13	Observation of fungal pathogen *(Candida*).	1	13
OCTOBER	14,15	Tests for disinfectant (Phenol coefficient).	2	15

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-20 (Batch 2017-20)

B.Sc SEMESTER - VI Paper - VIII

FOOD AND INDUSTRIAL MICROBIOLOGY (CBCS)

MONTH	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I	**Food Microbiology**		
NOV	1		Microorganisms of food spoilage and their sources	1	1
	1&2		Spoilage of different food materials - fruits, vegetables, meat, fish. Canned foods	5	6
	3&4		Food poisoning (botulism and staph poisioning), Food bornediseases (Salmonellosis, Shigellosis, Listeria) and their detection	4	10
	4		General methods of food preservation	2	12
		II	**Applied Food Microbiology**		
DEC	5		Microbiological production of fermented foods – bread, cheese, yogurt	3	15
	6		Biochemical activities of microbes in milk	2	17
	6&7		Microorganisms as food – SCP, edible mushrooms.	4	21
	8		Concept of probiotics and its production	2	23
		III	**Industrial Microbiology**		
	8&9		Microorganisms of industrial importance – yeasts, molds, bacteria, actinomycetes	3	26
DEC/JAN	9&10		Screening and isolation of industrially-important microorganisms	2	28
	10		Outlines of strain improvement	2	30
	11&12		Types of fermentation – aerobic, anaerobic, batch, fed batch continuous,surface ,submerged and solid state	4	34
		IV	**Microbial Biotechnology**		
	12		Design of a stirred tank reactor fermentor	1	35
FEB	12&13		Fermentation media. Raw materials used in fermentation industry	2	37
FEB/ MAR	13,14,15		Industrial production of alcohols (ethyl alcohol), beverages (beer), enzymes(amylases), antibiotics (penicillin), amino acids (glutamic acid), organic acids(citric acid), vitamins (B12), biofuels (biogas - methane). Insulin production.	8	45

Academic Organizer 2019-20(Batch 2017-20)

SUBJECT -MICROBIOLOGY VII SEMESTER PRACTICALS

FOOD AND INDUSTRIAL MICROBIOLOGY

Month	Week	B.Sc Practicals	Hrs	Total
NOV	1,2,3,4	Observation and Isolation of fungi and bacteria from spoiled fruits and vegetables	4	4
DEC	5	MBRT –Test for microbiological quality of milk	1	5
	6	Isolation of antagonistic microorganisms by crowded plate technique	1	6
	7,8	Isolation of amylase-producing organisms	2	8
JAN	9,10,11	Alcohol production and estimation; Calculation of fermentation efficiency	3	11
JAN/FEB	12,13	Citric acid production and estimation	2	13
FEB/ MAR	14,15	Preparation of fermented food- Yoghurt	2	15

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-20

SEC-4: MB 601: MUSHROOM CULTIVATION- VI SEMESTER

Month	Week	UNIT	B.Sc I Year Practicals	Hrs	Total
Nov/DEC	1	1	Introduction to mushroom	2	2
Dec	2		Importance and history of mushroom cultivation in India	2	4
	3		Global status of mushroom production	2	6
	4		Food value of mushroom	2	8
JAN	5	II	Steps in mushroom cultivation	2	10
	6&7		Selection of site and types of mushroom Mushroom farm structure, design layout	4	14
JAN/FEB	8,9&10		Principle and techniques of compost and composting Principle of spawn production	6	20
	11&12		Casing and crop production	4	24
MAR	13&14		Harvesting and marketing Pest and pathogens of mushrooms	4	28
	15		Post-harvest handling and preservation of mushrooms	2	30

DEPARTMENT OF MICROBIOLOGY

B.Sc ACADEMIC ORGANIZER 2019-20

GE-2: MB 602: CONTAGIOUS DISEASES AND IMMUNIZATION

VI SEMESTER (2 HPW-2Credits)

MONTH	WEEK	UNIT	TOPIC	NO.OF CLASSES	TOTAL
		I	**Contagious diseases**		
NOV	1,2		Types of Infections	3	3
	2,3		Sources of infections.	3	6
DEC	4,5		Mode of infections.	3	9
	5,6		Overview of bacterial diseases.	3	12
	7,8		Overview of Viral Diseases.	3	15
		II	**: Immunization**		
	8,9		Immunity.	3	18
JAN	9,10		Types of Immunity.	3	21
	11,12		Immunization.	3	24
	12,13		Types of immunization.	3	27
FEB / MAR	14,15		Vaccines- Live and killed vaccines.	3	30
			Vaccination schedule		