Department of Microbiology

Teaching Plan Academic Year 2020-2021

Teacher: Prof. K.R.Gaikwad

Class : B.Sc.F.Y [II Semester]
Course Title : Basics of Microbiology and Biomolecules
Course Code: U-MIB-252

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT I	**Ultra Structure of Bacterial Cell**	1.1 Structure, Chemical composition and function of following:- a) Capsule and slimes b) Cell wall and cytoplasmic membranes c) Flagella and Motility, fimbriae and pili d) Nuclear material, Plasmids, Mesosomse, , Ribosome e) Reserve materials and other cellular inclusions. f) Dormant forms of prokaryote: Endospore and cyst	15/03/2021	27042021	15
UNIT II	**The Viruses:Distribution and Structure**	2.1) Viruses:history 2.2) General characteristics of viruses 2.3)Bacterial , plant and animal viruses 2.4) Multiplication of Virulent phage: The lytic cycle 2.5) The development of temperate phages: Lysogeny 2.6)Cultivation of viruses 2.7) viruses like agent :Viroids Prion, Satellites	28/04/2021	18/05/2021	10

UNIT III	**Biomolecules**	3.1 Carbohydrates a) Definition and classification b) Triose, Pentose, Hexose (Examples and Structure) c) Disaccharides:- Glycoside linkage (Lactose, Maltose and Sucrose) d) Oligosaccharides:- Trisaccharides (Structure of Raffinose) e) Polysaccharides:- Homo and Heteropolysaccharides Structure (Starch, Cellulose,) 3.2 Lipids: a)Definition and classification b)Properties	19/05/2021	15/06/2021	10
UNIT IV	**Functional and Informational Biomolecules**	4.1 Proteins: a) Definition and Classification b) Peptide bond: Configurations of proteins c) Biological significance of proteins 4.2 Nucleic Acids a)Nucleosides and Nucleotides. b)DNA: - Properties, structure and functions c)RNA: - Properties, structure and functions	16/06/2021	07/07/2021	10

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Teacher: Prof. K.R.Gaikwad

Class : M.Sc.F.Y [I Semester]
Course Title : Advances in Virology
Course Code: P-ADV-181

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT I	**Classification, Cultivation and Detection of Viruses**	1.1Definitive properties and classification of viruses a. Cataloging of Viruses-International Committee onTaxonomy of viruses (ICTV), b. Structure based classification, c. Baltimore classification and Homes classification, d. LHT system of classification, Morphology and Ultra structure of Viruses. 1.2Cultivation of Viruses a. Introduction, b. Cell culture, Embryonated egg and Laboratory animals 1.3Detection of viruses in the host a. Measurement of infectious units, b. Measurement of virus particles and their components 1.4One step growth cycle and Assay of viruses, a. Physical (Electron microscopy) b. Chemical methods (Protein and Nucleic acid studies) c. Infectivity assay	01/01/2021	15/01/2021	12
UNIT II	**Multiplication of Viruses**	2.1Introduction, 2.2 Architecture of cell surfaces, Interaction of viruses with cell receptors, Uptake of macromolecules by cells, Mechanism of virus entry into cells, Transport of viral genome into the cell nucleus. 2.3Genomic replication of Viruses (DNA/RNA), mRNA production by animal viruses, Mechanism of RNA synthesis, Transcription mechanism and Post transcriptional processing, 2.4Translation of viral protein, Assembly, Exit and Maturation of progeny virions 2.5Multiplication of bacteriophages	16/01/2021	29/01/2021	11

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT III	**Viral Pathogenesis**	3.1Host and virus factors involved in pathogenesis, Patterns of infection, 3.2Pathogenesis of animal viruses (Adenovirus, Herpes virus, Hepatitis virus, Picorna virus, Poxivirus and Orthomyxovirus) 3.3Pathogenesis of plant viruses (TMV) and Insect viruses (NPV) 3.4Host cell transformation by viruses and oncogenesis of DNA and RNA viruses.	30/01/2021	11/02/2021	11
UNIT IV	**Prevention and Control of Viruses**	4.1Introduction 4.2 Viral vaccines, Preparation of viral vaccines, New vaccine technology, 4.3Antiviral drugs 4.4Virus evolution and Emergence of new viruses.	12/02/2021	25/02/21	11

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Teacher: Prof. K.R.Gaikwad

Class : M.Sc.S.Y [IV Semester]
Course Title : Fermentation Technology
Course Code: P-MIB-451

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT I	**Microbial Fermentations**	1.1 Metabolic pathways and metabolic control mechanisms. 1.2 Industrial production of citric acid, lactic acid, acetic acid. 1.3 Industrial production of Acetone- butanol, Lysine and Glutamic acid. 1.4 Alcoholic beverages, distilled beverages. 1.5 Industrial production of enzymes (alpha amylase, lipase, xylase, pectinases, proteases) 1.5 Some industrial techniques for whole cell and enzyme immobilization. 1.6 Application and advantages of cell and enzyme immobilization in pharmaceutical, food and fine chemical industries	23/02/21	15/03/21	09
Unit II	**Microbial production of therapeutic compounds**	2.1 Microbial production of antibiotics Beta-Lactam Antibiotics ,aminoglycosides, ansamycines (Rifamycin), 2.2 Industrial production of Peptide antibiotics (Quinolinones), 2.3 Microbial Transformation and Steroids and Sterols. 2.4 Vit.B-12 and riboflavin fermentation.	16/03/2021	24/03/2021	08

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT III	**Modern trends in microbial production**	3.1 Modern trends in microbial production of bioplastics (PHB,PHA), Biopolymer (dextran, alginates, xanthan, pullulan). 3.2 Biofertilizer (nitrogen fixer *Azotobacter*, phosphate solubilising microorganisms) 3.3 Single cell protein production 3.4 Useful features of biofuels. The substrate digester and the microorganisms in the process of biogas production (Biomethanation). 3.5 Production of bioethanol from sugar, molasses, starch and cellulosic materials. 3.6 Microbial production of hydrogen gas, biodiesel from hydrocarbons.	25/03/2021	17/04/2021	17
Unit IV	**Intellectual Property Rights (IPR), Patents**	4.1 Intellectual Property Rights (IPR), Patents, Trademarks, copyrights, secrets, Patenting of biological materials, International co-operation, Obligations with patent applications, Trademarks and geographical indications 4.2 Implication of patenting, current issues, hybridoma technology etc. 4.3 IPR and plant genetic resources (PGRs) Patenting of higher plants and animals, transgenic organisms and isolated genes, patenting of genes and DNA sequences, plant breeders right and farmers rights.	19/04/2021	03/05/2021	11

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Teacher: Prof. K.R.Gaikwad

Class : M.Sc.S.Y [IV Semester]
Course Title : MEDICAL AND PHARMACEUTICAL MICROBIOLOGY
Course Code: P-MIB-452

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT I	**Antibiotics, synthetic antimicrobial agents**	1.1 Antibiotics and synthetic antimicrobial agents (Aminoglycosides, β lactums, tetracyclines, ansamycins, macrolid antibiotics). 1.2 Antifungal antibiotics, antitumour substances. Peptide antibiotics, chloramphenicol, sulphonamides and quinolinone antimicrobial agents. Chemical disinfectants, antiseptics and preservatives. 1.3 Mechanism of action of antibiotics (inhibitors of cell wall synthesis, nucleic acid and protein synthesis). Molecular principal of drug targeting. 1.4 Drug delivery system in gene therapy. Bacterial resistance to antibiotics, quionolinones. Mode of action of bacterial killing by quinolinones. Mode of action of non-antibiotic antimicrobial agents. 1.5 Penetrating defenses –How the antimicrobial agents reach the targets (cellular permeability barrier, cellular transport system and drug diffusion).	22/02/2021	15/03/2021	18
Unit II	**Microbial production and spoilage of pharmaceutical products**	2.1 Microbial production and spoilage of pharmaceutical products (sterile injectable, non-injectable, ophthalmic preparation and implants) and their sterilization. 2.2 Manufacturing procedure and in process control of pharmaceuticals. Other pharmaceuticals produced by microbial fermentations (streptokinase, streptodornase). 2.3 New vaccine technology, DNA vaccines, synthetic peptide vaccines, multivalent subunit vaccines. 3.4 Vaccine clinical trials.	16/03/2021	25/03/2021	09

UNIT NO	UNIT NAME	UNIT CONTENT	FROM	TO	No. Of LECTURES
UNIT III	**Regulatory practices, biosensors and applications in pharmaceuticals**	3.1 Financing R & D capital and market outlook, IP, BP, USP. 3.2 Government regulatory practices and policies, FDA perspective.Reimbursement of drug and biological, legislative perspective. 3.3 Rational drug design.Immobilization procedures for pharmaceutical applications (liposomes).Macromolecular, cellular and synthetic drug carriers. 3.4 Biosensors in pharmaceuticals. Applications of microbial enzymes in pharmaceuticals.	26/03/2021	07/04/2021	09
Unit IV	**Quality assurance and validation**	2.1 Microbial production of antibiotics Beta-Lactam Antibiotics ,aminoglycosides, ansamycines (Rifamycin), 2.2 Industrial production of Peptide antibiotics (Quinolinones), 2.3 Microbial Transformation and Steroids and Sterols. 2.4 Vit.B-12 and riboflavin fermentation.	08/04/2021	20/04/2021	09