

E-mail: sriynmcollege@rediffmail.com
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Office: 08814 – 273246



Sri Y N College

(Autonomous)

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

Thrice Accredited by NAAC with 'A' Grade

Narsapur – 534275, West Godavari District, Andhra Pradesh



DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN – 2019-20

I B.Sc Paper-I, Semester -I

INTRODUCTORY MICROBIOLOGY

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	June	III rd week	History and mile stones in microbiology. Importance and applications of microbiology. of Carl Woese	Scope of microbiology, Scientists, Four kingdom, Five kingdom	Teaching	08	Assignment	1
		IV th week	Contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky. Classification of microorganisms – Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept					1
2.	July	I st week	Outline classification of bacteria as per the second edition of Bergey's Manual of Systematic Bacteriology.	Types of viruses. PPT	Teaching	24	Seminar Assignments World Population day	1
		II nd week	General characteristics of Bacteria, Archaea, Mycoplasmas and Cyanobacteria.					1
		III rd week	Ultra structure of Prokaryotic cell- Variant components and invariant components.					1
		IV th week	General characteristics of viruses. Morphology, Structure and replication of TMV and HIV.					1

3.	Aug	I st week	General characteristics and outline classification of Fungi,.	Bacterial motility – hanging drop technique, cultivation of aerobes & anaerobes	Teaching	24	Slip test Assignments Slip test National Nutrition week	1 1 1
		II nd week	General characteristics and outline classification of Algae and Protozoa					
		III rd week	Mid exams					
		IV th week	Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).					
4.	Sep	I st week	Staining Techniques –Simple and Differential (Gram Staining and Spore Staining).	Sterilization techniques	Teaching	24	Students Seminar	1 1 1 1
		II nd week	Sterilization and disinfection techniques. Physical methods – autoclave, hot- air oven, pressure cooker, laminar air flow, filter					
		III rd week	sterilization, Radiation methods – UV rays, Gamma rays. Chemical methods – alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites.					
		IV th week	Isolation of Microorganisms from natural habitats. Pure culture techniques – dilution-plating					
5.	Oct	I st week	Streak-plate, Spread-plate, Pour-Plate and micromanipulator. Enrichment culturing.	Culture preservation	Teaching	12	Assignments	1 1 1
		II nd week	Preservation of microbial cultures – subculturing, overlaying cultures with mineral oils,					
		III rd week	lyophilization, sand cultures, storage at low temperature.					



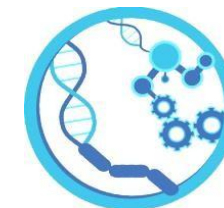
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DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN - 2019-20

I B.Sc Paper-II, Semester -II

MICROBIAL BIOCHEMISTRY & METABOLISM

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	Nov	III rd week	Biomolecules: Outline classification and General characters and Carbohydrates (Monosaccharides, Disaccharides, Polysaccharide)	Structure of Biomolecules.	Teaching	10	Assignment International Science Day	1
		IV th week	General characteristics of amino acids and proteins.					
2.	Dec	I st week	Structure of nitrogenous bases, nucleotides, nucleic acids. Fatty acids (saturated and un saturated). Lipids (spingolipids, sterols and phospholipids).	Analytical purification techniques Biomolecules sep Techniques Enzyme activity	Teaching	24	Slip test Assignments Quiz Seminars World AIDS Day	1 1 1 1
		II nd week	Analytical Techniques: Principle and applications of - Colorimetry Chromatography (paper, thin-layer, and column),					
		III rd week	Spectrophotometry (UV & visible), Centrifugation and Gel Electrophoresis					
		IV th week	Properties and classification of enzymes. Biocatalysis-induced fit and lock and key models. Coenzymes and cofactors.					

3.	Jan	I st week	Factors affecting catalytic activity. Inhibition of enzyme activity-competitive, noncompetitive, uncompetitive and allosteric	Microbial Nutrition	Teaching	14	Slip test Assignments Immunization Day	1 1
		II nd week						
		III rd week	Microbial Nutrition: nutritional requirements and uptake of nutrients by cells. Nutritional groups of microorganisms- autotrophs, heterotrophs, mixotrophs.	Microbial Growth				
		IV th week	Growth media. synthetic, complex, selective, enrichment and differential media. Microbial growth-different phases of growth in batch cultures, synchronous, continuous, biphasic growth. Factors influencing microbial growth,					
4.	Feb	I st week	Methods for measuring microbial growth - Direct microscopy, viable count estimates, turbidometry and biomass.	Microbial cell count	Teaching	24	Slip test Assignments National Science day	1 1
		II nd week	Aerobic respiration - Glycolysis, HMP pathway, ED pathway, TCA cycle, electron transport,	Microbial metabolism				
3.	March	III rd week	Oxidative and substrate level phosphorylation. Anaerobic respiration (Nitrate)	and Respiration				
		IV th week	Fermentation-alcohol & lactic acid fermentation.					
5.	April	I st week	Outlines of oxygenic & anoxygenic photosynthesis in bacteria	Microbial Respiration	Teaching	06	Slip test Assignments World health day	1 1



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DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN – – 2019-20

II B.Sc Paper-III, Semester –III

MICROBIAL GENETICS AND MOLECULAR BIOLOGY

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	June	I st week	Nucleic acids: DNA and RNA as genetic material.	Structures of Nucleic acids.	Teaching	10	Assignment	1
		II nd week	Structure and organization of prokaryotic DNA.				World Population day world donor day	
2.	July	I st week	Extrachromosomal genetic elements – Plasmids and transposons in bacteria.	Dispersive and conservative models of DNA Replication.	Teaching	24	Slip test	1
		II nd week	Replication of DNA – Semi conservative mechanism, Enzymes involved in replication				Assignments	
		III rd week	Mutations – spontaneous and induced, base pair changes, frame shifts, deletions, inversions, tandem duplications, insertions.				World Population day	

		IV th week	Mutagens - Physical and Chemical mutagens					
3.	August	I st week	Outlines of DNA damage and repair mechanisms.	DNA mutations.	Teaching	24	Slip test Assignments seminar	1 1 1
		II nd week	Genetic recombination in bacteria – Conjugation, Transformation and Transduction.	Bacterial Recombination.				
		III rd week	MID EXAMS					
		IV th week	Concept of gene- muton, recon, and cistron. One gene one enzyme and one gene one polypeptide hypothesis.					
4.	Sep	I st week	Types of RNA and their functions. Genetic code. Structure of ribosome.	Cloning vectors.	Teaching	24	Slip test Assignments National Nutrition week	1 1
		II nd week	Types of genes- structure, constitutive regulatory.					
		III rd week	Outlines of gene cloning methods. Polymerase chain reaction. Genomic and cDNA libraries					
		IV th week	General account on application of genetic engineering in industry, agriculture, and medicine.	Preparation of DNA libraries.				
5.	Oct	I st week	Types of PCR and DNA fingerprinting	Blotting techniques	Teaching	10	Slip test Assignments	1 1
		II nd week	REVISION					

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DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN - 2019-20

II B.Sc Paper-IV, Semester -IV

IMMUNOLOGY AND MEDICAL MICROBIOLOGY

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity			
					Activity	Hours Alloted	Activity	Hours Alloted		
1.	Nov	I st Week	Immune System: Concept of Innate and Adaptive immunity	Basics of immunology	Teaching	10	Slip test	1		
		II nd Week	Primary and secondary organs of immune system - thymus, bursa fabricus, bone marrow, spleen, lymph nodes				Assignments	1	Seminars	2
2.	Dec	I st week	Cells of immune system- Identification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and esinophils Complement system (in brief)	immunoglobulin's	Teaching	24	Slip test	1		
		II nd week	Immune response: Characteristics of antigen (Foreignness, Molecular size, Heterogeneity andsolubility) Haptens.				Assignments	1	Quiz	1
		III rd week	Antibodies - basic structure and types and functions (Immune complexformation and elimination - Agglutination, Precipitation, Neutralization, Complement fixation, Phagocytosis)				1	World AIDS Day		

		IV th week	Generation of Humoral Immune Response (Plasma and Memory cells) Generation of Cell Mediated Immune Response MHC- Functions of MHC I & II molecules Hypersensitivity-definition and types (in brief) Autoimmunity (in brief)					
3.	Jan	I st week	Microbes in Health and Disease: Normal flora of human body.	Pathology.	Teaching	32	Slip test Assignments Immunization Day	1 1 2
		II nd week	Definitions - Infection, Invasion, Pathogen, Pathogenicity, Virulence, Toxigenicity, Opportunistic infections, Nosocomial infections					
		III rd week	General account on microbial diseases.					
		IV th week	Diseases – causal organism, pathogenesis, epidemiology, diagnosis, prevention, and control of the following Bacterial diseases - Tuberculosis, Typhoid. Fungal diseases - Candidiasis. Protozoal diseases - Malaria.					
4.	Feb	I st week	Principles of Diagnosis: General principles of diagnostic microbiology- Collection, transport of clinical samples,	Sample collection	Teaching	32	Slip test Assignments National Science day	1 1 2
		II nd week	Identification by Culturing & Biochemical characteristics (IMViC), Identification by molecular assays (PCR, RT-PCR, DNA probes),					
		III rd week	Identification by serological tests (ELISA, Immunofluorescence, Agglutination based tests, Complement fixation)					
		IV th week	. Prevention and Treatment: Vaccines Monoclonal antibodies- Production and application Antimicrobial agents- General modes of action of antibacterial (Penicillin), antifungal (Amphotericin), antiviral (Amantadine) agents Interferons.	Vaccination.				

5.	March	I st week	Tests for antimicrobial susceptibility (Disc diffusion) Antibiotic resistance in bacteria.	Immunodiffusion test	Teaching	10	Slip test Assignments	1 1
		II nd week	Revision					



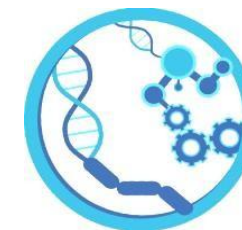
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DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN - 2019-20

III B.Sc Paper-V, Semester -IV

ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	June	I st week	Terrestrial Environment: Soil profile and soil microflora.	Microbial Ecology	Teaching	10	Assignments	1
		II nd week	Aquatic Environment: Microflora of fresh water and marine habitats,					
2.	July	I st week	Atmosphere: Aeromicroflora and dispersal of microbes.	Quality of water analysis	Teaching	24	Slip test	1
		II nd week	Role of microorganisms in nutrient cycling (Carbon, nitrogen, phosphorus). Treatment and safety of drinking (potable) water,					
		III rd week	methods to detect potability of water samples: (a) standard qualitative procedure: presumptive test/MPN test,					
		IV th week	confirmed and completed tests for faecal coliforms (b) Membrane filter technique.					
		I st week	Microbial interactions –mutualism, commensalism, antagonism, competition, parasitism, predation.	Solid and liquid waste management.	Teaching	24	Slip test Assignm	1 1

3.	August	II nd week	Outlines of Solid Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill).					1
		III rd week	Liquid waste management: Composition and strength of sewage (BOD and COD),					
		IV th week	Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment.					
4.	Sep	I st week	Plant Growth Promoting Microorganisms - Mycorrhizae, Rhizobia, <i>Azospirillum</i> , <i>Azotobacter</i> , <i>Frankia</i> ,	Micro organisms in agriculture.	Teaching	24	Slip test Assignments	1 1
		II nd week	phosphate-solubilizers and Cyanobacteria. Outlines of biological nitrogen fixation (symbiotic, non-symbiotic). Biofertilizers - <i>Rhizobium</i> .					
		III rd week	Concept of disease in plants. Symptoms of plant diseases caused by fungi, bacteria and viruses.					
		IV th week	Plant diseases - groundnut rust, Citrus canker and tomato leaf curl.					
5.	Oct	I st week	Principles of plant disease control.	Disease control in Plants.	Teaching	1	Slip test Assignments	1 1
		II nd week	Management of soil nutrients, Conversion of waste lands into fertile lands					

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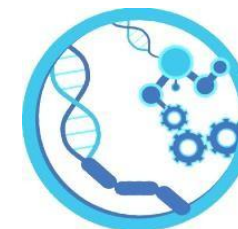
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DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN -- 2019-20

III B.Sc Paper-VI, Semester - V

FOOD AND INDUSTRIAL MICROBIOLOGY

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	Nov	I st week	Intrinsic and extrinsic parameters that affect microbial growth in food.	Bacterial growth curve	Teaching	10	Assignment	1
		II nd week	Microbial spoilage of food - fruits, vegetables, milk, meat, egg, bread and canned foods Food intoxication (botulism).					
2.	Dec	I st week	Food-borne diseases (salmonellosis) and their detection.	Priciples of fermentation.	Teaching	24	Slip test	1
		II nd week	Principles of food preservation - Physical and chemical methods. Fermented Dairy foods – cheese and yogurt.	Mushrooms cultivation.				
		III rd week	Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw). Probiotics and their benefits.					

		IV th week	Microorganisms of industrial importance – yeasts, (<i>Saccharomyces cerevisiae</i>) moulds, (<i>Aspergillus niger</i>) Bacteria (<i>E. coli</i>), actinomycetes (<i>Streptomyces griseus</i>).					
3.	Jan	I st week	Outlines of Isolation and Screening and strain improvement of industrially-important microorganisms	Types of fermentation.	Teaching	24	Slip test Guest Lecture	1 1
		II nd week	Types of fermentation processes – solid state, liquid state, batch, fed-batch, continuous.					
3.		III rd week	Basic concepts of Design of fermenter. Ingredients of Fermentation media.					
		IV th week	Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.					
4.	Feb	I st week	Microbial production of Industrial products - Citric acid, Ethanol,	Production of therapeutic enzymes	Teaching	24	Slip test	1
		II nd week	amylases, penicillin, glutamic acid and vitamin B12.					
		III rd week	Inter dependence of food production , food production					
		IV th week	consumption pattern in different parts of india.					
5.	Mar	I st week	Revision		Teaching	6	Slip test	1

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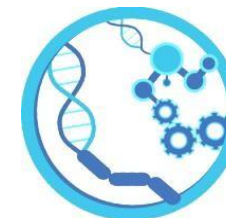
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DEPARTMENT OF MICROBIOLOGY

CURRICULAR PLAN – – 2019-20

III B.Sc Paper-VII, Semester –V

MICROBIAL BIOTECHNOLOGY

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	Nov	I st Week	Microbial biotechnology: Scope and its applications in human therapeutics, agriculture(Biofertilizers, PGPR, Mycorrhizae), environmental, and food technology.	Importance of microorganisms.	Teaching	10	Assignments	1
		II nd Week	Genetically engineered microbes for industrial application: Bacteria and yeast.					
2.	Dec	I st week	Recombinant microbial production processes in pharmaceutical industries - Streptokinase, recombinant vaccines (Hepatitis B vaccine).	Antibiotic production	Teaching	24	Assignments Quiz	2
		II nd week	Over view of production and applications of Microbial polysaccharides,					1
		III rd week	Bioplastics and Microbial biosensors					
		IV th week	Microbial based transformation of steroids and sterols.					

3.	Jan	I st week	Bio-catalytic processes and their industrial applications: Production of high fructose syrup and production of cocoa butter substitute.	SCP production,	Teaching	24	Slip test Assignment	1 1
		II nd week	Immobilization methods and their application: Whole cell immobilization.					
		III rd week	Bio-ethanol and bio-diesel production: commercial production from lignocellulosic waste and algal biomass.					
		IV th week	Biogas production: Methane and hydrogen production using microbial culture.					
4.	Feb	I st week	.Microorganisms in bioremediation: Degradation of xenobiotics	Flocculation, chemical precipitation.	Teaching	24	Slip test Assignment Project works	1 1
3.	August	II nd week	Mineral recovery, removal of heavy metals from aqueous effluents.					
		III rd week	Outlines of Intellectual Property Rights: Patents, Copyrights, Trademarks					
		IV th week	Bioenergetics – concept of free energy , entropy, enthalpy, & Redox potential.					
5.	March	I st week	Revision.		Teaching	6	Slip test Assignment	1 1