Phone : 08819 - 246126 / 246926 website:www.svkpandksrajucollege.edu.in
S.V.K.P. & Dr. K.S. RAJU ARTS & SCIENCE COLLEGE
(Autonomous)
Recognized by UGC as "College with Potential for Excellence"
Accredited by NAAC with "A" Grade
(Affiliated to ADIKAVI NANNAYA UNIVERSITY - Recognised by Govt. of Andhra Pradesh)
PENUGONDA-534 320, West Godavari District., (A.P.)

I Semester Syllabus
MICROBIOLOGY
(w.e.f. 2023-24 Admitted Batch)
23BSC11 INTRODUCTION TO CLASSICAL BIOLOGY

Hours/Week: 5 **Credits:4**

Unit1: Introduction to systematics, taxonomy and ecology.

1.1 Systematics– Definition and concept, Taxonomy –Definition and hierarchy.
1.2 Nomenclature– ICBN and ICZN, Binomial and trinomial nomenclature.
1.3 Ecology– Concept of ecosystem, Biodiversity and conservation.
1.4 Pollution and climate change.

Unit 2: Essentials of Botany.

2.1 The classification of plant kingdom.
2.2 Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).
2.3 Structure of flower–Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.
2.4 Mushroom cultivation, floriculture and landscaping.

Unit 3: Essentials of Zoology

3.1 The classification of Kingdom Animalia and Chordata**.**
3.2 Animal Physiology –Basics of Organ Systems & their functions, Hormones and Disorders
3.3 Developmental Biology –Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)
3.4 Economic Zoology –Sericulture, Apiculture, Aquaculture

Unit4: Cell biology, Genetics and Evolution

4.1 Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.
4.2 Chromosomes and heredity–Structure of chromosomes, concept of gene.
4.3 Central Dogma of Molecular Biology.
4.4 Origin of life

Unit 5: Essentials of chemistry

5.1 Definition and scope of chemistry, applications of chemistry in daily life.
5.2 Branches of chemistry
5.3 Chemical bonds–ionic, covalent, non-covalent– Vander Waals, hydrophobic, hydrogen bonds.
5.4 Green chemistry

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I Semester Syllabus
MICROBIOLOGY
(w.e.f. 2023-24 Admitted Batch)
23BSC12 INTRODUCTION TO APPLIED BIOLOGY

Hours/Week: 5 **Credits:4**

Unit 1: Essentials of Microbiology and Immunology

1.1 History and Major Milestones of Microbiology; Contributions of EdwardJenner, Louis Pasteur, Robert Koch and Joseph Lister.
1.2 Groups of Microorganisms–Structure & characteristics of Bacteria, Fungi, Archaea & Virus.
1.3 Applications of microorganisms in–Food, Agriculture, Environment and Industry.
1.4 Immune system–Immunity, types of immunity, cells and organs of immune system.

Unit 2: Essentials of Biochemistry

2.1 Biomolecules I– Carbohydrates Lipids.
2.2 Biomolecules II–Amino acids & Proteins.
2.3 Biomolecules III–Nucleicacids-DNA and RNA.
2.4 Basics of Metabolism–Anabolism and Catabolism.

Unit 3: Essentials of Biotechnology

3.1 History, scope and significance of biotechnology. Applications of Biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences.
3.2 Environmental Biotechnology– Bioremediation and Biofuels, Biofertilizers and Biopesticides.
3.3 Genetic engineering– Gene manipulation using restriction enzymes and cloning vectors; Physical, chemical and biological methods of gene transfer.
3.4 Transgenic plants–Stresstolerantplants(bioticstress–BTcotton,abioticstress–salt tolerance). Transgenic animals – Animal and disease models.

Unit 4: Analytical Tools and techniques in biology– Applications

4.1 Applications in forensics–PCR and DNA fingerprinting
4.2 Immunological techniques– Immunoblotting and ELISA.
4.3 Monoclonal antibodies–Applications in diagnosis and therapy.
4.4 Eugenics and Gene therapy

Unit 5: Biostatistics and Bioinformatics

5.1 Data collection and sampling. Measures of central tendency –Mean, Median, Mode.
5.2 Measures of dispersion– range, standard deviation and variance. Probability and tests of significance.
5.3 Introduction, Genomics, Proteomics, types of Biological data, biological databases- NCBI, EBI, Gen Bank; Protein 3D structures, Sequence alignment
5.4 Accessing Nucleic Acid and Protein databases, NCBI Genome Workbench

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II Semester Syllabus
MICROBIOLOGY HONOURS (23MB21 MAJOR/MINOR)
(w.e.f. 2023-24 Admitted Batch)
INTRODUCTION TO MICROBIOLOGY

Hours/Week: 5 **Credits:4**

Unit-1: History of Microbiology **No. of Hours: 10**

1. Discovery of Microscope and microbial world by Antonvon Leeuwenhoek; Aseptic techniques with reference to Charak Samhita, Sushruta Samhita and Ignaz Philipp Semmelweis
2. Golden era of Microbiology- Refutation of abiogenesis; Germ theory of Disease; Discovery of vaccination; Discovery of penicillin
3. Major contributions of Scientists: Edward Jenner, Louis Pasteur, Robert Koch, Joseph Lister, Ivanowsky, Martinus Beijerinck and Sergei Winogradsky

Unit-2: Place of Microorganisms in the living world **No. of Hours:10**

1. Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese
2. Definition and scope of Microbiology; Applications of Microbiology; Diverse groups of Microorganisms
3. Origin of microbial life on earth- Timeline, Miller's Experiment, endosymbiosis (cyanobacteria), distinguishing features of eukaryotic and prokaryotic cell

Unit-3:Prokaryotic microorganisms and Viruses **No. of Hours:10**

1. General characteristics of Bacteria (Morphology, metabolic diversity and reproduction)
2. General characteristics of Archaea differentiating them from Bacteria
3. General characteristics of viruses (Nature, composition, size, host specificity, diversity in structure)

Unit-4:Eukaryotic microorganisms **No. of Hours:10**

1. Fungi-Habitat,nutrition,vegetativestructureandmodesofreproduction;
2. Algae- Habitat, thallus organization, photosynthetic pigments, storage forms of food, reproduction.
3. Protozoa–Habitat, cell structure, nutrition, locomotion, excretion, reproduction, encystment.

Unit - 5: Growing Microbes in Lab: FiveI's **No. of Hours: 05**

1. Inoculation-Aseptic methods of introducing inoculum to growth media; Composition of basic growth media, solid and liquid
2. Incubation and Isolation- Ambient temperature for growth of microorganisms; Concept of Pure culture, mixed culture and contaminated culture
3. Inspection and Identification-Observation of colour, size and shape of colonies; Wet mount and simple staining of bacteria and fungi