B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VII (Discipline Specific Course)
MEDICAL MICROBIOLOGY

Theory syllabus

UNIT – I

1. Important mile stones in medial microbiology.
2. Normal flora of human body and their importance.
3. Definition of infection, non-specific defense mechanisms, mechanical barriers, antagonism of indigenous flora.

UNIT – II

1. Air-borne diseases -Tuberculosis, Influenza
2. Food and water-borne diseases - Cholera, Typhoid, Hepatitis – A, Amoebiasis
3. Zoonotic diseases - Rabies, Anthrax

UNIT – III

1. Insect-borne diseases - Malaria, Filariasis, Dengue fever
2. Contact diseases - Syphilis, Gonorrhoea
3. Blood-borne diseases - Serum hepatitis, AIDS

UNIT – IV

1. Collection, transport and processing of clinical samples
2. General methods of laboratory diagnosis – cultural, biochemical, serological and molecular methods
3. Chemotherapy and antimicrobial agents used to control of pathogens – therapeutic drugs. Drug resistance.

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VII (Discipline Specific Course)
MEDICAL MICROBIOLOGY

Practical syllabus

1. Enumeration of RBC and WBC
2. Estimation of blood haemoglobin.
3. Determination of blood groups and Rh typing.
4. Isolation and identification of medically important bacteria by cultural, microscopic and biochemical tests.
5. Antibiotic sensitivity testing – disc diffusion method.
6. Parasites – Malarial parasite, *Entamoeba* (study of permanent slides).
7. Tests for disinfectant (Phenol coefficient).

References:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication
3. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th edition. Elsevier
4. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education
5. Madigan MT, Martinko JM, Dunlap PV and Clark DP. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition.

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VIII/A (Discipline Specific Elective)
CELL BIOLOGY

Theory syllabus

UNIT – I

1. Structure of Cell: Plasma membrane: Structure and transport of small molecules.
2. Cell Wall: Eukaryotic cell wall, extracellular matrix and cell matrix interactions, cell-cell Interactions - adhesion junctions, tight junctions, gap junctions, and plasmodesmata (only structural aspects).
3. Mitochondria, chloroplasts and peroxisomes.

UNIT - II

1. Cytoskeleton: Structure and organization of actin filaments, association of actin filaments with plasma membrane, cell surface protrusions, intermediate filaments, microtubules.
2. Nucleus: Nuclear envelope, nuclear pore complex and nuclear lamina. Chromatin – Molecular organization. Nucleolus.
3. Protein targeting and Transport

UNIT - III

1. Golgi Apparatus – Organization, protein glycosylation, protein sorting and export from Golgi Apparatus. Lysosomes.
2. Cell Signalling: Signalling molecules and their receptors. Function of cell surface receptors.
3. Pathways of intracellular receptors – Cyclic AMP pathway, cyclic GMP and MAP kinase pathway.

UNIT - IV

1. Cell Cycle, Cell Death and Cell Renewal: Eukaryotic cell cycle and its regulation, Mitosis and Meiosis.
2. Development of cancer, causes, types, Diagnosis and therapy. Programmed cell death.
3. Stem cells. Types: Embryonic stem cell, induced pluripotent stem cells.

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VIII/A (Discipline Specific Elective)
CELL BIOLOGY

Practical syllabus

1. Study a representative plant and animal cell by microscopy.
2. Cytochemical staining of DNA – Feulgen.
3. Study of polyploidy in Onion root tip by colchicine treatment.
4. Identification and study of cancer cells by photomicrographs.
5. Study of cell division in onion root tip (mitotic divisions)
6. Study of different stages of Mitosis.
7. Study of different stages of Meiosis by permanent slides.

References:

1. Hardin J, Bertoni G and Kleinsmith LJ. (2010). Becker's World of the Cell. 8th edition. Pearson.
2. Karp G. (2010) Cell and Molecular Biology: Concepts and Experiments. 6th edition. John Wiley & Sons. Inc.
3. De Robertis, EDP and De Robertis EMF. (2006). Cell and Molecular Biology. 8th edition. Lipincott Williams and Wilkins, Philadelphia.
4. Cooper, G.M. and Hausman, R.E. (2009). The Cell: A Molecular Approach. 5th Edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VIIIB (Discipline Specific Elective)
PLANT PATHOLOGY

Theory syllabus

UNIT – I

1. Introduction and History of plant pathology: Concept of plant disease - definitions of disease, disease cycle & pathogenicity.
2. Symptoms associated with microbial plant diseases, types of plant pathogens, economic losses and social impact of plant diseases.
3. Stages in development of a disease: Infection, invasion, colonization, dissemination of pathogens and perennation.

UNIT - II

1. Host Pathogen Interaction: Virulence factors of pathogens: enzymes, toxins (host specific and non specific) growth regulators.
2. Effects of pathogens on host physiological processes (photosynthesis, respiration, cell membrane permeability, translocation of water and nutrients, plant growth and reproduction).
3. Concept of resistance (R) gene and virulence (avr) gene; gene for gene hypothesis, types of plant resistance: true resistance– horizontal & vertical, apparent resistance.

UNIT - III

1. Defense Mechanisms in Plants – Concepts of constitutive defense mechanisms in plants, inducible structural defenses (histological-cork layer, abscission layer, tyloses, gums), inducible biochemical defenses (hypersensitive response (HR), systemic acquired resistance (SAR), phytoalexins.
2. Important diseases caused by fungi: White rust of crucifers - *Albugo candida*, Late blight of potato - *Phytophthora infestans*, Red rot of sugarcane - *Colletotrichum falcatum*,
3. Important diseases caused by phytopathogenic bacteria: Angular leaf spot of cotton and crown gall.

UNIT - IV

1. Control of Plant Diseases: Principles & practices involved in the management of plant diseases by different methods.
2. Cultural – host eradication, crop rotation, sanitation, polyethylene traps and mulches. Chemical – protectants and systemic fungicides, antibiotics, resistance of pathogens to chemicals.
3. biological – suppressive soils, antagonistic microbes-bacteria and fungi, trap plants.

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VIII/B (Discipline Specific Elective)
PLANT PATHOLOGY

Practical syllabus

1. Demonstration of Koch's postulates in fungal, bacterial and viral plant pathogens.
2. Demonstration of Disease Tolerance Index (DTI) in crop plants.
3. Quantification of phytoalexins in healthy and diseased crop plants.
4. Study of important diseases of crop plants by cutting sections of infected plantmaterial - *Albugo, Puccinia, Ustilago, Fusarium, Colletotrichum.*
5. Study of following diseases through photographs: bacterial leaf blight of rice, Angular leaf spot of cotton, bacterial cankers of citrus, papaya ring spot, tomato yellow leaf curl, banana bunchy top, rice tungro disease, potato spindle tuber.

References:

1. Agrios GN. (2006). Plant Pathology. 5th edition. Academic press, San Diego,
2. Lucas JA. (1998). Plant Pathology and Plant Pathogens. 3rd edition. BlackwellScience, Oxford.
3. Mehrotra RS. (1994). Plant Pathology. Tata McGraw-Hill Limited.
4. Rangaswami G. (2005). Diseases of Crop Plants in India. 4th edition. Prentice Hallof India Pvt. Ltd., New Delhi.
5. Singh RS. (1998). Plant Diseases Management. 7th edition. Oxford & IBH, NewDelhi

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VIII/C (Discipline Specific Elective)
INDUSTRIAL MICROBIOLOGY

Theory syllabus

UNIT – I

1. Introduction to industrial microbiology and fermentation processes.
2. Brief history and developments in industrial microbiology.
3. Types of fermentation processes - Solid-state and liquid-state (stationary and submerged) fermentations; batch, fed-batch (eg. baker's yeast) and continuous fermentations.

UNIT - II

1. Components of a typical bio-reactor, Types of bioreactors-Laboratory, pilot- scale and production fermenters, constantly stirred tank and air-lift fermenters.
2. Design of typical batch fermentor. Factors affecting fermentor design, Fermentation media. Control of agitation, aeration, pH, temperature and dissolved oxygen.
3. Measurement and control of fermentation parameters - pH, temperature, dissolved oxygen, foaming and aeration.

UNIT - III

1. Sources of industrially important microbes and methods for their isolation, preservation and maintenance of industrial strains.
2. Screening and isolation of industrially-important microorganisms. Outlines of strain improvement.
3. Types of fermentation – aerobic, anaerobic, batch, continuous, submerged, surface, solid state.

UNIT - IV

1. Cell disruption, filtration, centrifugation, solvent extraction, precipitation, lyophilization and spray drying.
2. 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).
3. Methods of immobilization, advantages and applications of immobilization, large scale applications of immobilized enzymes (glucose isomerase and penicillin acylase).

B. Sc (CBCS) Microbiology – III Year
Semester-VI – Paper-VIII/C (Discipline Specific Elective)
INDUSTRIAL MICROBIOLOGY

Practical syllabus

1. Measurement and production of citric acid by *A. niger*.
2. Measurement and production of ethanol by *Saccharomyces*.
3. Measurement of in vitro production of IAA by soil fungi.
4. Demonstration for the production of amino acids by soil fungi.
5. Isolation of antibiotic producer from soil sample.
6. Estimation of streptomycin.
7. Isolation of amylase producer from soil sample.
8. Immobilization of enzymes

References:

1. Patel A.H. (1996). Industrial Microbiology. 1st edition, Macmillan India Limited.
2. Okafor N. (2007). Modern Industrial Microbiology and Biotechnology. 1st edition. Bios Scientific Publishers Limited. USA.
3. Waites M.J., Morgan N.L., Rockey J.S. and Higton G. (2001). Industrial Microbiology: An Introduction. 1st edition, Wiley – Blackwell.
4. Glaze A.N. and Nikaido H. (1995). Microbial Biotechnology: Fundamentals of Applied Microbiology. 1st edition. W.H. Freeman and Company.
5. Casida LE. (1991). Industrial Microbiology. 1st edition. Wiley Eastern Limited.
6. Crueger W and Crueger A. (2000). Biotechnology: A textbook of Industrial Microbiology. 2nd edition. Panima Publishing Co. New Delhi.
7. Stanbury PF, Whitaker A and Hall SJ. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.

KAKATIYA UNIVERSITY
U.G. B.Sc. Final Year (Under CBCS)
Semester – VI: Generic Elective Paper-II
(FOR ALL SCIENCE FACULTY DEPARTMENTS)

WATER RESOURCES MANAGEMENT

UNIT-I

1. Importance of Natural Resources – Different Types Resources
2. Significance of Water Resources and their uses
3. Conservation of water and recycling of the water – Global distribution of water
4. Water shed programmes and their management
5. Storing the rain water in tanks and recharging ground water.

Unit-II

6. Rain water harvesting in rural areas (chekdam, trenches etc.,)
7. Over use of surface and ground water and control measures.
8. Aims, objectives and implementation of Mission Bhagiratha (Telangana Government Drinking water programme)
9. Aims, objectives and implementation of Mission Kakatiya (Telangana Government minor irrigation programme)
10. Issues and challenges in Water Resources Management

P. Narasimhan
Dean FSS. K.U.

KAKATIYA UNIVERSITY
U.G. Skill Enhancement Course - IV
(Under CBCS)
B.Sc. Final Year (GE-2)
SEMESTER - VI
(FOR ALL SCIENCE FACULTY DEPARTMENTS)

QUANTITATIVE APTITUDE TEST

Credits: 2

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

Unit – I ARITHMETICAL ABILITY

1.1 Arithmetical Ability: Ratio & Proportion
1.2 Arithmetical Ability: Time & Work, Time & Distance
1.3 Arithmetical Ability: Simple Interest, Compound Interest
1.4 Arithmetical Ability: Stocks & Shares

Unit – II DATA INTERPRETATION

2.1 Data Interpretation: Tabulation
2.2 **Data Interpretation**: Bar Graphs
2.3 **Data Interpretation**: Pie Charts
2.4 **Data Interpretation**: Line Graphs

Text Book: Quantitative Aptitude by Dr. R.S.Aggarwal