

DEPARTMENT: MICROBIOLOGY

PROGRAMME: B SC

Statements of Programme Specific Outcomes (PSOs)

By the end of this course, the students will be able to:

1. Understand the contributions of various scientist in microbiology and scope of various branches of it
2. Understand and describe various kinds of prokaryotic and eukaryotic microbes and their positive negative interactions
3. Explain and describe importance of organic compounds and its chemistry found in living cells
4. Understand and explain various processes of metabolism of carbohydrates amino acids and vitamin in body
5. Explain and write DNA, RNA and protein structure and their formation in body
6. Understand and explain the concept of disease development, spread, control and eradication from society
7. Understand the basic concepts of gene and their regulation of action
8. Explain and write various industrial fermentations and bioinstrumentation.

Statements of Course Outcomes (COs)

Course: History & Microbial physiology

By the end of this course, the students will be able to:

1. Understand the contributions of eminent scientists in the development of microbiology
2. Understand the ultra structure of bacterial cell
3. Compare the differences in bacterial cell with plant cell and animal cell
4. Justify various scopes of microbiology
5. Classify the bacteria on the basis of various parameters.

Course: Microbial diversity

By the end of this course, the students will be able to:

1. Compare prokaryotic organism with eukaryotic organism
2. Understand the importance of methane producing bacteria
3. Write the method of reproduction in algae fungi and protozoa
4. Describe the history of discovery of virus
5. Understand and compare the characteristics properties of virus with other microbes
6. Understand various kinds of positive and negative interactions of different microbes
7. Study microbial diversity of various locations

Course: LAB Sem 1

By the end of this course, the students will be able to:

1. Understand the working and mechanism of different equipments and tools used in microbiology practical
2. Prepare various nutrients media for cultivating microbes in laboratory
3. Perform the staining technique of various bacteria
4. Demonstrate the presence of bacteria in environment.
5. Design an experiment to isolate specific bacteria in pure form from sample
6. Determine the sensitivity of specific bacteria to given antibiotics

Course: Microbial physiology

By the end of this course, the students will be able to:

1. Understand the basic nutritional requirements of bacteria
2. Describe various types of nutrient media for cultivation and isolation of bacteria
3. Explain typical growth curve of bacteria
4. Understand the factors that responsible for bacterial growth
5. Understand and define different physical methods used for microbial control
6. Understand and define various chemical reagents used for controlling microbial growth
7. Explain mechanism of bacterial cell injury by an anti-microbial agent like anti-biotic.

Course: Microbial Techniques

By the end of this course, the students will be able to:

1. Understand and explain basic principles and different kinds of microscope
2. Explain the process of different staining techniques
3. Understand and compare various types of stains and dyes
4. Analyze the determination of specific nutrients by bacteria

Course: LAB Sem 2

By the end of this course, the students will be able to:

1. Enumerate bacterial load in the food sample in quality unit
2. Cultivate bacteria in the lab by using aerobic & anaerobic techniques
3. Demonstrate antimicrobial power of heavy metal ion against any bacteria
4. Demonstrate effect VV radiations of bacterial growth.

Course: Chemistry of organic Constituents and Enzymology

By the end of this course, the students will be able to:

1. Understand the classification of organic compounds like carbohydrates
2. Understand the chemistry of digffernt kinds of carbohydrates

3. Describe importance of vitamins to human body and their deficiency syndrome
4. Compare DNA and RNA
5. Understand the mechanism of enzyme.

Course: Industrial Microbiology

By the end of this course, the students will be able to:

1. Understand and describe scope of industrial microbiology
2. Understand and operate fermenters in various industries
3. Explain and write the process of commercial production and ethanol Vitamin B2 Beer, Wine Penicillin etc.
4. Perform the methods and harvesting and product recovery in industrial fermentations
5. Work out the maintenance of ferment or plant.

Course: LAB Sem 3

By the end of this course, the students will be able to:

1. Design practical experiments to identify carbohydrates from given sample
2. Demonstrate enzyme activity by bacteria
3. Understand the techniques to estimate proteins, RNA, DNA from given sample
4. Design an experiment to produce ethanol by fermentation technique
5. Demonstrate application of yeast in baking industry

Course: Metabolism

Course outcomes: By the end of this course, the students will be able to:

1. Understand the general strategy of metabolism
2. Understand and explain various metabolic processes operating in living cell
3. Understand the mechanism by which energy is generated in human body
4. Explain and describe the process of protein formation in living cell
5. Explain and describe the process of replication of DNA

Course: Applied Microbiology

Course outcomes: By the end of this course, the students will be able to:

1. Understand and explain the significance of bacteriological analysis of drinking water
2. Understand and describe various methods applied for treatment of water and waste water
3. Explain the methods for disposal of industrial wastes
4. Understand the role of microbes of soil in various important processes
5. Describe and explain the applications of bacteria and fungi in bio fertilizers
6. Understand the mechanism of food spoilage
7. Describe the techniques used for food preservation

Course: LAB Sem 4

Course outcomes: By the end of this course, the students will be able to:

1. Understand the techniques to isolate microbes from water and waste water(sewage)
2. Understand and demonstrate chlorination of water
3. Demonstrate the technique to find out the alkalinity of water sample
4. Design the experiment to find out quality of raw material
5. Find out microbial load in given drinking water sample.

Course: Medical Microbiology

Course outcomes: By the end of this course, the students will be able to:

1. Understand and explain the stages of infections diseases
2. Describe various modes by which infections spread in community
3. Describe various methods that can be adopted to control spread of infection in community
4. Understand and explain various hospital borne, air borne and water-borne diseases
5. Understand how to educate the people about taking care of health
6. Understand the role of drugs in disease control.

Course: Molecular Biology & Bioinstrumentation

Course outcomes: By the end of this course, the students will be able to:

1. Understand and describe various concepts – related with gene and its regulation
2. Understand and explain various processes by which gene transfer occurs amongst microbes
3. Explain the causes of gene mutation and their effect on cell
4. Understand and explain the principles, methodology and application of various bio instruments like spectrophotometer, electrophoresis, chromatography, centrifuge etc

Course: LAB Sem 5

Course outcomes: By the end of this course, the students will be able to:

1. Understand the techniques for isolation of DNA and RNA from living cell
2. Understand and describe liver function test by estimating creatinine from patient's serum
3. Analyze proper chromatography technique to find out unknown organic compounds from sample
4. Understand and design the experiment to diagnose pathogenic organism from patient.

Course: Immunology

Course outcomes: By the end of this course, the students will be able to:

1. Understand and describe human body's resistance mechanism against disease
2. Understand and write the role of human body's various organs in natural resistance.
3. Understand the properties, structure and importance of antibiotics in immunity

4. Understand various mechanism by which antibiotic destroys antigens
5. Describe and explain the reasons, classes and development of allergy in humans.

Course: Biotechnology

Course outcomes: By the end of this course, the students will be able to:

1. Understand the tools and techniques of genetic engineering
2. Understand and describe DNA, fingerprinting and its application in forensic science
3. Understand the methods of production of health related compounds by biotechnology
4. Understand and write application of biotechnology in agriculture
5. Explain and describe the advantages /disadvantages of genetic engineering for humans
6. Understand the production and importance of genetically modified food

Course: LAB Sem 6

Course outcomes: By the end of this course, the students will be able to:

1. Understand and analyze the experiment to diagnose sexually transmitted disease
2. Understand and describe the detection of typhoid
3. Analyze the production of bio-fertilizer
4. Analyze the production of soyasauce
5. Understand and explain various experiments to diagnose diseases.