DEPARTMENT OF MICROBIOLOGY

B.Sc- Mb.Bc.C and Bt.Mb.C

PROGRAMME OUTCOMES

At the end of the programme students will have:

PO1: Essential Knowledge:

Comprehensive discipline knowledge and understanding of biological mechanisms, chemisty involved in living creatures from unicellular organisms to humans and to apply their knowledge in practical.

PO2: Creative and critical thinking and problem solving abilities:
Be effective problem solvers, able to apply critical and evidence-based thinking and to put infront the experiental evidences in life sciences and to conceive innovative responses to future challenges.

PO3: Teamwork and communication skills:
Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving goals.

PO4: Professionalism and leadership readiness:
Be able to engage in professional behaviour and have the potential to take leadership roles in their chosen occupations and communities.

PO5: Intercultural and ethical competency:
Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

PO6: Social responsibility:
Be sensitive to and demonstrate experimental evidences which does not effect the society.

SPECIFIC PROGRAM OUTCOMES FOR
B SC MICROBIOLOGY

SPO1: A student should be able to recall basics about concepts in life sciences and should be able to display knowledge of conventions such as, terminology.

SPO2: A student should get adequate exposure to global and local concerns that explore them many aspects of life sciences.

SPO3: Student is equipped with creative talent and power of communication necessary for various kinds of employment.

SPO4: Student should be able to apply their skills and knowledge in practical's.

SPO5: Enabling students to develop a positive attitude towards microorganisms as an interesting andvaluable subject of study.

SPO6: Think in a critical manner.

SPO7: Acquire good knowledge and understanding in advanced areas of life sciences chosen by the student from the given courses.

SPO8: The skills and knowledge gained has intrinsic beauty, which also leads to proficiency. This can be utilized in modelling and solving real life problems.

SPO9: To recognize patterns and to distinguish between essential and irrelevant aspects of problems.

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SPO10: Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.

SPO12: This Program will also help students to enhance their employability for jobs in research institutes,pharma companies and teaching fields, scientific data analyst and in various other public and private companies.

DEPARTMENT OF MICROBIOLOGY (2016-19)

SEM-I GENERAL MICROBIOLOGY-I (2016-17)

After the completion of the course, Students will be able to

CO1: Illustrate the contributions made by prominent scientists.
CO2: Analyze different characteristics of microbes and difference of cell wall components in bacteria and archaebacteria, viruses.
CO3: Summarize the techniques used to stain, and observe the microorganism under microscope.
CO4: Demonstrate different isolation, preservation techniques.
CO5: Analyze various method used for sterilization and disinfection techniques.

SEM-II General microbiology-II (2016-17)

After the completion of the course, Students will be able to

CO1: Understand microbial classification, difference between prokaryotes and eukaryotes.
CO2: General characteristics of prokaryotes, mycoplasmas, cyanobacteria and actinomycetes.
CO3: Understand bergyes manual of systemic bacteriology.

SEM-III MICROBIAL PHYSIOLOGY AND ENZYMOLOGY

After the completion of the course, Students will be able to

CO1: Understand about microbial nutrition, uptake of nutrients by cell.
CO2: Learn about nutritional groups of microbes- Autotrophs, Heterotrophs, Mixotrophs.
CO3: Understands Photosynthetic apparatus in prokaryotes
CO4: Learn about growth media used in growing microbes.
CO5: Understands about microbial growth, phases and types of growth.
CO6: Learn about microbial metabolism, the cycles involved in respiration of microbe.
CO7: Gets to understand the enzymology of bacteria.

SEM-IV MOLECULAR BIOLOGY AND MICROBIAL GENETICS

CO1: Explain the fundamentals of genetics, structure of DNA, its replication.
CO2: Summarize different mutations, various mutagenic agents, DNA damage and repair.
CO3: Illustrate the concept of gene, types of RNA and their functions and types of genes
CO4: Explain basic principles of genetic engineering. Outline of cloning methods

SEM-III SEC I -HAEMATOLOGY

After the completion of the course, Students will be able to

CO1 : Understands about composition of blood (RBC, WBC, Serum, Platelet cells)
CO2: Learn about staining of blood films.
CO3: Blood preservative methods.
CO4: Understands about general spread of diseases through blood and blood products.

SEM-III SEC II-FOOD ADULTERATION

After the completion of the course, Students will be able to

CO1: Understands about types of food adulteration, common adulterants, causes, analysis.
CO2: Effects of adulteration, detection of common food adulterants.
CO3: Gets the knowledge of food adulteration act and related law aspects around.

SEM-5: APPLIED MICROBIOLOGY PAPER-V

After the completion of the course, Students will be able to

CO1: Summarize various stain improvement, microorganisms in agriculture, biofertilizers-production and examples.
C02: Microbial pigments, biotransformation and metabolic engineering of
CO3: Microorganisms to produce compounds.
CO4: Illustrate various methods involved in diagnostic microbiology, preparation and use of culture media, techniques used for diagnosis of hospital.

SEM – V IMMUNOLOGY PAPER-VI

After the completion of the course, Students will be able to

- **CO1:** Summarize the concepts of cells and organs of immune system, basic structure of antigens and antibodies and types of immunity.
  CO2: Explain various types of hypersensitivity, types of antigen and antibody reactions. Polyclonal and monoclonal antibodies.
  CO3: Understands about immunological processes and applications
  CO4: Gains practical knowledge about antibody-based techniques- ELISA, RIA, and Immunofluorescence.
  CO5: Learns about autoimmunity diseases, hypersensitivity reactions.
  CO6: Polyclonal and monoclonal antibodies production and applications.

SEM -V PHARMACEUTICAL MICROBIOLOGY ELECTIVE-B, PAPER-VI

After the completion of the course, Students will be able to

CO1 : Understands about principles of chemotherapy.
CO2: Concept of choice of drugs
CO3: Knows about mode of action of drugs- cell wall inhibitors
CO4: Understands anti-microbial assays
CO5: Drug sensitivity testing methods and their importance.
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SEM -V SEC- MUSHROOM CULTIVATION

After the completion of the course, Students will be able to

CO1 : Understands about history, global status of mushroom cultivation, food value of mushroom
CO2: Steps in mushroom cultivation.
CO3: Pests and pathogens of mushrooms.
CO4: Post harvest handling and preservation of mushrooms.
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SEM -V GE -MICROBIOLOGY AND HUMAN HEALTH

After the completion of the course, Students will be able to

CO1 : Contributions of different scientists, Morphological characteristics of microorganisms and different culture media used.
Learn different bacterial diseases in humans- Typhoid, Tuberculosis, Syphilis, viral diseases- flu, HIV.

SEM -VI PAPER -VI MEDICAL MICROBIOLOGY

After the completion of the course, Students will be able to

CO1 : Illustrate the concept of normal flora of human body, air borne diseases, food borne and contact diseases.
CO2: Learn about antibacterial substances.
CO3: Discuss the various viral and parasitic infections
CO4: Summarize the concepts of cells and organs of immune system, basic structure of antigens and antibodies and types of immunity.
CO5: Explain various types of hypersensitivity, types of antigen and antibody reactions. Polyclonal and monoclonal antibodies.

SEM -VI PAPER -VIII FOOD MICROBIOLOGY

After the completion of the course, Students will be able to

CO1: Summarize different fermented foods, dairy products and role of microbes in fermentation of these foods.
CO2: Explain the parameters that induce food spoilage.
CO3: Explain the role of micro flora in water, air and testing the sanitary quality of water and sewage treatment procedures.
CO4: Concept of probiotics.

SEM -VI PAPER -VIII INDUSTRIAL MCROBIOLOGY

After the completion of the course, Students will be able to

CO1: Introduction to industrial microbiology, screening and selection of industrially useful microbes, strain improvement techniques.
CO2:Illustrate the principles of bioreactors, designs of bioreactors, stages of fermentation
CO3:Summarize the types of fermentations, Advantages and dis advantages of fermentations.
CO4:Explain industrial products derived frim microbes, biofuels, disposal of industrial waste.

SEM-VI SEC-4 HOSPITAL WASTE MANAGEMENT

After the completion of the course, Students will be able to

CO1: Learn about hospital waste management, general hazardous, health waste genotoxic waste.
CO2: Understands the guidelines of central pollution control board.
CO3: Ways to decontaminate, store and transport waste would be learned.
CO4: Health care safety practices.

SEM-VI CONTAGIOUS DISEASES AND IMMUNISATION

After the completion of the course, Students will be able to

CO1: Learn types of infections, Sources, mode.
CO2: Undersatnds the concept of immunization, types
CO3: Concept of vaccination would be understood.

DEPARTMENT OF MICROBIOLOGY (2020-23)

SEM-I GENERAL MICROBIOLOGY-I

After the completion of the course, Students will be able to

C01: Illustrate the contributions made by prominent scientists.
C02: Analyze different characteristics of microbes and difference of cell wall components in bacteria and archaebacteria, viruses.
C03: Summarize the techniques used to stain, and observe the microorganism under microscope.
C04: Demonstrate different isolation, preservation techniques.
C05: Analyze various method used for sterilization and disinfection techniques.

SEM-II MICROBIAL DIVERSITY

After the completion of the course, Students will be able to

CO1: Analyse different elements of biodiversity- Ecosystem, Genetic, Species abundance,
CO2:classification of living organisms.
CO3:Understand microbial richness, learn characteristics of extremophiles.
CO4:Learn eukaryotic microbial diversity-Algae, fungi and protozoa.
CO5: Analyse microbial ecosystems, cultivation independent methods and learn about sustainable agrosystems.

SEM-3 FOOD AND ENVIRONMENTAL MICROBIOLOGY

After the completion of the course, Students will be able to

C01: Summarize different fermented foods, dairy products and role of microbes in fermentation of these foods.
C02: Explain the parameters that induce food spoilage, and ,process of mycotoxin extraction ,and government regulatory policies followed in manufacturing of fermented foods.
C03: Explain the role of micro flora in water, air and testing the sanitary quality of water and sewage treatment procedures.
C04: Explain the role of micro flora soil, microbes and plant interactions, microbial bioremediation and degradation.

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SEM-IV MEDICAL MICROBIOLOGY AND IMMUNOLOGY

- C01: C01:Illustrate the concept of normal flora of human body, air borne diseases, food borne and contact diseases.
- C02:Discuss the various viral and parasitic infections and learn about nosocomial infections.
- C03:Summarize the concepts of cells and organs of immune system, basic structure of antigens and antibodies and types of immunity.

C04:Explain various types of hypersensitivity, types of antigen and antibody reactions.polyclonal and monoclonal antibodies.

SEM-III SEC I -HAEMATOLOGY

After the completion of the course, Students will be able to

CO1 : Understands about composition of blood (RBC,WBC,Serum,Platelet cells)
CO2: Learn about staining of blood films.
CO3:Blood preservative methods.
CO4: Understands about general spread of diseases through blood and blood products.

SEM-III SEC II-MUSHROOM CULTIVATION

After the completion of the course, Students will be able to

CO1 : Understands about history, global status of mushroom cultivation, food value of mushroom
CO2: Steps in mushroom cultivation.
CO3: Pests and pathogens of mushrooms.
CO4: Post harvest handling and preservation of mushrooms.

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SEM-V MOLECULAR BIOLOGY AND MICROBIAL GENETICS

After the completion of the course, Students will be able to

CO1: Explain the fundamentals of genetics, structure of DNA, its replication.
CO2:Summarize different mutations, various mutagenic agents , DNA damage and repair.
CO3:Illustrate the concept of gene, types of RNA and their functions and types of genes
CO4:Expalin basic principles of genetic engineering. Out line of cloning methods

SEM – V GE MICROBIOLOGY AND HUMAN HEALTH

After the completion of the course, Students will be able to

CO1 : Contributions of different scientists, Morphological characteristics of microorganisms and different culture media used.
CO2:Learn different bacterial diseases in humans- Typhoid, Tuberculosis, Syphilis, viral diseases- flu, HIV.
CO3:Understand about vaccines.

SEM -V MICROBIAL OMICS PAPER 5
After the completion of the course, Students will be able to **CO1 :** Understands about principles of molecular biology **CO2:** Concept of genomics,proteomics, **CO3:** Knows about mode of action of drugs- cell wall inhibitors **CO4:** Understands anti microbial assays **CO5:** Drug sensitivity testing methods and their importance. .

SEM -VI INDUSTRIAL MCROBIOLOGY PAPER-6
After the completion of the course, Students will be able to **C01:** Introduction to industrial microbiology, screening and selection of industrially useful microbes, strain improvement techniques. CO2:Illustrate the principles of bioreactors, designs of bioreactors, stages of fermentation CO3:Summarize the types of fermentations, Advantages and dis advantages of fermentations. CO4:Explain industrial products derived frim microbes, biofuels, disposal of industrial waste.
SEM -VI PHARMACEUTICAL MICROBIOLOGY ELECTIVE-B, PAPER-VI
After the completion of the course, Students will be able to CO1: Understands about principles of chemotherapy. CO2: Concept of choice of drugs CO3: Knows about mode of action of drugs- cell wall inhibitors CO4: Understands anti-microbial assays CO5: Drug sensitivity testing methods and their importance. .
SEM-6: APPLIED MICROBIOLOGY ELECTIVE AGAINST PROJECT
After the completion of the course, Students will be able to CO1: Summarize various stain improvement, microorganisms in agriculture, biofertilizers-production and examples. C02: Microbial pigments, biotransformation and metabolic engineering of CO3: Microorganisms to produce compounds. CO4: Illustrate various methods involved in diagnostic microbiology, preparation and use of culture media, techniques used for diagnosis of hospital.