

DEPARTMENT OF LIFE SCIENCES

PROGRAMME OUTCOMES

At the end of the programme students will have:

PO1: Essential Knowledge:

Comprehensive discipline knowledge and understanding of biological mechanisms, chemistry 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 in front the experiential 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
DEPARTMENT OF LIFE SCIENCES**

- 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 and valuable 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.
- 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.
- SPO11:** 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 BIOTECHNOLOGY (2016-19)
COURSE OUTCOMES

SEM-I CELL BIOLOGY AND GENETICS (2016-17)

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

- C01: Understand cell as basic unit of life .**
- C02: Learn and differentiate between the structure of prokaryotic and eukaryotic cell.
- C03: Understand cell division in prokaryotes and eukaryotes.
- C04: Learn cell death mechanisms.
- C05: Revise Mendelian mechanisms of inheritance.
- C06: Understand deviation from Mendel's laws
- C07: Learn Extension to Mendel's laws

SEM-II NUCLEIC ACIDS AND BIOINFORMATICS (2016-17)

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

- C01: Understand concept of genetic material with experiments**
- C02: Learn about organization of genome .**
- C03: Learn the concepts of DNA replication, damage and repair.
- C04: Explore various tools in Bioinformatics.
- C05: Learn applications of bioinformatics.

SEM-III BIOCHEMISTRY AND BIOSTATISTICS (2017 -18)

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

- C01: Understand basics of biomolecules.**
- C02: Learn about bioenergetics and basic bioanalytical techniques.**
- C03: Learn the basic concepts of biostatistics**
- C04: Understand the applications of biostatistics.

SEM-IV MICROBIOLOGY AND IMMUNOLOGY (2017 – 18)

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

- C01: Know about Historical development of microbiology.**
- C02: Understand basics of microscopy.
- C03: Learn about classification of microorganisms.
- C04: Learn about culturing of microorganisms and their identification.
- C05: learn about basics of immunity and immune system.
- C06: Understand about different aspects of cell mediated and humoral immunity.

SEM-III SEC I – ENZYME TECHNOLOGY (2017 -18)

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

- C01:** Understands about production and isolation of enzymes.
- C02:** Learn about applications of isolated and immobilized enzymes.
- C03:** Determination of enzyme activities for clinical diagnosis of some important diseases.
- C04:** Understand enzymes in determination of metabolites of clinical importance
- C05:** Learn about therapeutic uses of enzymes.

SEM-IV SEC II- IMMUNOTECHNOLOGY (2017 -18)

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

- C01: Understands about antigen antibody reactions.**
- C02:** Understand antibody assays.
- C03:** Learn different cellular assays with human peripheral blood.

SEM-5: PAPER-V MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY

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

- C01:** Understand Structure of gene – prokaryotic and eukaryotic.
- C02:** Understand expression of genes – prokaryotes and eukaryotes.
- C03:** Understand Regulation of gene expression.
- C04:** Know about enzymes required in recombinant DNA technology.
- C05:** Learn about different vectors required for rDNA technology.
- C06:** Learn about applications of rDNA technology.

SEM V, PAPER-VI: PLANT BIOTECHNOLOGY (DSE A) (2018 -19)

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

- **C01:** Understand basic requirement of plant tissue culture media and preparation of media.
- **C02:** Learn about callus culture and organogenesis and embryogenesis.
- C03:** Understands about applications plant tissue culture.
- C04:** Learn the concept of transgenic plants.
- C05:** Know about applications of transgenic plants.

SEM -V, PAPER-VI : MEDICAL BIOTECHNOLOGY (DSE B) (2018 -19)

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

- C01:** Understands about different methods for diagnosis of human diseases.
- C02:** Understand about the chromosomal disorders due to different chromosomal abnormalities
- C03:** Knows about mitochondrial disorders.
- C04:** Understands concept of gene therapy.
- C05:** Learn about stem cells and stem cell based therapies.

SEM -V SEC- MOLECULAR PLANT BREEDING (2018 -19)

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

- C01:** Understands about Molecular markers in plant breeding.
- C02:** Understand marker assisted selection for plant breeding.
- C03:** Understand the marker assisted backcrossing.
- C04:** Find out improved varieties using MAS

SEM -V GE -FUNDAMENTALS OF BIOTECHNOLOGY (2018 -19)

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

- C01:** Learn about the historical developments in Biotechnology
- CO2:** Learn about genes , chromosomes ,DNA sequencing
- CO3:** Know about genetically modified organisms.
- CO4:** Understand the genetic modifications in plants.
- CO5:** Know about the ethical issues in Biotechnology.

SEM -VI, PAPER -VII MICROBIAL TECHNOLOGY (2018 -19)

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

- C01:** Explore the microorganisms of industrial use.
- C02:** Learn the methods for isolation and screening of industrially important microbes.
- C03:** Understand the concept of Good Manufacturing Practices, intellectual property rights and patenting.
- C04:** Understand concept of fermentation.
- C05:** Understand the types and design of fermentation
- CO6:** Learn about the products from microbes and their applications.

SEM -VI PAPER -VIII ANIMAL BIOTECHNOLOGY (DSE A) (2018 -19)

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

- C01:** Understand the animal cell lines, genetic manipulations of cells.
- C02:** Understand commercial applications of cell culture.
- C03:** Know about model organisms and their significance.
- CO4:** Understand about DNA micromanipulation.
- CO5:** Understand development in molecular markers.

SEM -VI PAPER -VIII ENVIRONMENTAL BIOTECHNOLOGY (DSE B) (2018 -19)

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

- C01:** Understand Concept of pollution, types and sources
- C02:** Learn about types of pollutants
- C03:** Understand concept of Global warming and green house gases and its effect
- CO4:** Know about Impact of pollution on environment and different monitoring methods of pollution
- CO5:** Learn about Impact of pollution on environment and different monitoring methods of pollution.
- C06:** Understand Solid and Liquid waste management and treatment methods
- C07:** Understand Concept of Bioremediation of inorganic compounds like pesticides using microbes.
- C08:** Know Phytoremediation and Xenobiotics
- C09:** Understand Biodiversity types and its Conservation methods .

SEM-VI SEC-4 INTELLECTUAL PROPERTY RIGHTS (IPR) - BS601(2018 -19)

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

- C01:** know about IPR, its types. Trademark , Copyrights , Patents, Geographical indications and International organizations
- C02:** Understands Plant varieties protection, animal breeders right, patenting microbes and organisms, patenting genes, markers and Variants.
- C03:** Understand procedure for processing of Patents.

SEM-VI GE-2 APPLICATIONS OF BIOTECHNOLOGY (BS 602) (2018 -19)

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

- C01:** Learn Molecular diagnosis methods, gene therapy, recombinant therapeutic proteins and medicines.
- C02:** Understands the examples and use of transgenic plants for improving crop quality
- C03:** Understand the concept of Bioremediation , biofertilizers , biopesticides , biological pest control

C06. Learn about applications of rDNA technology.

DEPARTMENT OF BIOTECHNOLOGY (2020-23)

SEM-IV BIOINFORMATICS AND BIOSTATISTICS (2021-22)

- C01: Understand the historical development of bioinformatics.
- C02: learn the tools and databases in bioinformatics.
- C03: Learn the basics of sequence alignment and scoring matrices
- C04: Learn the basic terms in biostatistics
- C05: Understand the calculation of measures of central tendency and measures of dispersion.
- C06: Learn the different applications of biostatistics.

SEM-III SEC I -INDUSTRIAL FERMENTATION (2021-22)

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

C01: Learn the procedures for production of industrial chemicals

C02: Learn about the production of biochemicals and therapeutic products .

C03: Learn about the purification of proteins.

C04: Understands about Learn about the microbial products of pharmacological interest.

SEM-III SEC II- IMMUNOLOGICAL TECHNIQUES(2021-22)

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

C01: Understands about antigen antibody reactions.

C02: Understand antibody assays.

C03: Learn different cellular assays with human peripheral blood.

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SEM-IV SEC III MOLECULAR MARKERS IN PLANT BREEDING(2021-22)

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

C01: Understands about Molecular markers in plant breeding.

C02: Understand marker assisted selection for plant breeding.

C03: Understand the marker assisted backcrossing.

C04: Find out improved varieties using MAS

SEM – IV SEC IV DRUG DESIGNING (2021-22)

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

C01: Learn about historical perspective and challenges in drug discovery.

CO2: Learn Bioinformatic prediction of 3D structure of protein .

CO3: Learn about the structure based drug designing.

CO4 : Learn the strategies of drug designing.

CO5: Understand the concept of pharmacogenomics.

SEM -V PLANT BIOTECHNOLOGY (DSE I) (2022 -23)

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

- **C01:** Understand basic requirement of plant tissue culture media and preparation of media.
- **C02:** Learn about callus culture and organogenesis and embryogenesis.
- C03:** Understands about applications plant tissue culture.
- C04:** Learn the concept of transgenic plants.
- C05:** Know about applications of transgenic plants.

SEM -V MEDICAL BIOTECHNOLOGY (DSE II) (2022-23)

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

- C01:** Understands about different methods for diagnosis of human diseases.
- C02:** Understand about the chromosomal disorders due to different chromosomal abnormalities
- C03:** Knows about mitochondrial disorders.
- C04:** Understands concept of gene therapy.
- C05:** Learn about stem cells and stem cell based therapies.

SEM -V GE BASICS IN BIOTECHNOLOGY (2022-23)

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

- CO1:** Understand basics in plant biotechnology.
- CO2:** Learn the basics of microbial and industrial biotechnology
- CO3:** Know the basics of animal medical biotechnology
- CO4:** Understands Computer applications of biotechnology.

SEM-VI :IPR, BIOSAFETY AND ENTERPRENEURSHIP(2022-23) ELECTIVE AGAINST PROJECT

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

- C01 :**In detail know about IPR, its types. Trademark , Copyrights ,Patents, Geographical indications and International organizations
- C02:**Understands Plant varieties protection, animal breeders right, patenting microbes and organisms, patenting genes, markers and Variants.
- C03:** processing of Patents.

SEM-VI : ANIMAL BIOTECHNOLOGY – OPTIONAL II A(2022-23)

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

C01: Understand the animal cell lines, genetic manipulations of cells.

C02: Understand commercial applications of cell culture.

C03: Know about model organisms and their significance.

CO4: Understand about DNA micromanipulation.

CO5: Understand development in molecular markers.

SEM-VI : ENVIRONMENTAL BIOTECHNOLOGY – OPTIONAL II B(2022-23)

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

C01: Understand Concept of pollution, types and sources

C02: Learn about types of pollutants

C03: Understand concept of Global warming and green house gases and its effect

CO4: Know about Impact of pollution on environment and different monitoring methods of pollution

CO5: Learn about Impact of pollution on environment and different monitoring methods of pollution.

CO6: Understand Solid and Liquid waste management and treatment methods

CO7: Understand Concept of Bioremediation of inorganic compounds like pesticides using microbes.

CO8: Know Phytoremediation and Xenobiotics

CO9: Understand Biodiversity types and its Conservation methods .

DEPARTMENT OF BIOCHEMISTRY (2016-19) COURSE OUTCOMES

SEM-I CHEMISTRY OF BIOMOLECULES (2016-17)

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

- CO1: understand the scope of biochemistry
- CO2: what are buffers, pH, stereochemistry of carbohydrates and amino acids
- CO3: what are carbohydrates its types, and their importance
- CO4: what are lipids, their types and importance
- CO5: what are amino acids, types and their importance

SEM-II CHEMISTRY OF NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES (2016-17)

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

- CO1:** Understand composition and nature of nucleic acids
- CO2: structure of nucleic acids, about DNA, types of RNA, kinetics of nucleic acids
- CO3: spectrophotometry, centrifugation and its types
- CO4: what is chromatography and various types of chromatography techniques

SEM-III BIOENERGETICS, BIOLOGICAL OXIDATION AND ENZYMOLOGY (2017 -18)

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

- CO1:** learn about bioenergetics
- CO2:** Learn about biological oxidation, ETC, oxidative phosphorylation, ROS
- CO3:** classification of enzymes, methods of enzyme purification, enzyme substrate interactions, enzyme units
- CO4: enzyme kinetics and enzyme action, enzyme inhibition, enzyme activity, zymogen activation, isoenzymes.

SEM-IV INTERMEDIARY METABOLISM (2017 – 18)

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

- CO1:** amino acid metabolism
- CO2: carbohydrate metabolism
- CO3: Lipid metabolism
- CO4: Nucleic acid metabolism.

SEM-III SEC I – COMPUTATIONAL BIOCHEMISTRY (2017 -18)

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

- 01:**computational science and application of computer in biochemistry
- 02:** Learn about spreadsheets and databases.
- 03:** visualization of biomolecules by computer graphics,drawing and display structures.
- 04:** study of enzymes kinetics,metabolic database,gene identification
- 05:** protein sequence analysis, principles of molecular modeling

SEM-IV SEC II- MEDICAL LAB TECHNOLOGY(2017 -18)

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

- CO1:**clinical laboratory principles and tests
- CO2:**microbiology and immunology
- CO3:**histopathology and cytopathology, immumno-histochemical staining methods.

SEM-5: PAPER-V PHYSIOLOGY AND CLINICAL BIOCHEMISTRY

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

- CO1:** Human physiology, digestion, cardiac cycle, physiology of vision , muscles
- CO2:** different types and endocrine glands , functions, importance and disorders
- CO3:** organs and organ function tests
- CO4:** LFTs, RFTs, biochemical tests for heart diseases

SEM V, MOLECULAR BIOLOGY (DSE A) (2018 -19)

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

- **CO1:** DNA replication,enzymes of replication ,inhibitors of replication.
- **CO2:** transcription,promoters,initiation, elongation,termination.
 - CO3:** post transcriptional modification,inhibitors of RNA synthesis
 - CO4:** translation , genetic code, protein synthesis, post translational modifications
 - CO5:** inhibitors of translation, lac operon,tryptophan operon

SEM -V, PAPER-VI : CELL BIOLOGY AND GENETICS (DSE B) (2018 -19)

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

CO1:ultrastructure of prokaryotes and eukaryotes, chromosomes

CO2: mitosis,cell cycle and cell death

CO3: basics of genetics

CO4: Understands concept of gene therapy.

CO5: mutations, mutagens.

SEM -V SEC- APPLIED BIOCHEMISTRY (2018 -19)

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

O1: Enzyme and protein purification, methods

O2: nucleic acid analysis and cell cultures.

SEM -V GE- PHYSIOLOGY AND BIOCHEMISTRY (2018 -19)

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

CO1: human physiology,hormones of pituitary, thyroid and pancreatic gland.

CO2: biomolecules (carbohydrates,amio acids,lipids, nucleic acids)

CO3: metabolism of carbohydrates, amino acids, lipids and nucleic acids

SEM -VI , PAPER -VII NUTRITION AND IMMUNOLOGY (2018 -19)

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

CO1: Balance diet, BMR,RDA, malnutrition, vitamins .

CO2: organization of immune system, organs and cells of immune system

CO3:classification of immunoglobulins ,haptens, epitopes, adjuvants, monoclonal antibodies

CO4:anitigen-antibody reactions, blood group antigens, RIA,ELISA

CO5: vaccines, morden vaccines

CO6: outlines of hypersensitivity, graft rejection and MHC

**SEM -VI PAPER -VIII MICROBIOLOGY AND r-DNA TECHNOLOGY (DSE A)
(2018 -19)**

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

CO1: classification of microorganisms, isolation and cultivation , Grams's staining

CO2: industrial uses of A.niger, yeast,spirulina,structure and composition of virus, viral life cycle.

CO3: cloning strategy, DNA sequencing, r-DNA technology enzymes, restriction mapping.

CO4: cloning vectors, molecular markers

CO5: c-DNA libraries, PCR, blotting techniques, production of insulin GH, Bt cotton, edible vaccines.

SEM -VI PAPER -VIII BIOTECHNOLOGY (DSE B) (2018 -19)

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

CO1: plant biotechnology

CO2: animal biotechnology

CO3: microbial biotechnology

CO4: environmental biotechnology

SEM-VI SEC-4 MINI PROJECT - BS601(2018 -19)

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

CO1: The course is aimed to make students do live or review based projects to enhance their practical skills

SEM-VI GE-2 NUTRITION IN HEALTH DISEASE (BS 602) (2018 -19)

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

CO1: Nutrition (balance diet, SDA of foods, BMR, BMI, RDA, foods and their nutrition)

CO2: malnutrition, vitamins, trace elements, obesity and diabetes, probiotics in human health, functional foods

DEPARTMENT OF BIOCHEMISTRY (2020-23)

SEM-I CHEMISTRY OF BIOMOLECULES (2020 – 21)

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

- CO1: understand the scope of biochemistry
- CO2: what are buffers, pH, stereochemistry of carbohydrates and amino acids
- CO3: what are carbohydrates its types, and their importance
- CO4: what are lipids, their types and importance
- CO5: what are amino acids, types and their importance

SEM-II CHEMISTRY OF NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES(2020 -21)

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

- CO1:** Understand composition and nature of nucleic acids
- CO2: structure of nucleic acids, about DNA, types of RNA, kinetics of nucleic acids
- CO3: spectrophotometry, centrifugation and its types
- CO4: what is chromatography and various types of chromatography techniques

SEM-III ENZYMOLOGY, CARBOHYDRATE AND LIPID METABOLISM (2021-22)

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

- CO1:** classification of enzymes, methods of enzyme purification, enzyme substrate interactions, enzyme units
- CO2: enzyme kinetics and enzyme action, enzyme inhibition, enzyme activity, zymogen activation, isoenzymes.
- CO3: carbohydrate metabolism
- CO4: lipid metabolism

SEM-IV AMINO ACID, NUCLEIC ACID METABOLISM, BIOENERGETICS AND BIOLOGICAL OXIDATION(2021-22)

- **CO1:** amino acid metabolism and disorders.
- **CO2:** nucleic acid metabolism and disorders.
- **CO3:** learn about bioenergetics
- **CO4:** Learn about biological oxidation, ETC, oxidative phosphorylation, ROS
- **CO5:** ultrastructure and function of chloroplast, cyclic and non cyclic phosphorylation.
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**SEM-III SEC I -BASICS IN BIOCHEMICAL CALCULATIONS AND BIostatISTICS
(2021-22)**

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

- 01:** Learn basic biochemical calculations, units and measurements, pH, buffers, construction of calibration curve and absorption maxima
- 02:** basic statistical concepts, measures of central tendency, measures of dispersion, .
- 03: depiction of data by graphical methods, t-Test**
- 04:** regression and correlation , precision and accuracy, ANOVA.

SEM-IV SEC III APPLIED AND COMPUTATIONAL BIOCHEMISTRY(2021-22)

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

- 01:** Homogenization ,centrifugation techniques, enzyme and protein purification methods
- 02:** computational science and applications, software packages in docking designing
- 03: molecular modeling-drug designing, drug-biomolecule, receptor-biomolecule interactions,application in enzyme kinetics**
- 04:** KEGG, gene identification,protein data bank

SEM -V PHYSIOLOGY, NUTRITION AND CLINICAL BIOCHEMISTRY (DSE I) (2022 -23)

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

- CO1:** Human physiology, digestion, cardiac cycle, physiology of vision , muscles,structure of heart, neuron and propagation of nerve impulse
- C02:** different types and endocrine glands , functions, importance and disorders
Nutrition (balance diet, SDA of foods, BMR,BMI,RDA,foods and their nutrition)
- CO3:** malnutrition,vitamins,trace elements, obesity
- CO4:** organs and organ function tests
- CO5:** LFTs, RFTs, biochemical tests for heart diseases

SEM -V CELL BIOLOGY AND GENETICS (DSE II) (2022-23)

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

CO1:ultrastructure of prokaryotes and eukaryotes, chromosomes

CO2: mitosis,cell cycle and cell death

CO3: basics of genetics

CO4: Understands concept of gene therapy.

CO5: mutations, mutagens.

CO6 :classification of microorganisms, isolation and cultivation , Grams's staining

CO7 : industrial uses of A.niger, yeast,spirulina,structure and composition of virus, viral life cycle

CO8:TMV ,HIV, PFU, one step growth.

SEM -V GE BIOCHEMISTRY AND PHYSIOLOGY (2022-23)

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

: CO1:what are buffers, pH ,stereochemistry of carbohydrates and amino acids

CO2: what are carbohydrates,lipids, amino acids, nucleic acids its types,and their importance,enzymes,vitamins

CO3: what are carbohydrates,lipids, amino acids, nucleic acids metabolism and disorders

CO4: human physiology and endocrine system

SEM-VI : MOLECULAR BIOLOGY AND IMMUNOLOGY (2022-2023)

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

CO1: DNA replication,enzymes of replication ,inhibitors of replication.

• **CO2:** transcription,promoters,initiation, elongation,termination.

CO3: post transcriptional modification,inhibitors of RNA synthesis

CO4: translation , genetic code, protein synthesis, post translational modifications

CO5: inhibitors of translation, lac operon

organization of immune system, organs and cells of immune system

CO6:classification of immunoglobulins ,haptens, epitopes, adjuvants, monoclonal antibodies

CO7:antigen-antibody reactions, blood group antigens, RIA,ELISA

CO8: vaccines, morden vaccines,outlines of hypersensitivity, graft rejection and MHC

SEM-VI :r-DNA TECHNOLOGY AND BIOTECHNOLOGY – OPTIONAL B(2022-23)

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

CO1:cloning strategy, DNA sequencing, r-DNA technology enzymes, restriction mapping.

CO2: cloning vectors, molecular markers

CO3: c-DNA libraries, PCR, blotting techniques, production of insulin GH, Bt cotton, edible vaccines

CO4: plant and animal biotechnology

CO5: microbial and environmental biotechnology.

SEM-VI :BIOCHEMISTRY IN HEALTH AND DISEASE – OPTIONAL II(2022-23)

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

CO1:metabolic disorders

CO2: genetic disorders

CO3: endocrine disorders

CO4: molecular basis of cancer

DEPARTMENT OF MICROBIOLOGY (2016-19)

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

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 archaeobacteria, 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 General microbiology-II (2016-17)

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

- C01: Understand microbial classification, difference between prokaryotes and eukaryotes.
- C02: General characteristics of prokaryotes, mycoplasmas, cyanobacteria and actinomycetes.
- C03: Understand bergy's manual of systemic bacteriology.

SEM-III MICROBIAL PHYSIOLOGY AND ENZYMOLOGY

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

- C01: Understand about microbial nutrition, uptake of nutrients by cell.
- C02: Learn about nutritional groups of microbes- Autotrophs, Heterotrophs, Mixotrophs.
- C03: Understands Photosynthetic apparatus in prokaryotes
- C04: Learn about growth media used in growing microbes.
- C05: Understands about microbial growth, phases and types of growth.
- C06: Learn about microbial metabolism, the cycles involved in respiration of microbe.
- C07: Gets to understand the enzymology of bacteria.

SEM-IV MOLECULAR BIOLOGY AND MICROBIAL GENETICS

- C01: Explain the fundamentals of genetics, structure of DNA, its replication.
- C02: Summarize different mutations, various mutagenic agents, DNA damage and repair.
- C03: Illustrate the concept of gene, types of RNA and their functions and types of genes
- C04: 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

C01: Understands about composition of blood (RBC, WBC, Serum, Platelet cells)

C02: Learn about staining of blood films.

C03: Blood preservative methods.

C04: 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

C01: Understands about types of food adulteration, common adulterants, causes, analysis.

C02: Effects of adulteration, detection of common food adulterants.

C03: 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

C01: Summarize various stain improvement, microorganisms in agriculture, biofertilizers-production and examples.

C02: Microbial pigments, biotransformation and metabolic engineering of

C03: Microorganisms to produce compounds.

C04: 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

➤ **C01:** Summarize the concepts of cells and organs of immune system, basic structure of antigens and antibodies and types of immunity.

C02: Explain various types of hypersensitivity, types of antigen and antibody reactions. Polyclonal and monoclonal antibodies.

C03: Understands about immunological processes and applications

C04: Gains practical knowledge about antibody-based techniques- ELISA, RIA, and Immunofluorescence.

C05: Learns about autoimmunity diseases, hypersensitivity reactions.

C06: 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

- C01:** Understands about principles of chemotherapy.
- C02:** Concept of choice of drugs
- C03:** Knows about mode of action of drugs- cell wall inhibitors
- C04:** Understands anti-microbial assays
- C05:** Drug sensitivity testing methods and their importance.

SEM -V SEC- MUSHROOM CULTIVATION

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

- C01:** Understands about history, global status of mushroom cultivation, food value of mushroom
- C02:** Steps in mushroom cultivation.
- C03:** Pests and pathogens of mushrooms.
- C04:** Post harvest handling and preservation of mushrooms.

SEM -V GE -MICROBIOLOGY AND HUMAN HEALTH

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

- C01:** 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

- C01:** Illustrate the concept of normal flora of human body, air borne diseases, food borne and contact diseases.
- C02:** Learn about antibacterial substances.
- C03:** Discuss the various viral and parasitic infections
- C04:** Summarize the concepts of cells and organs of immune system, basic structure of antigens and antibodies and types of immunity.
- C05:** 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

C01: Summarize different fermented foods, dairy products and role of microbes in fermentation of these foods.

C02: Explain the parameters that induce food spoilage.

C03: 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 MICROBIOLOGY

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 disadvantages of fermentations.

CO4: Explain industrial products derived from microbes, biofuels, disposal of industrial waste.

SEM-VI SEC-4 HOSPITAL WASTE MANAGEMENT

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

C01: Learn about hospital waste management, general hazardous, health waste genotoxic waste.

C02: Understands the guidelines of central pollution control board.

C03: Ways to decontaminate, store and transport waste would be learned.

C04: Health care safety practices.

SEM-VI CONTAGIOUS DISEASES AND IMMUNISATION

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

C01: Learn types of infections, Sources, mode.

C02: Understands the concept of immunization, types

C03: Concept of vaccination would be understood.

