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PROTEOMICS

1. General safety and instrumentation awareness
2. Storage and sterilization techniques
3. Calculation and preparation of reagents and solutions
4. Preparation of Buffers
5. Extraction of soluble proteins from plant seed
6. Extraction of cellular proteins from Bacterial cells
7. Qualitative estimation of Proteins by Bradford method
8. Quantitative estimation of Proteins by different methods
9. Purification of proteins by Size exclusion chromatography
10. Separation of pigments by Paper chromatography
11. Thin layer Chromatography
12. Extraction of proteins by Ammonium Sulphate precipitation and dialysis.
13. Estimation of salivary amylase enzyme
14. Purification of salivary amylase by Hydrophobic chromatography
15. Separation of serum Proteins by SDS- PAGE
16. Western Blotting

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IMMUNOTECHNOLOGY & CLINICAL

1. Sterilization Techniques
2. Preparation of Buffers and reagents
3. Separation of Serum and Plasma from whole blood
4. Detecting and Blood Grouping and Rh factor
5. Heamoglobin estimation
6. Blood Sugar estimation
7. DOT Blot technique
8. Single radial Immunodiffuision
9. Purification of Immunoglobin from human serum
10. Detection of the purified Immunoglobin
11. Studies on Antibiotic sensitivity of urine samples by disc diffusion method
12. Estimation Total leukocyte count
13. Estimation of Differential leukocyte count
14. Hepatitis B detection
15. HIV tri Dot
16. ELISA

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GENOMICS & PROTEOMICS

1. Calculation and preparation of reagents and solutions
2. Preparation of Buffers
3. Extraction of soluble proteins from plant seed
4. Quantitative estimation of Proteins by different methods
5. Isolation of Genomic DNA from Plants
6. Agarose Gel electrophoresis for visualization of the DNA
7. Southern Blotting
8. Quantitative estimation of isolated DNA from Plants
9. To study the melting point of DNA
10. Purification of isolated DNA
11. Purification of proteins by Size exclusion chromatography
12. Thin layer Chromatography
13. Extraction of proteins by Ammonium sulphate precipitation and dialysis.
14. Estimation of salivary amylase enzyme
15. Purification of salivary amylase by Hydrophobic chromatography
16. Separation of serum Proteins by SDS- PAGE
17. Western Blotting

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MOLECULAR BIOLOGY

1. General Instrumentation and safety practices
2. Sterilization and storage practices
3. Preparation of Buffers and Reagents
4. Preparation of Medias for bacterial growth
5. Techniques for culturing and sub- culturing of Bacterial cells
6. Isolation of Bacterial genomic DNA
7. Agarose Gel electrophoresis for visualization of the DNA
8. Quantitative estimation of isolated DNA
9. Isolation of Bacterial Plasmid DNA
10. Purification of Isolated genomic DNA
11. Isolation of Genomic DNA from Plant Tissue
12. Isolation of Genomic DNA from fungal Tissue
13. Southern Blotting and visualization on Nitrocellulose membrane
14. Isolation of total RNA from Plants by DEPC method
15. Agarose Gel electrophoresis for visualization of the RNA
16. Northen Blotting and visualization of the RNA transfer
17. Restriction Digestion of Genomic DNA
18. Studies on Melting of DNA
19. Amplification of gene by Polymerase chain reaction

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ADVANCED RECOMBINANT DNA TECHNOLOGY

1. General Instrumentation and safety practices
2. Sterilization and storage practices
3. Preparation of Buffers and Reagents
4. Preparation of Medias for bacterial growth
5. Techniques for culturing and sub- culturing of Bacterial cells
6. Isolation of Bacterial genomic DNA
7. Agarose Gel electrophoresis for visualization of the DNA
8. Quantitative estimation of isolated DNA
9. Isolation of Bacterial Plasmid DNA
10. Agarose gel electrophoresis
11. Understanding the basics of Primer Designing and PCR
12. Polymerase Chain Reaction for amplification of gene
13. Preparation of growth media and Competent cells
14. Bacterial transformation and Cloning experiment
15. Screening of transformed colonies
16. Bacterial Conjugation and screening
17. Viral Transduction and Plaque detection and counting.

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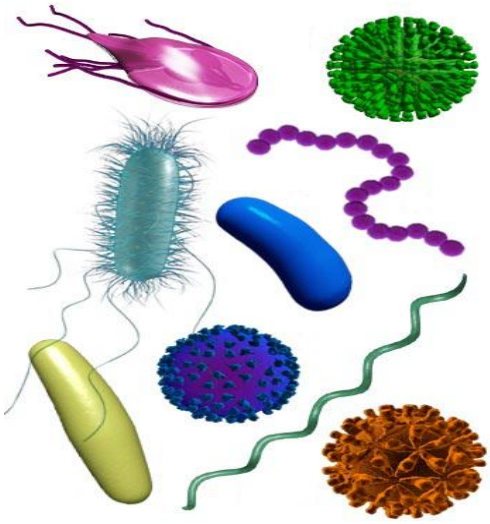
MICROBIOLOGY



- CFU Count (Colony forming Units)
- Antimicrobial Well Diffusion Test
-

- **Sterilization Techniques**
- **Staining Techniques**
  1) Simple,
  2)Negative,
  3)Gram staining,
  4) LPCB
- **Preparation of culture media**
  1)Basic media
  2)selective media,
  3)differential media etc.
- **Preparation of media slants for culture maintenance.**
- **Isolation & Culturing of microbes by different methods**
- **Antibiotic sensitivity**
- **Identification of bacteria by Biochemical test-**
  1)IMViC Test
  2)Hydrolysis test (starch /casein)
  3)Carbohydrate fermentation tests. (Sucrose, glucose, maltose, Arabinose, glycerol, starch, mannose, mannitol etc)
  4)Motility test
  5) TSI test

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PLANT BIOTECHNOLOGY

- **Buffers & Media Preparation**
- **Technique for sterilization of plant tissues.**
- **Technique for excision of plant explants under aseptic condition.**
- **Technique for inoculation of plant explants under aseptic condition.**

- **Growing of plant tissue into undifferentiated mass.**
- **Viability of seeds.**
- **Culture of plant seeds.**
- **Culture of plant embryo.**
- **Artificial seeds**
- **Protoplast Isolation**

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FERMENTATION TECHNOLOGY

- **Sterilization Techniques**
- **Buffers & Media Preparation**
- **Production media preparation**
- **Importance of Autoclaving**
- **Batch culture fermentation (Shake flask tech)**
- **Production of Biofuel using a Bioreacter**
- **Downstream processing of the product.**
- **Estimation of biofuel by preliminary test and by Gas Chromatography**

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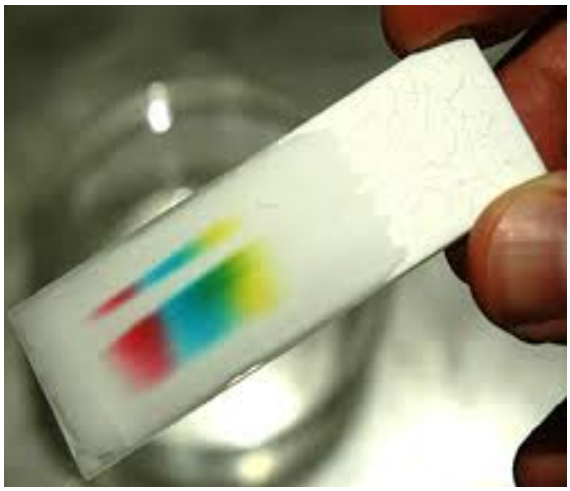
CHROMATOGRAPHY



- Buffer Preparation
- Column Chromatography
- Size exclusion Chromatography
- Hydrophobic Chromatography
- Paper Chromatography
- Thin Layer Chromatography
- Gas Chromatography
- Analysis of results

FORENSIC ANALYSIS

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- DNA Isolation from blood
- DNA fingerprinting
- Microbial forensics
- Fingerprint Analysis
- Stain analysis (Blood, Saliva, semen, etc)
- Forensic analysis of Diatoms

- Forensic analysis of urine
- Forensic Fiber Analysis
- Forensic analysis of saliva
- Foot print analysis
- Analysis of Toxins and drugs
- Detection of ink

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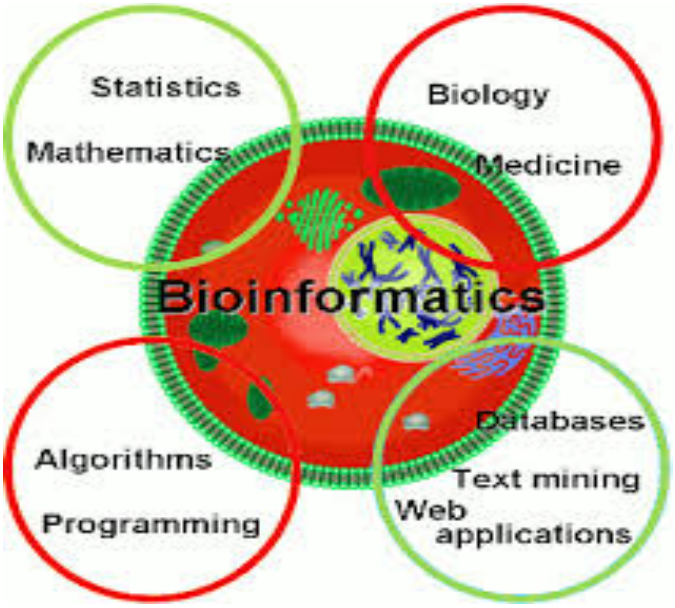
Eligibility : B.Sc., M.Sc, B.Tech & M.Tech
(Biotechnology, Microbiology, Biochemistry, Food Sciences, Forensic Science, Botany, Zoology, Pharmacy and Life-Science Courses)

- **Computer aided Drug-Designing**
- **Sequence Annotation and analysis**
- **Comparative Bioinformatics**
- **Omics Studies (Genomics/Proteomics/Metabolomics)**



- **Structural Bioinformatics**
- **Biological network analysis**
- **Biomodelling and Data mining**

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Biochemistry

1. General safety and instrumentation awareness
2. Calculation and preparation of reagents and solutions
3. Preparation of Buffers and reagents
4. Extraction of soluble proteins from plant and seed
5. Qualitative estimation of Proteins by Biuret method
6. Qualitative estimation of Total Protein From Human Serum By Biuret method
7. Qualitative estimation of Albumin From Human Serum .
8. Blood Sugar estimation from Human Serum
9. Estimation of Reducing Sugar in Urine Sample
10. Estimation of Urea from Human Serum
11. Estimation of Uric acid from Human Serum
12. Estimation of salivary amylase enzyme by DNS

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Immunology

1. Separation of Serum and Plasma from whole blood
2. DOT Blot technique
3. Single radial Immuno diffuision
4. Ouchterlony Double diffusion
5. Purification of Immunoglobin from human serum
6. Detection of the purified Immunoglobin
7. Hepatitis B detection
8. HIV tri Dot
9. ELISA
10. Separation of serum Proteins by SDS- PAGE
11. Western Blotting
12. Immunoelectrophoresis
13. Rocket Immunoelectrophoresis

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Clinical Pathology:-

1. Separation of Serum and Plasma from whole blood
2. Detecting and Blood Grouping and Rh factor
3. Hemoglobin Estimation
4. Blood Sugar Estimation
5. Urine Sugar Estimation
6. Studies on Antibiotic sensitivity of urine samples by disc diffusion method
7. Estimation of Total leukocyte count
8. Estimation of Differential leukocyte count
9. Estimation of Urea from human Serum
10. Estimation of Uric acid from human Serum
11. Estimation of Calcium from human Serum
12. Estimation of Total Protein from human Serum
13. Estimation of Albumin from human Serum

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14. Estimation of Albumin/ Globulin Ratio from human Serum

Customized Module-

MODULE 1--- Microbiology & Molecular Biology

- **Sterilization Techniques**
- **Preparation of Media**
  - **Nutrient Agar Media**
  - **Potato Dextrose Agar (PDA) Media**
- **Isolation & Culturing of microbes by different methods**
- **Study of morphology of bacteria & fungi through simple & differential staining**
- **DNA Isolation DNA Isolation from bacteria, plant & fungi by different methods**
- **Visualization of DNA by Agarose Gel Electrophoresis.**
- **Southern Blotting**

MODULE 2--- Molecular Biology & Advanced RDT

- **Sterilization Techniques**
- **Buffer preparation**
- **DNA Isolation from bacteria**

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- **Plasmid isolation from E.coli**
- **Visualization of DNA by Agarose Gel Electrophoresis**
- **Restriction Digestion**
- **DNA Ligation**
- **Polymerase Chain Reaction (PCR)**
- **Bacterial Transformation**

MODULE 3--- Genomics & Proteomics

- **Sterilization Techniques**
- **Buffer preparation**
- **DNA Isolation from Plants**
- **Visualization of DNA by Agarose Gel Electrophoresis**
- **Southern Blotting**
- **Quantification of Proteins from plant sample**
- **Protein Electrophoresis(SDS-PAGE)**
- **Western Blot Analysis**

MODULE 4--- Chromatography & Fermentation Technology:

- **Analysis of ink components by Paper Chromatography**

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- Separation of Chemicals by Thin Layer Chromatography
- Preparation fermentation media
- Importance of Autoclaving of fermentor vessel
- Batch culture fermentation (Shake flask)
- Production of alcohols and its estimation by GC.
- Fermentation using a Bioreactor (Bioreactor)
- Downstream processing / product purification

Industrial job oriented Training Module:

MODULE 1- For Food/Fermentation & QA/QC

- Sterilization Techniques
- Preparation of Simple & Selective media.
- Isolation & Culturing of microbes by different methods
- Study of morphology of bacteria & fungi through simple & differential staining
- Identification of bacteria by selective Media & Biochemical test

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- **CFU count from food, milk & dairy products**
- **Food & dairy products adulteration test.**
- **Alkalinity/acidity test from Beverages**
- **Estimation of Reducing sugar by biochemical test**
- **Estimation of Ethanol from different beverages by preliminary biochemical test**
- **Quantitative estimation of Ethanol by Gas Chromatography**
- **Production of beverages by fermentation**

MODULE 2- For Environment & Waste water Industry job

- **Determination of the concentration of wastewater (e.g. Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Oil and Grease (O&G).**
- **Measurement of the concentration of particulate solids that can dissolve or suspend in wastewater (e.g., Total Solids (TS), Total Suspended Solids (TSS), Total Dissolved Solids (TDS),**

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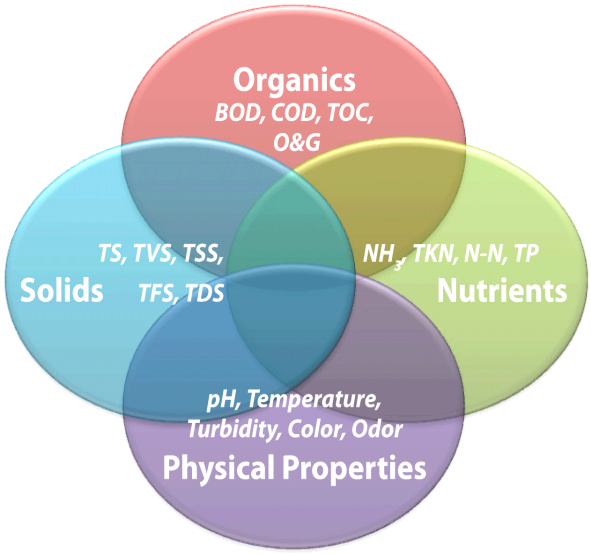
- **Measurement of the concentration of nutrients (e.g., Nitrate, Sulphate and phosphorus)**
- **Analytical tests designed to measure a varied group of constituents directly impacting wastewater treatability (e.g, temperature, color, pH, turbidity, odor).**
- **Isolation & Characterization of Bacteria involved in Bioremediation of wastewater.**
- **Comparative analysis of different parameters between wastewater & treated water.**



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DISSERTATION PROJECTS

We offer projects and dissertations works. Students are encouraged to design their own individualized projects with the help of our faculties. A list of some of the projects for 2,3,4,6 months are listed below.

RDT and Genomics:

- DNA profiling & fingerprinting of various microbial species.
- Characterization of modified strain *via* genomics & molecular biology techniques.
- Transformation and Cloning of gene of interest.
- Study of Molecular markers in crop plants.
- Isolation of gene of interest from bacteria via PCR.
- Identification of bacterial strains using 16sRNA amplification.

Proteomics:

- Analytical Profiling of proteins in plants after usage of pesticides and hormones.
- Soluble protein characterization & profiling from tissues.
- Study of herbs as antimicrobial agents
- Protein Fingerprinting in plants / animal tissue
- Study protein polymorphism related to abiotic stress.
- Isolation and purification of proteins/enzymes from plant tissues.
- Purification of IGg's and study using proteomic tools

Fuel Biotech:

- Isolation of Lignin degrading microbes.
- Study of microbes useful in ethanol production.
- Bioethanol production from agricultural waste.
- Biobutanol production from baggasse

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- Bioconversion of waste from Biofuels into economically important products.
- Studies on development of Microbial fuel cells for converting waste into electricity.
- Studies on hydrogen production through microbes.
- Study on Algae, BGA and Diatoms in Biofuel production

Industrial Biotech:

- Production of Antibiotics.
- Production of Organic Acids.
- Bacterial Secondary metabolite production.
- Production of Beverages.
- Production of Riboflavin.
- Production of amylases.

Environmental Biotech:

- Studies on microbial degradation of oil.
- Studies on lead Remediation
- Studies on microbial degradation of waste plastic / thermocol.
- Studies on industrial dye/effluent degradation.
- Biodiesel waste bioconversion.

Plant & Agriculture Biotech:

- Development of pesticide resistant BGA.
- Importance of BGA as biofertilizer.
- Enhancing the effect of botanical as biofungicide / biopesticide.

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- Analysis of effectiveness of different biofungicide on plant pathogen.
- Study the antimicrobial activity of weeds, Trees , lignocellulosic waste, barks etc

Forensics:

- Analysis of various techniques used in Forensics.
- Analysis and protein profiling of toxic plants and understanding their relevance in forensics.
- Studies on analysis of fingerprints under different environmental conditions
- DNA fingerprinting and its use in development of markers for forensic studies.
- Analysis of DNA degradation in blood stains present on fibers**.**
- Antimicrobial effect of different inks and dyes on Microbes.

Bioinformatics:

- Design and search for the inhibitors against the selected novel drug target proteins from the databanks.
- Structure based drug design / Computer based drug design.
- Database development.
- Metabolomics

IPR:

- Patent landscaping .
- Patent search for specific disease type.
- Patent drafting

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Eligibility : B.Sc., M.Sc, B.Tech & M.Tech
(Biotechnology, Microbiology, Biochemistry, Food Sciences, Forensic Science, Botany, Zoology, Pharmacy and Life-Science Courses)

For more information contact us-

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