



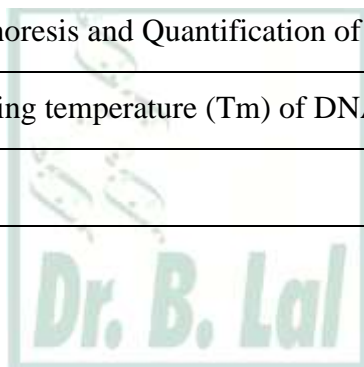
**Industrial Biotechnology Training
Advanced Genetic Engineering (Specialized)
Session 2023-2024**

S.No.	Module Content
1	Preparation of Molecular grade solutions
2	Demonstration of isolation of genomic DNA from prokaryotes
3	Demonstration of isolation of genomic DNA from Eukaryotes (animal and plant cells)
4	Isolation of plasmid DNA from prokaryotes
5	Agarose gel electrophoresis and quantification of molecular weight of DNA sample
6	T _m calculation of DNA
7	PCR amplification – gene specific
8	PCR amplification – using RAPD Primers
9	Multiplex PCR
10	Colony PCR
11	PCR Purification
12	Competent cell preparation and transformation
13	Ligation
14	RFLP
15	SNP detection
16	SDS-Page



**Industrial Biotechnology Training
Advanced Genetic Engineering (Standard)
Session 2023-2024**

S.No.	Module Content
1	Preparation of Molecular Grade Solution
2	Isolation of genomic DNA from prokaryotic sample
3	Isolation of genomic DNA from eukaryotic sample
4	Isolation of plasmid DNA from prokaryotic sample
5	Agarose Gel Electrophoresis and Quantification of DNA sample
6	Determination of melting temperature (T_m) of DNA
7	SDS PAGE





**Industrial Biotechnology Training
Biochemistry (Standard)
Session 2023-2024**

S. No.	Module Content
1	Introductory Lecture - Demonstration of Instruments, Laboratory mathematics, Good Laboratory Practices and Safe Handling of Biomedical Waste
2	Solution Preparation – Normal, Molar and Percent Solution
3	Qualitative determination of carbohydrates, proteins and lipids
4	To learn the UV-Vis Spectrophotometer technique by Validating the Lambert and Beer law and preparation of BSA Protein Standard curve
5	Clinical Biochemistry Determination the total Cholesterol in human Blood serum Separation of serum and plasma from blood Isolation of Serum Protein by Salting out Method
6	Plant Biochemistry Preparation of plant extracts using Soxhlet Extraction system Determination of sugar content in plant sample Quantitative estimation of total protein in plant sample Quantitative estimation of phenolic content in plant sample
7	Protein profiling by SDS- PAGE
8	Viva and Presentation



**Industrial Biotechnology Training
Environmental Biotechnology (Specialized)
Session 2023-2024**

S.No.	Module Content
1	Orientation Program, General Introduction to environmental biotechnology
2	Lab Visit: Proper Demonstration of Instruments and Good Laboratory Practices
3	Preparation of Buffers and Reagents and Introduction to lab mathematics
4	Determination Procedure of Physical Parameter of water quality testing by HANNA EDGE <ul style="list-style-type: none">• pH• temperature• Electrical conductivity• TDS• DO• Salinity
5	Determination Procedure of Chemical Parameter of water quality testing <ul style="list-style-type: none">• Determination of acidity• Determination of alkalinity• Estimation of the hardness• Determination of the dissolved oxygen (Manual Method)
6	Determination Procedure of wastewater quality parameter <ul style="list-style-type: none">• Determination of total, suspended, dissolved solids• Estimation of Nitrates Nitrogen• Determination of Ammonical Nitrogen• Determination of Biochemical oxygen demand• Determination of Chemical oxygen demand• Determination of Total phosphate• Determination of Sulphate
7	<ul style="list-style-type: none">• Enumeration of microbial index by standard plate count method (SPC)
8	Microbiological techniques (Environmental Microbiology) <ul style="list-style-type: none">• Plating methods



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	<ul style="list-style-type: none">• Streaking methods• Staining methods
9	<ul style="list-style-type: none">• Enumeration of Total coliforms by Multiple tube Fermentation test (MPN)
10	<ul style="list-style-type: none">• Exercise based on Bioremediation of Industrial effluent
11	<ul style="list-style-type: none">• Visit of Industrial tour – Saras Dairy• Visit of Vermifiltration Plant- BIBT Campus





**Industrial Biotechnology Training
Environmental Biotechnology (Standard)
Session 2023-2024**

S. No.	Module Content
1	Orientation Program, General Introduction to environmental biotechnology
2	Lab Visit: Proper Demonstration of Instruments and Good Laboratory Practices
3	Preparation of Buffers and Reagents and Introduction to lab mathematics
4	Determination Procedure of Physical parameter of water quality testing by HANNA EDGE <ul style="list-style-type: none">• pH• Temperature• Electrical conductivity• TDS• DO• Salinity
5	Determination Procedure of Chemical Parameter of water quality testing <ul style="list-style-type: none">• Determination of acidity• Determination of alkalinity• Estimation of the hardness• Determination of the dissolved oxygen (Manual Method)
6	Determination Procedure of wastewater quality parameter <ul style="list-style-type: none">• Determination of total, suspended, dissolved solids• Estimation of Nitrates Nitrogen• Determination of Biochemical oxygen demand• Determination of Chemical oxygen demand• Determination of Total phosphates• Determination of Sulphates
7	<ul style="list-style-type: none">• Enumeration of microbial index by standard plate count method (SPC)
8	Microbiological techniques (Environmental Microbiology) <ul style="list-style-type: none">• Plating methods• Streaking methods• Staining methods
9	<ul style="list-style-type: none">• Enumeration of Total coliforms by Multiple tube Fermentation test (MPN)
10	<ul style="list-style-type: none">• Report Writing, final monitoring by Quiz/ Viva/ Presentation



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Industrial Biotechnology Training Herbal Drug Formulations (Standard) Session 2023 – 2024

S. No.	Module Content
1	Orientation Program, General Interaction and Introductory Lecture
2	Lab Visit: Proper Utilization of Resources and Good Laboratory Practices
3	Preparation of plant material for Herbal extract preparation
4	Extraction techniques to prepare Herbal extract from Medicinal plants
5	Qualitative phytochemical screening
6	Total Phenolic Content Determination
7	Total Flavonoid content Determination
8	Antimicrobial activity
9	Presentation, Report Submission and Viva voce



**Industrial Biotechnology Training
Herbal Extractions and Phytochemistry (Advanced)
Session 2023-2024**

S.N.	Module Content
1	Introductory Lecture - Demonstration of Instruments, Laboratory mathematics, Good Laboratory Practices and Safe Handling of Biomedical Waste
2	Solution Preparation – Normal, Molar and Percent Solution
3	Qualitative Screening of Secondary metabolites <ol style="list-style-type: none">1. Test for Tannins2. Test for Phlobatannins3. Test for Saponins4. Test for Flavonoids5. Test for Alkaloids6. Test for Quinones7. Test for Coumarin8. Test for Terpenoids9. Test for Cardiac glycosides
4	To learn the UV-Vis Spectrophotometer technique by Validating the Lambert and Beer law and preparation of BSA Protein Standard curve
5	Preparation of plant material
6	Extraction techniques to prepare Herbal extract from Medicinal plants
7	DPPH Free Radical scavenging Assay
8	Superoxide anion radical scavenging (SO) assay
9	Hydroxyl radical scavenging (HO) assay
10	Reducing power ability
11	Total Flavonoid content Determination
12	Total phenolic content Determination
13	Determination of sugar content in plant sample
14	Quantitative estimation of total protein in plant sample
15	Determination of Vitamin C in plant sample
16	Determination of Alkaloid content
17	Determination of Lipid content in plant sample
18	Protein profiling by SDS- PAGE
19	Viva and Presentation



**Industrial Biotechnology Training
Immunotechnology (Specialized)
Session 2023-2024**

S. No.	Module Content
1	Introductory Lecture - Demonstration of Instruments, Laboratory mathematics, Good Laboratory Practices and Safe Handling of Biomedical Waste
2	Determination of Blood group
3	DOT-ELISA
4	Immunodiffusion Techniques i. Radial Immunodiffusion Technique(RID) ii. Ouchterlony Double Diffusion Technique (ODD)
5	Immuno-electrophoresis Techniques i. Rocket Immuno-electrophoresis Technique (RIEP) ii. Counter Current Immuno-electrophoresis Technique (CCIEP)
6	Chromatographic techniques (Affinity Chromatography, Ion exchange chromatography & Size exclusion chromatography)
7	Separation of serum and plasma Isolation of Serum Protein by Salting out Method.
8	Serum Protein profiling by SDS- PAGE.
9	Western Blotting



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Industrial Biotechnology Training Medical Diagnostics (15 days) Session 2023-2024

S.N.	Module Content
1.	Overview of the healthcare and hospital system and Laboratory Organization
2.	Complete Blood count, PBF, ESR, BT and CT, Blood Grouping
3.	Blood Glucose estimation, RFT, LFT
4.	Cardiac Function Test, Pancreatic Function Test
5.	Automation and recent advances
6.	Machines and their working principles, Urine Analysis
7.	Role and Responsibilities of Phlebotomist Ethics and professional behavior.
8.	Techniques of blood collection Blood collection in special cases and sites
9.	Central Lab (Biochemistry and Hematology Lab)
10.	Collection center
11.	Vitamins and their deficiency
12.	BMW, Interpretation, Lab reporting, Quality Assurance
13.	Revision, conclusion and report
14.	Meeting with Dietician, Placement cell



**Industrial Biotechnology Training
Medical Diagnostics (30 days)
Session 2023-2024**

S.N.	Module Content
1.	Overview of the healthcare and hospital system.
2.	Laboratory Organization
3.	Machines and their working principles
4.	Role and Responsibilities of Phlebotomist
5.	Ethics and professional behavior
6.	Requisites for sample collection
7.	Equipment used for collection
8.	Technique of blood collection
9.	Blood collection in special cases and sites
10.	Blood Collection
11.	Complete Blood count, PBF,
12.	ESR, BT and CT, Blood Grouping
13.	Urine Analysis
14.	Instruments Used in Biochemistry
15.	Blood Glucose estimation, HbA1c
16.	Renal Function Test
17.	Liver Function Test
18.	Cardiac Function Test
19.	Pancreatic Function Test
20.	Other parameters of diagnostic importance
21.	Automation and recent advances
22.	Equipment Handling and BMW
23.	Quality Control
24.	Basic Principles of Radio technology, Radiation Hazards and protection
25.	Dark Room Procedure, Positioning in Radiography
26.	X Ray procedure
27.	Report Printing and distribution



**Industrial Biotechnology Training
Medical Microbiology (Standard)
Session 2023 – 2024**

S. No.	Module Content
1	Introductory Lecture
2	Introduction to Good Laboratory Practices and Instrumentation Handling of Specimens and Biomedical Waste Disposal Introduction to Normal Flora of Human Body
3	Culture Media <ul style="list-style-type: none">• Types of Culture Media• Preparation of Culture Media
4	Isolation of Pathogenic Bacteria from Clinical Samples <ul style="list-style-type: none">• Serial Dilution Method• Spread Plate Method• Pour Plate Method• Streak Plate Method
5	Morphological Characterization of Microorganisms <ul style="list-style-type: none">• Colony Characterization• Colony Forming Unit (CFU) Count
6	Microscopic Characterization of Microorganisms <ul style="list-style-type: none">• Differential Staining<ul style="list-style-type: none">○ Gram's Staining○ Acid Fast Bacilli (AFB) Staining○ Endospore Staining• Negative Staining<ul style="list-style-type: none">○ Capsule Staining
7	Biochemical Characterization for Bacterial Identification <ul style="list-style-type: none">• IMViC Test• Oxidase Test• Catalase Test
8	Isolation and Identification of Fungi
9	Antibiotic Susceptibility Tests <ul style="list-style-type: none">• Disc Diffusion Test
10	Enumeration of Bacteria: Growth Kinetic Study
11	Presentation, Report Submission and Viva-Voce



**Industrial Biotechnology Training
Molecular Biology (Specialized)
Session 2023-2024**

S.N.	Module Content
1	Preparation of Molecular grade solutions
2	Demonstration of isolation of genomic DNA from prokaryotes
3	Demonstration of isolation of genomic DNA from Eukaryotes (animal and plant cells)
4	Isolation of plasmid DNA from prokaryotes
5	Agarose gel electrophoresis and quantification of DNA sample
6	Calculation of DNA melting temperature and estimation of composition of nucleotide sample
7	PCR amplification – gene specific
8	PCR amplification – using RAPD Primers
9	Multiplex PCR
10	Colony PCR
11	PCR Purification
12	Competent cell preparation and transformation
13	Ligation
14	RFLP
15	SNP detection
16	SDS-Page



**Industrial Biotechnology Training
Molecular Biology (Standard)
Session 2023-2024**

S. No.	Module Content
1	Preparation of Molecular grade solutions
2	Demonstration of isolation of genomic DNA from prokaryotes
3	Demonstration of isolation of genomic DNA from eukaryotes
4	Demonstration of plasmid DNA from prokaryotes
5	Agarose gel electrophoresis
6	Quantification of DNA sample
7	Determination of melting temperature (T_m) of prokaryotic DNA
8	RAPD
9	Restriction Digestion/RFLP
10	PCR



**Industrial Biotechnology Training
Nanobiotechnology (15 days)
Session 2023-2024**

S.N.	Module Content
1.	Introduction and Instrumentation
2.	Brief idea about nanoparticles (polymeric, metallic) and their applications
3.	Sample collection, washing, air drying for 2 days at room temp (dust free)
4.	Metal NPs synthesis (reducing agent), washing, pellet collected, stored Characterization through UV vis spectroscopy and data interpretation
5.	Plant extract preparation, filtration
6.	Green synthesis of metal nanoparticles and UV characterization
7.	Antibacterial activity- intro, procedure, preparation
8.	Evaluation of antibacterial activity for different nanoparticles
9.	Antibiofilm activity- intro, procedure, preparation
10.	Determining the antibiofilm activity of nanoparticles
11.	Antioxidant activity, Stability studies
12.	Results analysis
13.	Presentation and viva



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Industrial Biotechnology Training Research Mentorship (Specialized) Session 2023-2024

S.N.	Module Content
1.	Domains of Biotechnology – Medical Biotechnology, Environmental Biotechnology and Plant Biotechnology
2.	Introduction to Research and its intricacies
3.	Designing a research problem
4.	Concept of theories and its importance in research
5.	Hypothesis and its concepts
6.	Data collection and data processing
7.	Statistics in Research
8.	Referencing and ethics in research
9.	Scientific writing and communication



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Industrial Biotechnology Training Research Mentorship (Standard) Session 2023-2024

S.N.	Module Content
1.	Domains of Biotechnology – Medical Biotechnology, Environmental Biotechnology and Plant Biotechnology
2.	Introduction to Research and its intricacies
3.	Designing a research problem
4.	Concept of theories and its importance in research
5.	Hypothesis and its concepts
6.	Data collection and data processing
7.	Referencing and ethics in research

