

INFORMATION BROCHURE



**Hands-on Industrial Training and
Project/ Dissertation Work**



**Helix BioGenesis Pvt. Ltd.
D-34, Sector-2, Noida
+91-9717117289**

Introduction:

Helix BioGenesis (A unit of Helix BioGenesis Pvt. Ltd.), a fast growing **ISO 9001:2008 certified** company engaged in the field of Biotechnology/ Medical Diagnostics Research and Live Project based Training situated in Noida. Currently, Helix BioGenesis undertakes research in the frontier areas of Molecular biology, Microbiology, Immunology, Medical biotech and Diagnostic services. We have developed 15 days to 6 months Hands-on Industrial Training/ Project/ Dissertation Work and Summer & Winter Training Programs for the students of any field of Biotechnology/Life Sciences and Medical Biotechnology. This is a rigorous and comprehensive Industrial Training designed and developed for those with basic knowledge of Biotechnology, and looking for a career in Biotech and Pharmaceuticals sector as well as in research organizations in India and abroad.

This training will prepare the candidates for a brighter future in biotechnology by providing knowledge & experience in advanced technologies currently being employed in research. It will also help the candidates in designing of experiments, formulating project protocols, together with hands-on-training in advanced techniques in molecular biology & r-DNA technology, biotechnology, and drug discovery. Actual data from the research laboratories will be discussed, and a comprehensive protocol booklet will be provided to each trainee for future reference.

Industrial Training/ Project Work/ Dissertation Program (1-6 Months)

Helix BioGenesis has developed 15 days to 6 months rigorous Hands-on Industrial Training/ Project Training/ Dissertation & Summer/ Winter Training Program for the students of any stream of Biotechnology/ life sciences. Certificate will be provided to the candidates on successful completion of the training/ project work. The candidates who are pursuing or have completed their B.Tech, B. Sc., M.Tech, M.Sc., M. Phil and Ph.D in Biology/ Biotech/ Medical Biotech or any stream of Life Sciences from a recognized University are eligible for industrial training with us.

Helix BioGenesis also undertakes live research/ Project work at in the frontier areas of Biotechnology. Students can undertake any of the field, mentioned below, as per their requirement/ interest. Duration of the program can be from 1-6 months. We conduct live industry oriented research work in the following areas:

- Molecular Biology,
- Industrial Microbiology,
- Fermentation Technology,
- Food Technology,
- Probiotics,
- Metabolomics,
- Medical biotechnology
- Diagnostic services.

Objective of the project or dissertation work is to inculcate the good laboratory practices, real hands-on expertise and industrial exposure among students. This work includes a thorough understanding of research topic, meticulous experimental designing, and developing keen observation skills along with analytical power to understand and interpret the results/ findings of their hard work. We also support students in writing project report and help them in making presentation so that their work can be recognized in tune with their hard work. A list of various ongoing or tentative projects for HB-10 program can be obtained from our office.

Industrial Training Programs/ Modules Details:

Course Name	Course Code	Duration*
Advance Industrial Microbiology	HB-01	30 Days/ 4 weeks
Basic Industrial Microbiology	HB-01-A	15 Days/ 2 weeks
Advance Molecular Biology & r-DNA Technology	HB-02	30Days/ 4 weeks
Basic Molecular Biology	HB-02-A	15 Days/ 2 weeks
Biochemistry, Chromatography & Metabolomics	HB-03	30 Days/ 4 weeks
Biochemistry & Chromatography	HB-03-A	15 Days/ 2 weeks
Medical Immunology/ Diagnostics	HB-04-A	15 Days/ 2 weeks
Medical Microbiology	HB-04- B	21 Days/ 3 weeks
Food Biotechnology/ Food Microbiology	HB-04-C	30 Days/ 4 weeks
Microbiology, Molecular Biology & Protein Biology (Mix Module)	HB-05	30 Days/ 4 weeks
Medical Biotechnology (Medical Microbiology & Immunology/Diagnostics)	HB-06	30 Days/ 4 weeks
Advance Molecular Biology and Animal Cell Culture Training	MB-ACC	30 Days/ 4 weeks
Microbial, Advance Molecular Biology and Biochemical Technology	HB-07	45 Days/ (6 weeks)
Microbiology, Advance r-DNA Technology, Biochemistry & Chromatography Techniques	HB-08	60 Days/ (8 weeks)
Advance Job Oriented Industrial Training Program	HB-09	3 months/12 weeks
1-6 Month Live Project Based Industrial Training/ Dissertation Work	HB-10	1-6 Months
Ph.D. Work (Student must be registered from a recognized University/ College)	HB-11	1-2 Year
# Registration Fee: Rs. 500/- will be applicable for all programs (HB-01 to HB-11) and shall not be included in total fee.		

**For fee details, Please contact/ Whatsapp +91-9717117289
or visit our Office at**

**Helix BioGenesis Pvt. Ltd.
D-34, Near Red FM Building,
Sector-2, Noida**

Detailed Batch Schedule

Month	1 st Batch	2 nd Batch
December, 2020		December 15, 2020
January, 2021	January 04, 2021	January 18, 2021
February, 2021	February 01, 2021	February 15, 2021
March, 2021	March 01, 2021	March 15, 2021
April, 2021	April 01, 2021	April 15, 2021
May, 2021	May 03, 2021	May 17, 2021
June, 2021	June 01, 2021	June 15, 2021

- Customised/ Special modules of 21 days are also available to the students coming in groups or as per the need of a University/ Institution. For details please contact our office.
- Study material/ Protocol booklet will be provided to trainees for each Lab work. **Industrial Training Certificate will be provided to every student on last day of the training.**
- For detailed information on batch in a particular month please contact office on 9717117289.

Eligibility Criteria:

The candidates who have completed/pursuing their B.Sc., B.Tech., M.Sc., M.Tech., M.Phil. and Ph.D. in any field of Biotechnology/Life Sciences and Medical Biotechnology stream from a recognized University are eligible to apply. Selection will be purely on “First Come, First Serve Basis”. **There will be a maximum of 15 students in each batch.**

Application Procedure:

1. **Fill the application form directly on our website www.helixbiogenesis.com/applyonline.** Alternatively you can download the application form from our website and fill it completely as per the instructions.
2. Transfer registration fee through NEFT/Online banking or by using Paytm (Paytm No. 9717117289) the following account and send us a copy of receipt of transfer (with UTR No.) along with scanned copy of application form.
While doing the online payment, please use the following details
Payee Name: Helix Biogenesis Pvt Ltd; **Account Number:** 003105029384
Type: Current Account; **Bank Name:** ICICI Bank; **IFSC Code:** ICIC0000031
Branch Address: Sector-18, Noida.
3. Send scanned copy of application form along registration fee details (Screen-shot of payment) through mail at helix.noida@gmail.com.
4. You can also fill the application form by directly visiting our office at Helix BioGenesis, D-34, Sector-2, Noida, U.P., 201301. You can collect training application form from our office, fill it and submit it along with requisite amount in cash directly to the office.
5. We will contact you after receiving your application form and will confirm/ register your seat for batch and program of your choice.
6. **Training fee has to be paid at the time of joining through cash/cheque/ or online mode.**
7. Registration of the candidate would be valid for next six month from the date of registration. For further assistance, please contact our office or email us at “helix.noida@gmail.com”.

FACILITIES @ HELIX BIOGENESIS

- Individual Hands-on-experiment based learning of all techniques (every student will be able to perform every experiment on their own).
- Frequent visits and lectures by renowned Scientist/researchers from Industry and Academia.
- Fully air conditioned laboratory with Wi-Fi facility.
- Well-equipped lab with separate class cum waiting room.
- Printed Protocol Booklet/study material for every student.
- Library and e-book facility along with computer facility.
- Approved Certificate to all students on successful completion of training.
- Well-connected location with metro train facility at walking distance.
- **Accommodation Info:**
Accommodation should be booked in nearby PG hostels/guesthouses and hotels directly. Please click the following link to **download accommodation information**. If you need help then please call on +91-9717117289 or email to helix.noida@gmail.com.
- Career counseling services to all the trainees.
- Dedicated Research Paper Publication support facility for students doing project work.
- Dedicated team well-connected through Facebook & WhatsApp for guiding students.

Helix BioGenesis

D-34, Sector -2, Noida -201301

Cell No. - +91-9717117289

E-mail: helix.noida@gmail.com

Web: www.helixbiogenesis.com

Working Days: Monday to Saturday

Time: 9.30 AM to 5.30 PM

TRAINING PROGRAM DETAILS

List of Hands-on-Techniques of different modules

Advance Industrial Microbiology (30 Days/4 Weeks): Program Code- HB-01

1. Introduction to Good Laboratory Practices and General Safety Instructions
2. Instrumentation: Working with Autoclave, Laminar Air Flow System, Incubator/ Shaker, Hot Air Oven, Microscope and Other Instruments
3. Various Media (Solid/Liquid) preparation and Its Sterilization
4. Isolation and Screening of Microorganisms
5. Serial Dilution Method
6. Pure Culture Techniques (Streaking, Pouring & Plating, etc.)
7. Culturing & Sub Culturing Methods of Microbes
8. Isolation and Culturing of microbes from Soil Samples
9. Isolation and Culturing of microbes from Water Samples
10. Isolation and Culturing of microbes from Air Samples
11. To study the Components, use and care of Compound Microscope
12. Screening of Microbes (Staining Techniques)
 - Gram Staining
 - Endospore Staining
 - Capsular Staining
 - Flagellar Staining
13. IMViC Test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
14. Catalase activity Test
15. Oxidase activity Test
16. Bacterial Growth Curve Analysis/Growth Kinetics
17. Optimization of Growth Condition For Industrially Important Microorganisms
18. Antibiotics Sensitivity Test
19. Culturing Techniques for *E. coli*. or Industrially Important Microorganisms
20. Fungal Staining & Actinomycetes staining
21. Isolation and identification of enzyme producing microbe
22. Isolation of antibiotic producing microbe by crowed plate method
23. Isolation of antibiotic resistance (MDR) microbe from soil sample
24. To study the Chemical Control of Microbes
25. To study the Effect of Temperature on Growth of Bacteria
26. To study the Effect of pH on Growth of Bacteria
27. Isolation of Lipolytic Microbes from Butter
28. Effect of PH, Temperature, Pressure, Inhibitors on Growth of Microbes
29. Effect of physical & chemical mutagen of growth of microbes
30. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills, CV and Personality Development (Separate Certificate will be Provided for this Workshop without any Additional Charges).



Basic Microbiology (15 Days/2 Weeks): Program Code- HB-01-A

1. Introduction to Good Laboratory Practices and General Safety Instructions
2. Instrumentation: Working with Autoclave, Laminar Air Flow System, Incubator/ Shaker, Hot Air Oven, Microscope and Other Instruments
3. Various Media (Solid/Liquid) preparation and Its Sterilization
4. Isolation and Screening of Microorganisms
5. Serial Dilution Method
6. Pure Culture Techniques (Streaking, Pouring & Plating, *etc.*)
7. Culturing & Sub Culturing Methods of Microbes
8. Isolation and Culturing of microbes from Soil Samples
9. Isolation and Culturing of microbes from Water Samples
10. Screening of Microbes (Staining Techniques)
 - Gram Staining
 - Endospore Staining
11. IMViC Test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
12. Bacterial Growth Curve Analysis/ Growth Kinetics
13. Antibiotics Sensitivity Test
14. Culturing Techniques for *E. coli*. or Industrially Important Microorganisms
15. Isolation and identification of enzyme producing microbe
16. Isolation of antibiotic producing microbe by crowded plate method
17. Isolation of antibiotic resistance (MDR) microbe from soil sample.
18. Free Special Lecture/Talk on Future Prospects in Biotech (With Certificate)

Advance Molecular Biology & r-DNA Technology (30 Days/4 Weeks): Program code- HB-02

1. Working in Molecular Biology Laboratory
2. Good Laboratory Practices and General Safety Instructions
3. Basics of Calculations; Buffers and Reagent Preparation
4. Sterilization Techniques: Dry, Wet and Chemical Sterilization
5. Isolation and Purification of Prokaryotic (Bacterial) Genomic DNA
6. Agarose Gel Electrophoresis of Genomic DNA
7. Preparation of Luria Bertani Media and its Sterilization
8. Culturing of Microbes (*E. coli* DH5 α Strain for Plasmid DNA Isolation)
9. Isolation & Purification of Plasmid DNA from *E. coli* DH5 α Strain
10. Agarose Gel Electrophoresis of Isolated Plasmid DNA
11. Determination of Purity and Quantification of Isolated Plasmid DNA
12. Isolation & Purification of Genomic DNA from Plants
13. Agarose Gel Electrophoresis of Isolated Plant Genomic DNA
14. RNA Isolation from Plant Sources
15. Denaturing Agarose Gel Electrophoresis of Isolated RNA
16. Northern Blotting Technique (RNA from Gel to membrane)
17. Purification & Quantification of RNA
18. Quantitative analysis of Nucleic Acids using DPA reagent
19. Qualitative (A_{260/280}) & Quantitative analysis of Nucleic Acids using Nanodrop/Qubit 2.0
20. Primer Designing and Optimization of PCR
21. Polymerase Chain Reaction (PCR)



22. Gel Electrophoresis of PCR Products with Molecular Markers
23. Restriction Digestion of DNA
24. Electrophoresis of Digested DNA Product
25. Southern Blotting Technique (Transfer of DNA to Membrane)
26. Competent Cell Preparation of *E. coli*
27. cDNA Preparation and Cloning
28. Cloning of cDNA into Digested Plasmid (cDNA Ligation)
29. Transformation of Ligated Plasmid into Competent Cells
30. Screening of the Transformed Cells (Blue-White selection)
31. Colony PCR for Screening of Transformed Cells
32. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills, CV and Personality Development (Separate Certificate will be Provided for this Workshop without any Additional Charges)

Basic Molecular Biology (15 Days/2 Weeks): Program Code- HB-02-A

1. Working in Molecular Biology Laboratory
2. Good Laboratory Practices and General Safety Instructions
3. Basics of Calculations; Buffers and Reagent Preparation
4. Sterilization Techniques: Dry, Wet and Chemical Sterilization
5. Preparation of Luria-Bertani Media and its Sterilization
6. Culturing of Microbes (*E. coli* DH5 α Strain for Plasmid/ Genomic DNA Isolation)
7. Isolation and Purification of Prokaryotic (Bacterial) Genomic DNA
8. Agarose Gel Electrophoresis of Genomic DNA
9. Isolation & Purification of Genomic DNA from Plants
10. Agarose Gel Electrophoresis of Isolated Plant Genomic DNA
11. Isolation & Purification of Plasmid DNA
12. Determination of Purity and Quantification of Plasmid DNA
13. Agarose Gel Electrophoresis of Isolated Plasmid DNA
14. Quantitative analysis of Nucleic Acids using DPA reagent
15. Qualitative ($A_{260/280}$) & Quantitative analysis of Nucleic Acids using Nanodrop/Qubit 2.0
16. Primer Designing and Optimization of PCR
17. Polymerase Chain Reaction (PCR)
18. Gel Electrophoresis of PCR Products with Molecular Markers
19. Free Special Lecture/Talk on Future Prospects in Biotech (With Certificate)

Biochemistry & Metabolomics (30 Days/4 Weeks): Program Code- HB-03

1. Introduction to good Laboratory practices and general safety instructions
2. Principle and handling of laboratory equipments
3. Buffer And solution preparation
4. Dilution Preparation of Buffers and Solutions, Labelling & Storage
5. Process of sterilization and decontamination
6. Protein isolation from Plant sample
7. Partial Purification of plant Protein by Ammonium sulphate Precipitation Method
8. Quantification of Protein Concentration by Bradford Method
9. Quantification of Protein Concentration by Biuret Method
10. Quantification of Protein Concentration by Lowry's Method
11. SDS – PAGE along with molecular Markers
12. Bacterial Protein Isolation and quantification
13. ELISA
14. Western Blotting
15. Amylase Enzyme Assay
16. Beta Galactosidase Enzyme activity assay



17. Paper Chromatography
18. Thin Layer Chromatography
19. Column Chromatography
20. Estimation of Starch
21. Isolation of plant secondary metabolites from various plants
22. Determination of potency of plant secondary metabolites
23. Phytochemical Analysis of Plant Secondary Metabolites
24. Extraction of Antimicrobial Peptides from various microbes
25. To Quantify Total Serum Protein in Human Blood Sample
26. To Quantify Calcium Concentration in Human Blood Sample
27. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills, Personality & CV Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges)

Biochemistry & Metabolomics (15 Days/2 Weeks): Program Code- HB-03-A

1. Introduction to good Laboratory practices and general safety instructions
2. Principle and handling of laboratory equipments
3. Buffer And solution preparation
4. Dilution Preparation of Buffers and Solutions, Labelling & Storage
5. Process of sterilization and decontamination
6. Protein isolation from Plant sample
7. Partial Purification of plant Protein by Ammonium sulphate Precipitation Method
8. Quantification of Protein Concentration by Bradford Method
9. Quantification of Protein Concentration by Biuret Method
10. Quantification of Protein Concentration by Lowry's Method
11. SDS – PAGE along with molecular Markers
12. Bacterial Protein Isolation and quantification
13. Paper Chromatography
14. Thin Layer Chromatography
15. Amylase Enzyme Essay
16. Free Special Lecture/Talk on Future Prospects in Biotech (With Certificate)

Immunology/ Medical Diagnostics (15 Days/2 Weeks): Program Code- HB-04-A

1. To Perform Blood Grouping Test
2. To detect the Presence of *Salmonella* sp. by Qualitative Slide Agglutination Test (Widal Test)
3. Isolation of Serum and Plasma from Blood
4. To Perform VDRL Test
5. ELISA Test
6. Blood Sugar Test
7. To Perform Liver Function Tests (LFT)
8. To Calculate Total Serum Protein in Blood Sample
9. To Calculate Total Calcium in Blood
10. To Calculate Total Cholesterol in Serum
11. To Perform HDL Cholesterol Estimation Test
12. To Perform LDL Cholesterol Estimation Test
13. Isolation and Purification of Immunoglobins (IgG).
14. To Perform Radial Immunodiffusion Test
15. To Study the Reaction Pattern of an Antigen with a set of Antibodies by Ouchterlony Double Diffusion Method
16. Determination of the Rheumatoid Arthritis (RA)
17. Free Special Lecture/Talk on Future Prospects in Biotech (With Certificate)



Medical Microbiology (21 Days/3 Weeks): Program Code- HB-04-B

1. Introduction to Good Laboratory Practices and General Safety Instructions
2. Instrumentation: Working with Autoclave, Laminar Air Flow System, Incubator/ Shaker, Hot Air Oven, Microscope and Other Instruments
3. Various Media (Solid/Liquid) preparation and Its Sterilization
4. Isolation and Screening of Microorganisms
5. Isolation of Microbes from Clinical Samples through Serial Dilution Method
6. Identification of Bacteria of Clinical Importance by various Staining Method
7. To Perform Antibiotic Sensitivity Test
8. Identification of Bacteria of Clinical Importance by various Biochemical Tests (IMViC test)
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
9. Catalase activity Test
10. Oxidase activity Test
11. To Study Blood Microscopy
12. To Determine the Hemoglobin Content in Blood Sample
13. Urine Sample Analysis
14. Laboratory Diagnosis of Blood Parasitic Infection by Smear Method
15. Isolation of Serum and Plasma from Blood
16. To Perform Kidney Function Test (KFT)
17. DNA Isolation from Animal Tissue/ Blood Sample
18. Agarose Gel Electrophoresis of Genomic DNA
19. Polymerase Chain Reaction (PCR)
20. Gel Electrophoresis of PCR Products with Molecular Markers
21. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills, Personality & CV Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges)

Food Biotechnology/ Microbiology (30 Days/4 Weeks): Program Code- HB-04-C

1. Introduction to the basic Microbiology Laboratory practice and Equipments
2. Cleaning & Sterilization of glasswares and Lab Safety & Ethics
3. Preparation of chemical & Reagents used in food tech laboratory
4. Sterilization techniques for lab equipments and culture media
5. Preparation of Slant, Stab & Plates using nutrient agar media
6. Pure culture preparation
7. Isolation of microbes from various food items
8. Identification of bacteria using IMViC test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
9. Catalase test
10. Oxidase test
11. Starch hydrolysis test
12. Degradation of amino acid for hydrogen sulphide production
13. Enumeration of yeast and molds in food
14. Sugar fermentation test
15. Enumeration and isolation of *E. Coli* from food sample



16. Enumeration and isolation of *Salmonella*, *Shigella*, *Vibrio* from food sample
17. Enumeration of coliform, fecal coliforms from food sample / water sample
18. Assessing the quality of Jam, Jelly & Fruit juice
19. Quality control of Milk and Milk products
20. Milk analysis for fat and SNF
21. To acquaint with the problems of adulteration in Ghee and their detection
22. Determination of pH and acidity of food sample
23. Studies on food preservation by Temperature, Radiation and Bacteriocins
24. Total carbohydrate estimation in food sample
25. To estimate the reducing and non-reducing Sugar
26. To estimate the moisture content of food items
27. Determination of protein in food sample
28. Estimation of Starch in food sample
29. Determination of food adulteration in various commercial food items
30. BOD analysis of water
31. Analysis of Spices
32. Antioxidant analysis of Green tea products
33. Extraction of Genomic DNA from Microbes
34. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills, Personality & CV Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges).

Microbiology, Molecular Biology & Biochemistry (30 Days/4 Weeks):
Program Code HB-05

1. Working in Molecular Biology Laboratory
2. Good Laboratory Practices and General Safety Instructions
3. Basics of Calculations; Buffers and Reagent Preparation
4. Media preparation and sterilization,
5. Serial Dilution Method,
6. Culturing & Sub Culturing Methods of Microbes,
7. Isolation and Culturing of microbes from Soil & Air,
8. Screening of Microbes (Staining Techniques)
9. IMViC Test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
10. Growth Kinetics of Microbes,
11. Antibiotics Sensitivity Test,
12. Isolation & Purification of Plasmid DNA,
13. Agarose Gel Electrophoresis of Plasmid DNA,
14. Isolation and Purification of Prokaryotic (Bacterial) Genomic DNA,
15. Agarose Gel Electrophoresis of Genomic DNA,
16. Isolation & Purification of Genomic DNA from Plants,
17. Agarose Gel Electrophoresis of Plant Genomic DNA with molecular markers,
18. Restriction Digestion,
19. Quantitative analysis of Nucleic Acids using DPA reagent
20. Qualitative (A260/280) & Quantitative analysis of Nucleic Acids using Nanodrop/Qubit 2.0
21. Southern Blotting Techniques (Transfer of DNA from Gel to membrane),
22. Primer Designing and Optimization of PCR



23. Polymerase Chain Reaction (PCR),
24. Gel Electrophoresis of PCR Products with Molecular Markers
25. Protein Isolation,
26. Estimation of Protein by Bradford Method,
27. Estimation of Protein by Lowry's Method,
28. Protein Gel Electrophoresis- SDS-PAGE
29. Enzyme Assay – Amylase Assay,
30. ELISA.
31. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills, CV and Personality Development (Separate Certificate will be Provided for this Workshop without any Additional Charges).

Medical Biotechnology (Medical Microbiology & Immunology/Diagnostics)
(30Days/ 4 weeks): Program Code HB-06

1. Introduction to Good Laboratory Practices and General Safety Instructions
2. Instrumentation: Working with Autoclave, Laminar Air Flow System, Incubator/ Shaker, Hot Air Oven, Microscope and Other Instruments
3. Various Media (Solid/Liquid) preparation and It's Sterilization
4. Isolation and Screening of Microorganisms
5. Isolation of Microbes from Clinical Samples through Serial Dilution Method
6. Identification of Bacteria of Clinical Importance by various Staining Method
7. Identification of Bacteria of Clinical Importance by various Biochemical Tests
8. IMViC test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
9. Catalase activity Test
10. Oxidase activity Test
11. To Perform Antibiotic Sensitivity Test
12. To Study Blood Microscopy
13. Urine Sample Analysis
14. Laboratory Diagnosis of Blood Parasitic Infection by Smear Method
15. To Perform Blood Grouping Test
16. To Determine the Hemoglobin Content in Blood Sample
17. To detect the Presence of *Salmonella* sp. by Qualitative Slide Agglutination Test (Widal Test)
18. To Perform VDRL Test
19. ELISA Test
20. Determination of the Rheumatoid Arthritis (RA)
21. Isolation of Serum and Plasma from Blood
22. Blood Sugar Test from Serum/Plasma
23. To Perform Liver Function Tests (LFT)
24. To Perform Kidney Function Test (KFT)
25. To Calculate Total Serum Protein in Blood Sample
26. To Calculate Total Calcium in Blood
27. To Calculate Total Cholesterol in Serum
28. To Perform HDL Cholesterol Estimation Test
29. To Perform LDL Cholesterol Estimation Test
30. Isolation and Purification of Immunoglobins (IgG)
31. To Perform Radial Immunodiffusion Test



32. To Study the Reaction Pattern of an Antigen with a set of Antibodies by Ouchterlony Double Diffusion Method
33. DNA Isolation from Animal Tissue/ Blood Sample
34. Agarose Gel Electrophoresis of Genomic DNA
35. Polymerase Chain Reaction (PCR)
36. Gel Electrophoresis of PCR Products with Molecular Markers
37. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills & Personality Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges).

**Advance Molecular Biology and Animal Cell Culture Training
(30 Days/ 4 weeks); Program Code: MB-ACC**

1. Introduction to Good Laboratory Practices & General Safety Information
2. Maintenance of Sterility
3. Do's & Don'ts in the Animal Tissue Culture Lab
4. Exposure to Facility equipment
5. Preparation of medium and required Solutions
6. Cell Lines revival (Recovery)
7. Animal Cell Culture and maintenance of human cancer cell lines
8. Subculturing (passaging) & freezing
9. Freezing & thawing of human cancer cell lines
10. RNA extraction from human cancer cell lines
11. cDNA synthesis
12. Reverse Transcription PCR (RT-PCR)
13. Induction of proliferation and differentiation in human cancer cell lines
14. Protein extraction from human cancer cell lines
15. SDS-PAGE and coomassie blue staining
16. MTT Assay for proliferation/cytotoxicity
17. Restriction digestion
18. Ligation
19. DNA gel electrophoresis
20. DNA gel extraction
21. Preparation of competent cells
22. Transformation and plating on LBA plates
23. Plasmid DNA isolation
24. Genomic DNA isolation
25. Polymerase Chain Reaction (PCR)
26. Cytospin slide preparation and staining of hematopoietic cells for visualizing differentiation of cells
27. Protein & DNA sequence analysis
28. Primer Designing & Promoter analysis
29. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills & Personality Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges).

**HB-07: Microbial, Advance Molecular Biology and Biochemical Technology
(45Days/ 6 weeks)**

1. Introduction to Good Laboratory Practices and General Safety Instructions
2. Instrumentation: Working with Autoclave, Laminar Air Flow System, Incubator/ Shaker, Hot Air Oven, Microscope and Other Instruments
3. Various Media (Solid/Liquid) preparation and Its Sterilization
4. Isolation and Screening of Microorganisms



5. Serial Dilution Method
6. Pure Culture Techniques (Streaking, Pouring & Plating, etc.)
7. Culturing & Sub Culturing Methods of Microbes
8. Isolation and Culturing of microbes from Soil & Air Samples
9. Screening of Microbes (Staining Techniques)
10. IMViC Test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
11. Bacterial Growth Curve Analysis
12. Antibiotics Sensitivity Test
13. Culturing Techniques for *E. coli*. or Industrially Important Microorganisms
14. Isolation and identification of enzyme producing microbe
15. Isolation of antibiotic producing microbe by crowded plate method
16. Isolation and Purification of Prokaryotic (Bacterial) Genomic DNA
17. Agarose Gel Electrophoresis of Genomic DNA
18. Isolation & Purification of Plasmid DNA from *E. coli* DH5 α Strain
19. Agarose Gel Electrophoresis of Isolated Plasmid DNA
20. Isolation & Purification of Genomic DNA from Plants
21. Agarose Gel Electrophoresis of Isolated Plant Genomic DNA
22. RNA Isolation from Plant Sources
23. Denaturing Agarose Gel Electrophoresis of Isolated RNA
24. Quantitative analysis of Nucleic Acids using DPA reagent
25. Qualitative (A₂₆₀/A₂₈₀) & Quantitative analysis of Nucleic Acids using Nanodrop/Qubit 2.0
26. Primer Designing and Optimization of PCR
27. Polymerase Chain Reaction (PCR)
28. Gel Electrophoresis of PCR Products with Molecular Markers
29. Restriction Digestion of DNA
30. Electrophoresis of Digested DNA Product
31. Southern Blotting Technique (Transfer of DNA to Membrane)
32. Competent Cell Preparation of *E. coli*
33. cDNA Preparation and Cloning
34. Cloning of cDNA into Digested Plasmid (cDNA Ligation)
35. Transformation of Ligated Plasmid into Competent Cells
36. Screening of the Transformed Cells (Blue-White selection)
37. Colony PCR for Screening of Transformed Cells
38. Protein isolation from Plant sample
39. Partial Purification of plant Protein by Ammonium sulphate Precipitation Method
40. Quantification of Protein Concentration by Bradford Method
41. Quantification of Protein Concentration by Lowry's Method
42. SDS – PAGE along with molecular Markers
43. Bacterial Protein Isolation and quantification
44. ELISA
45. Western Blotting
46. Amylase Enzyme Assay
47. Beta Galactosidase Enzyme activity assay
48. Paper Chromatography
49. Thin Layer Chromatography
50. Column Chromatography
51. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills & Personality Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges).



HB-o8: Microbiology, Advance r-DNA Technology, Biochemistry & Chromatography Techniques (60 Days/ 8 weeks)

1. Introduction to Good Laboratory Practices and General Safety Instructions
2. Instrumentation: Working with Autoclave, Laminar Air Flow System, Incubator/ Shaker, Hot Air Oven, Microscope and Other Instruments
3. Various Media (Solid/Liquid) preparation and Its Sterilization
4. Isolation and Screening of Microorganisms
5. Serial Dilution Method
6. Pure Culture Techniques (Streaking, Pouring & Plating, etc.)
7. Culturing & Sub Culturing Methods of Microbes
8. Isolation and Culturing of microbes from Soil Samples
9. Isolation and Culturing of microbes from Water Samples
10. Isolation and Culturing of microbes from Air Samples
11. Screening of Microbes (Staining Techniques)
 - Gram Staining
 - Endospore Staining
 - Capsular Staining
 - Flagellar Staining
12. IMViC Test
 - Indole test
 - Methyl red test
 - Voges-Proskauer test
 - Citrate utilization test
13. Bacterial Growth Curve Analysis/ Growth Kinetics
14. Antibiotics Sensitivity Test
15. Culturing Techniques for *E. coli*. or Industrially Important Microorganisms
16. Isolation and identification of enzyme producing microbe
17. Isolation of antibiotic producing microbe by crowded plate method
12. Preparation of Luria Bertani Media and it's Sterilization
13. Culturing of Microbes (*E. coli* DH5 α Strain)
14. Isolation and Purification of Prokaryotic (Bacterial) Genomic DNA
15. Bacterial genomic DNA Quantification and Gel Electrophoresis
16. Isolation & Purification of Plasmid DNA from *E. coli* DH5 α Strain
17. Agarose Gel Electrophoresis of Isolated Plasmid DNA
18. Isolation & Purification of Plant Genomic DNA
19. Determination of Purity and Quantification of Plant Genomic DNA
20. Agarose Gel Electrophoresis of Isolated Plant Genomic DNA
21. RNA Isolation from Plant Sources
22. Purification & Quantification of RNA
23. Denaturing Agarose Gel Electrophoresis of Isolated RNA
24. Quantitative analysis of Nucleic Acids using DPA reagent
25. Qualitative/Spectrometric (A₂₆₀/280) analysis of Nucleic Acids
26. Quantitative analysis of Nucleic Acids using Nanodrop/Qubit 2.0
27. Primer Designing and Optimization of PCR
28. Polymerase Chain Reaction (PCR)
29. Gel Electrophoresis of PCR Products with Molecular Markers
30. Restriction Digestion of Genomic DNA
31. Electrophoresis of Digested DNA Product
32. Southern Blotting Technique (Transfer of DNA to Membrane)
33. Competent Cell Preparation of *E. coli*
34. cDNA Preparation and Cloning
35. Cloning of cDNA into Digested Plasmid (cDNA Ligation)
36. Transformation of Ligated Plasmid into Competent Cells



37. Screening of the Transformed Cells (Blue-White selection)
38. Colony PCR for Screening of Transformed Cells
39. Protein isolation from Plant sample
40. Partial Purification of plant Protein by Ammonium sulphate Precipitation Method
41. Quantification of Protein Concentration by Bradford Method
42. Quantification of Protein Concentration by Biuret Method
43. Quantification of Protein Concentration by Lowry's Method
44. SDS – PAGE along with molecular Markers
45. Bacterial Protein Isolation and quantification
46. ELISA
47. Western Blotting
48. Amylase Enzyme Assay
49. Beta Galactosidase Enzyme activity assay
50. Paper Chromatography
51. Thin Layer Chromatography
52. Column Chromatography
53. Special Lecture by Renowned Scientist from Industry or Academia/ One Day Workshop on Soft Skills & Personality Development for Biotech Students (Separate Certificate will be Provided for this Workshop without any Additional Charges).



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