

## System Biology Industrial Training

### Module 1: Industrial Applications of Systems Biology

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This module examines the practical applications of systems biology in industrial settings, demonstrating how these methods can optimize processes, enhance product development, and solve complex biological problems.

- Bioprocess Modeling and Optimization - using systems biology to improve the efficiency and output of biological manufacturing processes (process simulation software, metabolic engineering tools)
- Pharmaceutical Applications - leveraging systems biology in drug discovery and development, from target identification to toxicity prediction (drug discovery platforms, systems pharmacology tools)
- Environmental Bioremediation - applying systems biology to develop effective bioremediation strategies for environmental pollutants (microbial community analysis tools, genetic engineering software)
- Biotechnology Innovation - using systems approaches to accelerate biotechnological innovation, including synthetic biology and enzyme engineering (synthetic biology toolkits, protein design software)

**Duration: 12 Weeks**

**Fee Structure: Rs 3,00,000**

### Module 2: Computational Tools and Software in Systems Biology

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This module provides a thorough examination of the computational tools and software used in systems biology, offering hands-on experience and training in essential applications and platforms.

- Overview of Computational Tools - introduction to the primary software and tools used in systems biology, including their purposes and applications
- Software for Network Analysis - detailed training on tools like Cytoscape and NetworkX, focusing on their use in building and analyzing biological networks
- Simulation and Modeling Software - exploring tools like COPASI and BioNetGen for dynamic modeling and simulation of biological systems
- Data Analysis and Visualization - techniques for analyzing and visualizing complex data sets using tools like R, Python, and specialized visualization software
- Integrative and Multi-omics Tools - training on platforms that facilitate the integration of

diverse omics data types, enhancing comprehensive systems analysis

## **Duration: 12 Weeks**

## **Fee Structure: Rs 3,00,000**

Module 3: Teaching and Communication in Systems Biology

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This module focuses on the skills necessary for effectively teaching systems biology and communicating complex scientific information, crucial for both academic and industrial professionals.

- Educational Methods in Systems Biology - best practices for teaching complex systems concepts in classroom and workshop settings
- Scientific Communication - techniques for crafting clear, compelling presentations and publications that convey systems biology research to varied audiences
- Visual Communication Tools - using diagrams, infographics, and interactive media to explain systems biology concepts and data
- Outreach and Public Engagement - strategies for engaging the public and policymakers with systems biology research, emphasizing its societal relevance

## **Duration: 16 Weeks**

## **Fee Structure: Rs 3,00,000**

Module 4: Ethics and Regulatory Compliance

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This module explores the ethical, legal, and social implications of systems biology research, preparing participants to navigate complex regulatory environments and ethical dilemmas.

- Ethical Principles in Systems Biology - fundamental ethical issues related to biotechnology and systems biology research
- Regulatory Frameworks - understanding the regulatory landscape governing research, particularly in genomics and biotechnology
- Data Privacy and Security - best practices for managing sensitive genetic and health-related data
- Case Studies in Ethics - real-world scenarios highlighting ethical decision-making in systems biology research

## **Duration: 16 Weeks**

## **Fee Structure: Rs 3,00,000**

Module 5: Entrepreneurship and Innovation in Systems Biology

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This module delves into the business aspects of systems biology, including startup creation, innovation management, and market strategy, empowering researchers and entrepreneurs to translate scientific discoveries into market-ready solutions.

- Starting a Biotech Venture - key considerations for launching a startup in the biotech field, from concept to company
- Innovation Management - strategies for managing innovation within a startup or existing company in the biotech sector
- Market Analysis and Strategy - understanding the market dynamics and developing strategies to successfully launch and scale biotech products
- Case Studies of Successful Biotech Startups - insights from successful entrepreneurs in systems biology and related fields

**Duration: 18 Weeks**

**Fee Structure: 6,00,000**

Module 6: Grant Writing and Fundraising

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This module is designed to equip researchers with the knowledge and tools necessary to successfully write grant proposals and engage in fundraising activities to support their systems biology research.

- Overview of Funding Sources - identifying potential funding sources, including governmental, private, and international agencies
- Grant Writing Skills - essential components of a successful grant proposal, focusing on clarity, conciseness, and persuasiveness
- Strategies for Effective Fundraising - techniques and strategies for engaging potential funders, including crafting compelling narratives and building long-term relationships
- Workshop on Proposal Writing - hands-on training session with feedback from experienced grant writers and reviewers

**Duration: 18 Weeks**

**Fee Structure: Rs 6,00,000**

Module 7: International Collaboration and Network Building

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This module addresses the importance of international collaborations in systems biology, providing strategies to build and sustain professional networks that enhance research opportunities and foster global partnerships.

- Benefits of International Collaboration - exploring the advantages of collaborating across borders, including shared resources, diverse expertise, and access to unique research environments
- Building Professional Networks - techniques for connecting with fellow researchers,

clinicians, and educators in systems biology around the world

- Managing Collaborative Projects - best practices for managing international projects, including communication strategies, cultural considerations, and logistical planning
- Case Studies of Successful Collaborations - examples of successful international projects in systems biology that have led to significant scientific advancements

**Duration: 18 Weeks**

**Fee Structure: 6,00,000**