Biomedical Data Analysis in Omics Data Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In the age of precision medicine and data-driven health interventions, biomedical data analysis is a game-changer. Biomedical Data Analysis in Omics Data for Public Health training course offers participants a robust foundation in analyzing and interpreting high-throughput biological data—including genomics, transcriptomics, proteomics, metabolomics, and epigenomics—to drive impactful public health decisions. With real-world applications and hands-on case studies, this course is ideal for professionals aiming to bridge the gap between bioinformatics and public health strategy.

The course empowers learners with trending skills in multi-omics integration, biostatistics, machine learning, and health informatics—all tailored to uncover actionable insights from complex biological systems. By leveraging open-source tools and real omics datasets, participants will gain the competence to lead initiatives in disease surveillance, predictive modeling, population health management, and policy design, all while aligning with ethical standards and regulatory compliance in biomedical research.

Programme Curriculum

Biomedical Data Analysis in Omics Data for Public Health Training Course

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Course Objectives

1. Understand core concepts of biomedical and omics data analysis.
2. Analyze genomic and transcriptomic datasets using bioinformatics pipelines.
3. Apply data normalization, quality control, and transformation techniques.
4. Integrate multi-omics data for holistic health insights.
5. Use statistical modeling and machine learning in omics analytics.
6. Employ R, Python, and open-source tools for biological data analysis.
7. Interpret proteomic and metabolomic patterns in disease pathways.
8. Develop reproducible workflows with FAIR data principles.
9. Visualize omics data for policy advocacy and public health reporting.
10. Apply case-based learning for infectious and chronic disease studies.
11. Address ethical, legal, and social issues (ELSI) in biomedical data usage.
12. Communicate scientific findings to multidisciplinary health teams.
13. Explore the future of AI and big data in omics-driven public health.

Target Audience

1. Public Health Analysts
2. Epidemiologists
3. Biomedical Researchers
4. Data Scientists
5. Biostatisticians
6. Policy Makers in Health
7. Healthcare IT Professionals
8. Graduate Students in Health Sciences

Course Duration: 5 days

Course Modules

Module 1: Foundations of Biomedical and Omics Data

- Introduction to omics: genomics, proteomics, transcriptomics, metabolomics
- Public health relevance of omics data
- Key databases and repositories (NCBI, EMBL-EBI)
- Introduction to data standards and formats
- Overview of ethical data management
- **Case Study**: Building a genomic profile for population risk mapping

Module 2: Data Preprocessing and Quality Control

- Omics data acquisition and cleaning
- Batch effect correction and normalization
- Handling missing values and outliers
- Preprocessing tools in R and Python
- Data quality reporting
- **Case Study**: Preprocessing of lung cancer gene expression dataset

Module 3: Genomic and Transcriptomic Data Analysis

- Sequence alignment and variant calling
- Expression profiling and clustering
- Differential gene expression analysis
- Use of tools (DESeq2, edgeR, STAR)
- Integrative data interpretation
- **Case Study**: Transcriptomic analysis of COVID-19 patients

Module 4: Proteomics and Metabolomics Integration

- Protein identification and quantification
- Metabolite annotation and pathway analysis
- Use of MS and NMR data
- Integration with transcriptomic data
- Systems biology approach
- **Case Study**: Multi-omics approach in type 2 diabetes research

Module 5: Statistical Methods in Omics

- Biostatistical principles for omics
- Regression, ANOVA, and correlation in high-dimensional data
- Adjusting for multiple comparisons (FDR, Bonferroni)
- Feature selection techniques
- Dimensionality reduction (PCA, t-SNE)
- **Case Study**: Statistical modeling in Alzheimer's biomarker discovery

Module 6: Machine Learning for Biomedical Data

- Supervised vs. unsupervised learning
- Classification and clustering algorithms (Random Forest, K-means)
- Model training, validation, and performance metrics
- Deep learning in omics
- Risk prediction modeling
- **Case Study**: AI-based cancer subtype classification using omics

Module 7: Data Visualization and Communication

- Data storytelling in public health
- Creating interactive dashboards (Shiny, Plotly, Tableau)
- Heatmaps, volcano plots, network maps
- Best practices in scientific communication
- Visualizing uncertainty and reproducibility
- **Case Study**: Visualization of Zika outbreak genomics in Latin America

Module 8: Ethical, Legal, and Future Trends

- ELSI in biomedical data analysis
- Privacy, consent, and de-identification
- Regulatory compliance (HIPAA, GDPR)
- The future of AI and federated learning
- Open science and reproducibility
- **Case Study**: Ethical challenges in global genome-sharing initiatives

Training Methodology

- Interactive lectures and expert-led webinars

- Guided hands-on practicals using real datasets
- Peer-reviewed collaborative projects
- Capstone project aligned with learners' work environments
- Case-based discussions for every module
- Continuous feedback and real-time Q&A sessions

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com