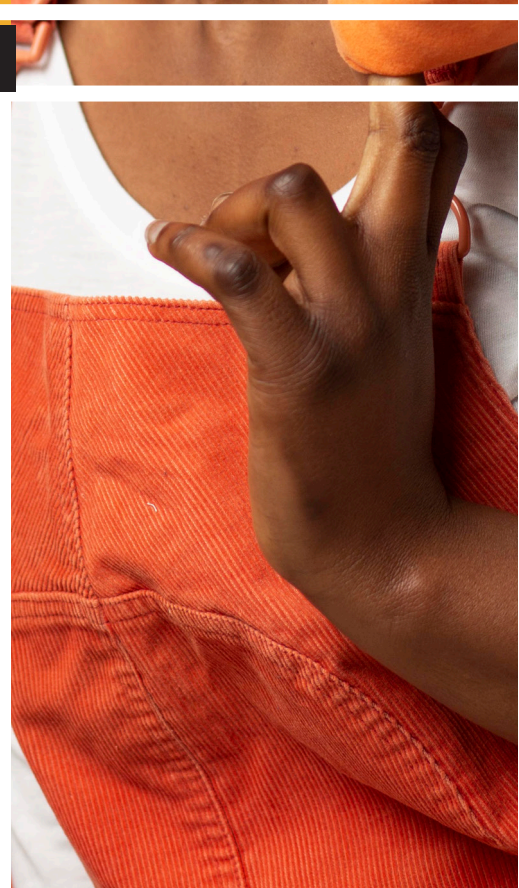


4-Month Project-Based Bioinformatics Course

29th July 2024 - October 2024

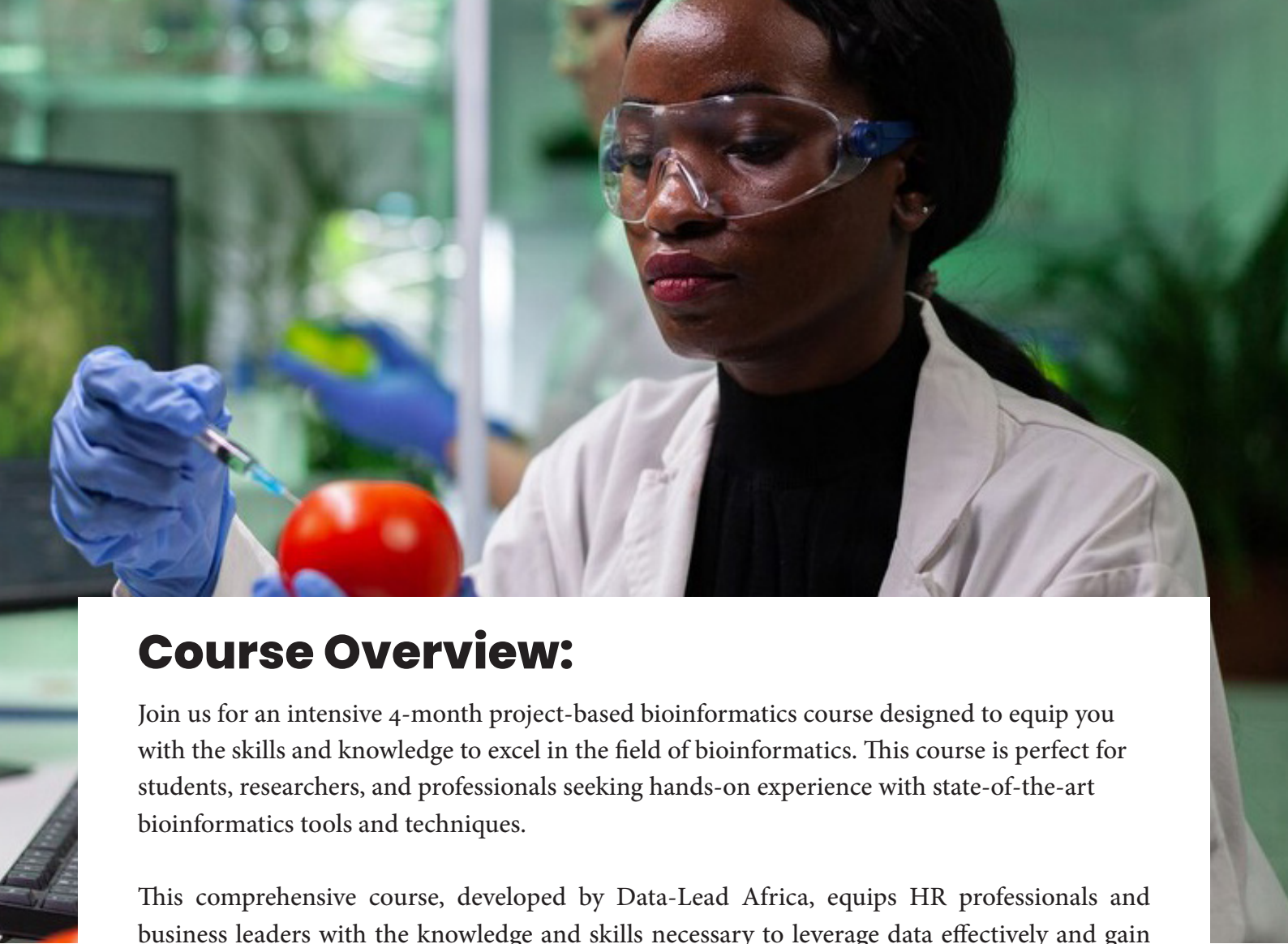




Company Profile

Data-Lead Africa is a research consulting firm based in Nigeria that provide services in monitoring and evaluation, data analytics, data science training, and other strategic consulting services. We deploy exceptional skills in statistics, research methods, and information technology in processing data into insights. We have over seven (7) years of experience and professional expertise conducting field-based research in education, child protection, agriculture, health, population, and nutrition.

We have core expertise in research methodology, project management, data collection, and analysis and we have a team that is proficient in developing and deploying mobile data collection tools for field-based monitoring.



Course Overview:

Join us for an intensive 4-month project-based bioinformatics course designed to equip you with the skills and knowledge to excel in the field of bioinformatics. This course is perfect for students, researchers, and professionals seeking hands-on experience with state-of-the-art bioinformatics tools and techniques.

This comprehensive course, developed by Data-Lead Africa, equips HR professionals and business leaders with the knowledge and skills necessary to leverage data effectively and gain actionable insights into their workforce.

Key Features:

- **Comprehensive Curriculum:** Covering sequence alignment, phylogenetics, genomics, transcriptomics, proteomics, metabolomics, structural bioinformatics, data integration, and systems biology.
- **Hands-On Training:** Extensive practical sessions using Unipro UGENE, a versatile bioinformatics software, shell scripting and R.
- **Project-Based Learning:** Engage in real-world bioinformatics projects, from proposal development to bioinformatics analysis and manuscript writing.
- **Expert Guidance:** Learn from experienced bioinformatics professionals and guest lecturers.
- **Final Manuscript:** Culminate your learning by writing and submitting a scientific manuscript based on your project.

4 Month

Dates: 29th July 2024 – October 2024

Schedule: Monday to Friday, 10 am – 3 pm

Software: Unipro UGENE, Unix-shell, R

Why Enroll?

- **Hands-On Experience:** Gain practical skills through immersive hands-on sessions.
- **Real-World Projects:** Apply your knowledge to meaningful bioinformatics projects.
- **Professional Development:** Enhance your research and data analysis capabilities.
- **Networking Opportunities:** Connect with peers and experts in the bioinformatics community.

Who Should Enroll?

- **Students and researchers in biology, genetics, and related fields**
- **Healthcare professionals and laboratory technicians**
- **Anyone interested in learning bioinformatics**

Enroll now to advance your career in bioinformatics and make a significant impact in the field of biological research!



Curriculum and Activities

Course Outline:

- Weeks 1-4: Introduction to bioinformatics, sequence alignment, phylogenetics, genomics, transcriptomics, proteomics, and metabolomics.
- Week 5: Structural bioinformatics, including protein structure prediction and molecular docking.
- Week 6: Data integration and systems biology.
- Weeks 7-8: Project planning, execution, and initial analysis.
- Weeks 9-10: Advanced topics and manuscript writing.
- Weeks 11-12: Final project presentation, manuscript submission, and course wrap-up.

Course Outline:

Week 01

Introduction to Bioinformatics and Unipro UGENE

- Welcome and course overview
- Introduction to bioinformatics: history, scope, and applications
- Overview of Unipro UGENE: installation and user interface
- Basic bioinformatics tools and databases (NCBI, EMBL, etc.)

Day 1-2:

Day 3-5:

- • Sequence data: types, formats, and sources
- • Hands-on session: importing and exporting sequence data in UGENE
- • Quality control of sequence data
- • Introduction to sequence alignment: concepts and algorithms

Week 02

Sequence Alignment and Phylogenetics

- Welcome and course overview
- Introduction to bioinformatics: history, scope, and applications
- Overview of Unipro UGENE: installation and user interface
- Basic bioinformatics tools and databases (NCBI, EMBL, etc.)

Day 1-3:

Day 4-5

- • Hands-on session: constructing phylogenetic trees in UGENE
- • Analysis and interpretation of phylogenetic trees
- • Case studies and practical examples/projects.

Week 03

Genomics and Transcriptomics Analysis

- Introduction to genomics: concepts and applications
- Genome annotation and visualization
- Hands-on session: genome browsing and annotation in UGENE

Day 1-2:

Day 4-5

- • Introduction to transcriptomics: RNA-Seq data analysis
- • Hands-on session: RNA-Seq data preprocessing and quality control
- • Differential expression analysis using UGENE
- • Interpretation of results and biological significance

Course Outline

Week 04

Structural Bioinformatics

- Introduction to proteomics: concepts and workflows
- Protein sequence analysis and annotation
- Hands-on session: protein sequence analysis in UGENE

Day 1-2:

Day 3-5:

- Introduction to metabolomics: concepts and workflows
 - Data processing and analysis in metabolomics
 - Case studies and practical examples
-

Week 05

Sequence Alignment and Phylogenetics

- Introduction to structural bioinformatics: concepts and applications
- Protein structure prediction and visualization
- Hands-on session: protein structure analysis in UGENE

Day 1-3:

Day 4-5

- Molecular docking and simulation: principles and applications
 - Hands-on session: molecular docking in UGENE
 - Interpretation of docking results
-

Week 06

Data Integration and Systems Biology

- Introduction to systems biology: concepts and approaches
- Data integration: combining genomics, transcriptomics, proteomics, and metabolomics data

Day 1-2:

Day 4-5

- Hands-on session: data integration and network analysis in UGENE
 - Pathway analysis and visualization
 - Case studies and practical examples
-

Week 7-8

Project Planning and Execution

- Project proposal development: selecting a research topic
- Literature review and hypothesis formulation
- Experimental design and data collection strategies
- Initial data analysis and troubleshooting

Day 1-5:

Day 6-10

- Continued project work: data analysis and interpretation
 - Regular progress check-ins and troubleshooting sessions
 - Peer feedback and collaborative problem solving
-

Course Outline

**Week
9-10**

Day 1-5:

Advanced Topics and Manuscript Writing

- Advanced bioinformatics topics (e.g., machine learning in bioinformatics, single-cell
 - RNA-Seq analysis)
 - Guest lectures and expert sessions
 - Workshop on scientific writing: structure and style of a manuscript
-

Day 6-10

- Writing the introduction and methods sections
 - Drafting the results and discussion sections
 - Figures and tables: best practices for scientific illustration
 - Peer review and revision process
-

**Week
11-12**

Day 1-5:

Final Project Presentation and Submission

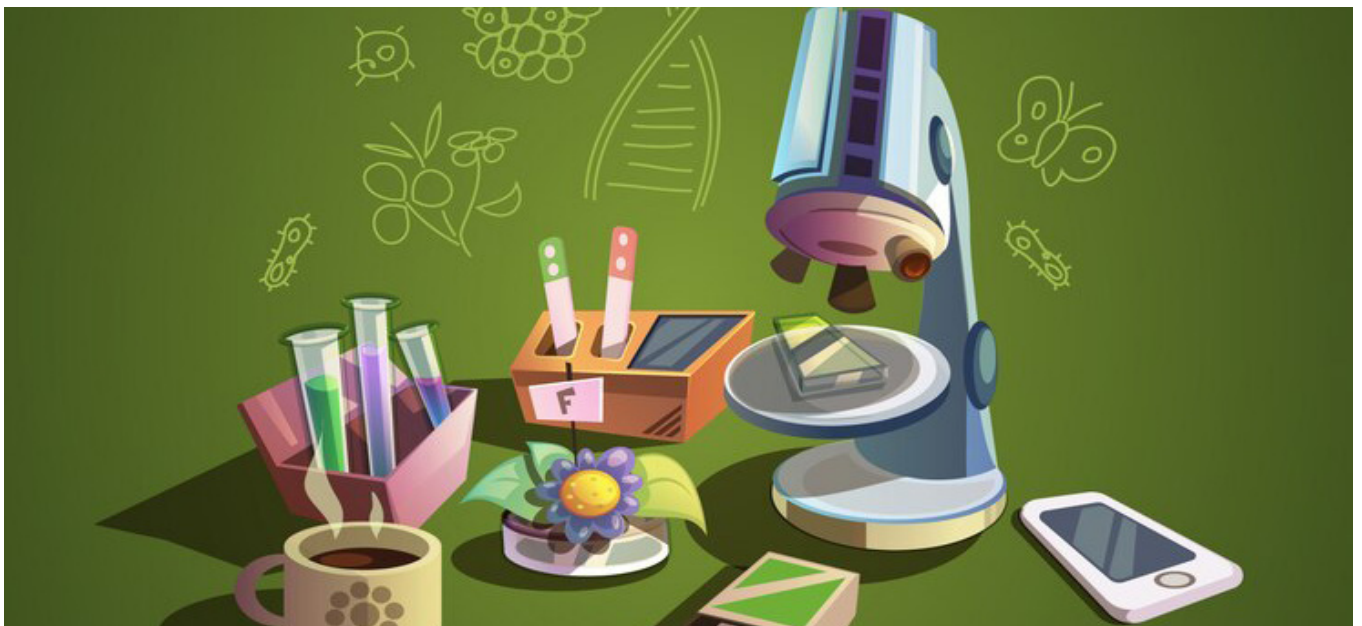
- Final data analysis and manuscript writing
 - Individual consultations and feedback sessions
-

Day 6-10

- Final project presentations and peer review
 - Manuscript submission and course wrap-up
 - Reflection and feedback session
-

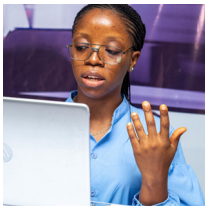
Additional Notes:

- **Assessment:** Weekly quizzes, mid-term project proposal, final project presentation, and manuscript submission
- **Resources:** Access to bioinformatics databases, research papers, and additional software tools
- **Support:** Regular office hours, online forums, and peer study groups





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4 Month

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“ Upgrade your Skills and Accelerate your Career!



10th street, Bassan Plaza, Block F, 3rd floor, Central Business District, Abuja

4 Month

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