FSGene
Medical Molecular Genetics Laboratory

EDUCATION & TRAINING | 2026

PROFESSIONAL TRAINING COURSE

Bioinformatics *Training Program*

From Biological Data to Meaningful Insights



MEET YOUR INSTRUCTOR

Dr. Ahmed Al Hassan

PhD in Biology (Molecular Systematics)
University of Reading, UK

MSc in Biology
Ball State University, USA

BSc in Biology
King Abdulaziz University, Saudi Arabia

Scientific expertise spans DNA extraction, sequencing, genome assembly, and applied bioinformatics with Python and R, with research presentations at scientific meetings in the UK and USA.

- Hands-On Data Analysis
- Genomics & Transcriptomics
- Microbiome & Metagenomics
- Protein Structure & Function

COURSE DATES
29 Nov - 10 Dec 2026

DURATION
20 Contact Hours

LOCATION
FSGene, Jeddah

DISCOVER / ANALYZE / INTERPRET / APPLY

Inside the *program.*

10 MODULES | 20 CONTACT HOURS | APPLIED LEARNING

THEORY	HANDS-ON	DELIVERY
10 hours	10 hours	In person / Jeddah

CURRICULUM ROADMAP

01 Foundations of Bioinformatics

Biological questions, major data types and reproducible research.

02 Experimental Design & Data Quality

Samples, metadata, controls, bias and wet-lab data handover.

03 Biological Databases & File Formats

FASTA, FASTQ, GFF/GTF, BAM, VCF and public records.

04 Python & Essential Data Literacy

Biopython, pandas, descriptive statistics and guided notebooks.

05 Sequence Analysis & Evolution

BLAST, sequence alignment and phylogenetic interpretation.

06 Genomics & Genetic Variation

Read mapping, genome assembly, variants and annotations.

07 Transcriptomics & Gene Expression

RNA-seq, normalization, PCA, heatmaps and volcano plots.

08 Microbiome & Metagenomics

Community profiling, microbial diversity and interpretation.

09 Protein Structure & Function

Domains, structural data, pathways and gene-set enrichment.

10 Integrated Case Studies

Team-based workflows, analysis plans and peer review.

WHO SHOULD ATTEND

Diploma, BSc, MSc and PhD students/graduates; laboratory professionals, researchers and life-science professionals.

The learning *journey.*

DAYS 01 - 02 / FOUNDATIONS & DATA TOOLS

DATES 29 NOV - 10 DEC 2026 | **SUN / WED / THU** | **9 AM - 5 PM**

DAY 01
Foundations & Experimental Design

09:00 - 10:30	Module 1: Foundations of Bioinformatics (theory + practical intro)
10:30 - 10:45	Morning break
10:45 - 12:15	Modules 1 & 2: practical continuation
12:15 - 13:00	Module 2: experimental design and data quality (theory)
13:00 - 14:00	Lunch & networking
14:00 - 15:00	Module 2: sample sheets and bias identification (practical)
15:00 - 15:15	Afternoon break
15:15 - 17:00	Open Q&A, foundational review and day-one recap

DAY 02
Databases, File Formats & Python

09:00 - 10:30	Module 3: databases and file formats (theory + practical)
10:30 - 10:45	Morning break
10:45 - 11:45	Module 3: retrieving gene, nucleotide and protein records
11:45 - 13:00	Module 4: Python notebooks, variables and Biopython
13:00 - 14:00	Lunch break
14:00 - 15:30	Module 4: pandas, statistics and correlation
15:30 - 15:45	Afternoon break
15:45 - 17:00	Module 4: guided notebook and sequence statistics

Structured training: 20 contact hours (10 theory + 10 supervised practical).

The learning *journey.*

DAYS 03 - 04 / GENOMICS & OMICS

DATES 29 NOV - 10 DEC 2026	SUN / WED / THU	9 AM - 5 PM

DAY 03
Sequence Analysis & Genomics

09:00 - 10:15	Module 5: BLAST, alignments and phylogenetics
10:15 - 10:30	Morning break
10:30 - 11:30	Module 5: sequence comparison and MEGA X trees
11:30 - 13:00	Module 6: genome assembly, mapping and variant calling
13:00 - 14:00	Lunch break
14:00 - 15:00	Module 6: genomic regions and annotated variants
15:00 - 15:15	Afternoon break
15:15 - 17:00	Applied sequence-analysis and variant workflow

DAY 04
Transcriptomics & Microbiome

09:00 - 10:15	Module 7: RNA-seq, normalization, PCA and volcano plots
10:15 - 10:30	Morning break
10:30 - 11:15	Module 7: interpreting expression comparisons
11:15 - 13:00	Module 8: marker-gene/shotgun profiling and diversity
13:00 - 14:00	Lunch break
14:00 - 14:45	Module 8: microbial-community profile interpretation
14:45 - 15:00	Afternoon break
15:00 - 17:00	Hands-on expression matrices and taxonomic datasets

Structured training: 20 contact hours (10 theory + 10 supervised practical).

The learning *journey.*

DAYS 05 - 06 / FUNCTIONAL ANALYSIS & CAPSTONE

DATES 29 NOV - 10 DEC 2026 | **SUN / WED / THU** | **9 AM - 5 PM**

DAY 05
Protein Structure & Interpretation

09:00 - 10:15	Module 9: protein domains, structures and enrichment
10:15 - 10:30	Morning break
10:30 - 11:15	Module 9: connecting gene lists to functional information
11:15 - 13:00	Advanced case-study preparation and data integration
13:00 - 14:00	Lunch break
14:00 - 15:30	Module 10: analysis plans, metadata and controls
15:30 - 15:45	Afternoon break
15:45 - 17:00	Capstone team formation and project kickoff

DAY 06
Capstone & Presentations

09:00 - 11:00	Module 10: team-based bioinformatics workflow design
11:00 - 11:15	Morning break
11:15 - 13:00	Finalize team analysis plans and presentations
13:00 - 14:00	Lunch break
14:00 - 16:00	Team presentations, peer review and feedback
16:00 - 16:30	Next-stage specialist training pathways
16:30 - 17:00	Closing remarks, course evaluation and certificates

Structured training: 20 contact hours (10 theory + 10 supervised practical).