

Title of the Course: Bioinformatics Field and Degree: Human Genetics – Master’s Program Faculty: School of Medicine Course Code: 10 Academic Year: 2025–2026 Prerequisite: - Credits: 1 Credits Semester: First Semester Credit Distribution: 1 Practical Credit Teaching Staff: Dr. Tahmasbi, Class Day and Time: Saturday, 12:00–114:00 Course Coordinator: Dr. Tahmasbi Email: tahmasebi.birgani62@gmail.com Office Hours: Every day, 08:00–16:00				
General Objectives				
To provide students with a clear understanding of the structural and functional organization of the genome, including chromatin architecture, gene distribution, repetitive elements, and higher-order genomic arrangements, enabling them to interpret how genome structure influences gene expression and cellular function.				
Specific Objectives				
Explain the fundamental concepts of bioinformatics and its role in analyzing biological data from sequence level to big-data scale.				
<ul style="list-style-type: none"> Retrieve and evaluate nucleotide sequence information from major biological databases. Use protein databases and describe the basic principles of protein structure. Perform and interpret pairwise sequence alignment as the foundation of comparative analysis. Conduct multiple sequence alignment (MSA) and apply phylogenetic methods to explore evolutionary relationships. Navigate and utilize genome browsers to visualize, explore, and interpret genomic data. Analyze functional genomics datasets and apply Gene Ontology for functional annotation of genes and pathways. Design primers based on thermodynamic principles, specificity requirements, and molecular application needs. 				
Course Description				
This course introduces the foundational concepts and analytical approaches of bioinformatics, focusing on the management, analysis, and interpretation of biological data. Topics include biological databases, sequence alignment, genomics and proteomics analysis, gene expression profiling, and essential computational algorithms. Practical sessions emphasize hands-on work with common bioinformatics tools for analyzing DNA, RNA, and protein sequences. The course prepares students to apply computational methods to research questions in genetics, molecular biology, and biomedical sciences.				

Lecturer	Teaching Method	Student Activities	Expected Teaching Concepts	Session
Dr. Tahmasebi	interactive lecture	Q & A method	Introduction to Bioinformatics: From Sequence to Big Data	1
Dr. Tahmasebi	interactive lecture	Q & A method	Nucleotide Sequence Databases and Retrieval	2
Dr. Tahmasebi	interactive lecture	Q & A method	Protein Databases and Structure Fundamentals	3
Dr. Tahmasebi	interactive lecture	Q & A method	Sequence Alignment: The Basis of Comparison	4
Dr. Tahmasebi	interactive lecture	Q & A method	Multiple Sequence Alignment and Phylogenetics	5
Dr. Tahmasebi	interactive lecture	Q & A method	Genome Browsers: Visualizing Genomic Data	6
Dr. Tahmasebi	interactive lecture	Q & A method	Functional Genomics and Gene Ontology	7
Dr. Tahmasebi	interactive lecture	Q & A method	Primer Design	8

معاونت آموزشی دانشگاه علوم پزشکی اهواز
مرکز مطالعات و توسعه آموزش علوم پزشکی

Student Assignments
Students are required to complete all assigned homework for each session on time. -
Course Evaluation Method
Student assignment (60%) + Final Exam (40%)
Reference
Lewin. Gene X