

SIXTEEN WEEK TEACHING PLAN

Course & Course Code	Introduction to Bioinformatics BIOI-2101
Credit Hours	2
Department	Institute of Biological Sciences
Course Type:	
Theory/Lab	Theory
Program/semester/section	BS-ZOOL-8 th , BS-MLT 5 th , BS-BOCH 7 th , BS-BIOT 6 th , BS-FDST 3 rd , BS-HND 3 rd
Semester	8, 5, 7, 6, 3, 3
Course Instructor name/Designation	Asma Taj / Visiting lecturer
Office	
Office Hours / Counseling hours for students	3pm to 4:30pm 12pm to 1:30pm 9am to 10:30 pm
Email ID:	Tajasma73@gmail.com

Note: For practical/lab work, a separate teaching plan can be prepared.

Week 1	
Objectives / Learning Outcome	Students should understand the importance of Bioinformatics in modern era by the use of bioinformatics databases, Tools and Software's.
Contents / Sub Contents	History and Importance of bioinformatics
Appropriate Teaching Strategies / Methods	Lectures\ performances on laptop
Learning Material	Notes/Sides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/performances/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 2	

Objectives / Learning Outcome	Students should understand the importance of Bioinformatics in modern era by the use of bioinformatics databases, Tools and Software's.
Contents / Sub Contents	Overview of NCBI ,EMBL,DDBJ(students will learn to use these databases)
Appropriate Teaching Strategies / Methods	Lectures/performances on laptop
Learning Material	Notes/Slides/Web links/performance videos
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 3	
Objectives / Learning Outcome	Students should understand the Biological Data and its type
Contents / Sub Contents	Primary and Secondary Databases
Appropriate Teaching Strategies / Methods	Lectures\ performances on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 4	
Objectives / Learning Outcome	Advantages and Disadvantages of primary and secondary databases
Contents / Sub Contents	What is Advantages and Disadvantages of primary and secondary databases?
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 5	
Objectives / Learning Outcome	Bioinformatics Storage and Retrieval Systems
Contents / Sub Contents	Entrez, SRS and DBget

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Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 6	
Objectives / Learning Outcome	Sequence Alignment
Contents / Sub Contents	Local and Global Alignment
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 7	
Objectives / Learning Outcome	Multiple Sequence Alignment MSA
Contents / Sub Contents	Progressive Alignment, Iterative Alignment and Homology based
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 8	
Objectives / Learning Outcome	Sequence Alignment again
Contents / Sub Contents	
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/Presentations
Assessment Schedule	Last 15 min of lecture
Others	

Week 9	
Objectives / Learning Outcome	Pairwise Sequence Alignment
Contents / Sub Contents	What is PSA?
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 10	
Objectives / Learning Outcome	Types of PSA
Contents / Sub Contents	Dynamic Programming and Dot matrix
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 11	
Objectives / Learning Outcome	Needleman Wunsch Algorithm
Contents / Sub Contents	What is Needleman Wunsch algorithm how we can use it in Bioinformatics.
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 12	
Objectives / Learning Outcome	Smith waterman Algorithm
Contents / Sub Contents	What is Smith waterman Algorithm?
Appropriate Teaching Strategies / Methods	Lectures

Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 13	
Objectives / Learning Outcome	Sequence formats
Contents / Sub Contents	FASTA, FASTAQ, SAM, BAM
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 14	
Objectives / Learning Outcome	Sequence Formats
Contents / Sub Contents	VCF, GFF and BLAST types
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 15	
Objectives / Learning Outcome	Protein Prediction and methods
Contents / Sub Contents	Homology based, Ab-initio and threading
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	
Week 16	

Objectives / Learning Outcome	Primer Designing
Contents / Sub Contents	Primer Designing and its types and functions
Appropriate Teaching Strategies / Methods	Lectures\ performance on laptop
Learning Material	Notes/Slides/Web links
Appropriate Assessment Tools	Class discussion/Quiz/Assignments/ Presentations
Assessment Schedule	Last 15 min of lecture
Others	

Curriculum Contents:

Bioinformatics Lab: Overview of NCBI, EMBL, DDBJ (students will learn to use these databases), Online Tools BLAST, BLAT and FASTA, PDB File Structure. Overview and Introduction to Protein Structure, Sequence -Sequence Alignment Methods, Sequence Based Secondary Structure Prediction, Mutation prediction (identification and naming of mutation by BLASTx), Phylogenetic analysis by MEGA, In-silico Gel Electrophoresis /Gel simulation/Snap Gene.