

SEMESTER II
LSM3241 BIOINFORMATICS & BIOCOMPUTING

Prerequisite: LSM2232 and LSM2241

Workload: 26 lecture hours + 30 tutorial hours/ laboratory hours

Course description:

This module provides intermediate to advanced topics in bioinformatics. Topics include sequence analysis and applications, basic programming for bioinformatics applications, molecular modeling and drug design, protein modeling, data mining and machine learning in biomedical sciences. Besides hands-on practical classes, students are involved in a project in which skills taught in the course will be applied to solve a biological research problem. Students of this module achieve proficiency in computational skills which are highly sought after in today's competitive biological research laboratories.

S/N	Topics	Lecture hours
1.	Bioinformatics Resource Solving Biological Problems with Bioinformatics Software Implementation. Concepts in databases. Knowledge discovery: Ontologies and Data grammar (XML)	6
2.	Basic Bioinformatics Scripting Concepts in programming. Introduction to Algorithms in Bioinformatics.	4
3.	Machine Learning techniques in biological data analysis Machine learning I (SVM). Machine learning II (RF).	4
4.	Molecular Modeling and Rational Drug Discovery and Design Advanced Computational Structural Biology: Structural Modeling and Molecular Dynamics; Computational Drug Design	6
5.	Protein Interactions, Biological Pathways and Simulation Modelling of biological pathways; Analyzing Protein-Protein Interactions	4
6.	Development of Bioinformatics Discussion: Journal Paper Classic	2
7.	Practicals	30
Total Lectures: 26h		
Tutorials/ Laboratory: 30h		
Total hours:		56h

TEXT BOOK (Reference books):

Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins

Andreas D. Baxevanis, B. F. Francis Ouellette Edition: 3rd edition. Publisher: Wiley-Interscience

Introduction to Bioinformatics

Arthur M. Lesk. 2008. Oxford University Press; ISBN: 9780199208043

Beginning Perl

Simon Cozens & Peter Wainwright. 2000. Wrox Press; ISBN: 1861003145

Bioinformatics: The Machine Learning Approach (Adaptive Computation and Machine Learning).

Pierre Baldi, Soren Brunak. 2001. The MIT Press; ISBN: 026202506X

Molecular modelling : principles and applications.

Andrew R. Leach. Imprint Harlow, England; Singapore: Pearson Education, c2001. ; ISBN: 0582382106

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