

**OPEN ELECTIVE AND FOUNDATION COURSE
OFFERED BY
CENTRE FOR BIOINFORMATICS
DURING**

II SEM

**CENTRE FOR BIOINFORMATICS
M. D. UNIVERSITY, ROHTAK**

CBCS-SCHEME OF EXAMINATION (M.Sc. -Bioinformatics)-2016-17 onwards

OPEN ELECTIVE

Course Title: Introduction to Bioinformatics

Credit: 3 0 0

Course Code:

MM. Th 80+ IA 20

Time: 3 Hours

Students completing this course will be able to:

- CO1** Access the world of Bioinformatics, different types of biological data and databases.
- CO2** Perform the analysis on DNA and protein sequences using different Bioinformatics tools.
- CO3** Discuss and compare different Omics science.

Note: In all 7 questions are to be set. Question number 1 is compulsory and to be set covering entire syllabus. 6 Questions will be set with two questions from each unit. Students are required to attempt one compulsory question and 4 other questions *i.e.*, selecting atleast one from each unit.

UNIT I

Overview of Bioinformatics and Information technology: History, scope and application, Internet and World Wide Web; Generation of computers; Concept of networking; Internet protocols – OSI model; TCP/IP models.

UNIT II

Bioinformatics resources: Biological databases, Basic classification – Sequence & Structure; Generalized & Specialized; Primary & Secondary, with example databases.

Omics science: Introduction to genomics, proteomics, metabolomics, interactomics.

UNIT III

Bioinformatics tools: Information retrieval system (Entrez, SRS); Sequence alignment tools (BLAST, FASTA, CLUSTAL-W/X, MUSCLE, TCOFFEE), Variants of BLAST (BLASTn, BLASTp, PSI-BLAST, PHI-BLAST, etc).

CENTRE FOR BIOINFORMATICS
M. D. UNIVERSITY, ROHTAK

CBCS-SCHEME OF EXAMINATION (M.Sc. -Bioinformatics)-2016-17 onwards

FOUNDATION COURSE

Course Title: Fundamental of computers & networking

Credit: 2 0 0

Course Code:

MM. Th 40+ IA 10

Time: 3 Hours

Students completing this course will be able to:

- CO1** Easily navigate and search through the internet.
- CO2** Work on different operating systems with ease.
- CO3** Handle the computer equipment, including both hardware and software.
- CO4** Explain the concepts of Data Communication and Networking.

Note: In all five questions are to be set. Question number 1 is compulsory and to be set covering entire syllabus. Four Questions will be set with two questions from each unit. Students are required to attempt one compulsory question and 2 other questions *i.e.*, one from each unit.

UNIT I

UNIT-I: Fundamentals of Computing; Introduction to Operating Systems: WINDOWS, UNIX/Linux operating systems; Computer Security (hacking, cracking), Computer Viruses.

Computer Graphics: Visualization techniques - Software and Hardware, Interactive Graphics; Viewing in three dimension; Raster algorithms; Rendering; Animation; Image Processing with emphasis on biological systems.

UNIT-II

Computer Networking, Security of the network, Fire-walls, Network Goals, Applications Network, Network architecture, Hierarchical networks, Ethernet and TCP/IP family of protocols.

Use of INTERNET and WWW, Internet services.

**OPEN ELECTIVE COURSE OFFERED BY
CENTRE FOR BIOINFORMATICS
DURING**

III SEM

CENTRE FOR BIOINFORMATICS
M. D. UNIVERSITY, ROHTAK

CBCS-SCHEME OF EXAMINATION (M.Sc. -Bioinformatics)-2016-17 onwards

OPEN ELECTIVE

Course Title: Computer Aided Drug Design

Credit: 3 0 0

Course Code:

MM. Th 80+ IA 20

Time: 3 Hours

Students completing this course will be able to:

- CO1** Explain the basic principles of pharmacogenomics and pharmacogenetics.
- CO2** Describe the concept of QSAR methods and their applications in drug design.
- CO3** Discuss the basic concepts and methods of Pharmacophore modeling and chemoinformatics.
- CO4** Explain and perform molecular docking and virtual screening.

Note: In all 7 questions are to be set. Question number 1 is compulsory and to be set covering entire syllabus. 6 Questions will be set with two questions from each unit. Students are required to attempt one compulsory question and 4 other questions *i.e.*, selecting atleast one from each unit.

UNIT I

Introduction to pharmacogenomics and pharmagenetics, clinical trials in pharmagenomics, polymorphism of CYP450 enzymes affecting drug response, role of SNP in pharmacogenomics, The multi Drug Resistance proteins: drug carriers affecting drug response.

UNIT II

Basis of Drug Pharmacokinetics and Pharmacodynamics, molecular descriptors, QSAR methodologies 3D QSAR. Structure based drug designing, Ligand based drug designing, Different docking methodologies, success stories in docking.

UNIT III

Pharmacophore modeling, Pharmacophore generation- (Hiphop and HypoGen theories). Combinatorial libraries, High thoughtput screening, Virtual screening, Lipinski's rule of five and its applications. Chemoinformatics: Introduction, Chemical Database(ACD,MDDR and WDI), Application of Chemoinformatics in CADD.