



MAHARANI LAKSHMI AMMANI COLLEGE FOR WOMEN

(NAAC ACCREDITED B++)

UGC SPONSORED CAREER ORIENTED COURSE

**Subject: Certificate Course
Bioinformatics ©**

COURSE STRUCTURE
CERTIFICATE COURSE IN BIOINFORMATICS©

Prerequisite : PUC(PCMB)

Total Hours: 160
 (Theory:100 hrs & Practicals:60 hrs)

Objective : To turn the flood of new bio-information into useable knowledge and to enhance the students in data mining and knowledge management technologies that are being deployed today to assist researchers and regulators.

Module	Title of the Paper	Theory Hours	Practical Hours	Total Hours
I	Cell & Molecular Biology	30	-	30
II.	Introduction to Computers, OS, Networking and Bioinformatics	30	20	50

Module	Title of the Paper	Theory Hours	Practical Hours	Total Hours
III	Genomic & Post Genomic Era.	20	10	30
IV	Introduction to Bioinformatics, Organizations, Databases, Tools, Analysis and Project	20	30	50

MODULE – I: Cell and Molecular Biology

30hrs

Origin of Life, Cell and Cell Organelles,
Bio-Molecules (Chemical nature of DNA & RNA, Protein)
Central Dogma of Life(DNA replication, RNA & transcription, Genetic code, protein synthesis)
Cell Signaling(PTM, signal transduction)
Genome Sequencing Methods (Sangers and Maxam –Gilbert Sequencing, Linear and Shotgun Methods, Basecalling)
Model Organisms / Other Genomes, The Human Genome Project.

MODULE – II: Introduction to Computers, Operating Systems, Networking)

50hrs

Introduction to Computers: Computer Basics, Classification, generation, hardware, software)
Operating Systems(Windows 2000/XP,Linux),Window tools(MS Word, MS Excel, MS Access, MS Power-Point)
Networking & Internet (Introduction, LAN, WAN, MAN, Protocols, IP/TCP, http, SMTP)
Linux(Introduction, Features, File System Structure, Overview of file system, Hierarchy Standard, Boot Process in Hit Shutdown, Users and Groups,
Commands, Important Bash and Shell Variables, Shell Programming)

REFERNECES

1. Cell & Molecular Biology- E.D.P. De Robertis and E.M.F. DeRobertis, Lippincott Williams and Wilkins Publications.
2. Cell & Molecular Biology-Cooper.
3. Essentials of Genomics & Bioinformatics-Edited by Christoph W. Sensen.
4. Computer Fundamentals-Rajaramana.
5. Linux/Unix Programming-Yashwanth Kanitker.
6. Linux/Unix Programming-Ravishanker.
7. TCP/IP-Stephen.
8. Linux in a book for Dummies-John Hall & others.
9. Introduction to Bioinformatics-Arthur M. Lesk, Oxford University Press.

MODULE – III : Genomic and Post-Genomic Era. 30hrs

Introduction to Bioinformatics, History, Latest Trends
Genome Mapping and Assembly
“Omics” (Genomics, Proteomics, Metabolomics, Pharmacogenomics) Post-
Genomics Era

**MODULE – IV: Introduction to Bioinformatics Organizations and Databases
And Tools and Analysis 50hrs**

Introduction of Biological Database(Primary,Secondary databases)Tools and Analysis
NCBI(Submitting and Retrieving Sequences FASTA, Ncb cutter, ORF, PDB)
EMBL(EMBL, Pairwise and Multiple sequence Alignment, ClustalW)
DDBJ, TIGR
Protein Sequence Database: - Swiss-Prot, PIR, MIPS, TrEMBL, HPRD etc.
Structural Database: -PDB, SCOP, CATH
Metabolic Pathway Database: - KEGG, 123Genomics
Gene Expression Database: - Stanford, TIGR
Molecular Visualization Software: RasMol

PROJECT

REFERNECES

1. Bioinformatics, Sequence & Genome Analysis-David W. Mount, CBS Publishers & Distributors.
2. Fundamentals of Bioinformatics- Edited by Irfan Ali Khan & Atiya Khanum, Ukaaz Publications.
3. Genomics, Proteomics & Vaccines-Edited by Guido Grandi, John Wiley & Sons Publications.
4. Bioinformatics-Bahl & Bahl.
5. Introduction to Bioinformatics-Attwood & Smith.
6. Bioinformatics-C.S.V. Murthy, Himalaya Publications.
7. Bioinformatics, Sequence, Structure & Databanks-Edited by Des Higgins, Willie Taylor, Oxford University Press.