VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc. (Bio-Informatics)

(2006-07)

Semester – I

BI-101	**Introduction to Bioinformatics**
BI-102	**Fundamentals of Biology**
BI-103	**Basic Mathematics and Biostatistics**
BI-104	**Introduction to Information Technology**
BI-105	**Computer Programming and Programming Methodology**
BI-106	**Practical**

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Semester – I

BI – 101: INTRODUCTION TO BIOINFORMATICS

Unit 1

- What is bioinformatics?
- History of bioinformatics and glossary of' Bio-Informatics
- Applications of Bio-Informatics in different fields
- Scope of Bio-Informatics
- Use of computers in Bio-Informatics

Unit 2

- Biological literature information access, storage and retrieval
- Information contents of bio molecules — DNA, RNA and Protein
- Structural databases of' bio molecules - DNA, RNA and Protein

Unit 3

- Concept of Phylogeny, systematics, and evolution
- Building of phylogenetic trees
- Principles of classification and nomenclature
- Bio-University and its significant

Unit 4

- Chemiinformatic resource resources
- Bio-Informatics and drug

discovery • Farmainformatic
resources

- Types of Biological databases

Reference Books

1. Cynthia Gibs and Per Jambeck — Developing Bio-Informatics Computer Skills - O'Reilly

2. Atwood T.K., Parry Smith D.J. — Introduction to Bio-Informatics - Addison Wesley **3.** Lesk A.M. -- Introduction to Bio-Informatics — Oxford- University Press

4. D.R. Westhead, J.H. Parish — Instant Notes : Bio-Informatics - Viva Books Pvt. Ltd. **5.** D.W. Mount — Bio-Informatics -- Cold Spring I !arbour

6. D.E. Krane and M.C. Ragner-- Fundamental Concepts of Bio-Informatics Pearson Education

7. P.A. Pevxner – Computational Molecular Biology -- Prentice I tall of India

VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc. (Bio-Informatics)
Semester – I

BI-102: FUNDAMENTALS OF BIOLOGY

Unit I

- Cell as a structural and functional unit of life
- Cellular organization in multi cellular organisms
  Prokaryotic and Eukaryotic cells
- Introduction to micro organisms — Bacteria, Fungi, and Viruses

Unit 2 :

- Cell organelles their structures and functions

Unit 3

- Concept of cellular and organismic growth
- Nutritional requirements
- Mode of transport
- Cellular processes

Unit 4 :

- Multiplication in bacteria and viruses
- Cell division in eukaryotes
- Cell cycle and cell division
- Mitosis and Meiosis

Reference Books

1. G.M. Cooper — The Cell : A Molecular Approach — ASM Press Washington
2. Enger — Concepts in Biology — Tata McGraw Hill
3. Robertes & Robertes — Cell and Molecular Biology - W.B. Sunder Philadelphia
4. G. Karp, N.L. Puritt — Cell and Molecular Biology : Concepts and Experiments John Wiley & Sons
5. H. Lodish — Molecular Cell Biology — W.H. Freeman & company
6. Raven & Johson-Biology-W.C. Brown Publisher
7. B.D. Alberts — Molecular Biology and Cell — Garland Press

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Semester – I

BI-103 : BASIC MATHEMATICS AND BIOSTATISTICS

Unit 1

- Sequence and Series,
    - Finite and Infinite Series,
    - Arithmetic and Geometric Progression,
    - Sum to n terms, Arithmetic and Geometric Means between two numbers
    - Sum of an infinite G.P.
- Permutation and combination — Simple problems under restrictions
- Matrices
    - Definition, order of matrix, types of matrix
    - Transpose of Matrix
    - Symmetric and Skew symmetric and Subtraction of Matrix
    - Matrix Multiplication
    - Commutative, Associative and Distributive Laws
    - Inverse of Matrix
    - Determinant of Matrix
    - Properties of Matrix

Unit 2 :

- Basic Concepts of Statistics
    - Data, Data Graphics, Frequency Distribution
    - Measure of Central Tendency
    - Measures of Dispersion
- Introduction to Probability Distributions
    - Binomial Distribution
    - Normal Distribution

Unit 3

- Correlation Analysis

o Introduction to Correlation and Regression
o Correlation Coefficient
o Spearman's Rank Correlation Coefficient
o Regression Analysis
o ANOVA

Unit 4

- Sampling
    - Introduction to sampling
    - Sample size and its significance
    - Sampling techniques :
- Testing of Hypothesis

Reference Books

1. Hogg R.V. & Craig A.L. — Introduction to Mathematical Statistics -- Tata McGraw McGraw Hill
2. Yule USG. & Kendall M.G. — An Introduction to the theory of statistics -- Chailes Griffing & Co.
3. Kappor and Gupta — Fundamental of Mathematical Statistics -- S. Chand & Co.
4. K.B. Datta — Matrix and Linear Algebra — Tata McGraw Hill
5. Trembley J.P. & Manohar R.P. -- Discrete Mathematical Structures with Applications to Computer Science — McGraw Hill

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Semester – I

BI-104 INTRODUCTION TO INFORMATION TECHNOLOGY

Unit 1

- Introduction to Computers .
    - Block Diagram
    - Secondary Storage Devices
    - Memory Organization
    - Addressing Mode
    - Memory Types
    - Various I/O devices
- Introduction to software
    - Types of software

Unit 2

- Introduction to Network
    - What is Network?
    - Types of Network
    - Network Topology
    - Networking devices
- Introduction to Internet
    - How Internet works
    - Network services : Mail, Search, FTP, Telnet etc..

Unit 3 :

- Operating Systems
    - Introduction and function of operating system
    - Types of Operating Systems
- Operation of Windows operating system
    - Concept of Window,Icon, Menu
    - Desktop
    - Creating Files and Folders
    - Finding Files and Folders
    - Creating Copying, Moving, and deleting Files and Folders
    - Windows Explorer
    - Elementary Commands
- Operation of Linux / Unix operating system

Unit 4

- Office Automation Packages
    - Word Processor
    - Spreadsheets
    - Presentation Package

Reference Books

1. Ron White – I-low Computers Work – Techmedia
2. Peter Norton — Introduction to Computers — Tata McGraw I fill
3. Peter Norton - Inside IBM PC — PHI
4. Das — Unix Concepts and Application — McGraw Hill
5. Cowart - Mastering Windows 95 — BPB
6. L. Moseley, D. Boody — Mastering Microsoft Office — BPB
7. A.S. Tanenbaum — Computer Networks — Prentice Hall

VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc. (Bio-Informatics)
Semester – I
BI-105 COMPUTER PROGRAMMING AND PROGRAMMING METHODOLOGY

Unit 1

- Types of Programming Languages
- Algorithms and Flowcharts
- Sample calculation
- Compilation, and Interpretation
- Bugs and Testing

Unit 2

- Introduction to `C' Language
- Variables and constants
- Expressions
- Operators and their precedence
- Basic I/O functions
- Control Structures

Unit 3 :

- Built-in Functions
- User Defined Functions
- Parameter Passing to functions
- Recursive Functions

Unit 4:

- Storage Classes
- Arrays
- Strings
- Pointers
    - Definition and use of pointers
    - Pointer variables and address operators
    - Arrays of Pointers
- Passing array to function

Unit 5

- Introduction to Structure and Union
- Declaring and using Structure
- Operations on Structure
- Array of structure
- Pointer to structure
- Operations on Union
- Scope of Union
- # and ## operators
- Preprocessor Statements

Unit 6

- Introduction to Files
- File Structure
- File handling
- Macro definition

Reference Books

1. Byron Gottfried — Programming with C (2ed) - TI IM
2. La Budde — Structure Programming Concept — McGraw Hill
3. Karnighan and Richie — C Programming language -THM
4. Vijay Mukhi - `C' Odyssey (6'h Vol) — PI HI
5. Stephan Kochan -- Programming in `C' — CBS
6. Kelly and Bootle -- Mastering turbo C -- BPB
7. Herbert Schildt — the Complete Reference C' Tata McGraw Hill
8. Y.Kanitkar — Let us C -BPB
9. Y.Kanitkar -- Pointer in C - BPB

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Semester – I

BI-106 : Practical

Practical shall be conducted on the basis of paper number BI- 102,BI-103,BI-104, and BI-105
Separate journals to be prepared for Biology (papers BI-102) and Computer (papers BI-102,B1-104, and BI-105).