

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

**(2006-07)**

**Semester – II**

**BI-201 Biochemistry**

**BI-202 Molecular Biology and Genetics**

**BI-203 Immunology**

**BI-204 Database Management System**

**BI-205 Object Oriented Programming Methodology**

**BI-206 Practical**

- **The syllabus of second year will be proposed later on**

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**BI-201 BIOCHEMISTRY**

**Unit 1**

- Carbohydrates — chemical aspects
- Metabolic pathways of carbohydrates
  - o EMP, PP, Gluconeogenesis
  - o TCA cycle
  - o ETC and Oxidative phosphorylation
- Regulation of metabolism

**Unit 2**

- Protein Chemistry
  - o Amino Acids : Structure and Types
  - o Primary, Secondary, Tertiary and Quaternary structures of protein
- Lipids : Chemistry and Metabolism

**Unit 3 :**

- Structure of DNA and RNA
- Chromosomal organization of DNA in prokaryotes and eukaryotes
- Genomes of viruses

**Unit 4**

- Enzymes — Chemical nature
- Classification and nomenclature of enzymes
- Kinetic studies
- Factors affecting the activity of enzymes and regulation of enzyme activity

**Reference Books**

1. J.M. Beig, J.L. Tymoczko & L.Stryer — Biochemistry - W.H. Freeman
2. A.L. Lehninger — Principles of Biochemistry — Worth Publishing'
3. John J.L. — Fundamentals of Biochemistry — S. Chand & Co.
4. Voet & Voet — Biochemistry — John Wiley & Sons
5. B.D. Hames — Instant Notes in Biochemistry — Viva Books Pvt. Ltd.

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**BI-202: MOLECULAR BIOLOGY AND GENETICS**

**Unit I**

- Mendelian Genetics
- Laws of inheritance
- Chromosomes, Linkage, Crossover, and multiple alleles
- Chromosomal disorders

**Unit 2 :**

- DNA replication
- Mutation, Repair, and Recombination in DNA
- RNA replication mechanisms in viruses

**Unit 3**

- Transcription process
- Structure and functions of RNAs
- Genetic code
- Translation process

**Unit 4**

- Microbial genetics transformation, transduction and Conjugation
- Regulation of gene expression
- Gene mapping
- Plasmids, viroids, prions

**Reference Books**

1. G.M. Malacinski - Essentials of Molecular Biology Jones & Bartleff Publication
2. B. Lewin - Genes VII - Oxford University Press
3. J.M. Wallcer , E.B. Gingold Molecular Biology & Biochemistry Panima Publishing
4. Turner -- Molecular Biology - Viva Books
5. P.C. Winter - Instant Notes in Genetics Viva Books Pvt. Ltd.

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**BI-203: IMMUNOLOGY**

**Unit 1**

- Immunity – types and significant
- Antigens – definition and types
- Primary and secondary immune response
- Organs and cells of immune response

**Unit 2 :**

- Antibody – structure, types, and functions
- Production of antibody- *in vivo* and *in vitro*
- Generation of diversity in antibodies
- Recombinant antibodies

**Unit 3**

- Cell mediated immunity
- cells – types and their role in immunity
- Autoimmunity
- Hyper sensitivity

**Unit 4 :**

- Antigen – antibody reactions
- Role in diagnoses of diseases
- Vaccines
- Immunological techniques --- RIA, ELISA, Electro phoretic technique

**Reference Books**

1. K.D. Elgert -- Immunology : Understanding of Immune System Wiley --Liss & sons
2. F. Benjamine, R. Coico & G. Sunshine Immunology : A short course John Wiley & sons
3. R. Goldsberg, T.J. Kindt & B.A. Osborne - Immunology - W.H. Freeman
4. P.M. Lydard – Instant Notes in Immunology Viva Books Pvt. Ltd.

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**BI-204: DATABASE MANAGEMENT SYSTEM**

**Unit I**

- Fundamental Concepts of Files and databases
- Purpose of Database systems
- Introduction to data models
  - Conceptual data model
  - Record base data models
    - Hierarchical, Relational, Network
- Features of Database system

**Unit 2 :**

- Data Abstraction and data independence
- Types of database languages — DDL, DML, TCL,
- Database Users — Database manager, administrator, and users
- Overall system structure

**Unit 3**

- Structure of Relational database model
  - Relation schema, relation instance, views
  - Notion of keys
  - Pure query language : relational algebra
- Relational Commercial Language - SQL
- Relational database design
  - Pitfalls in relational database design
  - Normalization

**Unit 4**

- Microsoft access
  - Basic Architecture ..
  - Working with databases and tables
  - Managing constraints and relationships
  - Using SQL query
  - Forms, Reports, Macro etc.
- Integrity Constraints

**Reference Books**

- 1 Silberschats Korth, Sudarshan — Database System Concept - McGraw I fill
2. C.J. Date An Introduction to Database System Addison Wesley
3. Thomas Connoly, Carolyn Begg — Database Systems : A Practical Approach to Design Implementation and Management - Pearson Education
4. Virginia Andersen -- Access -'the Complete Reference McGraw I Lill
5. Steven Roman -- Access Database Design and Programming -- O'Reilly

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**BI-205: OBJECT ORIENTED PROGRAMMING**

**Unit 1**

- Comparison of Procedure Oriented Programming and Object Oriented Programming
- Characteristics of OOP
- Classes and Objects
- Encapsulation and data hiding

**Unit 2 :**

- Constructors and Destructors
- Polymorphism
  - Operator Over loading
  - Functional Overloading
- Inheritance and Dynamic Polymorphism

**Unit 3**

- Data files
- Templates
- Class library, OWL & Window Programming

**Reference Books**

1. Stroustrup : The C++ Programming Language – Addison Wesley
2. Robert !afore : OOP in turbo C++ Galgotia publication
3. Lippman Primer - Addison Wesley
4. Probal Sengupta : Object Oriented Prog. fundamentals & Applins - PHil
5. Schildt : The complete reference - Osborne

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**BI-206: Practical**

Practical shall be conducted on the basis of paper number 131-201, B1-202,B1-204, and 131-205.  
Separate journals to be prepared for Biology (papers 131-201,131-202) and Computer (papers 131-204, and BI-205).