Swami Ramanand Teerth Marathwada University, Nanded

Syllabus M.Sc. Bioinformatics (Revised)

Choice Base Credit System (CBCS) Pattern- (June - 2014)

M. Sc. Bioinformatics First Year (First Semester)

Paper No.	Paper Title	External (ESE)	Internal (CA)	Total
BI -I	Cell Biology and Genetics	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -II	Biophysics and Biochemistry	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI - III	Computing foundations in Bioinformatics	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
*BI -IV (Elective)	Bioinformatics Fundamentals	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -V	Seminar	25 Marks		Credit : 1
			Total for Sem: I	**Credit: 17**

M. Sc. Bioinformatics First Year (Second Semester)

Paper No.	Paper Title	External (ESE)	Internal (CA)	Total
BI - VI	Molecular Biology and Genetic Engineering	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -VII	Immunoinformatics	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI - VIII	Biodiversity and Phylogenetic Analysis	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
*BI -IX (Elective)	Programming using C language	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -X	Seminar	25 Marks		Credit : 1
			Total for Sem: II	**Credit :17**

Lab Course Work (Annual Practical)	Lab Course work- I	75 Marks	25 Marks	Credit :4 (100 Marks)
	Lab Course work- II	75 Marks	25 Marks	Credit :4 (100 Marks)
	Lab Course work- III	75 Marks	25 Marks	Credit :4 (100 Marks)
	Lab Course work- IV	75 Marks	25 Marks	Credit :4 (100 Marks)
	Total for Lab Course Work (Annual)			**Credit :16**
Total for M.Sc. I Year: Sem. I + Sem. II + Lab Course Work (Annual)				**Credit : 50**

M. Sc. Bioinformatics Second Year (Third Semester)

Paper No.	Paper Title	External (ESE)	Internal (CA)	Total
BI -XI	Statistics for Bioinformatics	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -XII	Chemo Informatics and Drug Designing	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI - XIII	Systems Biology	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
*BI -XIV (Elective)	Object Oriented Programming	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -XV	Seminar	25 Marks		Credit : 1
			Total for Sem: III	**Credit :17**

M. Sc. Bioinformatics Second Year (Fourth Semester)

Paper No.	Subject Title	External (ESE)	Internal (CA)	Total
BI -XVI	Biological Data Base Management	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -XVII	Programming using Perl and Python	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI -XVIII	Genomics and Proteomics	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
*BI -XIX (Elective)	Structural Bioinformatics	75 Marks	25 Marks (2 Test:15 Marks + Assignments:10 Marks)	Credit :4 (100 Marks)
BI - XX	Seminar	25 Marks		Credit : 1
			Total for Sem: IV	**Credit :17**

Lab Course Work (Annual Practical)	Lab Course Work -V	75 Marks	25 Marks	Credit :4 (100 Marks)
	Lab Course Work -VI	75 Marks	25 Marks	Credit :4 (100 Marks)
	Lab Course Work -VII	75 Marks	25 Marks	Credit :4 (100 Marks)
	Lab Course Project Work -VIII (Dissertation/ Elective Lab Course Work)	75 Marks	25 Marks	Credit :4 (100 Marks)
			Total for Lab Course Work (Annual)	**Credit :16**
			Total for M.Sc. I Year: Sem. I + Sem. II + Lab Course Work (Annual)	**Credit: 50**
			Total for M.Sc. (I Year + II Year)	**Credit:100**

Note: *Paper –IV (Elective): Transfer of Credit as per Students Choice
**The Evaluation of Seminar Should be from panel of Experts.

M.Sc. Bioinformatics (Semester Pattern) I Semester

BI : I Cell Biology and genetics **Marks: 100 Hours: 45**

Unit - I: Life – Form & Function

Origin of Life
Prokaryotic & Eukaryotic Cells (Cellular Architecture)
Structural Organization and Function of Intracellular Organelles
Cell Membrane – Structure and Function
Membrane Transport

Unit - II: Cell Growth

Genomic Organization in Prokaryotes & Eukaryotes,
Cell Division and Cell Cycle

Unit - III: Cellular Communication

Cell Signaling – Different mechanisms of signal transduction, concepts in signal network, second messenger, molecules involved in various signaling pathways such as G-protein coupled receptors, protein kinases, calcium binding proteins; Cancer.

Unit - IV: Genetics

Heredity and Variation
Mendelism – Experiments in Garden Pea, Monohybrid & Dihybrid Crosses, Dominance, Segregation and Independent Assortment.

Unit - V: Concept of Gene

Alleles, Multiple Alleles, Gene Interactions, Epistasis, Pleiotropy,
Complementation Tests. Linkage, Crossing over and chromosome maps, chromosome theory of Inheritance. Maternal effects and Cytoplasmic inheritance.

References

1. Campbell, Essential Biology (Abridged), Cambridge.
2. Starr & Taggart, Biology: The Unity and Diversity of Life.
3. Geoffry.M Cooper and Robert.E.Hansmann : The Cell
4. Gardner E : Principles of Genetics
5. Gupta P.K : Cytology, Genetics and Evolution
6. Snustad, Simmons: Principles of Genetics.
7. Introduction to Genetic Analysis Eighth Edition, Griffiths, Wessler

Practical:

1. Problems based on Genetics.
2. Cell types of plants- Microtomy/ maceration of various tissue explants and identification
3. Study of Mitosis
4. Study of Meiosis
5. Study of Membrane transport, osmosis
6. Microscopic observation and staining of microbes and cells
7. Study of karyotypes of genetic disorders and normal
8. Cell fractionation and study of cell organelles

M.Sc. Bioinformatics (Semester Pattern) I Semester

BI –II: Biophysics and Biochemistry **Marks:100 Hours: 45**

Unit - I: Thermodynamics

Laws of thermodynamics, concept of free energy, unavailable energy and entropy, heat content of food, bomb calorimetry, chemical kinetics – rate, order, molecularity of reactions and energy of activation.Oxidation and reduction, redox potential and its calculation by Nernst equation, examples of redox potential in biological system.

Unit -II: Bioenergetics and Biophysical properties of Water

Energy requirements in cell metabolism, role and structure of mitochondria, high energy phosphate bond, electron transfer phenomenon and biological transfer.

Physicochemical properties of water Molecular structure, Association of water through H- bonding Nature of hydrophobic interactions,Surface tension; adsorption; diffusion; osmosis; dialysis and colloids.

Unit -IV: Biochemistry of Carbohydrates and Lipids

Carbohydrates: monosaccharides, oligosaccharides, polysaccharides, proteoglycans and glycoproteins. Lipids: fatty acids, acylglycerols; phospholipids, sphingolipids, cholesterol and membranes Isoprenoids, icosanoids and their biological importance.

Unit -IV: Biochemistry of Proteins, Nucleic acids and Enzymes

Proteins: amino acids and peptides; primary, secondary, tertiary and quaternary structures; structure, function and evolutionary relationships; Nucleic acids: bases, nucleotides, RNA and DNA; different structural forms of DNA; denaturation, renaturation and hybridization of DNA; different types of RNA; Protein-nucleic acid interaction. Enzymes: details of enzyme nomenclature and classification; units of enzyme activity; coenzymes and metal cofactors; temperature and pH effects, Michaelis-Menten kinetics

References

1. Physical Chemistry for Life Sciences by Barrow C, MC-Grow Hill
2. Biophysical Chemistry by Bloomfield V A and Harrington R E, W A Freeman and Co.
3. Biophysical Chemistry by Cantor C R and Schimmel, P R, W A Freeman and Co.
4. Aspects of Biophysics, Hughe S W, John Willy and Sons.
5. Introduction of Biophysics by Pranab Kumar Banargy, S Chand and Co.
6. Biochemistry by A. L Lehninger
7. Biochemistry by Voet & Voet
8. Biochemistry by Zube
9. Biochemistry by Stryer L

Practicals:

1. Study of General and Safety Rules of Laboratory
2. Concept of Buffers, pH, Morality and Normality (Problem solving and preparation)
3. Reaction of amino acids, sugars, lipids
4. Estimations of Carbohydrates and Sugars
5. Estimation of amino acids, proteins
6. Estimations of DNA & RNA
7. Cholesterol estimation
8. UV visible, fluorescence & IR spectroscopy absorption spectra
9. Study of Enzyme activity s

M.Sc. Bioinformatics (Semester Pattern) I Semester

BI -III: Computing foundations in Bioinformatics **Marks: 100 Hours: 45**

Unit – I: Introduction

Overview and functions of a computer system, storage, devices, memory, etc.Types of Processing: Batch, Real-Time, Online, Offline Types of modern computers: The workstation, The Minicomputer, Mainframe Computers, Parallel Processing Computer, The Super Computer, etc. The Internet and its Resources, World Wide Web (WWW): associated tools, services, resources and various terminologies; Introduction to operating systems; File System Concept – NTFS, Fat, ext, etc.

Unit – II: Computer Networking

OSI Reference Model, TCP/IP, topologies and protocols, designing networks; networking gadgets Router, Switch, etc); Data Communication (ISDN, VPN, DSL, cable modem, cellular modem, etc); Communication Links (Wire pairs, Coaxial cables, Fiber optics, Microwave, Satellite, etc) Network security fundamentals: types of attacks, firewall, packet filtering,

Unit –III: Data security

Classification of data security threats, protection mechanism (authentication, access control, access rules) An overview of Computer viruses: How do they get transmitted? What are the dangers? General Precautions to be taken. Encryption/Decryptions techniques; Current & future technologies (Grid Computing, VPN, Cloud computing, wireless, mobile computing, biometrics etc.)

Unit –IV: Introduction to Windows Operating System

Features of MS Windows – GUI, Multitasking etc. Elements of Windows – Desktop, Windows, Applications, Icons, Group window etc. Main modules of Windows O.S. – Program Manager, File manager, Control Panel, Networks, Print manager. Switching between applications – Running MS DOS applications, Windows Help. Study of Windows important files – DLL, INI, etc.

Unit –V: Introduction to Linux Operating System

Introduction to Linux – Features of Linux; Hardware Requirements Installation. Linux Commands and Utilities – Add User, alias, at, banner, batch, bind, cat, cd, chmod, chown, chroot, cp, cpio, dc, dd, df, dir, du,dump, grep, zip, unzip, gzip, halt, hostname, kill, locate, lpc, lpd, lpr, lprm, ls,mail, man, mcopy, mdel, mdir, mformat, mkdir, mlevel, more, mount, mt, mv, passwd, ping, , ps, pwd, rm , rmdir, set, shutdown, sort, stat, su,tar,tree, umount, unzip, vdir, vi, view, wc, who, whoami, zip,

References

1. Computers Today by Sanders D. H., McGraw Hill.
2. Fundamentals of Computers by Rajaraman V., PHI.
3. Computer Fundamentals by P. K. Sinha.
4. Computer Architecture and Organizations by J. P. Hayes, Mc Graw Hill.
5. Computer Network by Andrew S. Tanenbaum, PHI.
6. Inter Networking With TCP/IP: Principles, Protocol And Architecture by
7. D.E. CornerVol1, 2nd Edition Prentice Hall, 1991.
8. Linux. The Complete Reference.

Practical:

1. Study architecture of computer system
2. Study of different modern computers.
3. Study of computer networks and network topologies
4. Study of internet
5. Practical bases on Windows o/s
6. Practical bases on Linux O/S

M.Sc. Bioinformatics (Semester Pattern) I Semester

BI -IV: Bioinformatics Fundamentals **Marks: 100** **Hours: 45**

Unit – I: Introduction

Various Definitions; History of Bioinformatics; Bioinformatics in business; Scope of Bioinformatics; Bioinformatics Applications; Nature of biological data.

Unit – II: Introduction to Biological databases

What is Database?Types of Databases; Biological databases: Primary databases – GenBank, DDBJ, EMBL. Protein sequence databases – Uniprot-KB: SWISS-PROT, TrEMBL, UniParc. PIR-PSD, PRINTS. Structural databases – PDB, NDB, PubChem, ChemBank, CCSD. Derived Darabases: Sequence- InterPro, Prosite, Pfam, ProDom. Structure- FSSP, DSSP. Specialized – FlyBase, HIV, BLOCKS, EST, SNP, AceDB, Microarray databases. Genome & genetic disorders – Genome databases; EBI, TIGR, SANGER; Human, model organisms, Microbes & Viral; OMIM.

Unit – III: Data Retrieval and Information Search

Google, Bibliographic resources related to Life Sciences viz., PubMed, BioMed Central, Public Library of Sciences(PloS), citeXplore.Database search engines – Entrez, SRS etc. Biological Data warehousing and Data mining concept. Database Similarity Searching – FASTA, BLAST. Searches on Medline, etc.

Unit – IV: Sequence Alignments and Visualization

Introduction to Sequences, alignments and Dynamic Programming; Local alignment and Global Alignment (algorithm and example), Pairwise alignment (BLAST and FASTA Algorithm) and multiple sequence alignment (Clustal W algorithm)

Unit – V: Scoring Matrices

PAM, BLOSUM, etc

References

1. Bioinformatics: Sequence and Genome Analysis by David Mount, New York, Cold Spring Harbor Laboratory Press, 2004.
2. Introduction to Bioinformatics by Attwood, T.K. & Parry-Smith, D.J., Delhi, Pearson Education (Singapore) Pte.Ltd., 2001.
3. Bioinformatics: A Practical Guide to the analysis of Genes and Proteins (2nd Ed.) by Baxevanis, A.D. & Ouellettee, B., F. F., New York, John Wiley & Sons, Inc. Publications, 2002.
4. Bioinformatics: Concepts Skills and Applications by S. C. Rastogi, Namita Mendirata, Parag Rastogi, Estern Economi Edition, PHI (Prentice – Hall India),

Practical:

1. Study of various Bioinformatics resources
2. Retrieval of data from databases.
3. Study of sequence alignment and visualization tools
4. Study of Paper Chromatography/ TLC.
5. Separation of Pigments/ Biomolecules by Chromatography.
6. Separation of pigments by column chromatography

M.Sc. Bioinformatics (Semester Pattern) II Semester

BI - VI: Molecular Biology and Genetic Engineering **Marks: 100** **Hours: 45**

Unit – I: Genomic Organization

Genomic Organization in Prokaryotes and Eukaryotes. Chromosome and Chromatin Structure, Structural and Numerical alterations of Chromosomes. Gene Mutations and their molecular basis Experiments Proving genetic material is stored in DNA, Cot Curve, C value paradox.

Unit – II: DNA Replication

DNA replication in Prokaryotes and Eukaryotes; DNA replication in λphage and ϕ X174 (Rolling Circle Replication), DNA damage, DNA repair, DNA recombination. Mechanisms of Transpositions in eukaryotes and Viruses with specific examples.

Unit – III: Expression of the Genome and Regulation of Gene Expression

Transcription in Prokaryotes and Eukaryotes; Post transcriptional processing in Prokaryotes and Eukaryotes; Structural and functional aspects of Genetic Code;
Mechanism of Translation : Protein Synthesis and Post – Translational Modifications
Gene regulation: Operons Lac, Tryptophan and Arabinose Operons. Gene regulation in Eukaryotes: Gene silencing, RNA interference.

Unit – IV: Recombinant DNA Technology

Techniques of Gene Manipulation and Enzymes involved. Vectors- Plasmids Phages, Artificial vectors –Cosmids, Phasmids and Expression vectors. Methods of Gene Transfer, Identification of recombinant DNA and transformants, Construction of gene libraries, cDNA and Genomic Library, Applications of rDNA Technology

Unit – V: Gene Manipulation and Molecular markers

Polymerase chain reaction, Gene sequencing –enzymatic and Chemical, shotgun Sequencing. Blotting techniques, Molecular markers : Physical and Genetic RFLP, RAPD, AFLP, SNP etc, DNA Finger printing and DNA foot printing DNA Bar coding, Chromosome Walking, Chemical Synthesis of Gene.

References

1. Molecular Biology of the Gene : James D.Watson
2. Robert F. Weaver : Molecular Biology
3. Watson J.D: Molecular Biology of the Gene.
4. Old R.W Primrose: Principles and Techniques of Gene Manipulation
5. Lewin B: Gene VIII
6. Frefielder D : Essentials of Molecular Biology
7. T.A. Brown: Gene Cloning and DNA Analysis
8. Peter J Russell: Genetics A Molecular approach
9. Robert F.Wearer: Molecular Biology
10. Fundamentals of Cell and Molecular biology-Baig, Telang and Ingle-Amruta
11. B.D.Singh: Molecular Biology, Genetic engineering and Applications of Biotechnology.

Practicals

1. Study and isolation of mutants by Replica plate technique
2. Isolation of antibiotic resistant bacteria by gradient plate method
3. Study to mutation and repair in bacteria /yeast
4. Study of spontaneous mutation by Fluctuation test
5. Isolation of genomic DNA/RNA from bacteria, animal and plant cells.
6. Isolation of plasmid DNA /Phage DNA.
7. Spectroscopic analysis of DNA/ RNA
8. Agarose gel electrophoresis.
9. Study of in vitro transcription and translation

M.Sc. Bioinformatics (Semester Pattern) II Semester

BI- VII: Immunoinformatics **Marks: 100 Hours: 45**

Unit – I: Introduction to immunology

infection, immunity, types of immunity, Cells and organs of immune system. Humoral and cellular immune response. Activation of T and B cells C ytokines. Immunoregulation; Hybridoma Technology, Monoclonal antibodies, immunoglobulins. Antigen, Antibodies, Antigen-antibody reactions. Complements and complement activation.

Unit – II: Genetic basis of antibody diversity

B cell differentiation B cell, membrane proteins. T cell differentiation, T-cell receptor complex, Major histocompatiability complex, MHC restriction.

Unit – III: Advanced Immunology

Immunostimulants, immunomodulants and ELISA. Immunologic tolerance. Hypersensitivity, Auto immunity, Immuno deficiency diseases. Transplantation immunology, tumor immunology and immune hematology.

Unit – IV: Computational Immunology

MHC peptides –Structure and interactions QSAR based predictions of epitopes. Epitope modification, epitope mapping tools, Allergenicity prediction. Vaccine design and system immunology.

References

1. Roitt Elbs: Essential Immunology
2. Kuby immunology Kindt Goldsby
3. DAVID J Hentges Microbiology and Immunology
4. Paul W.E Fundamental immunology
5. Helen Chappel $ Mansel Haeney Essential clinical immunology
6. R.Ananthanarayan and C.K. Jayaram: Text book of Microbiology
7. John W Kimball MAXWELL Introduction to immunology
8. Daren R. Flower Immunoinformatics predicting Immunogenicity In Silico.

Practical:

1. Determination of ABO Blood group
2. Determination of total leukocyte count
3. Determination of differential leukocyte count
4. Radial immunodiffusion, double diffusion
5. Study of Ag-Ab reactions Widal, VDRL
6. Immuno electrophoresis
7. ELISA, Western Blotting
8. Rocket immuno electrophoresis
9. Radioimmunoassay
10. Hybridoma Technology

M.Sc. Bioinformatics (Semester Pattern) II Semester

BI –VIII: Biodiversity and Molecular Phylogenetics **Marks: 100 Hours: 45**

Unit – I: Biological Diversity

Biological diversity of life; India as mega biodiversity nation; Hotspots of diversity; Genetic diversity; Species diversity; Ecological / ecosystem diversity. Diversity informatics in India, challenge and potential.

Unit – II: Biodiversity Databases

Species 2000; Tree of life; National Biological Informatics Infrastructure; International Committee on taxonomy of viruses (ICIV) and ICTVDB. Animal Virus Information System (AVIS); Global biodiversity information facility (GBIF); Other biodiversity databases.

Unit – III: Species Identification

Barcode of life;Delta; ITIS; Databases and softwares for identification of Species. Metadata- Definition; Metadata standards; Metadata & biodiversity; Need for metadata standards

Unit – IV: Molecular Phylogenetics

Introduction; Relationship between phylogenetic analyses and multiple sequence alignment; Genome complexity; Evolutionary trees Rooted & Unrooted trees; Methods for phylogenetic prediction , Maximum parsimony method, Distance based alignment; Soft ware package for phylogeny prediction.

Unit – IV: Applications of phylogeny analyses

Comparison of Phylogenetic Trees obtained using DNA seq. Vs. protein seq.Vs. Full genomes. Need for addition of other properties towards total phylogenetic analysis; Comparative methods for detection of species / organism relationships; Gene duplication, Horizontal transfer, Domain evolution; Study of co-evolution: Plant-insect interactions. Host-parasite interactions. Viral evolution.

References

1. Bioformatics sequence and genome analysis – by David W. Mount.
2. Practical taxonomic computing – by Pankhurst R.J
3. Molecular Evolution a Phylogenetic Approach by R. D. M. Page and E.C. Holmes, Blackwell Scientific, 1998.
4. Fundamentals of Molecular Evolution by D. Graur and W-H Li, 2nd Edition, Sinauer Associates.

Practical:

1. Study of different biodiversity databases and retrieval of biodiversity information from them
2. Study of database structures and designing biodiversity databases
3. Study of different species identification systems.
4. Study of different methods for sequence alignment.
5. Study of different methods for phylogenetic prediction

M.Sc. Bioinformatics (Semester Pattern) II Semester

BI -IX: Programming using C language **Marks:100 Hours: 45**

Unit – I: Introduction

Types Of Programming Languages , Introduction To C ,Historical Development Of C Language, Structure Of C Program.**C Fundamentals** The C Character Set ,Identifiers And Keywords ,Data Types, Constants , Operators Used In C ,Variables And Types Of C Variables , Declaration,
Expressions ,Statements ,Symbolic Constants ,I/O Statements used in C.

Unit – II: Control Statements

Branching: If Statement, If-Else Statement, If-Else Ladder, Switch Statement.
Looping: While Loop, Do-While Loop, For Loop, Nested Control Structures, Jumps In Loop- Break Statement, Continue Statements, Goto Statement

Unit – III: Arrays, Functions and Strings

What Is An Array? , Declaring And Initializing An Array , One-Dimensional Array , Multi-Dimensional Array , Passing array to function, Strings- What Are Strings ,Declaring And Initializing String Variables ,Reading And Writing Of String , Standard Library Functions User-Defined Functions , Return Types , Passing Arguments To A Functions , Scope And Life Time Of Variables In Function, Nesting Of Functions ,Recursion ,Functions And Array.

Unit – IV: Pointers, Structures and Union

Introduction To Pointers, Declaring And Initializing Pointers , Accessing A Variable Through Its Pointer , Pointer Expression , Pointers And Arrays, Pointers And Character Strings , Array of Pointer and pointer to pointer Introduction ,Structure ,Structure Initialization , Array Of Structures, Arrays Within Structure, Structure Within Structure ,Introduction To Union

Unit – V: Storage Classes And File Management in C

Automatic Storage Class, Register Storage Class , Static Storage Class External Storage Class. Introduction ,Defining And Opening A File ,Closing A File ,Input/Output Operations On File ,Error Handling During I/O Operations ,Random Access To file

References

1. Programming With C By Byron Gottfried Second Edition, Tata-Mcgraw-Hill
2. Let Us C By Yashwant Kanetkar 4th Edition Bpb Publication.
3. Pointers In C By Yashwant Kanetkar 3rd Edition.
4. Programming in Ansi C by E. Balagurusami

Practical:

1. Study of structure of C program.
2. Write C programs using control and looping statements.
3. Write C programs using arrays, pointers, structures and unions.
4. Write C programs using Strings.
5. Write C programs for Functions.
6. Write C programs for file handling
7. Write C programs using consol I/O functions