

**PART I – SYLLABUS**

**PAPER I – RESEARCH METHODOLOGY**

**UNIT I :**

Research Methodology:Introduction ;meaning of research;objectives of research;types of research; research approaches; significances of research; research methods vs methodology; research and scientific method ; importance of knowing how research is done; research process; criteria of good research; problem encountered by researchers in india; Defining the research problem;What is the research problem? Selecting the problem; Techniques involved in defining the problem; Research design; Need for research Design;Features of good Design,important concepts relating to design; different research designs; basic principles of experimental designs.

**UNIT II :**

Hypothesis testing:What is Hypothesis? Basic concepts concerning testing of hypothesis;procedure for hypothesis testing;Probability;Markov models and Hidden Markov Models;Probability distribution;Binomial;Poisson;Normal distribution and Multiple testing Methods ANOVA;Test of significance-t-test;F-test

**UNIT III :**

Interpretation and Report writing; Meaning of Interpretations; Techniques of interpretation;precautions of interpretations; significances of report writing; Different steps in report writing; layout of the research project;types of report; oral presentation;mechanics of writing a research project; precautions for writing research reports; conclusions

**UNIT IV :**

Elements of C Programming;Features of C;Variables;Constants;keywords;Data types;operators;statements;loops – simple programs using Loops,Arrays – integer arrays – character arrays – simple programs using arrays;Introductions to functions – simple programs using functions – Introduction to pointers,structures string Manipulations using pointers and arrays;Files;Defining and opening a file,Closing a file,input/output operations on files  
PERL:Basic syntax-I/O – Variables,strings & arrays-control structures – regular expressions – simple programs

**UNIT V :**

Algorithms in computer sciences inspired by biology genetic algorithms,Neural networks and path optimization

**Reference:**

- 1 Kothari. C.R. 2004 Research Methodology – Methods and Techniques,New Age International(P)Ltd
- 2 E Balagurusamy.Programming in ANSI C Tata Mc Graw Hill
- 3 Randa L.Schwartz,tom phoenix,learning perl,third edition

PART I – SYLLABUS

PAPER II – ADVANCES IN BIOINFORMATICS

**UNIT I**

High throughput genome sequencing and genome assembly, Gene finding algorithms, DNA Microarrays and large gene expression data sets, clustering algorithms

**UNIT II**

Protein and Nucleic acid sequence alignments, Sequence databases, the use of algorithm BLAST, Multiple sequence alignments

**UNIT III**

Protein Structure analysis; Protein structure databases; Protein Structure comparison; Fold Recognition; 3D – ID Profiles; Threading; Comparative Structure Modeling

**UNIT IV**

Phylogeny (evolutionary trees) biological networks; pathway analysis

**UNIT V**

Emerging new ideas on treating biological systems; Pharmacogenetics and its applications; SNPs and their applications

**Reference:**

1 Andreas D Baxevanis and BF Francis Ouellette 2001 Bioinformatics A Practical Guide to the analysis of Genes and Proteins, A John Wiley & sons, INC, Pub

2 David W Mount, 2003 Bioinformatics – Sequence and Genome Analysis, CBS Publishers, Ian Korf, Mark Yandell & Joseph Bedell, 2003

3 Ian Korf, Mark Yandell & Joseph Bedell. 2003 BLAST(O' REILLY) SPD Pvt Ltd

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