



THE WEST BENGAL UNIVERSITY OF HEALTH SCIENCES

DD – 36, Sector – 1, Salt Lake, Kolkata - 700 064

Website: -www.wbuhs.ac.in ; EPBX: - 2321-3461 / 2334-6602; Fax: 2358-

COURSE WORK - OUT LINE

A) BIOSTATISTICS:

- 1) Summarization of Data: measures of center, dispersion, skewness Dependence of variables:
- 2) Correlation, Linear regression, Logistic regression.
- 3) Basic probability distributions: Binomial, Normal, Chi-squares.
- 4) Estimation of parameters: method of moments, maximum likelihood Testing of hypotheses:
 - a) Parametric tests: t-test, z-test, chi-squares test, ANOVA
 - b) Non-parametric tests: Mann- Whitney, Kruskal Wallis, Kolmogorov- Smirnov

B) COMPUTATION/ BIOINFORMATICS:

- 1) Computers: Introduction, evolution and classification of computers, Fundamentals of computing. Bit and Byte, introduction to types of Hardware and Software, Components of computer, introduction of operating systems, introduction to Computer Viruses.
- 2) Network: introduction, network structure and architecture, hierarchical networks, Ethernet and TCP/IP family of protocols, transport protocol design, types of network, topologies of network, router, switch, data communication, concept of wireless networking, LAN, WAN, MAN, security of the network, fire-walls, network applications.
- 3) Information Technology: concepts of client server architecture, concept of search engine, database search engines, introduction to internet.
- 4) Introduction to Word, PowerPoint and Excel.
- 5) Introduction to Bioinformatics: history of Bioinformatics, genome sequencing projects, Human Genome project, applications of Bioinformatics.
- 6) Introduction to databases: type and kind of databases, applications and limitations.
- 7) Literature Search Databases, nucleic acid and protein databases, animal and plant databases, Ensemble Genome project TIGR database, biotechnological databases, motifs and pattern databases, databases for species identification and classification, structural databases, database retrieval and deposition systems.
- 8) Web tools and resources for sequence analysis; pair wise and multiple sequence alignment, sequence similarity search: BLAST, pattern recognition, motif and family prediction, restriction map analysis, primer design, gene prediction, phylogenetic tree, protein structure prediction and visualization.

C) RESEARCH METHODOLOGY/ ETHICS/ SAFETY:

- 1) Philosophy and structure of scientific thoughts, objective and motivation of research, meaning of the research, what constitutes a research topic? How to select a research topic?
- 2) Importance of literature review, selection of appropriate methodology, collection of data, interpretation of data, writing research paper, paper presentation in scientific conference, statistical methods, importance of documentation, procedure for Hypothesis Testing, Values and ethical problems, criteria of Good Research.
- 3) Good lab practices: Record keeping, organizing data, organizing the lab space.
- 4) Chemical, Radioactive and Biological safety: Possible hazards and precautionary measures; do and don'ts upon exposure.
- 5) What is ethics, the different interpretations & historical instances of unethical science, Case studies: Data fraud/ plagiarism and Human Ethics violation.

D) EPIDEMIOLOGY:

- 1) Survival analysis
- 2) Hazard Model
- 3) Concept of validity and reliability
- 4) Concept of sensitivity and specificity
- 5) Concept of risk factors
- 6) Calculation of Odds ratio and Relative risk with confidence interval
- 7) Calculation and interpretation of Incidence and Mortality rates
- 8) Logistic regression methods.

E) COMPUTER APPLICATIONS:

- 1) Computer hardware and software
- 2) Basic operating system
- 3) Database management using computers
- 4) Identification of outliers in a database
- 5) Preparation of slides using Microsoft Power Point
- 6) Web tools of Genomics
- 7) Information technology
- 8) Web tools for Genomics
- 9) Introduction to molecular modeling, Small molecular designing in relation to Drug design, Macro molecular modeling & Rational drug design.
- 10) Data analysis using software packages
- 11) Preparation of Graphs, Line diagram and Bar diagram using software
- 12) Map information system