COURSE 10: BIOINFORMATICS AND BIOSTATISTICS

Theory	Credits: 3	3 hrs/week

I. LEARNING OUTCOMES

On successful completion of the course, the students will be able to

1.   Learn about concept and branches of bioinformatics
2.   Learn about searching sequences using databases
3.   Learn about computer phylogenetics
4.   Learn about the measurement of central tendency
5.   Learn about test hypothesis

II. Syllabus

UNIT – I

1.   Scope of computers in biological research, Introduction to Bioinformatics: Definition, nature and scope of bioinformatics.

2.   Bioinformatics versus computational biology.

3.   Branches of bioinformatics. Basic concepts in bioinformatics.

UNIT – II

1.   Basic concepts of system biology. Protein Data Bases -visualization of proteins using database

2.   Overview of computer-aided drug design.

3.   Searching sequence database using BLAST. Concept of genomics and proteomics

UNIT – III

1.   Computational phylogenetics – various applications.

2.   Phy lip software. Microarray,

3.   Bio informatics – Experimental design & Over view of data analysis.

UNIT – IV

1.   Measurement of central tendency (mean, mode and range)

2.   Dispersion (standard error and standard deviation).

3. Probability and distribution. Poisson and binomial distributions. Normal distribution

UNIT – V

1.   Population and sampling test of significance. Test hypothesis.
2.   Student t-test for small samples. ANOVA ,Chi^2 test for analysis, correlation and regression.
3.   Computer applications in Biotechnology

III . Skills Outcome

On Successful Completion of this Course, Student shall be able to

1. Learn about problems of mean median mode
2. Learn about test hypothesis
3. Learn about sequence Retrieval from NCBI

COURSE 10: BIOINFORMATICS AND BIOSTATISTICS

Practical   Credits: 1   2 hrs/week

1. Mean, Median, Mode
2. Standard deviation, variance and coefficient of variation
3. Testing of hypotheses regarding population mean
4. Testing of hypotheses about the difference between population means
5. Chi-square test
6. Testing of Correlation Coefficient
7. Fitting of simple linear regression
8. Sequence retrieval (protein and gene) from NCBI, Structure download (protein and DNA) from PDB

V. REFERENCES

1. Fowler, J., Cohen, L. and Jarvis, P. (1998). Practical Statistics for Field Biology. John Wiley and Sons, 2nd ed. .

2. Bland, M. (2006). An Introduction to Medical Statistics. Oxford University Press, 3rd ed.

3. Finney, D.J. (1980). Statistics for Biologists.Chapman and Hall Ltd.

4. Wayne, W, Daniel (1999). Biostatistics: A Foundation for Analysis in Health Sciences. John Wiley and Sons, 7th ed.

VI. CO-Curricular Activities

a) **Suggested C0-Curricular Activities**

1. Assignments
2. Seminars, Group Discussions on related topics
3. Charts on data bases