

BIRLA INSTITUTE OF TECHONOLOGY AND SCIENCE, PILANI

Pilani Campus

INSTRUCTION DIVISION

FIRST SEMESTER 2015-2016 Course Handout (Part II)

03/08/2015

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course

Course No. : BIO G510

Course Title : APPLICATION OF STATISTICS AND COMPUTERS IN BIOLOGY

Instructor-in-Charge: PRITI JAIN

Instructor : Shibasish Chowdhury, Ashish Runthala

1. Course Description:

Methods of collection and presentation of statistical data; Calculation and Interpretation of various measures like mean, median, mode, standard deviation, Kurtosis, correlation coefficient, probability distributions; sampling and estimation of parameters; tests of hypothesis; data analysis, ANOVA, analysis of research problems. Topics covered will aim to relate to the health field.

Introduction to UNIX operating system and commads; Biological data mining; basic algorithms and tools to analyze sequences and structures; Phylogenetic tree generation.

2. Scope and Objective of the course:

This course is designed to impart training in computational techniques and use of computational tools in the analysis of research problems, experimental design, and statistical analysis of data.

3. Text Book (T):

- T1: S. Bolton, "Pharmaceutical Statistics: Practical and clinical application", 3rd Edn., Marcel Dekker, New York, 1997.
- T2: Wayne, W. Daniel, Biostatistics : A foundation for analysis in the health science, 7th Ed., John Wiley, 1999.

Reference Books (R):

R1:Marcello Pagano and Kumberlee Gourerau, Principles of Biostatistics, 2nd Ed., Duxbury – Thomson Learning, 2000.







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4. Course Plan: Lectures are sub-divided into two parts: I- Biostatistics and II- Computer application

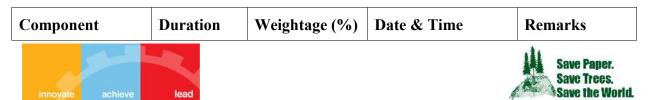
I- Biostatistics

S.No	Learning Objectives	Topics	Chap Ref T1	Chap. Ref. T2
1-2	Overview of various statistical techniques for data collection and analysis	Introduction to Biostatistics Descriptive Statistics	1, 2	1,2
3-9	Sampling design	Some Basic Probability Concepts Probability Distributions Some Important Sampling Distribution	3,4,5	3,4,6
10-13	Understanding statistical inference	Estimation Hypothesis Testing	6,7	5
14-16	Understanding the basic premises in analysis based on regression and correlation	Simple Linear Regression and Correlation	9	7
17-20	Application of non-parametric testing procedures	The Chi-Square Distribution and the Analysis of Frequencies Nonparametric and Distribution-Free Statistics	12,13	15
21-25	Application of parametric testing procedures	Analysis of Variance	8	8

II- Computer Applications

Lecture No.	Learning Objectives				Topic to be covered		Reference	
1-3	Unix OS, Filesystem and Basic commands				Unix OS – overview and selected commands	Class notes		
4-6	Basics	of	Biolog	ical	Archives and information retrieval; Sequence and	Class	notes	and
	Databases and data mining				structural database, Hand on sessions		Web resources	
7-12	Sequence	and	Struct	ture	Sequence analysis algorithms, basic sequence and	Class	notes,	Web
	analysis			structure analysis tools to analyze structures and		resources		
					functions of biomolecules			
13-15	Phylogeny	relatio	onships	of	Algorithms to infer the evolutionary relationship	Class	notes,	Web
	DNA and Protein sequences			S	between the DNA and protein sequences		resources	

5. Evaluation Scheme:





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Mid Term	90 min	25	5/10 4:00 - 5:30 PM	СВ
Practice based		40		
Laboratory				
Component/Quizze				
s/ Assignments				
Comprehensive	180 min	35	2/12 AN	CB+OB
Exam				

- **6. Mid-semester evaluation:** Will be announced after the mid term test.
- **7. Attendance**: Regularity in attendance will be one of the criteria in deciding the borderline cases at the time of final grading.

8. Grading Procedure:

- 1. It is not necessary that all the grades would be awarded.
- 2. In borderline cases subjective judgment will be exercised for pull-up. Basic guiding factors will be regularity, consistency in performance (above average) or/and steady improvement throughout the semester.
- **9. Make-up:** Make-up will be given only for genuine reasons. It is expected that students shall avoid misuse of this feature.
- **10. Chamber consultation hours:** To be announced in the class.
- 11. Notices: Notices pertaining to this course will be displayed on the Notice Board of Department of Pharmacy and Biological Sciences.

Instructor-in-Charge BIO G510



