Progressive Education Society's

Modern College of Arts, Science and Commerce (Autonomous),
Shivajinagar, Pune- 5
First Year of B.Sc. Biotechnology
(2024 pattern under NEP 2020)
Semester II

Course Code: 24ScBIOU2601 Course Name: Basic of Mathematics & Biostatistics

Teaching Scheme: TH: 2 Hours/ Week **Credit: 02C (2T)**

Examination Scheme: CIA: 20 Marks **End-Sem: 30 Marks**

Prerequisite Courses:

- Basic Mathematics from 11th and 12thScience.

Course Objectives:

- To study Set theory, Differential equation, Calculus, Matrices.
- To study Introduction to Statistics, Descriptive Biostatistics, Probability and Probability distribution.

Course Outcomes:

On completion of the course, student will be able to–

- Solve differential equations, integration, set system-based problems etc.
- Know aboutbiological datacollection, sampling and analysis.
- Find Probability and Probability distribution.

Course Content

Unit	Title	30 lectures
Unit 1	Sets	2 lectures
	• Definition. • Types of sets withVenn diagram. • Subset. • Operations on sets. • Cartesian Product and Relations.	
Unit 2	Calculus	5 lectures
	• Function. • Limit of a function. • Continuity of function. • Differentiation of Function. • Integration. • Area under the curve.	
Unit 3	Differential Equation	5 lectures
	• Ordinary and Partial differential equation. • Order and degree of differential equation. • Homogeneous differential equation. • Variable separable form. • Exact differential equation. • Linear differential equation. • Applications: growth and decay, law ofcooling.	
Unit 4	Matrices	3 lectures
	• Definition. • Types of matrices. • Addition of matrices. • Multiplication of matrices. • Determinant of matrices. • Minor, cofactor, adjointand inverse of a matrix. • System of linear equations. • Cramer's Method.	
Unit 5	Introduction to statistics	2 lectures
	• Need of Statistics in biology. • Various types of data. • Population, sample and sampling method. • Representation of data using frequencydistribution diagram.	
Unit 6	Descriptive Biostatistics	4 lectures

	• Measures of central tendency. • Measures of dispersion. • Correlation.	
	• Scatter diagram.	
Unit 7	Probability and Probability distribution	4lectures
	• Basics of Probability theory. • Probability distribution. • Binomial distribution. • Poisson distribution. • Normaldistribution.	
Unit-8	Inferential Statistics	5 lectures
	• Hypothesis. • Significant level. • Test Statistics (t and z test). • Chi square test. • ANOVA (One way and Two way).	

References:

1. Ordinary and Partial Differential Equations, 19th Edition, Dr. M.D. Raisinghania
2. Matrices: ShantiNarayana S.CHAND& Co. New Delhi,1957
3. Mathematics Analysis, 5th Edition, S.C.Malik and SavitaArora
4. Fundamentals of Mathematical Statistics by S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons.
5. Fundamental of Biostatistics, 7th Edition, Barnard Rosener,