

Semester – IV			
16UBCDA07	DSE Allied - 4 Mathematics for Biologists	4hrs/week	4Credits

**Objectives:-**

Upon completion of the course students will be able to

1. Understand the nature of any random experiment and construct sample space..
2. Identify the relevant population, sample, study units (subjects) and variables.
3. Identify data that follow a normal curve and find chances and percentages using a normal curve.
4. Understand and construct the probability distribution and find mean and variance of the given Binomial Distribution and Poisson Distribution
5. Produce and interpret numerical summary statistics using mean, median, mode, range, standard deviation and variance.
6. Perform and interpret testing of hypothesis including chi-squared test and other ANOVA test for independence.
7. Understand and utilize the formulae of Logarithm, Permutation and Combination, Area and Volume

**Unit 1: Data Collection and presentation (10 hrs)**

- Sampling methods
- Random and non-random sampling
- Graphical presentation of data

**Unit 2: Probability distributions (10 hrs)**

- Concept of probability
- Laws of probability
- Normal distribution
- Binomial distribution

**Unit 3: Measures of central tendency and dispersion (10 hrs)**

- Characteristics of a good average
- Mean, median and mode
- Measures of dispersion-
- Range, mean deviation, standard deviation, variance

**Unit 4: Hypothesis testing (10 hrs)**

- Tests of hypothesis
- Types of hypothesis
- Tests of significance for small samples- student's t test, F test, Chi-sqaure test ANOVA test

**Unit 5: Logarithm, Permutation and Combination , Area and Volume (8 hrs)**

- Logarithm .
- Solving problems using the properties of Logarithm.

- Permutation and Combination.
- Area of sphere, Cone, Cylinder.
- Volume of sphere , Cone, Cylinder.

**TEXT BOOKS: -**

1. Digambar Patri, D. N. Patri, Statistical Methods, Kalyani Publications.
2. R. S. Agarwal, Quantitative Aptitude, S. Chand and Company, New Delhi.

**REFERENCE BOOKS:-**

1. Prof. H. R. Vyas, Business Statistics, B.S. Shah Prakashan.
2. Nabendu Pal, Sabaded Sarkar, Statistics concepts and Applications, Prentice Hall of India.
3. J. N Kapur, H. C Saxena, Mathematical Statistics, S. Chand & Company Ltd.
4. P.S.S. Sundar Rao, J.Richard, Introduction to BioStatistics and Research Method, PHI Learning Private Ltd.

<b>Semester – IV</b>			
<b>16UBCDA08</b>	<b>DSE Allied Practical - 4: Mathematics for Biologists Practical</b>	<b>2 hrs/wk</b>	<b>1 Credits</b>

**Objectives:-**

Upon completion of the course students will be able to

1. Understand and interpret data using graphing tools.
2. Represent the data pictorially and derive information from the figures.
3. Calculate areas and volumes of geometric shapes including sphere , cone, cylinder.
4. Utilize software including Excel and Scilab to process given data and derive useful and meaningful information.

**List of Practical**

1. Problems based on probability, Normal distribution and Binomial distribution.
2. Plotting of Graphs of trigonometric, exponential and logarithmic function.
3. Problems based on properties of Logarithm.
4. Introduction to Microsoft Excel as tool for graphical representation of data.
5. Plotting of given data using Microsoft Excel-1.
6. Plotting of given data using Microsoft Excel-2.
7. Problems based on variance and standard deviation manually and using MS Excel.
8. Introduction to Scilab.
9. Plotting of data and functions using Scilab-1.
10. Plotting of given data using Microsoft Excel-2.
11. Problem based on ANOVA.
12. Problems based on Permutation and Combination-1.
13. Problems based on Permutation and Combination-2.
14. Problems based on Area of sphere, cone, cylinder.
15. Problems based on volume of sphere , cone, cylinder.
16. Problems based on mean, median, mode.

**TEXT BOOKS: -**

1. Digambar Patri, D. N. Patri, Statistical Methods, Kalyani Publications.
2. Bill Jelen (Author), Excel 2013 Charts and Graphs Pearson Pub. Co. – 2013
3. Jean-Philippe Chancelier, Michel de Lara cermics, Introduction to Scilab, September 6, 2006

**REFERENCE BOOKS:-**

1. Vook (Author), Microsoft Excel Charts and Graphs: The How-To Guide.
2. J. N Kapur, H. C Saxena, Mathematical Statistics, S. Chand & Company Ltd.