FYUGP MULTIDISCIPLINARY COURSE

Course Title: Statistical Methods	**L**	**T**	**P**	**S**	**Multidisciplinary**
Course Code: DOMS100MD	**3**	**x**	**x**	**x**	**Max Marks**: 100
Credits: 3					

Course objective: The students will get an overview of basic statistical concepts and measurements. The students will be able to manage quantitative and quantitative data materials and also will be able to calculate the descriptive statistics from real data sets, its presentation and interpretation. Finding linear correlation between two variates using different measures and studying their properties. Least square method of fitting of curves, regression lines and their elementary properties.

Course Outcomes: On completing the course, the student will be able to:

1. Use a wider range of summary measures available for data analysis.

2. Select and calculate appropriate measures of dispersion for data sets.

3. Establish the linear relationship between the two variables by using scatter plots and other correlation methods.

4. Regression Analysis is performed by using least square methodology

UNIT-I: Statistical Methods: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement nominal, ordinal, interval and ratio. Presentation: Diagrammatic and Graphical representation of data.

UNIT-II: Measures of central tendency: mean, median, mode. Measures of dispersion-range, mean deviation, quartile deviation, standard deviation and variance, coefficient of variation, Measure of Skewness- Karl-Pearson's and Bowley's methods. Measures of Kurtosis.

Unit III: Correlation Analysis - conceptual frame work .Methods of studying correlation-Scatter diagram, Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient.
Regression Analysis - definition and uses, Linear and Non-linear regression. Regression equations and regression coefficient, Properties of regression coefficient.

Text Books/ References:

1. Fundamentals of Statistics by S.C. Gupta
2. Fundamentals of Statistics by D.N. Elhance, V. Elhance B.M Aggarwal, Kitab Mahal
3. New Mathematical Statistics (A problem-Oriented First course) by Sanjay Arora & Bansi Lal.
4. Business Mathematics & Statistics, Asian Books Private Ltd. By A.P Verma.

Course Title: Fundamentals of Mathematics	**L**	**T**	**P**	**S**	**Multidisciplinary**
Course Code: DOMS150MD	**3**	**x**	**x**	**x**	**Max Marks**: 100
Credits: 3					

Course objective: This course provides a concise overview of essential concepts from algebra, matrix theory, and Python programming, equipping students with the mathematical foundations and computational skills required for advanced studies in data science, artificial intelligence, and allied fields.

Course outcomes: On completing the course, the student will be able to:

1. Use basic algebraic tools, such as functions, equations and inequalities to address mathematical problems related to data science, artificial intelligence and other allied sciences.
2. Use basic matrix theory principles including matrix operations, determinants and eigen values to model and tackle complex challenges.
3. Identify and fix mathematical knowledge gaps successfully bridging them to better prepare for challenging problems.
4. Students will be able to apply Python to model and solve basic mathematical concepts in a computational environment.

Unit-I: Sets, notation and types of sets, operation on sets, Introduction to Venn diagrams to illustrate set identities, subset relationships and application of Venn diagrams to understand Syllogistic arguments, Cartesian product of sets, relations and functions, domain, co-domain and range of a function, types of function (one-one, onto and bijective), real valued functions, domain and range of different types of functions, Linear and quadratic models and their graphical representation.

Unit-II: Introduction to logic, statements and propositions, logical connectives, conjunction (AND), disjunction(OR), negation(NOT), implication(IF-THEN), Biconditional (IF AND ONLY IF), truth tables, logical equivalences and laws(De Morgan's laws, distributive laws, associative laws, tautologies and contradictions).

Unit III: Introduction to counting principles, permutation and combinations, introduction to algebra, algebraic identities, linear equations in one and two variables and methods of solving, Introduction to matrices, types of matrices, operation on matrices, inverse of a matrix.

Textbooks/References:

1. Calculus, Early Transcendentals Seventh Edition Metric Version, Cengage Learning, Inc by James Stewart, 2010.
2. Basic Mathematics, Ist Edition, Springer by Serge Lang, 1998.
3. Linear Algebra and its Applications, Fourth Edition, Cengage India Private Limited by Gilbert Strang, 2005.
4. Calculus, 2nd edition, Wiley by Thomas M. Apostol, 1976.
5. Mathematics Volume I & Volume II, Oxford University press by A.K. Roy, 2005.