

DEPARTMENT OF MATHEMATICS

VALUE ADDED COURSE

R-PROGRAMMING

HOURS: 30

Course Outcomes:

1. To learn a new programming language, beginner in the field of data science.
2. To kindle the problem solving ability of the students in statistics.
3. To understand the concepts of vector and data types.
4. To get exposed with graphical representation of data.
5. To familiarize with R-syntax for solving different tests in statistics.

List of Practical

- i. Develop a R Programme to create vectors.
- ii. Develop a R Programme to create matrices.
- iii. Develop a R Programme using control statements.
- iv. Develop a R Programme to import spread sheet data into R.
- v. Develop a R Programme to calculate mean and median.
- vi. Develop a R Programme to calculate standard deviation.
- vii. Develop a R Programme to present the data in tabulation and graphical representation.
- viii. Develop a R Programme using chi-square test.
- ix. Develop a R Programme using student's t test.
- x. Develop a R Programme to calculate one way ANOVA.

Books for Reference:

1. Programming with R by S.R. Mani Sekhar, T.V. Suresh Kumar, Madhavi Kasa, Sunil Kumar S. Manvi, Cengage Learning India Pvt. Ltd, 2017
2. R for Statistics by Pierre-Andre Cornillon, Arnaud Guyader, Francois Husson, Nicolas Jegou, Julie Josse, Maela Kloareg, Eric Matzner-Lober, Laurent Rouvière, Chapman and Hall, 2012
3. Statistics with R Programming by Dr. Sandip Rakshit, McGraw Hill Education (India) Pvt. Ltd, 2018

VALUE ADDED COURSE

MATHIMATICA

HOURS: 30

Course Outcomes:

1. To understand the different mathematical concepts through mathematica.
2. To familiarize with mathematica syntax
3. To apply the built-in functions for solving mathematical problems.

List of Practical

1. Solving higher degree equations.
2. Solving system of equations by matrix method and find the eigen values and eigen vectors of a matrix of order 4 by 4 or #higher order#.
3. Solving system of non-linear equations.
4. Finding the differentiation of different functions of second and third derivatives.
5. Finding the Integration of different functions with limits.
6. Evaluation of double integrals and #triple integrals#.
7. Solving ordinary differential equations with initial condition.
8. Solving system of ordinary differential equations.
9. Creating and plotting 2-D and 3-D graphs.
10. Solving Linear programming problems.

Text Books:

T.B-1 : Eugene Don, *Mathematica*, Scham's Outline Series, Mc Graw Hill Publisher, New York. (2009)

T.B-2 : Pragathi Gautam and Swapnil Verma, *Practical Mathematica*, Ane Books Publisher (2019).

VALUE ADDED COURSE

MAPLE

HOURS: 30

Course Outcomes:

1. To understand the different concepts in mathematics through maple software.
2. To apply the built-in functions for solving linear and non-linear equations.
3. To compute Eigen values and vectors using maple software.
4. To solve transforms and initial value problems using maple.
5. To focus different graphical representation like plane, surfaces through maple.

List of Practical

1. Simple Programs using Mathematical constant
2. Programs using complex functions
3. Numerical solutions of nonlinear equations and systems
4. Solving nonlinear equations using bisection method
5. Solving nonlinear equations using Newton's method
6. Solving nonlinear equations using fixed point method
7. Solving nonlinear equations using secant method
8. Solving system of linear equations using Jacobi method
9. Programs using Mathematical Expressions
10. Program using Trigonometric and Hyperbolic Expressions
11. Programs using Operations on Functions
12. Programs using Matrix operations
13. Finding Eigenvalues and Eigenvectors
14. Plotting Points in the Plane and Space
15. Finding Secant and Tangent Lines
16. Analyse data using Central Tendency and Measures of dispersion and distributions
17. Solving LPP by graphical method
18. Find the Laplace integral transforms for different functions.
19. Find the inverse Laplace transforms for different functions.
20. Obtain the solution of the initial value problem

Text Book

Maple and Mathematica, A Problem Solving Approach for Mathematics *Second Edition*, Dr. Inna Shingareva & Dr. Carlos Lizárraga-Celaya, Springer Wien New York

VALUE ADDED COURSE

MATHEMATICS FOR COMPETITIVE EXAMINATIONS-I

HOURS: 30

Course Outcomes:

At the end of the course, student will be able to

CO.1.To understand the basic mathematical arithmetic operations.

CO.2.To recall the different types of numbers.

CO.3.To Kindle the problem solving ability of the students.

CO.4.To develop the logical thinking of the students.

CO.5.To nurture the fundamental Mathematical skills for preparing and cracking competitive examination.

UNIT I

6 hrs

Numbers-H.C.Fand L.C.M of Numbers-Decimal Fractions.

UNIT II

6 hrs

Simplification-Square Roots and Cube Roots-Average.

UNIT III

6 hrs

Problems on Numbers-Problems on Ages-Surds and Indices.

UNIT IV

6 hrs

Percentage-Profit and Loss - Ratio and Proportion- Partnership.

UNIT V

6 hrs

Chain Rule-Time and Work-Pipes and Cistern-Time and Distance-Problems on Trains

Books for Reference:

1. Quantitative Aptitude by R.S.Agarwal, Sultan Chand and Company Ltd, New Delhi,2012
2. Quantitative Aptitude for Competitive Examinations by Abhijit Guha, McGraw Hill Education,2011.

Web Reference:

1. <https://www.indiabix.com/aptitude/questions-and-answers/>
2. <http://placement.freshersworld.com/aptitude-questions-and-answers>

VALUE ADDED COURSE

MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II

Hours: 30

Course Outcomes:

At the end of the course, student will be able to

CO.1.To Kindle the problem solving ability of the students.

CO.2.To develop the logical thinking of the students.

CO.3.To understand the different types mathematical concepts.

CO.4.To utilize the aptitude problems in real life situations.

CO.5.To nurture the fundamental Mathematical skills for preparing and cracking competitive examination.

UNIT I **6 hrs**

Boats and Streams-Mixture-Simple Interest-Compound Interest.

UNIT II **6 hrs**

Logarithms-Area-Volume and Surface Areas.

UNIT III **6 hrs**

Races and Games of Skill-Calendar-Clocks.

UNIT IV **6 hrs**

Stocks and Shares - Permutations and Combinations-Probability.

UNIT V **6 hrs**

True Discount-Banker's Discount - Heights and Distances - Odd Man Out and Series

Books for Reference:

1. Quantitative Aptitude by R.S.Agarwal, Sultan Chand and Company Ltd, New Delhi,2012
2. Quantitative Aptitude for Competitive Examinations by Abhijit Guha, McGraw Hill Education,2011.

Web Reference:

1. <https://www.indiabix.com/aptitude/questions-and-answers/>
2. <http://placement.freshersworld.com/aptitude-questions-and-answers>