SEMESTER I
ALLIED – I : PAPER – I
STATISTICS FOR MATHEMATICS – I

Instructional Hrs. : 105   **Sub.code : 15MCUA101**

Max.Marks : CIA – 25 ; ESE – 75   **Credits : 5**

Objective :

- To study about the random variables.
- The students will be able to apply statistical tools in real-life problems as well as research problems.
- The contents of this paper is a prerequisite for learning SPSS package.

UNIT I   **21 Hrs.**

Random Variables : Random Variable - Cumulative Distribution Function - Continuous Random Variable - Two Dimensional Random Variable - Marginal Probability Distribution - Conditional Probability Distribution – Independent Random Variables.

UNIT II   **21 Hrs.**

Characteristics of Distributions: Expectation or Mean Value – Function of a Random Variable – Properties of Expected Values. Variability (or dispersion) – Properties of Variance – Sample Mean and Sample Variance – Mean and Standard Deviation of the Combination of two Samples – Frequency Table – Tchebechev's Inequality.

UNIT III   **21Hrs.**

Characteristics of Distribution: Moments – Moment Generating Function – Measures of Dispersion – Skewness – Kurtosis – Covariance – Correlation – Sample Correlation Coefficient – Correlation for a grouped data – Rank Correlation.

UNIT IV   **21Hrs.**

Least Squares and Regression Analysis: Curve Fitting – Principle of Least Square – Fitting a Straight Line – Fitting a Second Degree Polynomial – To Fit a Curve of the form $y=ae^{bx}$, $y=ab^x$ $y=ax^b$ – Regression of First Kind – Regression of Second Kind – Scatter Diagram – Lines of Regression – Regression line of Y on X – Properties of Regression Coefficient – Angle between the Regression Lines.

UNIT V   **21Hrs.**

Discrete Distributions & Continuous Distributions: Binomial Distribution - Poisson Distribution – Continuous Distribution: Normal Distribution.

Note: *Italics* **denotes Self Study Topics**

TEXT BOOK:

1   S.Venkataraman, P.R.Vittal., Mathematical Statistics.

Unit	Chapter	Section	Page
I	2	2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8	39-79
II	3	3.1, 3.2, 3.3, 3.4 to 3.8	73-110
III	3	3.8 to 3.19(except 3.11)	111 – 121 &131 - 157
IV	11	11.1 to 11.4, 11.7 to 11.14	379 to 405
V	4 & 5	4.1, 4.2, 5.1	163 - 198 &203 - 229

- Question Paper setters are asked to confine to the above **text book only.**

SEMESTER - II

CORE PAPER - IV

TRIGONOMETRY AND VECTOR CALCULUS

Instructional Hrs. 75   **Sub. Code: 15MSUC204/ 15MCUC204**

Max. Marks: CIA -20; ESE -55   **Credits: 4**

Objective: This paper deals with expansion of trigonometric functions, line integral, surface integral and volume integral.

UNIT I   **15 Hrs.**

Expansions and Hyperbolic Functions: Expansion of $\cos n\phi$, $\sin n\phi$, $\cos^n \phi$, $\sin^n \phi$ - *Hyperbolic functions* – Separations of real and imaginary parts of $\sin(\alpha + i\beta)$,

$\cos(\alpha + i\beta)$, $\tan(\alpha + i\beta)$, $\sinh(\alpha + i\beta)$, $\cosh(\alpha + i\beta)$, $\tanh(\alpha + i\beta)$, $\tan^{-1}(\alpha + i\beta)$.

UNIT II   **15 Hrs.**

Logarithm of a complex number and Summation of Series: Logarithm of a complex number – Summation of trigonometric Series – *When angles are in A.P. - method of Differences.*

UNIT III   **15 Hrs.**

Differentiation of Scalar and Vector Point Functions: Scalar and Vector functions – Level Surfaces – Directional derivative of a Scalar Point function - -Gradient of a Scalar Point function – Summation notation for gradient – Gradient of *f(r)* – Divergence and curl of a vector point function – Summation notation for divergence and curl – Laplacian differential operator – Other differential operators – Divergence and curl of a gradient – *Divergence and curl of a curl* – Examples.

UNIT IV   **15 Hrs.**

Integration of Scalar and Vector Point Functions: Line integrals – Independence of path of integration – Conservative field and scalar potential – *Line integral of a conservative vector –* Surface integrals – Volume integrals – Cylindrical and Spherical polar coordinates – Examples.

UNIT V   **15 Hrs.**

Integral Theorems: Integral theorems – Gauss' Divergence theorem – Integral theorems derived from the Divergence theorem – Green's theorem in plane – Stoke's theorem – Integral theorems derived from Stoke's theorem – *Operational meanings of $\nabla, \nabla., \nabla \times$ in terms of surface integrals –* Examples.

Note: *Italics* **denote Self Study Topics**

TEXT BOOKS

1. **P. Duraipandian, Kayal Pachaiappa,** *Vector Analysis*, S.Chand &Co., 1st Edition 2014.
2. **S. Narayanan** and **T.K.Manicavachagam Pillay,** C*alculus*,Vol. III, S. Viswanathan Publishers, 18th Edition 2002.
3. **S.Narayanan** and **T.K .Manicavachagam Pillay.**, Trigonometry**,** S. Viswanathan Publishers, 2004.

REFERENCE BOOKS

1. **M.L**.**Khanna**, *Trigonometry,* Jai Prakash Nath & Co., Educational Publisher, 14th Edition 1993.
2. **M.D**.**Raisinghania**, **H.C.Saxena**, **H.K.Dass**, *Simplified Course in Trigonometry,* S.Chand and Company Ltd., 1st Edition1999.
3. **M.D**. **Raisinghania,** *Vector Calculus*, S.Chand and Company Ltd., 3rd Edition, 1997.

- Question paper setters are asked to confine to the above **text books** only.

SEMESTER - III

Core Paper - VIII

C-PROGRAMMING (PRACTICAL)

Instructional Hrs : 45   **Sub. Code : 15MCUCP01**

Max. Marks : CIA – 40; ESE – 60   **Credits : 2**

Objective : On successful completion of this course (with practicals) the students should have

gained knowledge about developing an algorithm using C programming language..

1. Write a program to find the sum, average, standard deviation for a given set of number.

2. Write a program to find the number of palindromes in a given sentence.

3. Write a program to generate 'n' prime numbers.

4. Write a program to multiply 2 matrices.

5. Arrange a set of numbers in ascending order using Quick sort.

6. Arrange a set of numbers in descending order using Heap sort.

7. Write functions for the following Stack operations

       1) Push

       2) Pop

       3) List stack

8. Write a program to print the Student's mark sheet assuming R.No, name, marks in the 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.

9. Write a program which takes file as command line argument and copy it to another file. At the end of the second file (i) no. of chars (ii) no. of words and (iii) no. of files.

SEMESTER - IV

Core Paper X

OBJECT ORIENTED PROGRAMMING WITH C++ (PRACTICAL)

Instructional Hrs : 45   **Sub. Code : 15MCUCP02**

Max. Marks : CIA – 40 ; ESE – 60   **Credits : 2**

Objective : On successful completion of this course with practicals the students should have

gained knowledge about developing an algorithm using C++ Programming

Language.

Objects and Classes

1.   Create a class to implement the data structure stack. Write a constructor to initialize the top of the stack to zero. Write a member function Push( ) to insert an element and member function Pop( ) to delete an element. Check for overflow and underflow conditions.

2.   Create a class Arith which consists of a float and an integer variable. Write member functions Add( ), Sub( ), Mul( ), Div( ), Mod( ) to perform addition, subtraction, multiplication, division and modulus respectively. Write member functions to get and display values.

Operator Overloading

3.   Create a class mat has a 2–D matrix and R & C represents the rows and columns of the matrix. Overload the operators +, -, * to add, subtract and multiply two matrices. Write member function to get and display mat object values.

4.   Create a class string. Write member function to initialize, get and display strings. Overload the operator + to concatenate two strings, = = to compare two strings and a member function to find the length of the string.

Inheritance

5.   Create a class shape which consists of two virtual functions Cal area ( ) and Cal peri ( ) to calculate area and perimeter of various figures. Derive three classes Square, Rectangle and Triangle from the class Shape and calculate Area and Perimeter of each class separately and display the result.

6.   Create two classes which consist of two private variables, one integer and one float variable in each class. Write member functions to get and display them. Write a friend function common to both classes which takes the object of the above two classes as arguments and the integer and float values of both the objects separately and display the result.

Console I/O

7.   Write a user-defined function Userfun( ) which has the formatting commands like setw( ), showpoint( ), showpos( ), precision( ). Write a program which prints a multiplication table and uses Userfun( ) for formatting.

Files

8.   Write a program which takes a file as argument and copies into another file line numbers using command line arguments.

ANALYTICAL GEOMETRY

Instructional Hrs: 90   **Sub. Code: 15MCUC411**

Max. Marks: CIA – 25; ESE – 75   **Credits: 5**

Objective:

Students are exposed to the Fundamental Aspects of Two and Three

Dimensional Analytical Geometry and it Develops Logical and Systematic

Computational Skills.

UNIT I   **18Hrs**

Analytical geometry of two dimensions: Polar Coordinates – Equation of a Conic - Directrix – Chord – Tangent – *Normal* – Some Properties of General Conic - Simple Problems.

UNIT II   **18Hrs**

Analytical geometry of three dimensions : Straight Lines – Coplanarity of Straight Lines – Shortest Distance (S.D) and Equations of S.D between Two Lines – Line Intersecting a given Line – *Lines of Intersection of Three Planes* - Simple problems.

UNIT III   **18Hrs**

Sphere: Standard Equation of Sphere – *Results Based on the Properties of a Sphere* – Tangent Plane to a Sphere – Equations of a Circle.

UNIT IV   **18Hrs**

Cone and Cylinder: Cone whose Vertex is at the Origin – Enveloping Cone of a Sphere – *Right Circular Cone* – Equation of a Cylinder –Right Circular Cylinder.

UNIT V   **18Hrs**

Conicoids : Nature of a Conicoids – Standard Equation of a Central Conicoid – Enveloping Cone – Tangent Plane – *Conditions for Tangency* – Director Sphere and Director plane*.*

Note: *Italics* **denotes Self Study Topics**

TEXT BOOKS

1.   **Duraipandian P., Laxmi Duraipandian, Muhilan D.,** *Analytical Geometry – 3 dimentsional,* Emerald Publishers, Revised Edition, 1986.

2.   **Manicavachagom Pillay T.K., Natarajan T.,** *Analytical Geometry,* S. Viswanathan (Printers & Publishers), Pvt., Ltd., 14th Edition, 2006.

REFERENCE BOOKS

1**.**   **Barnett Rich revised by Philip A. Schmidt,** *Geometry,* Tata MCGraw Hill Publishing Company Limited, 3rd Edition.

2.   **Duraipandian P., Laxmi Duraipandian, Muhilan D.,** *Analytical Geometry – 2 dimentsional,* Emerald Publishers, Revised Edition, 1983.

3.   **Sharma A.K.,** *Text book of 3D, Sphere, Cone and Cylinder,* Discovery Publishing House, 1st Edition, 2005.

- Question paper setters confine to the above text books only.

SEMESTER - V
Core Paper - XIV
VISUAL BASIC (PRACTICAL)

Instructional Hrs: 30   **Sub. Code: 15MCUCP03**

Max. Marks: CIA – 10; ESE – 15   **Credits: 2**

Objective: On Successful Completion of this Practical Course the Students should have

Gained Knowledge in Writing the Programs with Library Fuctions, Combo

Box, Timer Control, Scroll Box, Menus, Input Box and Procedures.

1. In VB, create a project that displays the current data and time. Use VB variable Now and the Format Library functions.

2. Write a program to enter and display text. Use text box and command button.

3. Write a program to convert temperature from Fahrenheit to Centigrade or vice – versa.

4. Write a program to select any one from a list. U combo box to display choices.

5. Write a program to calculate factorial of a given number.

6. Write a program to illustrate the use of Timer control.

7. Write a program to illustrate the usage of scroll bars.

8. Write a program to illustrate the usage of Dropdown menus.

9. Write a program to illustrate the usage of menu enhancement.

10. Write a program to illustrate the usage of pop-up menu.

11. Write a program to illustrate the usage of input boxes.

12. Write a program to find smallest of n numbers.

13. Write a program to find the sine of angle.

14. Write a program to sort list of numbers.

15. Write a program to determine deviations about an average.

SEMESTER – V
CORE PAPER - XV
OPERATIONS RESEARCH

Instructional Hrs: 75   **Sub. Code: 15MCUC515**

Max. Marks: CIA -25; ESE -75   **Credits: 5**

Objectives: Operations Research Deals Mainly with Mathematical Modeling and Formulating Real Life Problems into Mathematical Models. It also Provides Methods of Solving such Models. Hence, it makes the Students to Apply their Mathematical Knowledge in Real Life Situations.

UNIT I   **15Hrs.**

Linear Programming Problem: Mathematical Formation of the Problem– Graphical Solution – Simplex Method – *Two Phase Simplex Method*.

UNIT II   **15Hrs.**

Linear Programming Problem: Clarnes's Method of Penalities – Duality in Linear Programming & *Dual Simplex Methods*.

UNIT III   **15Hrs.**

Transportation Problem: Initial Basic Feasible Solution – North-West Corner Rule – *Least Cost Method* – Vogel's Approximation Method – Optimum Basic Feasible Solution – Modi Method.

Assignment Problem: Introduction – Mathematical Formulation Hungarian Assignment Method – Maximization in Assignment Problem – Unbalanced Assignment Problem – Prohibited Assignment.

UNIT IV   **15Hrs.**

Queuing Theory: Elements of Queuing System – Prohability Distribution Queuing System – *Poisson Queuing System* – Single Channel Model:

        (i)   Model $\{(M/M/1): (\infty/FIFO)\}$,

        (ii)   Model $\{(M/M/1):(N/FIFO)\}$

UNIT V   **15Hrs.**

Dynamic Programming: Introduction – Recursive Equation Approach – *Characteristics of DPP* – Dynamic Programming Algorithm – Solution of LPP by Dynamic Programming.

Note : *Italics* **denotes Self Study Topics**

TEXT BOOK

1.   **Kantiswarup, Gupta P.K, Man Mohan,** *Operations Research***,** Sultan Chand & Sons, New Delhi, 14th Edition, 2009.

REFERENCE BOOKS

1. **Frederick Hillier, Gerald J Liberman,** *Introduction to Operations Research* **,** Tata McGraw Hill Publications Company Ltd., New Delhi, 5th Edition, 1990.
2. **Hamdy A.Taha,** *Operations Research: An Introduction*, Prentice Hall of India Pvt. Ltd., 7th Edition, 2003.
3. **Sharma J K,** *Operations Research: Problems and Solutions*, Macmillan India Ltd., 3nd Edition, 2009.

- Question paper setters confine to the above text book only.

SEMESTER -VI
Core Paper - XVIII
INTERNET AND JAVA PROGRAMMING (PRACTICAL)

Instructional Hrs: 45   **Sub. Code: 15MCUCP04**

Max. Marks: CIA – 10; ESE – 15   **Credits: 1**

Objective: On successful Completion of this Practical Course the Students should have

Gained Knowledge about Java Evolution, Classes, Objects and Methods,

Packages and Applet Programming.

HTML:

1.   Create a program using HTML to display the ordered list and unordered list of department store .

2.   Create a program to display images and text using HTML tag for an, advertisement of a company products

3.   Create a table to display list of products using HTML tags.

JAVA:

4.   Write a program that will accept command line argument and print the same.

5.   Write a program to display the months of your. The months of the year should be held in an array.

6.   Write a program that has overload methods. The first method should accept no arguments, the second method will accept one string and the third method will accept a string and an integer. The first method should display the message "Rose is a beautiful flower" twice. The second method should display the message "sun flower is a beautiful flower" twice. The third method should display the message "Marigold is a beautiful flower" four times.

7.   Write a program to sort the elements of an array in ascending order.

8.   Create a class called, Numeral that accepts an array of ten numbers. Create a sub class called Numplay which has a menu as follows.

    a. Display numbers entered.

    b. Sum of the numbers.

    c. Average of the numbers.

    d. Maximum of the numbers.

    e. Minimum of the numbers.

9.   Create an applet to obtain the list of fonts available with the current java working environment.

10.   Create an interface called Variable Test which contains a method disp( ) and two variables x, y which are integers and whose value is set as 10 and 20. Create a class called VarIntTest which implements this interface. The disp( ) method should display a message "Inside interface – Variable Test and method disp". Write a method called display ( ) within VarIntTest class prints the value of x.

11.   Create two threads, one of the threads has to print even numbers and another should print odd numbers.

12.   Write a program to display the course name, fees and the duration using a String Tokenzier class.

SEMESTER - VI

PRACTICAL – MATLAB, SPSS AND MICROSOFT MATH 3.0

Instructional Hrs: 45   **Subject Code: 15MCUCP05**

Max.Marks: CIA- 40; ESE-60   **Credits :3**

MATLAB :

1. Write a program to find the following for the matrices
   (i)Sum (ii) Product (iii) Determinant (iv) Sum of the diagonal (v) 2nd row of the transpose.

2. Write a program to
   (i)Find the Eigen values, Eigen vectors & Inverse for a given matrix.
   (ii)Check whether the given matrix is orthogonal.

3. Write a program to find the solution of a given system of equations by LU Decomposition method.

4. Write a program to solve the given system of equations by using Gaussian Elimination method.

5. Write a program to find the value of
   (i) $Sin(x)$ and $Sinh(x)$ (ii) $Cos(x)$ and $Cosh(x)$ (iii) $\tan(x)$ and $\tanh(x)$ for $x = 0, \frac{\pi}{2}, \pi$

6. Write a program to find the zero of the function $x^2 - sinx$ at $x = \frac{\pi}{4}$

7. Write a program to evaluate the following (i) Single Integral (ii) Double Integral with finite limits.

8. Write a program to solve Lagrangian polynomial for the given data.

9. Write a program to solve the first and second order differential equations.

SPSS:

10. Write a program to find the following for the numerical data
    (i) Mean   (ii) Median (iii) Harmonic Mean (iv) Geometric Mean (v) Variance and Standard Deviation.

11. Write a program to find the probability function by using

    (i) Binomial Distribution (ii) Poisson Distribution (iii) Normal Distribution.

12. Write a program to create a database, present the data through charts and diagrams and summarize the data using frequencies.

13. Write a program to apply T- test for an analysis of (i) One sample (ii) Independent samples (iii) Paired samples.

14. Write a program to analysis means of different variables by using one way ANOVA table.

15. Write a program to fit a (i) straight line (ii)Exponential.

MICROSOFT MATH 3.0

16. Write a program to check whether the given function is (i) continuous (ii)Differentiable (iii) Analytic.