

ALLIED COURSES
(For Physics & Chemistry)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI - 614016
(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Course-I

(For B.Sc., Data Science and B.Sc., Physics & Chemistry)

Semester: I - AC – I: Algebra and Calculus

Ins. Hrs./Week:3

Course Credit:3 Course Code: U26AMM101

COURSE OBJECTIVES:

- To Understand matrix operations and applications
- To Solve systems using matrices and eigenvalue methods
- To Apply differentiation techniques to mathematical problems
- To Evaluate integrals using standard methods and formulas
- To Solve ordinary differential equations systematically

UNIT -I: Matrices

(9 Hours)

Formation of Matrices—Special types of matrices – Scalar multiplication of a matrix – Equality of matrices - Addition of matrices – Subtraction – Symmetric matrix – Skew symmetric matrix – Hermitian and Skew Hermitian matrices – Multiplication of matrices – Inverse matrix – Related problems.

UNIT –II: Matrices (Continued....)

(9 Hours)

Inner product – Solution of simultaneous equations – Rank of a Matrix – Linear dependence and independence of vectors - Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) – Simple Problems

UNIT–III: Differentiation

(9 Hours)

Basic Formulae on Differentiation - Maxima & Minima – Concavity, Convexity – Points of inflexion- Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT-IV: Integration

(9 hours)

Basic Formulae on Integration – Integration of rational algebraic functions – integration of irrational functions - Evaluation using Integration by parts – Properties of definite integrals –Reduction formula 1) $\int x^n e^{ax} dx$ 2) $\int \sin^n x dx$ 3) $\int \cos^n x dx$ (n being a positive integer) – Related Problems.

UNIT- V: Differential Equations

(9 Hours)

Formation of Differential Equations - Linear Equations – Second order of types

$(aD^2 + bD + c)y = F(x)$ where a, b, c are constants and $F(x)$ is one of the following

(i) e^{ax} (ii) $\sin(ax)$ or $\cos(ax)$ (iii) x^n , n being an integer (iv) $e^{ax}f(x)$.

UNIT-VI: Current Contours (For Continuous Internal Assessment Only – self-study)

Addition of matrices – Subtraction – Symmetric matrix – Skew symmetric matrix

Total Lecture Hours – 45

COURSE OUTCOME

After the completion of the course, students should be able to,

1. Find the solutions of transformation of equation by increasing and decreasing roots.
2. Analyze vector dependence and matrix characteristics.
3. Understand the concept of maxima and minima and partial differential equation.
4. Understand the different types of Integral Equations and their properties.
5. Perform the problems in different methods of Differential Equations.
6. Identify symmetric and skew-symmetric matrices and perform matrix operations.

TEXT BOOK(S)

1. Manicavachagam Pillai. T.K & Others. 2008. Algebra Volume II. Revised Editions. S.V Publications, Chennai.
2. Narayanan. S, Manicavachagam Pillai.T.K. 2008. Calculus Volume I. S. Viswanathan Pvt. Limited, Chennai.
3. Narayanan.S, Manicavachagam Pillai.T.K.2008.Calculus Volume II. S.Viswanathan Pvt. Limited, Chennai.
4. Narayanan.S, Manicavachagam Pillai.T.K.2003.Differential Equations. S.Viswanathan Pvt. Limited, Chennai.

UNIT – I Chapter 2: Sec. 1 to 8 of [1].

UNIT – II Chapter 2: Sec. 9 to 16 only of [1].

UNIT – III Chapter 5: Sec. 1, 2 of [2].

Chapter 8: Sec. 1.1, 1.3 and 1.6 of [2].

UNIT – IV Chapter 1: Sec. 7.3, 8, 9, 11, 12, 13.1, 13.3, 13.4 of [3].

UNIT – V Chapter 5: Sec. 1, 2, 3 and 4 of [4].

REFERENCE BOOK(S)

1. Arumugam, Issac 2007. Allied Mathematics. New Gamma Publishing House, Palayamkottai.
2. Khanna M.L. 2004. Differential Calculus. Jai prakash Nath and Co., Meerut.
3. Khanna M.L. 1994. Integral Calculus. 19 th Edition. Jai Prakash Nath & Co. Meerut.

4. Sannu Rahi. 2009. Algebra. Tata McGraw Hill Publishing Company Limited, NewDelhi.
5. Singh U.P, Srivastava R.J, Siddiqui N.H. 2003. Calculus. Dominant Publishers andDistributors, New Delhi.

E.RESOURCES

- 1.<https://nptel.ac.in>
- 2.<https://ocw.mit.edu>
- 3.<https://www.khanacademy.org>
- 4.<https://tutorial.math.lamar.edu>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	1	3	1	2	2	2	3	2	1
CLO2	3	2	1	2	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	1	2	1	2	1	3	2	3	2	1
CLO4	2	1	2	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1
CLO6	3	2	2	1	2	1	1	1	3	3	2	2	1

Strong: 3

Medium: 2

Low: 1



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(AUTONOMOUS)**

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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Practical – I

(For B.Sc., PHYSICS , CHEMISTRY AND DATA SCIENCE)

Semester: I- AP-I: Algebra and Calculus with MATLAB Programming Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMM102P

COURSE OBJECTIVES:

- Understand the fundamental concepts of matrices and their applications in solving mathematical problems.
- Apply matrix operations, eigenvalues, eigenvectors, and rank concepts to solve systems of equations.
- Develop proficiency in differential calculus, including maxima, minima, and partial differentiation.
- Solve integration problems involving algebraic, irrational, and trigonometric functions using standard techniques.
- Analyze and solve ordinary differential equations arising in mathematical and engineering applications.

LIST OF PRACTICALS

1. Matrix Addition and Subtraction Method
2. Matrix Multiplication and Inverse Matrix Method
3. Rank and Linear Dependence Method
4. Eigenvalue and Eigenvector Method
5. Differentiation and Partial Differentiation Method
6. Maxima, Minima and Point of Inflection Method
7. Integration by Substitution and Partial Fractions Method
8. First-Order Linear Differential Equation Method

Total Lecture Hours – 45

COURSE OUTCOME

After the completion of the course, students should be able to:

1. Perform basic matrix operations and identify different types of matrices.
2. Determine rank, eigenvalues, eigenvectors, and solve systems of linear equations using matrices.
3. Apply differentiation techniques to solve problems involving maxima, minima, partial derivatives, and total differentials.
4. Evaluate definite and indefinite integrals using standard integration methods and reduction formulae.
5. Formulate and solve ordinary differential equations of first and second order.
6. Utilize MATLAB software to implement mathematical algorithms and solve problems involving matrices, calculus, and differential equations.

TEXT BOOK(S)

1. Bali N.P and Manish Goyal, 2021, A Text book of Engineering Mathematics, 10th Edition Laxmi Publications.
2. Grewal B.S, 2022, Higher Engineering Mathematics, Khanna Publications.

REFERENCE BOOK:

1. **Attaway, S.**, *MATLAB: A Practical Introduction to Programming and Problem Solving*, 7th Edition, Elsevier, 2024.
2. **Chapman, S. J.**, *MATLAB Programming for Engineers*, 7th Edition, Cengage Learning, 2023.
3. **Palm III, W. J.**, *Introduction to MATLAB for Engineers*, 4th Edition, McGraw-Hill Education, 2020.
4. **Hahn, B. D. & Valentine, D. T.**, *Essential MATLAB for Engineers and Scientists*, 8th Edition, Academic Press, 2023.
5. **Moore, H.**, *MATLAB for Engineers*, 6th Edition, Pearson Education, 2022.

E_RESOURCES

1. <https://www.google.com/amp/s/dokumen.tips/amp/documents/free-download-here-manickavasagam-pillai-volume-1pdf-free-download-here-algebra.html>
2. https://www.academia.edu/19646465/Analytical_solid_geometry_Shanti_Narayan
3. http://fhscastormath.weebly.com/uploads/1/2/4/7/12476962/chapter11_precal.pdf
4. <https://ncert.nic.in/textbook/pdf/lemh205.pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	2	3	2	3	1	1	1	1	2	3	2	2
CLO2	3	2	3	2	3	1	1	1	1	2	3	2	2
CLO3	3	3	3	2	3	1	1	1	1	2	3	3	2
CLO4	3	2	2	2	3	1	1	1	1	2	3	2	2
CLO5	3	3	2	3	3	1	1	2	2	2	3	2	2
CLO6	3	3	2	3	3	1	1	1	1	2	3	3	2

Strong: 3

Medium: 2

Low: 1

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SUNDARAKKOTTAI, MANNARGUDI- 614016
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DEPARTMENT OF MATHEMATICS

Allied Course

(For B. Sc., Physics & Chemistry)

Semester: II – AC – II: Trigonometry and Fourier series

Ins.Hrs./Week: 3

Course Credit: 3

Course Code: U26AMM203

COURSE OBJECTIVES

- To understand the fundamental concepts of complex numbers, De Moivre's theorem, and their applications in trigonometric expansions and related problems.
- To study hyperbolic functions, their properties, relationships with circular functions, inverse hyperbolic functions, and the separation of real and imaginary parts of complex expressions.
- To develop knowledge of logarithms of complex numbers and apply various techniques such as summation of series, difference methods, and arithmetic progression methods in problem solving.
- To learn the theory of Fourier series and apply Fourier series expansions to periodic functions, including the analysis of odd and even functions.
- To understand and construct half-range sine and cosine series for representing functions over finite intervals and solve related mathematical problem.

UNIT-I : Demovier's Theorem for Rational Number (9 Hours)

Introduction on Number System - Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer)
– Related Problems–Expansion of $\sin^n\theta$, $\cos^n\theta$ – Related Problems – Expansion of $\sin\theta$, $\cos\theta$
and $\tan\theta$ in terms of powers of θ – Related Problems.

UNIT –II : Hyperbolic Functions (9 Hours)

Introduction on Hyperbolic functions – Results – Related Problems – Relation between Hyperbolic and Circular functions–Related Problems–Expansion of Inverse Hyperbolic functions–Related Problems–Separation of real and imaginary parts–Related Problems.

UNIT –III : Logarithm of a Complex Number (9 Hours)

Introduction - Logarithm of a complex number – Related Problems – Summation of a series – Related Problems – Difference Method – Related Problems – Angles in Arithmetic Progression method – Related Problems.

UNIT- IV : Fourier series (9 Hours)

Fourier Series – Definition – Related Problems – Fourier Series Expansion of Periodic Functions with period 2π – Definition – Related Problems – Odd and Even Functions – Definition– Properties of Odd and Even Functions – Related Problems.

UNIT –V : Half Range Fourier series (9 Hours)

Half range sine series – Definition – Related Problems - Half range cosine series – Definition – Related Problems.

Total Lecture Hours-45

UNIT-VI: CURRENT CONTOUR (For Continuous Internal Assessment Only):

Problems on Demoivre's theorem-Arithmetic Progression-Sine Series and Cosine Series.

COURSE OUTCOME

After the Completion of the Course, the students should be able to

1. Examine the expansion of $\sin n\theta$ and $\cos n\theta$ and its related problems.
2. Analyze the hyperbolic functions and its relation between hyperbolic and circular functions.
3. Describe the summation of series and its methods.
4. Apply the concept of Fourier series and familiarizes with odd, even Fourier series with their periodic functions.
5. Analyze the half range sine and cosine functions and its change of interval.
6. Analyze the Sine Series and Cosine Series for odd functions and even functions.

TEXT BOOKS

1. Arumugam S, Thangapandi Issac A and Somasundaram A. 1999. Trigonometry and Fourier Series. New Gamma Publications, Palayamkkottai.
2. Narayanan S and Manicavachagam Pillay. T.K 2014. Calculus Volume III. Viswanathan Publishing Company, Chennai.

UNIT-I	Chapter 1 : Sec. 1.2 to 1.3 of [1]
UNIT-II	Chapter 2 : Sec. 2.1 and 2.2 of [1]
UNIT-III	Chapter 3 : Sec 3.1 of [1] Chapter 4 : Sec. 4.1 & 4.2, 4.3 of [1]
UNIT- IV	Chapter 6 : Sec. 1 to 3 of [2]
UNIT- V	Chapter 6 : Sec. 4 & 5 of [2]

REFERENCE BOOK(S)

1. Dyke P.G 2001. An Introduction to Laplace Transforms and Fourier Series. Springer – Verlag, London.
2. Gelfand I.F. and Saul M. 2012. Trigonometry. Springer – Verlag, London.
3. Jain S.K. 2001. Fourier Series and Fourier Transforms. Sarup and Sons, New Delhi.
4. Rawat K.S. 2005. Trigonometry. Sarup and Sons, New Delhi.
5. Robert T Seeley. 2006. An Introduction to Fourier Series and Integrals. Dover Publications, New York.

E-RESOURCES

1. https://orion.math.iastate.edu/butler/PDF/trig_notes.pdf
2. <http://users.auth.gr/~siskakis/GelfandSaul-Trigonometry.pdf>
3. <https://lib.alfaisal.edu/pdf/AlgebraAndTrigonometry-LR.pdf>
4. <https://math.mit.edu/~gs/cse/websections/cse41.pdf>
5. <https://fenedebiyat.siirt.edu.tr/dosya/personel/uygulamali-matematik-siirt-201935221347541.pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	1	3	1	2	2	2	3	2	1
CLO2	3	2	1	2	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	1	2	1	2	1	3	2	3	2	1
CLO4	2	1	2	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1
CL06	3	2	2	1	1	3	2	2	2	1	1	2	1

Strong: 3 Medium: 2 Low: 1



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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Practical – II

(For B.Sc., Physics & Chemistry)

Semester: II- AP-II: Trigonometry and Fourier Series with SCILAB Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMM204P

COURSE OBJECTIVES:

- Apply De Moivre's theorem to obtain expansions of trigonometric functions and solve related problems.
- Evaluate hyperbolic and inverse hyperbolic functions, and establish relationships between circular and hyperbolic functions.
- Compute the logarithm of complex numbers, separate real and imaginary parts, and solve problems involving series summation.
- Determine Fourier series expansions of periodic functions and identify the properties of odd and even functions.
- Obtain half-range sine and cosine series expansions for functions defined on a finite interval and apply them in mathematical analysis.

LIST OF PRACTICALS

1. Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$.
2. Evaluate Hyperbolic Functions.
3. Evaluate Inverse Hyperbolic Functions.
4. Separate Real and Imaginary Parts of a Complex Number.
5. Logarithm of a Complex Number.
6. Half-range sine and cosine series for a given function.
7. Program for Fourier Series Coefficients.
8. Determine Fourier coefficients of simple periodic functions.

Total Lecture Hours – 45

COURSE OUTCOME

After successful completion of the course, the students will be able to:

1. Apply De Moivre's theorem to expand trigonometric functions and solve problems involving complex numbers.
2. Analyze hyperbolic functions, inverse hyperbolic functions, and their relationships with circular functions.
3. Evaluate logarithms of complex numbers and apply methods for summation of series.
4. Determine Fourier series expansions of periodic functions and identify the properties of odd and even functions.
5. Construct half-range sine and cosine series and apply them to solve problems arising in Physics and Chemistry.
6. Interpret and apply mathematical concepts to analyze periodic phenomena, wave motions, heat transfer, and other scientific problems encountered in Physics and Chemistry.

TEXT BOOK(S)

1. Arumugam S, Thangapandi Issac A and Somasundaram A. 1999. Trigonometry and Fourier Series. New Gamma Publications, Palayamkottai.
2. Narayanan S and Manicavachagam Pillay. T.K 2014. Calculus Volume III. Viswanathan Publishing Company, Chennai.

REFERENCE(S)

1. Dyke P.G 2001. An Introduction to Laplace Transforms and Fourier Series. Springer – Verlag, London.
2. Gelfand I.F. and Saul M. 2012. Trigonometry. Springer – Verlag, London.
3. Jain S.K. 2001. Fourier Series and Fourier Transforms. Sarup and Sons, New Delhi.
4. Rawat K.S. 2005. Trigonometry. Sarup and Sons, New Delhi. Robert T Seeley. 2006.
5. An Introduction to Fourier Series and Integrals. Dover Publications, New York.

E_RESOURCES

1. <https://www.siirt.edu.tr/dosya/personel/E-Numerical-siirt-2019217142654486.pdf>
2. https://sde.uoc.ac.in/sites/default/files/sde_videos/BSc_maths_numerical_methods.pdf
3. <https://www.scribd.com/document/815954921/Introductory-Methods-of-Numerical-Analys>
4. www.sultanchandandsons.com/Book/61/Fundamentals-of-Mathematical
5. [Logarithmic vals?utm_source=chatgpt.com](https://www.logarithmicvals.com/?utm_source=chatgpt.com)

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CLO1	3	2	3	1	1	2	2	2	1	1	3	2	2	3	2
CLO2	3	3	3	2	2	1	2	2	3	1	3	3	2	3	2
CLO3	3	2	3	2	1	2	2	2	1	1	3	3	3	3	2
CLO4	3	3	3	2	1	2	2	2	1	1	3	3	3	3	3
CLO5	3	2	2	1	2	1	2	2	1	1	3	3	3	3	3
CLO6	3	3	2	1	2	1	2	2	1	1	3	2	3	2	2

Strong: 3

Medium: 2

Low: 1

ALLIED COURSES

(For CS, AI & ML)



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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Course

(For B.Sc., CS , AI&ML)

Semester: I- AC-I: Numerical Analysis and Statistics

Ins. Hrs./Week:3

Course Credit: 3

Course Code: U26AMA101

COURSE OBJECTIVES:

- To understand the concepts of algebraic and transcendental equations and apply numerical methods for finding their roots.
- To learn numerical integration techniques such as Trapezoidal Rule and Simpson's Rules for approximating definite integrals.
- To develop the ability to solve ordinary differential equations using Taylor Series, Euler's method, and Runge-Kutta methods.
- To understand the measures of central tendency and apply them in the analysis and interpretation of statistical data.
- To study the concepts of correlation and regression and analyze relationships between variables using statistical Techniques.

.UNIT-I: Algebraic and Transcendental Equations

(9 Hours)

Introduction on Algebraic and Transcendental Equations - The Solution Algebraic and Transcendental Equations - Bisection method, Steps for finding roots of equations using bisection method-Newton Raphson method-Theory and problems.

UNIT-II:Numerical Integration

(9 Hours)

Basic Formulae on Integration-Numerical Integration: Trapezoidal Rule - Simpson's 1/3Rule, Simpson's 3/8-Rule.

UNIT-III: Solution of Ordinary Differential Equations

(9 Hours)

Formation of Ordinary Differential Equations - Method of finding Solution of ordinary differential equations by Taylor's Series -Formula for Euler's method- Runge Kutta Second and Fourth order method, Theory and Problems.

UNIT-IV : Measures of central tendency

(9 Hours)

Introduction on Measures of central tendency-Arithmetic Mean – Median – Mode – Definitions – Properties – Merits and Demerits of Mean, Median and Mode – Problems to find Mean, Median and Mode.

UNIT-V: Correlation and Regression

(9 Hours)

Introduction on Correlation – Definition-Properties of Simple Correlation – Karl Pearson's Correlation Coefficients Limits of Correlation Coefficients - Simple Problems – Regression: Definition - Regression coefficients –Properties of regression coefficient - Simple Problems only.

UNIT-VI: CURRENT CONTOUR (For Continuous Internal Assessment Only):

Applications of Solutions of Linear Programming Problem-Correlation and its types-Uses of Regression.

Total Lecture Hours-45

COURSE OUTCOME

After the completion of the course, the students should be able to:

1. Explain the concepts of algebraic and transcendental equations and apply the Bisection and Newton-Raphson methods to obtain numerical solutions.
2. Apply numerical integration techniques such as Trapezoidal Rule, Simpson's 1/3 Rule, and Simpson's 3/8 Rule to evaluate definite integrals.
3. Solve ordinary differential equations using Taylor Series, Euler's method, and Runge-Kutta methods.
4. Calculate and interpret measures of central tendency including Mean, Median, and Mode for statistical data.
5. Determine Karl Pearson's coefficient of correlation and interpret the degree and direction of relationship between variables
6. Compute regression coefficients and apply simple regression analysis to estimate and predict relationships between variables.

TEXT BOOK(S)

1. Sastry S.S. 2006. A First Course in Introductory Methods of Numerical Analysis, Fourth Edition, PHI Learning Private Limited, New Delhi.
2. Gupta S.C and Kapoor V.K. 2002, Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi.

UNIT- I Chapter 2: Sec. 2.1, 2.2, 2.5 of [1]

UNIT- II Chapter 3 : Sec. 3.1, 3.3(3.3.1&3.3.2), 3.6, 3.9.1 of [1]

UNIT -III Chapter 5 Sec. 5.4 (5.4.1, 5.4.2, 5.4.3) of [1]

UNIT- IV Chapter 2 Sec.2.4 to 2.7 of [2]

UNIT -V Chapter 2: Sec. 2.8, 2.9 of [2]

REFERENCE BOOK(S)

1. Arumugam S, Thangapandi Issac and Somasundaram A. 2012. Numerical Methods. Scitech Publications, Chennai.
2. David Kincaid, Ward Cheney. 1991. Numerical Analysis. Brooks/Cole Publishing Company, USA.
3. Jain M.K, Iyengar S.R.K and Jain R.K. 2001. Numerical Methods for Scientific and Engineering Computation. New Age International Private Limited, Bangalore.
4. Kapil Sharma. 2011. Statistical Methods. ABO Publishers, Jaipur, India.
5. Pillai R.S.N and Bagavathi. 2003. Practical Statistics. S Chand & Company Ltd. New Delhi.

E_RESOURCES

1. <https://www.siirt.edu.tr/dosya/personel/numerik-analiz-siirt-2019217142654486.pdf>
2. https://sde.uoc.ac.in/sites/default/files/sde_videos/BSc_maths_numerical_methods.pdf
3. <https://www.scribd.com/document/815954921/Introductory-Methods-of-Numerical-Analys>
4. www.sultanchandandsons.com/Book/61/Fundamentals-of-Mathematical-Statistics?utm_source=chatgpt.com

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CLO1	3	2	3	1	1	2	2	2	1	1	3	2	2	3	2
CLO2	3	3	3	2	2	1	2	2	3	1	3	3	2	3	2
CLO3	3	2	3	2	1	2	2	2	1	1	3	3	3	3	2
CLO4	3	3	3	2	1	2	2	2	1	1	3	3	3	3	3
CLO5	3	2	2	1	2	1	2	2	1	1	3	3	3	3	3
CLO6	2	3	3	2	3	3	3	3	2	2	2	3	3	2	3

Strong: 3

Medium: 2

Low: 1



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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

ALLIED PRACTICAL – I

(For B.Sc., CS , AI&ML)

Semester: I- AP-I: Numerical Analysis and Statistics with MATLAB Programming Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMA102P

COURSE OBJECTIVES:

- To introduce the fundamental concepts of numerical analysis and statistical methods.
- To develop skills in solving mathematical problems using numerical techniques and MATLAB programming.
- To apply numerical methods for solving equations, interpolation, integration, and differential equations.
- To analyze statistical data using descriptive statistics, correlation, regression, and probability distributions.
- To use MATLAB software for implementing numerical and statistical algorithms and interpreting results.

LIST OF PRACTICALS

1. Linear Interpolation
2. Newton – Raphson Method of Solving Equations
3. Trapezoidal Rule of Integration
4. Simpson's $1/3$ Rule of Integration
5. Runge-Kutta Second-Order Method of Solving Differential Equations
6. Euler's Method for Solving Differential Equations
7. Computation of Mean, Median, Mode and Standard Deviation
8. Correlation and Regression

Total Lecture Hours – 45

COURSE OUTCOME

After the completion of the course, the students should be able to:

1. Apply interpolation techniques to estimate unknown values from given data using MATLAB.
2. Solve algebraic and transcendental equations using the Newton–Raphson method.
3. Compute definite integrals using the Trapezoidal Rule and Simpson’s 1/3 Rule.
4. Solve ordinary differential equations using Euler’s Method and Runge–Kutta methods.
5. Calculate statistical measures, correlation, and regression using MATLAB.
6. Analyze Binomial, Poisson, and Normal distributions and interpret the results using MATLAB programming.

TEXT BOOK(S)

1. Etter, D.M., Kuncicky, D.C. and Moore, H., 2019. *Introduction to MATLAB*, 4th Edition, Pearson Education.
2. Venkatraman, M.K., 2001. *Numerical Methods in Science and Engineering*, 5th Edition, National Publishing Company, Chennai.
3. Kanetkar, Y.P., 2020. *Let Us C*, 18th Edition, BPB Publications, New Delhi.
4. Rajaraman, V., 2018. *Computer Oriented Numerical Methods*, PHI Learning Private Limited, New Delhi. Attaway, S., 2022. *MATLAB: A Practical Introduction to Programming and Problem Solving*, 6th Edition, Butterworth-Heinemann.

REFERENCE(S)

1. Jain, M.K., Iyengar, S.R.K. and Jain, R.K., 2012. *Numerical Methods for Scientific and Engineering Computation*, New Age International (P) Limited, New Delhi.
2. Froberg, C.E., 1985. *Introduction to Numerical Analysis*, 2nd Edition, Addison-Wesley Publishing Company.
3. Chapman, S.J., 2019. *MATLAB Programming for Engineers*, 6th Edition, Cengage Learning.
4. Gupta, S.C. and Kapoor, V.K., 2020. *Fundamentals of Mathematical Statistics*, 12th Revised Edition, Sultan Chand & Sons, New Delhi.
5. Sastry, S.S., 2012. *Introductory Methods of Numerical Analysis*, 5th Edition, PHI Learning Private Limited, New Delhi.

E_RESOURCES

1. <https://www.siirt.edu.tr/dosya/personel/numerik-analiz-siirt-2019217142654486.pdf>
2. https://sde.uoc.ac.in/sites/default/files/sde_videos/BSc_maths_numerical_methods.pdf
3. <https://www.scribd.com/document/815954921/Introductory-Methods-of-Numerical-Analys>
4. www.sultanchandandsons.com/Book/61/Fundamentals-of-Mathematical-Statistics?utm_source=chatgpt.com

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CLO1	3	2	3	1	1	2	2	2	1	1	3	2	2	3	2
CLO2	3	3	3	2	2	1	2	2	3	1	3	3	2	3	2
CLO3	3	2	3	2	1	2	2	2	1	1	3	3	3	3	2
CLO4	3	3	3	2	1	2	2	2	1	1	3	3	3	3	3
CLO5	3	2	2	1	2	1	2	2	1	1	3	3	3	3	3
CLO6	2	3	3	2	3	3	3	3	2	2	2	3	3	2	3

Strong: 3

Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Course
(For B.Sc., CS & AI & ML)

Semester: II- AC – II : Operations Research

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMA203

COURSE OBJECTIVES

- To understand the fundamental concepts, scope, models, and applications of Operations Research in decision- making and problem-solving.
- To formulate and solve Linear Programming Problems using graphical methods and the Simplex technique for optimal resource allocation.
- To develop the ability to analyze and solve transportation and assignment problems using appropriate optimization algorithms.
- To apply sequencing techniques for scheduling jobs and machines in order to minimize processing time and improve operational efficiency.
- To understand network analysis techniques such as PERT and CPM for project planning, scheduling, monitoring, and resource management.

UNIT-I : Operations Research

(9 Hours)

Introduction of Operations Research - Scope of Operations Research – Phases of Operations Research-Models in Operations Research-Advantages of a Model-Characteristics of a Good model –Classification of Models-Uses and limitations of Operations Research-Operation Research and Decision Making-Linear Programming-General Formulation of Linear Programming Problem - Graphical solution of two variables – Matrix form of linear programming problem.

UNIT – II : Simplex Method

(9 Hours)

Simplex Method– Basic Definitions - Simplex Method Algorithm - Simplex Method for less than or equal to ($\leq$), equal to ($=$) and greater than or equal to ($\geq$) constraints – Big M Method - Big M Method Algorithm – Problems.

UNIT –III : Transportation Problem and Assignment problem

(9 Hours)

Transportation Problem –Introduction and mathematical formulation of Transportation Problem – To find the initial basic feasible solution using (i) North West Corner Method (ii) Least Cost Method (iii) Vogel's Approximation Method - Unbalanced Transportation problem-Assignment Algorithm – Formulation of Assignment Problem - Unbalanced Assignment problem.

UNIT –IV : Sequencing Problem

(9 Hours)

Sequencing Problem– Definition - Processing of n jobs through two machines – Processing of n jobs through two machines algorithm - Processing of n jobs through three machines – Processing of two jobs through n machines – Processing of two jobs through n machines algorithm - Related Problems in all the above.

UNIT –V : Networks

(9 Hours)

Networks – Immediate Predecessor -Immediate Successor– Dummy activity – Critical Path - Fulkerson's rule - Measure of activity – PERT computation – Earliest Time – Latest Time - Total Float – Free Float – Independent Float - CPM computation - Resource scheduling.

Total Lecture Hours – 45

UNIT-VI: CURRENT CONTOUR (For Continuous Internal Assessment Only):

Linear Programming Problem-Assignment Problem to find optimal solution- Critical Path Method

COURSE OUTCOME

The students should be able to

1. Understand the advantages and limitations of operation research.
2. Gain knowledge on the simplex method and algorithms.
3. Solve the transportation and assignment problems.
4. Describe the sequencing problems.
5. Summarize the concept of Network scheduling by CPM and PERT.
6. Analyze the various concepts of programming problem.

TEXT BOOKS

1. Kalavathy S. 2013. Operations Research, Fourth Edition. Vikas Publishing House Pvt. Ltd, Chennai.

UNIT -I	Chapter 1	: Full
	Chapter 2	: Sec. 2.1, 2.2
	Chapter 3	: Sec 3.1 to 3.3
UNIT -II	Chapter 4	: Full
	Chapter 5	: Sec. 5.1, 5.2
UNIT –III	Chapter 8	: Sec. 8.1 to 8.4
	Chapter 9	: Sec. 9.3 to 9.5
UNIT –IV	Chapter 14	: Sec. 14.1 to 14.3, 14.5
UNIT –V	Chapter 15	: Sec. 15.1 to 15.8

REFERENCE BOOK(S)

1. Hamdy A. Taha. 2005. Operations Research, 7th Edition. Prentice Hall of India Private Limited, New Delhi.
2. Kanti Swarup, Gupta P.K, Man Mohan. 2014. Operations Research, Fourteenth Edition. Sultan Chand & Sons, New Delhi.
3. Prem Kumar Gupta and Hira D.S. 1976. Operations Research - An Introduction. Sultan Chand, New Delhi.
4. Sharma J.K. 2001. Operations Research. MacMillan India Ltd, New Delhi.
5. Sundaresan V, Ganapathy Subramanian. K.S and Ganesan K. 2002. Resource Management Techniques. A.R.Publications, Chennai.

E_RESOURCES

1. http://ebooks.lpude.in/commerce/bcom/term_5/DCOM303_DMGT504_OPERATION_RESEARCH.pdf
2. <http://www.ggu.ac.in/download/class-note14/operation%20research07.04.14.pdf>
3. [file:///C:/Users/Commerce2/Downloads/Operations%20Research%20\(%20PDFDrive%20\).pdf](file:///C:/Users/Commerce2/Downloads/Operations%20Research%20(%20PDFDrive%20).pdf)
4. https://www.google.co.in/books/edition/_/6khDDAAQBAJ?hl=en
5. https://www.researchgate.net/publication/333748649_Chapter_-1_Operations_Research

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3

Medium: 2

Low: 1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

ALLIED PRACTICAL

(For B.Sc., CS , AI&ML)

Semester: II- AP-II: Operations Research with Excel Solver Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMA204P

COURSE OBJECTIVES:

- To understand the fundamentals of Operations Research and optimization techniques.
- To formulate and solve Linear Programming, Transportation, Assignment, and Scheduling problems.
- To apply Excel Solver for obtaining optimal solutions.
- To analyze project planning and decision-making problems.
- To develop spreadsheet-based problem-solving skills for real-world applications.

LIST OF PRACTICALS

1. Solving Linear Programming Problems (Maximization and Minimization) using Excel Solver.
2. Transportation Problem using North-West Corner Rule
3. Transportation Problem using Least Cost Method
4. Transportation Problem using Vogel's Approximation Method (VAM)
5. Assignment Problem using Hungarian Method
6. Sequencing Problem (n Jobs – 2 Machines) using Johnson's Rule
7. Critical Path Method (CPM)
8. Program Evaluation and Review Technique (PERT)

Total Lecture Hours – 45

COURSE OUTCOME

After the completion of the course, students should be able to:

1. Formulate mathematical models for optimization problems.
2. Solve Linear Programming Problems using Excel Solver.
3. Apply transportation and assignment techniques to optimize resource allocation.
4. Analyze sequencing and project scheduling problems.
5. Interpret optimization results and support effective decision-making

TEXT BOOK(S)

1. Kalavathy S. 2013. Operations Research, Fourth Edition. Vikas Publishing House Pvt. Ltd, Chennai

REFERENCE(S)

1. Hamdy A. Taha. 2005. Operations Research, 7th Edition. Prentice Hall of India Private Limited, New Delhi.
2. Kanti Swarup, Gupta P.K, Man Mohan. 2014. Operations Research, Fourteenth Edition. Sultan Chand & Sons, New Delhi.
3. Prem Kumar Gupta and Hira D.S. 1976. Operations Research - An Introduction. Sultan Chand, New Delhi.
4. Sharma J.K. 2001. Operations Research. MacMillan India Ltd, New Delhi.
5. Sundaresan V, Ganapathy Subramanian. K.S and Ganesan K. 2002. Resource Management Techniques. A.R.Publications, Chennai.

E_RESOURCES

1. <https://www.siirt.edu.tr/dosya/personel/numerik-analiz-siirt-2019217142654486.pdf>
2. https://sde.uoc.ac.in/sites/default/files/sde_videos/BSc_maths_numerical_methods.pdf
3. <https://www.scribd.com/document/815954921/Introductory-Methods-of-Operations-research>
4. www.sultanchandandsons.com/Book/61/Assignment.rob5 <https://www.google.com/search>
5. <https://www.google.com/search?q=sequencing+problem&oq=sequencing+problem>

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CLO1	3	2	3	1	1	2	2	2	1	1	3	2	2	3	2
CLO2	3	3	3	2	2	1	2	2	3	1	3	3	2	3	2
CLO3	3	2	3	2	1	2	2	2	1	1	3	3	3	3	2
CLO4	3	3	3	2	1	2	2	2	1	1	3	3	3	3	3
CLO5	3	2	2	1	2	1	2	2	1	1	3	3	3	3	3
CLO6	2	3	3	2	3	3	3	3	2	2	2	3	3	2	3

Strong: 3

Medium: 2

Low: 1

ALLIED COURSES
(For B.C.A)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614 016

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

ALLIED COURSE

(For B.C.A Students)

Semester: I – AC –I: Mathematical Foundation to Computer Science - I

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMS101

COURSE OBJECTIVES

- To understand the fundamental concepts of mathematical logic, propositions, truth tables, and quantifiers
- To apply numerical methods for solving algebraic and transcendental equations.
- To utilize interpolation and numerical integration techniques for mathematical computations
- To analyze graph structures and their properties in the context of computer science.
- To perform matrix operations and apply matrices to solve systems of linear equations and eigenvalue problems

UNIT I: Logic and Methods of Proofs

(12 Hours)

Propositions-logical operations (basic connectives)-compound statement- construction of truth table-quantifiers- conditional statements-tautology-contradiction contingency-logical equivalence.

UNIT II: Algebraic and Transcendental Equations

(12 Hours)

Numerical Methods-Solution of algebraic and transcendental equations-Bisection method-The method of False Position-The Iteration Method-Newton-Raphson methods..

UNIT III: Numerical Interpolation

(12 Hours)

Numerical Interpolation-Newton's Forward and Newton's Backward interpolation formula and Lagrange's formula. -Numerical Integration-Trapezoidal rule and Simpson's 1/3 rule-only formula and problem solving for all the topics mentioned above.

UNIT IV: Elementary Graph Theory

(12 Hours)

Basic terminologies of graphs, connected and disconnected graphs, subgraph, paths and cycles, complete graphs, digraphs, weighted graphs. Trees, properties of trees.

UNIT V: Matrix Algebra

(12 Hours)

Types of matrices, algebra of matrices–addition, subtraction, and multiplication of matrices, determinant of a matrix, symmetric and skew-symmetric matrices, orthogonal matrix, rank of a matrix, inverse of a matrix, applications of matrices to solve system of linear equations, Eigen values and Eigen vectors.

UNIT-VI: Current Contours (For Continuous Internal Assessment Only – self study)

Numerical Interpolation-Newton's Forward and Newton's Backward interpolation formula and examples

Total Lecture Hours-45

COURSE OUTCOME

After the completion of the course, students should be able to,

1. Apply numerical methods to equations, systems, and proofs.
2. Approximate roots of algebraic and transcendental equations.
3. Estimate function values and evaluate definite integrals numerically.
4. Formulate Linear Programming models for decision problems.
5. Apply matrix techniques to solve determinants, inverses, rank, linear equations, eigenvalues, and eigenvectors.
6. Solve matrix problems involving determinants, inverses, rank, and eigen analysis.

TEXT BOOKS

1. Ashwani Jain, Archana Arora, Surinder Mohan Deep, 2014, "Discrete Mathematics", 4th Ed., Kalyani Publishers, New Delhi.
2. Sastry S.S, 2022, Introductory Methods of Numerical Analysis, Fifth Edition,
3. Arumugam. S, Ramachandran. S, "Invitation to Graph Theory", Scitech Publication (India) Pvt. Ltd., Chennai.
4. Manicavachagam Pillai.T.K., Natarajan.T., Ganapathy K.S., 2012. Algebra, Volume II, S.Viswanathan Pvt Limited, Chennai.

UNIT- I Chapter 1: Sec. 9.1 to 9.11 of [1]

UNIT- II Chapter 2: Sec. 2.1 to 2.5 of [2]

UNIT- III Chapter 3: Sec. 3.6,3.9.1 of [2]

Chapter 5: Sec.5.4.1,5.4.2 of [2]

UNIT- IV Chapter 2 : Sec. 2.1 to 2.4 of [3]

Chapter 3: Sec 3.1 to 3.3, 3.6 of [3]

UNIT- V Chapter 10: Sec.10.1, 10.8,10.9 of [3]

REFERENCE BOOK(S)

1. Rosen Kenneth H. and Krithivasan Kamala, 2019, Discrete Mathematics and its Applications, McGraw Hill, India.
2. Chakravorty J. G. and Ghosh P. R., 2017, Numerical Programming Theory, Moulik Library.
3. Sharma J. K.,2007Invitation of Graph Theory and Applications, Fourth Edition, Macmillan Publishers.
4. Garg, Reena,(2023) Advanced Engineering Mathematics, Khanna Book Publishing Company.
5. Deo Narsingh(1979), Graph Theory with Application to Engineering Prentice Hall, India.

E- Resources

1. <https://nptel.ac.in/courses/111107127>.
2. <https://www.math.iitb.ac.in/~siva/si50716/SI507lecturenotes.pdf>.
3. <https://nptel.ac.in/courses/1hjyd.bgt>.
4. <https://tutorial.math.lamar.edu>
5. <https://ocw.mit.edu>

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1
CLO6	3	2	1	2	3	3	2	2	2	1	3	2	1

Strong: 3

Medium: 2

Low: 1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Practical – I

(For BCA Students)

Semester: I- AP-I: Numerical Methods with MATLAB Programming Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26AMS102P

COURSE OBJECTIVES:

- To develop skills in solving mathematical problems using numerical techniques and MATLAB programming
- To apply numerical methods for solving equations, interpolation, integration, and differential equations
- To analyze mathematical problems through numerical approaches
- To implement numerical algorithms using computational tools
- To Use numerical methods for scientific and engineering computations

LIST OF PRACTICALS

1. Bisection Method for finding root of nonlinear equation
2. Newton–Raphson Method for root finding
3. Newton's Forward Interpolation
4. Newton's Backward Interpolation
5. Lagrange Interpolation Method
6. Trapezoidal Rule for numerical integration
7. Simpson's 1/3 Rule for numerical integration
8. Euler's Method for solving ordinary differential equations

Total Lecture Hours – 45

COURSE OUTCOME

After the completion of the course, students should be able to:

1. Apply numerical methods to solve mathematical problems.
2. Determine approximate roots using Bisection, Iterative, and Newton–Raphson methods.
3. Estimate function values using interpolation techniques.
4. Evaluate definite integrals using numerical integration methods.
5. Solve ordinary differential equations using Euler's method.
6. Solve systems of linear equations using Gauss Elimination..

TEXT BOOK(S)

1. Etter, D.M., Kuncicky, D.C. and Moore, H., 2019. *Introduction to MATLAB*, 4th Edition, Pearson Education.
2. Venkatraman, M.K., 2001. *Numerical Methods in Science and Engineering*, 5th Edition, National Publishing Company, Chennai.
3. Kanetkar, Y.P., 2020. *Let Us C*, 18th Edition, BPB Publications, New Delhi.
4. Rajaraman, V., 2018. *Computer Oriented Numerical Methods*, PHI Learning Private Limited, New Delhi. Attaway, S., 2022. *MATLAB: A Practical Introduction to Programming and Problem Solving*, 6th Edition, Butterworth-Heinemann.

REFERENCE(S)

1. Jain, M.K., Iyengar, S.R.K. and Jain, R.K., 2012. *Numerical Methods for Scientific and Engineering Computation*, New Age International (P) Limited, New Delhi.
2. Froberg, C.E., 1985. *Introduction to Numerical Analysis*, 2nd Edition, Addison-Wesley Publishing Company.
3. Chapman, S.J., 2019. *MATLAB Programming for Engineers*, 6th Edition, Cengage Learning.
4. Gupta, S.C. and Kapoor, V.K., 2020. *Fundamentals Operation*, 12th Revised Edition, Sultan Chand & Sons, New Delhi.
5. Sastry, S.S., 2012. *Introductory Methods of Numerical Analysis*, 5th Edition, PHI Learning Private Limited, New Delhi.

E_RESOURCES

1. <https://www.siirt.edu.tr/dosya/personel/numerik-analiz-siirt-2019217142654486.pdf>
2. https://sde.uoc.ac.in/sites/default/files/sde_videos/BSc_maths_numerical_methods.pdf
3. <https://www.scribd.com/document/815954921/Introductory-Methods-of-Numerical-Analys>
4. www.sultanchandandsons.com/Book/61/Fundamentals-of-Mathematical-Statistics?utm_source=chatgpt.com

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	2	3	2	3	1	1	1	1	2	3	2	2
CLO2	3	2	3	2	3	1	1	1	1	2	3	2	2
CLO3	3	3	3	2	3	1	1	1	1	2	3	3	2
CLO4	3	2	2	2	3	1	1	1	1	2	3	2	2
CLO5	3	3	2	3	3	1	1	2	2	2	3	2	2
CLO6	3	3	2	3	3	1	1	1	1	2	3	3	2

Strong: 3

Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614 016
(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS
ALLIED COURSE
(For B.C.A Students)

Semester: II – AC – II : Mathematical Foundation to Computer Science - II

Ins. Hrs./Week: 3

Course Credit:3

Course Code: U26AMS203

COURSE OBJECTIVES:

- To Understand sets, relations, and functions.
- To understand functions, their properties, and their applications in Computer Science.
- To Apply counting techniques, probability, and recurrence relations.
- To Formulate and solve Linear Programming problems.
- To Analyze and optimize transportation problems using standard methods.

UNIT I: Set, Relation and Functions (9 Hours)

Set, Set Operations, Properties of Set operations, Subset, Venn Diagrams, Cartesian Products. Relations on a Set, Properties of Relations, Representing Relations using matrices and digraphs, Types of Relations.

UNIT II : Functions, properties of Functions (9 Hours)

Functions, properties of functions (domain, range), composition of functions, surjective (onto), injective (one-to-one) and bijective functions, inverse of functions. Some useful functions for Computer Science: Exponential and Logarithmic functions.

UNIT III: Counting and Recurrence Relation (9 Hours)

Basics of counting, Pigeonhole principle, permutation, combination. Elements of Probability, Recurrence relations, recurrence relations with examples.

UNIT IV: Optimization Techniques (9 Hours)

Optimization Techniques-Linear programming: Introduction-LP formulation, Graphical method for solving LPs with two variables-Special cases in graphical methods- Simplex method.

UNIT V: Transportation problem (9 Hours)

Definition-Linear form-North-west corner method-Least cost method- Vogel's approximation method-Balanced and Unbalanced Methods.

UNIT-VI: Current Contours (For Continuous Internal Assessment Only – self study)

LP formulation -Vogel's approximation method - Applications.

Total Lecture Hours-45

COURSE OUTCOME

After the completion of the course, students should be able to,

1. Apply set operations, relations, and functions to mathematical problems.
2. Analyse function properties and compute compositions and inverses.
3. Solve counting, probability, and recurrence relation problems.
4. Formulate and solve Linear Programming Problems using graphical and simplex methods..
5. Solve transportation problems using standard methods.
6. Identify and handle special cases in Linear Programming problems

TEXT BOOKS

1. Ashwani Jain, Archana Arora, Surinder Mohan Deep, 2014, “Discrete Mathematics”, 4th Ed., Kalyani Publishers, New Delhi.
2. Kolman B., Busby R. and Ross S., 2015, “Discrete Mathematical Structures”, 6th Edition, Pearson Education.
3. Kanti Swarup, Gupta.P.K and ManMohan, 2022, Operations Research, 20th Edition, Sultan Chand and Sons

UNIT- I : Chapter 1 : Sec. 1.1 to 1.9 and 1.16 to 1.19 of [1]

Chapter 2 : Sec. 2.1 to 2.3 of [1]

UNIT- II : Chapter 3 : Sec. 3.1 to 3.7 of [1]

UNIT- III : Chapter 3 : Sec. 3.1 to 3.5 of [2]

UNIT- IV : Chapter 2 : Sec. 2.1 to 2.4 of [3]

Chapter 3 : Sec 3.1 to 3.3, 3.6 of [3]

UNIT- V : Chapter 10 : Sec.10.1, 10.8,10.9 of [3]

REFERENCE BOOKS:

1. Grimaldi Ralph P. and Ramana B. V.(2007), Discrete and Combinatorial Mathematics: An Applied Introduction, Fifth Edition, Pearson Education.
2. Rosen Kenneth H. and Krithivasan Kamala(2019), Discrete Mathematics and its Applications, McGraw Hill, India,.
3. West Douglas B.(2015.), Introduction to Graph Theory, Second Edition, Pearson Education.
4. Garg, Reena(2024), Engineering Mathematics, Khanna Book Publishing Company, (AICTE Recommended Textbook)
5. Garg, Reena,(2023) Advanced Engineering Mathematics, Khanna Book Publishing Company.

E - Resources:

1. <https://nptel.ac.in/courses/106103205>
2. <https://nptel.ac.in/courses/111101115>.
3. <https://www.iacr.org>.
4. <https://www.khanacademy.org/math/settheory>.
5. <https://grow.google/certificates/cybersecurity/>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	1	3	1	2	2	2	3	2	1
CLO2	3	2	1	2	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	1	2	1	2	1	3	2	3	2	1
CLO4	2	1	2	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1
CLO6	3	2	2	1	2	1	1	1	3	3	2	2	1

Strong: 3 Medium: 2 Low: 1

ALLIED COURSES
(For DATA SCIENCE)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI - 614016
For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Course-I

(For B.Sc., Data Science)

Semester: I - AC – I: Algebra and Calculus

Ins. Hrs./Week:3

Course Credit:3 Course Code: U26AMT101

COURSE OBJECTIVES:

- To Understand matrix operations and applications
- To Solve systems using matrices and eigenvalue methods
- To Apply differentiation techniques to mathematical problems
- To Evaluate integrals using standard methods and formulas
- To Solve ordinary differential equations systematically

UNIT -I: Matrices

(9 Hours)

Formation of Matrices–Special types of matrices – Scalar multiplication of a matrix – Equality of matrices - Addition of matrices – Subtraction – Symmetric matrix – Skew symmetric matrix – Hermitian and Skew Hermitian matrices – Multiplication of matrices – Inverse matrix – Related problems.

UNIT –II: Matrices (Continued....)

(9 Hours)

Inner product – Solution of simultaneous equations – Rank of a Matrix – Linear dependence and independence of vectors - Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) – Simple Problems

UNIT–III: Differentiation

(9 Hours)

Basic Formulae on Differentiation - Maxima & Minima – Concavity, Convexity – Points of inflexion- Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT-IV: Integration

(9 hours)

Basic Formulae on Integration – Integration of rational algebraic functions – integration of irrational functions - Evaluation using Integration by parts – Properties of definite integrals –Reduction formula 1) $\int x^n e^{ax} dx$ 2) $\int \sin^n x dx$ 3) $\int \cos^n x dx$ (n being a positive integer) – Related Problems.

UNIT- V: Differential Equations

(9 Hours)

Formation of Differential Equations - Linear Equations – Second order of types

$(aD^2 + bD + c)y = F(x)$ where a, b, c are constants and F (x) is one of the following

(i) e^{ax} (ii) $\sin(ax)$ or $\cos(ax)$ (iii) x^n , n being an integer (iv) $e^{ax} f(x)$.

UNIT-VI: Current Contours (For Continuous Internal Assessment Only – self-study)

Addition of matrices – Subtraction – Symmetric matrix – Skew symmetric matrix

Total Lecture Hours – 45

COURSE OUTCOME

After the completion of the course, students should be able to,

1. Find the solutions of transformation of equation by increasing and decreasing roots.
2. Analyze vector dependence and matrix characteristics.
3. Understand the concept of maxima and minima and partial differential equation.
4. Understand the different types of Integral Equations and their properties.
5. Perform the problems in different methods of Differential Equations.
6. Identify symmetric and skew-symmetric matrices and perform matrix operations.

TEXT BOOK(S)

1. Manicavachagam Pillai. T.K &Others. 2008.Algebra Volume II. Revised Editions. S.V Publications, Chennai.
2. Narayanan. S, Manicavachagam Pillai.T.K. 2008. Calculus Volume I. S. ViswanathanPvt. Limited, Chennai.
3. Narayanan.S, Manicavachagam Pillai.T.K.2008.CalculusVolume II. S.Viswanathan Pvt. Limited, Chennai.
4. Narayanan.S, Manicavachagam Pillai.T.K.2003.Differential Equations. S.Viswanathan Pvt. Limited, Chennai.

UNIT – I Chapter 2: Sec. 1 to 8 of [1].

UNIT – II Chapter 2: Sec. 9 to 16 only of [1].

UNIT – III Chapter 5: Sec. 1, 2 of [2].

Chapter 8: Sec. 1.1,1.3 and 1.6 of [2].

UNIT – IV Chapter 1: Sec. 7.3, 8, 9, 11, 12, 13.1, 13.3, 13.4 of [3].

UNIT – V Chapter 5: Sec. 1, 2, 3 and 4 of [4].

REFERENCE BOOK(S)

1. Arumugam, Issac 2007. Allied Mathematics. New Gamma Publishing House,Palayamkottai.
2. Khanna M.L. 2004. Differential Calculus. Jai prakash Nath and Co., Meerut.
3. Khanna M.L. 1994. IntegralCalculus. 19 th Edition. Jai Prakash Nath & Co. Meerut.

4. Sannu Rahi. 2009. Algebra. Tata McGraw Hill Publishing Company Limited, NewDelhi.
5. Singh U.P, Srivastava R.J, Siddiqui N.H. 2003. Calculus. Dominant Publishers andDistributors, New Delhi.

E.RESOURCES

- 1.<https://nptel.ac.in>
- 2.<https://ocw.mit.edu>
- 3.<https://www.khanacademy.org>
- 4.<https://tutorial.math.lamar.edu>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	1	3	1	2	2	2	3	2	1
CLO2	3	2	1	2	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	1	2	1	2	1	3	2	3	2	1
CLO4	2	1	2	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1
CLO6	3	2	2	1	2	1	1	1	3	3	2	2	1

Strong: 3

Medium: 2

Low: 1

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI-614016
(For the Candidates admitted in the academic year 2026–2027)

DEPARTMENT OF MATHEMATICS

Allied Practical
(For B.Sc., Data Science)

Semester: I-AP-I: Data Analytics using Spreadsheets Lab-I

Ins. Hrs./Week:3

Course Credit: 3

Course Code: U26AMT102P

Objectives

1. To learn and use basic spreadsheet functions.
2. To perform calculations using mathematical and logical functions.
3. To organize and analyze data effectively in a spreadsheet.
4. To create Pivot Tables and use data analysis tools.
5. To apply statistical techniques for understanding and interpreting data.

List of Exercises

1. Demonstrate the usage of the following built-in-functions in spreadsheet. MAX, SUM, AVERAGE, CONCATENATE, LEN, LOWER, UPPER and TRIM
2. Demonstrate the usage of the following logical functions in spreadsheet. AND, OR, NOT, IF and IFERROR
3. Demonstrate the usage of the following built-in-functions in spreadsheet. SUMIFS, AVERAGEIFS, COUNTIFS, COUNTA,
4. Demonstrate any 10 math and trigonometric functions in spreadsheet.
5. Create and demonstrate the usage of a pivot table in spreadsheet.
6. Display the transpose of a given matrix using spreadsheet.
7. Add the Data Analysis Toolpak in the spreadsheet.
8. Demonstrate the descriptive statistics in spreadsheet.
9. Find the Correlation between two variables in spreadsheet.
10. Perform Regression analysis in spreadsheet.

COURSE OUTCOMES

On the completion of this course students will be able to

1. Use built-in spreadsheet functions to perform calculations and data processing.
2. Apply logical functions to make decisions based on conditions.
3. Create and use Pivot Tables for data summarization.
4. Perform statistical analysis such as descriptive statistics, correlation, and regression.
5. Utilize spreadsheet tools to analyze and present data accurately.

E-Resources

1. [Microsoft Excel Training Center](#)
2. [Google Sheets Learning Center](#)
3. [LibreOffice Calc Guide](#)
4. [Excel Easy Tutorials](#)
5. [GCFLearnFree Excel Tutorials](#)

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PS O1	PS O2	PS O3	PS O4	PSO 5
CO1	3	3									3		3		
CO2	2	3	2												
CO3	2	2	3		3						3				
CO4	3	3	2	3	3			2			3	2		2	
CO5	2	2	3	3	3							2			

S-Strong(3)

M-Medium(2)

L-Low(1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

Allied Course
(For B.Sc., Data Science)

Semester: II-AC-II: Optimization Techniques

Ins. Hrs. /Week: 3

Course Credit: 3

Course Code: U26AMT203

COURSE OBJECTIVES

- To understand the fundamental concepts, scope, models, and applications of Operations Research in decision-making and linear programming problems.
- To develop the ability to solve linear programming problems using the Simplex Method and Big M Method under different constraints.
- To acquire knowledge in formulating and solving transportation and assignment problems using various optimization techniques.
- To apply sequencing algorithms for optimizing job processing and minimizing total elapsed time in production systems.
- To understand network analysis techniques such as PERT and CPM for project scheduling, critical path identification, and resource management.

UNIT-I: Operations Research

(9 Hours)

Introduction of Operations Research - Scope of Operations Research – Phases of Operations Research-Models in Operations Research-Advantages of a Model-Characteristics of a Good model –Classification of Models-Uses and limitations of Operations Research-Operation Research and Decision Making-Linear Programming-General Formulation of Linear Programming Problem - Graphical solution of two variables – Matrix form of linear programming problem.

UNIT – II: Simplex Method

(9 Hours)

Simplex Method– Basic Definitions - Simplex Method Algorithm - Simplex Method for less than or equal to ($\leq$), equal to ($=$) and greater than or equal to ($\geq$) constraints – Big M Method - Big M Method Algorithm – Problems.

UNIT-III: Transportation Problem and Assignment problem

(9 Hours)

Transportation Problem –Introduction and mathematical formulation of Transportation Problem – To find the initial basic feasible solution using (i) North West Corner Method (ii) Least Cost Method (iii) Vogel's Approximation Method - Unbalanced Transportation Problem-Assignment Algorithm – Formulation of Assignment Problem - Unbalanced Assignment problem.

UNIT –IV: Sequencing Problem

(9 Hours)

Sequencing Problem– Definition - Processing of n jobs through two machines – Processing of n jobs through two machines algorithm - Processing of n jobs through three machines – Processing of two jobs through n machines – Processing of two jobs through n machines algorithm - Related Problems in all the above.

UNIT –V: Networks**(9 Hours)**

Networks – Immediate Predecessor -Immediate Successor– Dummy activity – Critical Path - Fulkerson's rule - Measure of activity – PERT computation – Earliest Time – Latest Time - Total Float – Free Float – Independent Float - CPM computation - Resource scheduling.

UNIT-VI: Current Contours (Continuous Internal Assessment Only-Self Study)

Recent Trends and Applications of Operations Research in Artificial Intelligence, Supply Chain Management, Transportation Systems, Healthcare Optimization, and Project Management Software Tools.

Total Lecture Hours – 45**COURSE OUTCOME**

After the completion of the course, students should be able to,

1. Understand the advantages and limitations of operation research.
2. Gain knowledge on the simplex method and algorithms.
3. Solve the transportation and assignment problems.
4. Describe the sequencing problems.
5. Summarize the concept of Network scheduling by CPM and PERT.
6. Apply modern Operations Research techniques and software tools to solve optimization problems in artificial intelligence, supply chain management, transportation, healthcare, and project management.

TEXT BOOK(S)

1. Kalavathy. S, 2013, Operations Research, Fourth Edition. Vikas Publishing House Pvt. Ltd., Chennai.

UNIT-I	Chapter 1: Full Chapter 2: Sec. 2.1, 2.2 Chapter 3: Sec 3.1 to 3.3
UNIT-II	Chapter 4: Full Chapter 5: Sec. 5.1, 5.2
UNIT-III	Chapter 8: Sec. 8.1 to 8.4 Chapter 9: Sec. 9.3 to 9.5
UNIT-IV	Chapter 14: Sec. 14.1 to 14.3, 14.5
UNIT-V	Chapter 15: Sec. 15.1 to 15.8

REFERENCE BOOK(S)

1. Hamdy A. Taha, 2022, Operations Research, Eleventh Edition, Prentice Hall of India Private Limited, New Delhi.
2. Kanti Swarup, Gupta P.K, Man Mohan, 2022, Operations Research, Twentieth Edition. Sultan Chand & Sons, New Delhi.
3. Prem Kumar Gupta and Hira D, 2014, Operations Research - An Introduction, Seventh Revised Edition, Sultan Chand, New Delhi.
4. Sharma J.K, 2023, Operations Research, Sixth Edition, MacMillan India Ltd, New Delhi.
5. Sundaresan V, Ganapathy Subramanian. K. S and Ganesan K, 2023, Resource Management Techniques, Fourteenth Edition, A.R. Publications, Chennai.

E-RESOURCES

1. http://ebooks.lpude.in/commerce/bcom/term_5/dcom303_dmgt504_operation_research.pdf
2. <http://www.ggu.ac.in/download/class-note14/operation%20research07.04.14.pdf>
3. [file:///C:/Users/Commerce2/Downloads/Operations%20Research%20\(%20PDFDrive%20\).pdf](file:///C:/Users/Commerce2/Downloads/Operations%20Research%20(%20PDFDrive%20).pdf)
4. https://www.google.co.in/books/edition/_/6khDDAAAQBAJ?hl=en
5. https://www.researchgate.net/publication/333748649_Chapter_-1_Operations_Research

Course Learning Outcome (for Mapping with POs and PSOs)

	POs										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	3	3	2	1	1	–	2	3	2	3	3
CLO2	3	3	3	3	2	1	–	–	2	2	2	3	3
CLO3	3	3	3	3	2	1	1	–	2	3	2	3	3
CLO4	3	3	3	3	2	1	1	–	2	3	2	3	3
CLO5	3	3	3	3	3	2	1	–	2	3	2	3	3
CLO6	2	2	3	2	3	2	1	1	3	3	3	2	3

Strong: 3

Medium: 2

Low: 1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI-614016
(For the Candidates admitted in the academic year 2026–2027)

DEPARTMENT OF MATHEMATICS

Allied Practical

(For B.Sc., Data Science)

Semester: II-MP–II: Data Analytics using Spreadsheets Lab-II

Ins. Hrs./Week:3

Course Credit: 3

Course Code: U26AMT204P

Course Objectives

1. To learn and use advanced spreadsheet functions for data analysis and data lookup.
2. To perform data cleaning, sorting, and filtering for effective data management.
3. To create charts, sparklines, and dashboards for data visualization.
4. To apply data validation and What-If Analysis techniques for decision-making.
5. To use conditional functions to analyze and summarize data efficiently.

List of Exercises

1. Demonstrate the usage of the following Data Analysis built-in-functions in spreadsheet.
VLOOKUP, HLOOKUP, FIND, SEARCH, LEFT, RIGHT, RANK
2. Demonstrate the usage of Data Cleaning – Text Functions in spreadsheet
DATA CLEANING USING TEXT TO COLUMN CONDITIONAL FORMATTING
3. Perform **SORTING** with single and multiple columns in spreadsheet.
4. Demonstrate the usage of **FILTERING** in spreadsheet
5. Construct various Line, Bar and Piecharts in spreadsheet.
6. Demonstrate the creation and usage of Charts and Sparklines in spreadsheet.
7. Perform Data Validation in spreadsheet using drop-down lists, number restrictions, and custom validation rules.
8. Demonstrate the use of Goal Seek and Scenario Manager for What-If Analysis in spreadsheet.
9. Create and analyze a Dashboard in spreadsheet using charts, pivot tables, slicers, and summary reports.
10. Demonstrate the use of Conditional Functions in spreadsheet using **COUNTIF, SUMIF, AVERAGEIF, MAXIFS** and **MINIFS**.

COURSE OUTCOMES

On the completion of this course students will be able to

1. Use lookup, text, and conditional functions to process and analyze data.
2. Clean, sort, and filter data to improve data quality and organization.
3. Create and interpret charts, sparklines, and dashboards for visual reporting.
4. Apply data validation, Goal Seek, and Scenario Manager to solve business problems.
5. Generate meaningful insights using conditional calculations and summary reports.

E-RESOURCES

1. [Microsoft Excel Support and Training](#)
2. Google Sheets Help Center
3. [Excel Easy Tutorials](#)
4. [GCFLearnFree Excel Tutorials](#)
5. [LibreOffice Calc Documentation](#)

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PS O1	PS O2	PS O3	PS O4	PSO 5
CO1	3		2	3		3		3	3		3		3		
CO2	3					3									
CO3		3	3		2		3	3			3				
CO4	3	3	3	3		2	2				3	2		2	
CO5	3		3		3	3						2			

-Strong(3)

M-Medium(2)

L-Low(1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614 016.
(For the Candidates admitted in the academic year 2025 – 2026)

DEPARTMENT OF MATHEMATICS
ALLIED MATHEMATICS - III
(For B.Sc., Data Science)

Semester: III- AC-III: Statistics I

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: U25AMT304

UNIT-I : Introduction on Statistics (8 Hours)

Origin and development of statistics- Scope of statistics- Limitations of statistics- Frequency distribution in statistics - Graphical representation of statistical data.

UNIT-II : Measures of central tendency (10 Hours)

Introduction on Measures of central tendency-Arithmetic Mean – Median – Mode – Definitions – Properties – Merits and Demerits of Mean, Median and Mode – Problems to find Mean, Median and Mode.

UNIT-III : Measures of central tendency Continued... (6 Hours)

Geometric Mean – Harmonic Mean - Geometric Mean of the combined group – Merits & Demerits of Geometric mean - Merits & Demerits of Harmonic mean – Solved Problems.

UNIT-IV : Measures of Dispersion (11 Hours)

Introduction on Measures of Dispersion- Definition- Objectives- Properties- Methods of measuring dispersion- Range- Quartile deviation- Mean deviation- Standard deviation and Root mean square deviation.

UNIT-V : Correlation and Regression (10 Hours)

Introduction on Correlation – Definition-Properties of Simple Correlation – Karl Pearson's Correlation Coefficients – Limits of Correlation Coefficients - Simple Problems – Regression: Definition - Regression coefficients – Properties of regression coefficient - Simple Problems only.

Total Lecture Hours- 45

COURSE OUTCOME

The students should be able to

1. Describe the concepts, principles, tools and techniques in statistics.
2. Gain knowledge on the determination of measures of central tendency.
3. Determine the measures of dispersion.
4. Compute correlation coefficient and the regression coefficient.
5. Understand the basic concept, properties and moments of binomial distribution.

TEXT BOOK(S)

1. Gupta S.C and Kapoor V.K., 2002, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.

REFERENCE BOOK(S)

1. Freund J.E. 2001. Mathematical Statistics. Prentice Hall of India., New Delhi.
2. Goon A.M. Gupta M.K. and Dos Gupta B. 1991. Fundamentals of Statistics, Volume I. World Press, Calcutta.
3. Gupta S.P. 1994. Statistical Methods. Sultan Chand & Sons, New Delhi.
4. Kapil Sharma. 2011. Statistical Methods. ABO Publishers, Jaipur, India.
5. Pillai R.S.N and Bagavathi. 2003. Practical Statistics. S Chand & Company Ltd. New Delhi.

E- RESOURCES

1. <https://www.math.arizona.edu/~jwatkins/statbook.pdf>
2. <http://www.cimt.org.uk/cmmss/S1/Text.pdf>
3. <https://stat.ethz.ch/~geer/mathstat.pdf>
4. <https://mason.gmu.edu/~jgentle/books/MathStat.pdf>
5. <http://fstroj.uniza.sk/kam/orsansky/pdf/eng/basicsofstatisticalmethods.pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3

Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI-614016
(For the Candidates admitted in the academic year 2025–2026)
DEPARTMENT OF MATHEMATICS
(For B.Sc., Data Science)

Semester: III-AP–II: Statistics For Data Science Lab –I

Ins. Hrs./Week:3

Course Credit: 2

Course Code: U25AMT305P

1. Find Mean, Median and Mode using SPSS.
2. Calculate Standard deviation and variance using SPSS.
3. Demonstrate Bar diagram in SPSS.
4. Construct Line diagram in SPSS.
5. Demonstrate Pie chart in SPSS
6. Construct Histograms in SPSS.
7. Explore t-test for one sample problem.
8. Analyze t-test for two sample problems.
9. Demonstrate t-test for testing the significance of Correlation Coefficient in SPSS.
10. Implement the analysis of variance using SPSS.

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614 016.
(For the Candidates admitted in the academic year 2025 – 2026)

DEPARTMENT OF MATHEMATICS
ALLIED MATHEMATICS - IV
(For B.Sc., Data Science)

Semester: IV- AC-IV: Statistics II

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: U25AMT406

UNIT-I: Probability Theory (8 Hours)

Random experiments - Sample space and events - Addition and Multiplication Theorems - Condition probability - Bayes theorem.

UNIT-II: Statistical Inference and Theoretical Distributions (10 Hours)

Estimation theory - Point and interval estimation – Properties of estimators - Maximum likelihood estimation – method of moments - Binomial distribution - Poisson Distribution - Normal Distribution.

UNIT-III: Sampling Theory (6 Hours)

Methods of Sampling - Standard error - Large and small sample tests - Confidence intervals.

UNIT-IV: Testing of Hypothesis (11 Hours)

Null and alternative Hypothesis - Type I & II errors - Chi-square test - t-test - F-test.

UNIT- V: Statistical Software and Applications (10 Hours)

Introduction to SPSS - Data entry and analysis - Graphs and charts - Interpretation of output - Applications in Data science.

COURSE OUTCOME

The students should be able to

1. Understand probability concepts and theorems.
2. Apply estimation and distribution techniques.
3. Use sampling methods for statistical analysis.
4. Apply testing of Hypothesis in decision making.
5. Analyze data using SPSS software.

TEXT BOOK(S)

1. Gupta S.C. and V.K. Kapoor, 2023, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, 12th Edition.

REFERENCE BOOK(S)

1. Pillai R.S.N. and Bagavathi, 2022, Statistics, S. Chand Publishing, 9th Edition.
2. Murray R. Spiegel, 2018, Schaum's Outline of Statistics, McGraw Hill, 5th Edition.
3. Gupta and Kapoor, 2020, Applied Statistics, Sultan Chand & Sons, 4th Edition.
4. J.K. Sharma, 2021, Fundamentals of Business Statistics, Vikas Publishing, 8th Edition.
5. Ronald E. Walpole, 2017, Probability and Statistics for Engineers and Scientists, Pearson, 9th Edition.

E- RESOURCES

1. <https://nptel.ac.in/course.html>
2. <https://www.khanacademy.org/math/statistics-probability>
3. <https://www.coursera.org/browse/math-and-logic/statistics>
4. <https://ocw.mit.edu>
5. <https://www.ibm.com/analytics/spss-statistics-software>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	2	1	3	2	2	1	3	2	3	2	3	2	1
CLO2	3	2	1	1	2	3	2	2	2	2	3	2	1
CLO3	2	3	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	2	1	2	3	2	3	1	2	3	2	1
CLO5	2	3	2	3	2	3	2	2	2	1	3	2	1

Strong: 3

Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI-614016
(For the Candidates admitted in the academic year 2025–2026)
DEPARTMENT OF MATHEMATICS
(For B.Sc., Data Science)

Semester: IV-AP-II: Statistics For Data Science Lab -II

Ins. Hrs./Week:3

Course Credit: 2

Course Code: U25AMT305P

1. Read Data from Database using SPSS.
2. Demonstrate how to handle Missing data in SPSS.
3. Show Summary Measures for Categorical Data in SPSS.
4. Construct Charts for Categorical Data in SPSS
5. Construct Pivot tables in SPSS.
6. Find the Co efficient of correlation using SPSS.
7. Find the Regression equation of X on Y.
8. Formulate the Regression equation of Y on X.
9. Apply One-tailed Test with an example using SPSS.
10. Implement Two-tailed test with a sample problem in SPSS.