



COURSE DATA SHEET

SEMESTER	I	BATCH	2026-2029
COURSENAME	MATHEMATICS FOR COMPUTER APPLICATIONS	COURSE CODE	26UMAGE1E02
COURSE UNITS	5	COURSE TYPE	GENERIC ELECTIVE-I
CONTACT HOURS (L-T-P)	4-2-0	CREDITS	4
OFFERED BY	MATHEMATICS	SHIFT-(I/II) Shift-I-8.15am - 12.50pm Shift-II-1.00pm to 5.30pm	II

COURSE OBJECTIVES

1	Understand basic logic used in mathematics to check if statements are true or false, and learn how to form correct conclusions.
2	Learn about various kinds of matrices, their special types, and how they are used in solving problems.
3	Learn key matrix techniques such as finding the rank, calculating eigen values, and verifying the Cayley-Hamilton theorem.
4	Explore trigonometric expressions and how to break down or expand formulas involving sine, cosine, and tangent.
5	Understand what hyperbolic functions are and how they relate to sine, cosine, and other functions used with angles and complex values.

COURSE OUTCOMES: On completion of the course the students will be able to...

	CO Statement	Cognitive Level
CO1	Understand and apply the basic concepts of logic, including propositions, connectives, truth tables, and logical equivalences.	K1-K3 (Understand and Apply)
CO2	Identify and describe different types of matrices such as symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, and unitary matrices.	K1-K3 (Understand and Apply)
CO3	Perform matrix operations such as finding the rank, reducing to echelon form, computing Eigen values, and verifying the Cayley-Hamilton theorem.	K1-K4 (Understand , Apply and Analyze)



CO4	Expand and simplify trigonometric expressions involving $\sin^n \theta, \cos^n \theta, \cos n\theta, \sin n\theta, \tan n\theta, \sin \theta, \cos \theta, \tan \theta$.	K1-K5 (Understand , Apply , Analyze and Evaluate)
CO5	Understand and use hyperbolic functions, relate them to circular trigonometric functions, and work with real and imaginary parts of expressions.	K1-K4 (Understand , Apply and Analyze)

SYLLABUS

UNIT	TOPICS	HOURS
1	Logic: Introduction – Propositions – Connectives - Truth table – Tautology and Contradiction - Logical equivalences. Book 1: Chapter 3: Section 3.0-3.5	15
2	Introduction to Matrix: Kinds of matrices - Symmetric matrix - Skew Symmetric matrix - Hermitian matrix - Skew – Hermitian matrix - Orthogonal matrix and Unitary matrices. Book 2: Volume I: Chapter 4: Section 4.1 – 4.1.6	15
3	Matrix applications and Eigen Values Rank of a matrix - Echelon form - Eigen values - Cayley - Hamilton theorem (without proof) – verification- inverse of matrix - simple problems. Book 2: Volume I: Chapter 4: Sections 4.2, 4.2.1, 4.5, 4.5.2, 4.5.3.	15
4	Trigonometric Series Expansions : Expansions of $\sin^n \theta, \cos^n \theta, \cos n\theta, \sin n\theta, \sin \theta, \cos \theta, \tan \theta$ in powers of θ . Book 2: Volume I: Chapter 6: Section: 6.1.1 to 6.1.3	15
5	Circular and Hyperbolic Functions: Hyperbolic Functions ,Relation between circular and hyperbolic functions - Formulae in hyperbolic functions – Real and Imaginary parts. Book 2: Volume I: Chapter 6: Section: 6.2	15



Note (if any)	Definitions and simple problems from all units may be asked in section A	Total Hours 75
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TEXT/REFERENCE BOOKS/E - RESOURCES:

Text Books	1. K.Chandrasekhara Rao ,Discrete Mathematics Narosa Publishing House, 2012 (Unit I) . 2. Duraipandian P., Udayabaskaran S., Allied Mathematics -Volume I, second edition,Muhil Publishers, Chennai. 2016 (Unit II , III,IV & V).
Books For Reference	1. Sharma J. K., Discrete Mathematics., Macmillian India Ltd. 5th Edition – 2022. 2. Manicavachagom Pillay T. K., Natarajan T. K., Ganapathy K. S., Algebra, Volume I, II S.Viswanathan (Printers and Publishers), pvt. Ltd. Reprint 2009. 3. Kandasamy P, Thilagavathy K, , Mathematics – I, II, S. Chand & Company Pvt.Ltd. Reprint 2017. 4. Vittal P. R. Mathematical Foundations, Reprint: 2006, Margham Publications,. Reprint 2020.
E-Learning Resources	1. https://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf 2. https://www.khanacademy.org/math/linear-algebra/alternate-bases/eigen-everything/v/linear-algebra-introduction-to-eigenvalues-and-eigenvectors 3. https://www.khanacademy.org/math/trigonometry 4. https://www.britannica.com/science/trigonometry



**SHRIMATHI DEVKUNVAR NANALAL BHATT
VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)**

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Chromepet, Chennai - 600 044.

PEDAGOGY (TEACHING METHODOLOGY):

- Chalk & Talk
- LCD/SMART Boards
- Student Assignments
- Student Seminars/Webinars
- MCQ
- Quizzes
- NPTEL/Others - Add-on-courses
- Web Resources
- Power Point Presentation
- Group Discussion

CO-PO AND CO-PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6		PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1		3	2	1
CO2	3	3	2	2	1	1		3	2	1
CO3	3	3	2	2	2	1		3	3	2
CO4	3	3	2	2	1	1		3	2	1
CO5	3	3	2	2	1	1		3	2	2
Average (Use only filled in cells for calculation)	3.0	2.8	1.8	1.8	1.2	1.0		3.0	2.2	1.4

Correlation Level: 1-Low, 2-Moderate, 3-Strong



JUSTIFICATION OF CO-PO/PSO MAPPING

CO	PO/PSO	Level of correlation	Justification
CO1	PO1	3	Applies concepts of propositions, connectives and logical equivalences with confidence to solve logical problems.
	PO2	2	Analyzes truth tables and logical statements to draw valid logical conclusions.
	PO3	1	Uses logical reasoning to develop simple solution strategies for computational problems.
	PO4	1	Establishes a foundation for advanced courses in discrete mathematics and computer science.
	PO5	1	Encourages self-learning of logical methods through continuous practice.
	PO6	1	Demonstrates ethical and rational decision-making through logical thinking.
	PSO1	3	Strengthens the fundamental concepts of mathematical logic required for computing.
	PSO2	2	Applies logical reasoning techniques in computational and algorithmic applications.
	PSO3	1	Develops basic analytical and problem-solving skills useful for higher studies.
CO2	PO1	3	Applies concepts of different types of matrices confidently to solve mathematical problems.
	PO2	3	Analyzes the properties and characteristics of special matrices to draw logical conclusions.
	PO3	2	Uses matrix concepts to formulate mathematical models for computational applications.
	PO4	2	Develops programme-specific mathematical competency required for higher studies.
	PO5	1	Encourages continuous learning of linear algebra concepts and applications.
	PO6	1	Demonstrates accuracy and responsibility while solving matrix-based problems.
	PSO1	3	Builds strong competence in the fundamental concepts of linear algebra.
	PSO2	2	Applies matrix techniques in computing, data analysis and scientific applications.



	PSO3	1	Develops analytical reasoning for solving application-oriented mathematical problems.
CO3	PO1	3	Applies rank, eigenvalue and Cayley-Hamilton concepts confidently to solve matrix problems.
	PO2	3	Evaluates matrix operations and interprets results using analytical reasoning.
	PO3	2	Develops mathematical solutions for computational problems involving matrices.
	PO4	2	Strengthens mathematical thinking required for advanced computing courses.
	PO5	2	Engages in lifelong learning by exploring advanced matrix techniques and computational tools.
	PO6	1	Demonstrates systematic and ethical practices while performing mathematical computations.
	PSO1	3	Strengthens mathematical foundations in linear algebra and computational mathematics.
	PSO2	3	Applies advanced matrix techniques in computer science, data science and engineering applications.
	PSO3	2	Enhances analytical and problem-solving skills required for research and employability.
CO4	PO1	3	Applies trigonometric expansion techniques confidently to solve mathematical problems.
	PO2	3	Analyzes and evaluates trigonometric expressions using logical reasoning.
	PO3	2	Uses trigonometric approximations to develop solutions for scientific and computational problems.
	PO4	2	Builds programme-specific mathematical competency required for advanced applications.
	PO5	1	Encourages independent learning through continuous practice of trigonometric techniques.
	PO6	1	Demonstrates precision and ethical responsibility while solving mathematical problems.
	PSO1	3	Strengthens fundamental knowledge of trigonometry essential for higher mathematics.
	PSO2	2	Applies trigonometric methods in computational modelling and scientific analysis.
	PSO3	1	Develops mathematical reasoning and analytical thinking for employability and higher education.
CO5	PO1	3	Applies hyperbolic function concepts confidently to solve mathematical problems.
	PO2	3	Analyzes relationships between circular and hyperbolic functions to interpret mathematical results.
	PO3	2	Develops mathematical models involving hyperbolic functions for engineering and scientific applications.
	PO4	2	Enhances programme-specific knowledge required for advanced mathematical studies.
	PO5	1	Encourages lifelong learning through exploration of advanced mathematical concepts.



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PO6	1	Demonstrates responsibility and ethical practices in mathematical analysis and computations.
PSO1	3	Strengthens competence in advanced mathematical concepts and techniques.
PSO2	2	Applies hyperbolic functions in computational mathematics and scientific modelling.
PSO3	2	Enhances problem-solving ability and analytical thinking useful for research and employability.

