



COURSE DATA SHEET

SEMESTER	I	BATCH	2026 -2029
COURSE NAME	Foundations of Algebra and Trigonometry	COURSE CODE	26UMAGE1D02
COURSE UNITS	5	COURSE TYPE	Generic Elective Allied Theory I
CONTACT HOURS (L-T-P)	5-1-0	CREDITS	5

COURSE OBJECTIVES	
1.	Understand the summation of Binomial, Exponential and Logarithmic series.
2.	Learn different types of matrices and compute eigen values and eigenvectors.
3.	Apply Cayley–Hamilton theorem to find the inverse of a matrix.
4.	Analyze polynomial equations and determine relations among roots. Perform transformations of equations.
5.	Familiarize students with the expansion of trigonometric functions and enable them to apply these expansions in mathematical analysis and problem solving.

COURSE OUTCOMES: On completion of the course the students will be able to...		
	CO Statement	Cognitive Level
CO1	Compute summations of Binomial, Exponential and Logarithmic series.	K1 - K6 (Understand, Apply, Analyze, Evaluate and Create)
CO2	Identify and apply properties of special matrices and determine eigen values and eigenvectors.	K1 - K6 (Understand, Apply, Analyze, Evaluate and Create)
CO3	Use the Cayley–Hamilton theorem to find the inverse of a matrix.	K1 - K6 (Understand, Apply, Analyze, Evaluate and Create)
CO4	Solve polynomial equations involving imaginary and irrational roots and form equations with given roots.	K1 - K6 (Understand, Apply, Analyze, Evaluate and Create)
CO5	Transform equations, solve reciprocal equations, and apply trigonometric expansions in problem solving.	K1 - K6 (Understand, Apply, Analyze, Evaluate and Create)



SYLLABUS

UNIT	TOPICS	HOURS
1	Algebra: Summation of Binomial, Exponential and Logarithmic series (without proof). Chapter 2: Sections: 2.1-2.1.3, 2.2-2.2.1, 2.3-2.3.3	15
2	Matrices: Eigen values and Eigen vectors, Cayley- Hamilton theorem (without proof), Inverse of a matrix using Cayley-Hamilton theorem. Chapter 4: Sections: 4.5, 4.5.2, 4.5.3 (Omit 4.5.1)	15
3	Theory of Equations: Polynomial equations – Imaginary and irrational roots – solving equations with related roots, Equation with given numbers – Problems. Chapter 3: Sections 3.1-3.1.1, 3.1.2, 3.2	15
4	Theory of Equations (Contd.): Transformations of an equation by diminishing (or Increasing) its roots by a constant, Reciprocal equations – Problems. Chapter 3: Sections 3.2.2, 3.3	15
5	Trigonometry: Expansion of $\cos^n \theta$, $\sin^n \theta$, $\cos n\theta$, $\sin n\theta$, $\tan n\theta$, and $\sin \theta$, $\cos \theta$, $\tan \theta$ in powers of θ . Chapter 6: Sections: 6.1-6.1.1, 6.1.2	15
Note (if any)	Definitions and simple problems from all units may be asked in section A (As MCQ)	Total Hours 75

TEXT/REFERENCE BOOKS/E-RESOURCES:

Text Book	P. Duraipandian and S. Udayabaskaran, Allied Mathematics, Volume I, 2014, S. CHAND & Company.
Books For Reference	1. Manicavachagom Pillay T. K., Natarajan T., K., Ganapathy K.S., Reprint 2015 Algebra, Volume I & Volume II, S. Viswanathan (Printers & Publishers), Pvt. Ltd. 2. Singaravelu A., (2003), Algebra and Trigonometry – Volume I & II, Meenakshi Agency. 3. Kandasamy P., Thilagavathy K., Reprint: 2004, Mathematics – I, II, S. Chand & Company Pvt. Ltd. 4. Vittal P.R., Malini V., Reprint 2007, Algebra and Trigonometry, Margham Publications. 5. Arumugam S., Thangapandi Isaac A., (2003), Classical Algebra, New Gamma Publishing House.
E-Learning Resources	1. https://nptel.ac.in/ NPTEL – Algebra, Linear Algebra, and Trigonometry courses.. 2. https://ocw.mit.edu/ MIT Open Course Ware – Linear Algebra and Algebra lectures. 3. https://www.khanacademy.org/math Khan Academy – Matrices, Eigen values,



Polynomial Equations, and Trigonometry.

4. <https://tutorial.math.lamar.edu/> Paul's Online Math Notes – Algebra and Trigonometry.

PEDAGOGY (TEACHING METHODOLOGY):

- Chalk and Talk
- Online Coaching
- LCD
- Assignment
- Seminar
- Quiz
- Group discussion
- Reference material
- E-Learning Resources
- YouTube links and videos

CO-POANDCO-PSOMAPPING:										
	PO1	PO2	PO3	PO4	PO5	PO6		PSO1	PSO2	PSO3
CO1	3	2	2	2	3	1		3	2	2
CO2	3	3	3	3	3	1		3	3	3
CO3	3	3	3	3	2	1		3	3	3
CO4	3	2	2	3	3	1		3	2	2
CO5	3	2	2	3	3	1		3	3	2
Average (Use only filledincells for calculation)	3	2.6	2.6	2.6	2.2	1		3	2.8	2.4

Correlation Level: 1-Weak 2-Moderate 3-Strong



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RubricsforContinuousAssessment

Assignment	ContentQuality,Originality,Organization,References, Timely Submission
Seminar	Knowledge,Communication,Presentation,Q&A Handling, Confidence
Field visit	ObservationSkills,ReportWriting,Analysis,Participation
ParticipatoryLearning	Engagement,Collaboration,Creativity,Reflection
GroupDiscussion	Communication, Teamwork,AnalyticalAbility, Leadership
Flipped/Blended Learning	Pre-classPreparation,OnlineParticipation,In-class Engagement, Application of Knowledge