



COURSE DATASHEET

SEMESTER	I	BATCH	2026 -2029
COURSE NAME	Differential and Algebraic Techniques	COURSE CODE	26UMAGE1D03
COURSE UNITS	5	COURSE TYPE	Generic Elective Theory I
CONTACT HOURS (L-T-P)	4-2-0	CREDITS	5

COURSE OBJECTIVES	
1.	To inspire the student to get knowledge in basic Mathematical concepts
2.	To promote conceptual understanding and problem-solving skills
3.	To present a study on summation of series, Matrices, Trigonometry, Finite differences and the ability to analyze problems in a systematic and logical manner

COURSE OUTCOMES: On completion of the course the student will be able to...		
	CO Statement	Cognitive Level
CO1	To learn about summation of Binomial, Exponential and Logarithmic infinite series.	K1-K5 (Understand, Apply, Analyze and Evaluate)
CO2	Recognize the concept of certain types of matrices, Eigen values, Eigen vectors and Cayley Hamilton theorem.	K1-K5 (Understand, Apply, Analyze and Evaluate)
CO3	The learner will become proficient in expansion of Trigonometric series.	K1-K5 (Understand, Apply, Analyze and Evaluate)
CO4	To demonstrate knowledge in various types of hyperbolic functions.	K1-K5 (Understand, Apply, Analyze and Evaluate)
CO5	To understand the basic theory in Interpolation and its applications.	K1-K6 (Understand, Apply, Analyze, Evaluate and



Create)

SYLLABUS

UNIT	TOPICS	HOURS
1	Differential Calculus: n^{th} derivative, Leibnitz's formula for the n^{th} derivative of a Product (without proof). Book 2: Chapter 1: Sections: 1.1.1 & 1.1.2	15
2	Differential Calculus: Jacobians, Maxima and Minima of function of two variables Book 2: Chapter 1: Sections: 1.2 & 1.3-1.3.1, 1.3.2	15
3	Theory of Equations: Polynomial equations – Imaginary and irrational roots – Transformations of an equation by diminishing (or increasing) its roots by a constant, Reciprocal equations - Problems. Book 1: Chapter 3: Sections 3.1, 3.1.1, 3.2.2, 3.3	15
4	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 . Book 1: Chapter 6: Sections: 6.1-6.1.1, 6.1.2	15
5	Trigonometry (contd.): Hyperbolic functions, relations between circular and hyperbolic function, formulae in hyperbolic functions, real and imaginary parts - Inverse hyperbolic functions. Book 1: Chapter 6: Sections: 6.2-6.2.1, 6.2.2, 6.3	15
Note (if any)	Definitions and simple problems from all units may be asked in section A	Total Hours 75

TEXT/REFERENCE BOOKS/E - RESOURCES:

Text Books	1. Duraipandian P., Udayabaskaran S., Reprint: 2014, Allied Mathematics-Volume I, S. CHAND Publishers. 2. Duraipandian P., Udayabaskaran S., Reprint: 2014, Allied Mathematics-Volume II, S. CHAND Publishers.
Books For Reference	1. Abdul Rasheed A., Reprint: 2004, Allied Mathematics, Vijay Nicole Imprints Private Limited, Chennai 2. Singaravelu A., Reprint: 2018 Allied Mathematics, Meenakshi Agency, Chennai. 3. Venkatachalapathy S.G., Reprint: 2016, Allied Mathematics Margham Publications() 4. Kandasamy P., K. Thilagavathy K., Reprint: 2004,



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	Mathematics-I,II,S.Chand&CompanyPvt.Ltd. 5.ChandraSekaran,Nithya,Reprint:2017,Allied Mathematics I,DhanamPublications,
E-Learning Resources	1. https://www.learnbse.in/trigonometry-formulas/ 2. https://www.askitians.com/revision-notes/maths/trigonometric-functions/ 3. http://www.khullakitab.com/binomial-theorem-exponential-and-logarithmic-series/notes/mathematics/grade-12/30/practices 4. https://www.khanacademy.org/math/linear-algebra/alternate-bases/eigen-everything/v/linear-algebra-introduction-to-eigenvalues-and-eigenvectors 5. https://global.oup.com/uk/orc/biosciences/maths/reed/01student/numerical_tutorials/

PEDAGOGY(TEACHING METHODOLOGY):

- ChalkandTalk
- OnlineCoaching
- LCD
- Assignment
- Seminar
- Quiz
- Groupdiscussion
- E-LearningResources
- YouTubelinksandvideos

CO-POANDCO-PSOMAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6		PSO1	PSO2	PSO3
CO1	3	3	2	2	2	1		3	2	1
CO2	3	2	2	2	2	1		3	2	1
CO3	3	2	3	2	2	1		3	3	1
CO4	3	3	3	2	2	1		3	3	1
CO5	3	3	2	2	2	2		3	2	2
Average (Use only filled in cells for calculation)	3	2.6	2.4	2	2	1.2		3	2.4	1.2

CorrelationLevel:1-Weak2-Moderate3-Strong



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Assignment	Content Quality, Originality, Organization, references, Timely Submission
Seminar	Knowledge, Communication, Presentation, Q&A Handling, Confidence
Field visit	Observation Skills, Report writing, Analysis, Participation
Participatory Learning	Engagement, Collaboration, Creativity, Reflection
Group Discussion	Communication, Teamwork, Analytical ability, Leadership
Flipped/Blended Learning	Pre-Class preparation, Online participation, In-class engagement, Application of knowledge