

Professional Elective Subject of Mathematics in M. Tech. (AI & ML)

Title of the course : **Mathematics for AI & ML**
 Subject Code :
 Weekly load : 3 Hrs.
 Credit : 3 (Lecture 3; Tutorial 0; Practical 0)

LTP 4-1-0

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Linear Algebra	Basics of Matrix Algebra, Vector Space, Subspace, Basis and Dimension. Linear Transformations, Norms and Spaces, Orthogonal Complement and Projection Mapping. Eigenvalues and Eigenvectors, Special Matrices and Properties. Spectral Decomposition, Singular Value Decomposition. Classification Metrics, Gram Schmidt Process and QR Decomposition.	16
	2. Calculus	Basics Concepts of Calculus, Gradient, Jacobian, Chain Rule, Change of Variables. Gradient Concept, Gradient Algorithms- local/global maxima and minima.	7
Unit-2	3. Probability	Expectation and Variance. Discrete and Continuous Distribution Functions. Probability Distributions- Binomial, Poisson, Normal and Exponential. Joint Probability and Covariance. Marginal Distribution.	11
	4. Statistics	Linear and Multiple Regression, Logistic Regression, Least Square Approximation and Minimum Normed Solution. Maximum Likelihood Estimation, Prior and Posterior, Maximum a Posteriori Estimation. Principal Component Analysis, Linear Discriminant Analysis.	11

Total=45

Books and References

1. W. Cheney, Analysis for Applied Mathematics. New York: Springer, 2001.
2. S. Axler, Linear Algebra Done Right (Third Edition). Springer, 2015.
3. F. Zhang, Matrix Theory: Basic Results and Techniques, New York: Springer, 2011.
4. J.S. Rosenthal, A First Look at Rigorous Probability Theory (Second Edition). Singapore: World Scientific Publishing, 2006.
5. R.A. Johnson and D.W. Wichern, Applied Multivariate Statistical Analysis, New Jersey: Pearson, 2015.

Head
 Department of Mathematics
 Sant Longowal Institute of Engg. & Tech.
 Longowal, Distt. Sangrur (Pb.) - 148106

Applicable with effect from academic session 2024-25

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M. Tech. (AI & ML)

SYLLABUS & SCHEME

(From the Academic Year 2024-25 Onwards)

BOARD OF STUDY



DEPARTMENT OF MATHEMATICS

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY

(Deemed to be University under Ministry of Education, Govt. of India)

Longowal – 148106 (Punjab) INDIA

Head
Department of Mathematics
Sant Longowal Institute of Engg. & Tech.
Longowal, Distt. Sangrur (Pb.) - 148106

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Chairman

[Signature]

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Sunder

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