II Year II Semester	L	Т	Р	С	
Code:20MA4711	3	0	0	3	
MATHEMATICAL FOUNDATIONS FOR AI & ML (Minors)					

Course Objectives:

At the end of semester, the students able to understand the concepts of:

1. The purpose of this course is to provide a mathematically rigorous introduction to these developments with emphasis on methods and their analysis.

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

	COURSE OUTCOMES	BT
CO1	Determine whether or not particular subsets of a vector spaces are linearly	
COI	independent.	
CO2	Understand inner products and associated norms.	1, 2, 3
CO3	Understand the concepts of probability distributions.	1, 2, 3
CO4	Explain sampling distribution, estimation and confidence intervals.	1, 2, 3, 4
CO5	Understand how to find nature as well as the amount of relationship	1, 2, 3, 4, 5
005	between the human variables.	1, 2, 3, 4, 5

CO – PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	1	-	-	-	-	-	-	-	-	-	1
2	2	2	-	-	_	-	-	-	-	-	-	1
3	2	2	-	-	_	-	-	-	-	-	-	1
4	2	2	-	-	-	-	-	-	-	-	-	1
5	2	2	-	-	-	-	-	-	-	-	-	1

CO–**PSO** Mapping

	CSE						
CO	PSO1	PSO2	PSO3				
1	2	-	-				
2	2	-	-				
3	2	-	-				
4	2	-	-				
5	2	-	-				

CSO Dept.

UNIT- I

Linear Algebra: Vector Spaces, Linear Independence, Basis and Rank, Linear Mappings - affine spaces

UNIT-II

Analytic Geometry: Norms, Inner Products, Lengths and Distances, Angles and Orthogonality, Orthonormal Basis, Orthogonal Complement, Inner Product of Functions, Orthogonal Projections.

UNIT-III

Probability and Distributions: Construction of a Probability space, Discrete and Continuous probabilities, sum rule, product rule and Bayes Theorem, Summary statistics and Independence, Gaussian Distribution.

UNIT-IV

Introduction – Population and samples – Sampling distribution of Means and Variance (definition only) – Central limit theorem (without proof) – Introduction to t, χ^2 and F-distributions – Point and Interval estimations –Standard error and Maximum error of estimate.

UNIT-V

Method of least squares – Straight line – Parabola – Exponential – Power curves. Regression - Regression coefficients and properties – Curvilinear Regression, Multiple Regression - Correlation – correlation coefficient – Rank correlation

Text Books:

- 1. https://mml-book.github.io/book/mml-book.pdf c 2021 M. P. Deisenroth, A. A. Faisal, C. S. Ong. Published by Cambridge University Press (2020).
- 2. Miller and Freund's, Probability and Statistics for Engineers, 7/e, Pearson, 2008.

Reference Books:

- 1. Shron L. Myers, Keying Ye, Ronald E Walpole, Probability and Statistics Engineers and the Scientists,8th Edition, Pearson 2007.
- 2. Jay l. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage.
- 3. Sheldon M. Ross, Introduction to probability and statistics Engineers and the Scientists, 4th Edition, Academic Foundation, 2011.
- 4. Johannes Ledolter and Robert V. Hogg, Applied statistics for Engineers and Physical Scientists, 3rd Edition, Pearson, 2010.
- 5. Probability, Statistics and Random Processes, Murugesan, Anuradha Publishers, Chennai.

Web Links:

- 1. https://onlinecourses.nptel.ac.in/noc17_ma17/preview
- 2. https://onlinecourses.nptel.ac.in/noc16_ma03/preview
- 3. https://www.youtube.com/watch?v=1VSZtNYMntM