Lesson Plan

Session: July-December 2026 Subject Name: **Mathematics for Data Science**

Subject Code: **CS 5301** Course Instructor: Dr. Parikshit Saikia

Course AIM: The course will introduce the fundamental concepts of probability, statistics, and linear algebra, required for a programme in data science.

Course outcome (CO): At the end of the course students are expected to,

1. be able to use the basic concepts of probability and how it can be used in the field of data science
2. be able to use the basic concept of descriptive statistics and how it can be used in the field of data science to design an intelligent system
3. be able to use basic concept of matrix algebra and how it can be used to design an intelligent system

Unit	Topic	Sub-topics	COs	Number of Lectures
Unit I	**Theory of Probabilities**	Axioms of Probability	1	12
		Conditional Probability	1	
		Bay's Rule	1	
		Discrete Random Variables	1	
		Continuous Random Variables	1	
		Probability Mass Function	1,2	
		Probability Distributed Function	1	
		Mathematical expectation, variance, and standard deviation	1,2	
		Moments and moment generating functions	1,2	
		Binomial and Poisson Distributions	1,2	
		Normal Distributions	1,2	
Unit II	**Descriptive Statistics**	Scope of statistics	1,2	14
		Statistical population and samples	1	
		Quantitate and qualitative data, attributes, and variables	1	
		Scale of measurement, nominal, ordinal, and ratio	1,2	
		Data presentation: tabular, graphical histogram	1	
		Data consistency and independence	1,2	
		Measure of central tendency	1,2	
		Measure of dispersion: range, quartile, and mean	1,2	
		Measure of dispersion: coefficient of variations, absolute moments, and factorial moments,	1,2	
		Skewness and kurtosis	1	
		Bivariate data: scatter diagram, simple, partial, and multiple correlation (3 variables)	1,2	
		Rank correlation	1	
		Linear regression	1	
		Principle of least squares and fitting of polynomials	1,2	
		Exponential curves	1	
Unit III	**Matrices**	Linear and orthogonal transformations	1	12
		Linear dependence vectors	1	
		Characteristic equations	1	
		Eigen values and Eigen vectors	1,3	
		Cayley-Hamilton theorem	3	
		Reduction of Diagonal form	3	
		Orthogonal transformation	3	
		Sylvester's Theorem	3	
		Solution to Second order LDE with constant coefficients by matrix method.	3	
		Finding Largest Eigen value and Eigen vector by iteration method	3	
	Total number of lectures			40

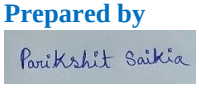
Evaluation Plan

Sl. No.	Component		% of Marks
1	Mid Semester Exam		30%
2	End Semester Exam		50%
3	Sessional	Attendance/ Assignment/Surprised Test / Class Impression	10%
		Minor Exam	10%
	Total		100%

Text books:

1. Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication
2. Advanced Engineering Mathematics by Erwin Kreysizig, 8th Edition, Wiley India
3. Applied Mathematics for Engineers & Physicist by L.R. Pipes and Harville
4. Theory & Problems of Probability and Statistics by M.R. Spiegal ,Schaum Series, McGraw Hills.
5. **Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Elsevier, Fourth Edition**

Prepared by



Date: 14/08/2024

Dr. Parikshit Saikia
Assistant Professor
Department of Computer Science and Engineering
National Institute of Technoloogy Silchar
Assam 788010

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