

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
**(Formerly West Bengal University of Technology)**  
**Syllabus for B. Tech in CSE (Artificial Intelligence and Machine Learning)**  
**(Applicable from the academic session 2020-2021)**

**SEMESTER –V**

<b>Name of the Course: B. Tech in CSE(AI &amp; ML)</b>	
<b>Subject: Probability &amp; Statistics</b>	
<b>Course Code: PCCAIML 501</b>	<b>Semester: V</b>
<b>Teaching Scheme</b>	<b>Maximum Marks: 100</b>
<b>Theory: 3 hrs./week</b>	<b>Examination Scheme</b>
<b>Tutorial:</b>	End Semester Exam: 70
<b>Practical:0</b>	Attendance: 5
<b>Credit:3</b>	Continuous Assessment: 25
<b>Aim:</b>	
<b>Sl. No.</b>	
1.	The aim of this course is to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.
2.	The objective of this course is to familiarize the students with statistical techniques.
<b>Objective:</b> Throughout the course, students will be expected to demonstrate their understanding of probability & statistics by being able to learn each of the following	
<b>Sl. No.</b>	
1.	The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
2.	The basic ideas of statistics including measures of central tendency, correlation and regression.
3.	The statistical methods of studying data samples.
<b>Pre-Requisite:</b>	
<b>Sl. No.</b>	
1.	Knowledge of basic algebra, calculus.
2.	Ability to learn and solve mathematical model.

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Contents		Hrs./week	Contents
Chapter	Name of the Topic	Hours	Marks
01	Definition of Partial Differential Equations, First order partial differential equations, solutions of first order linear PDEs; Solution to homogenous and nonhomogeneous linear partial differential equations of second order by complimentary function and particular integral method. Second-order linear equations and their classification, Initial and boundary conditions, D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Heat diffusion and vibration problems, Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables.	16	20
02	Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality. Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities. Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.	16	25
03	Basic Statistics, Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, Tests for single mean, difference of means, and difference of standard deviations. Test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.	16	25
	Sub Total:	48	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	52	100

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**Assignments:**

Based on the curriculum as covered by subject teacher.

**List of Books**

**Text Books:**

<b>Name of Author</b>	<b>Title of the Book</b>	<b>Edition/ISSN/ISBN</b>	<b>Name of the Publisher</b>
Erwin Kreyszig	Advanced Engineering Mathematics	9 th Edition	John Wiley & Sons
N. G. Das	Statistical Methods	0070083274, 9780070083271	Tata Mc.Graw Hill
Reena Garg	Advanced Engineering Mathematics	First Edition	Khanna Publishing

**Reference Books:**

P. G. Hoel, S. C. Port and C. J. Stone	Introduction to Probability Theory		Universal Book Stall
W. Feller	An Introduction to Probability Theory and its Applications	3rd Ed.	Wiley
Manish Sharma, Amit Gupta	The Practice of Business Statistics	First Edition	Khanna Publishing House