RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Teaching & Examination Scheme
M.Tech.: Computer Science and Engineering
1st Year –I Semester

S. No	Course Type	Course Code	Course Name	Contact Hours per Week			Marks				Credits
				L	T	P	Exam Hrs	IA	ETE	Total	
1	PCC	1MCS1-01	Statistical Methods in Computer Science	3	0	0	3	30	70	100	3
2	PCC	1MCS1-02	Digital Forensics	3	0	0	3	30	70	100	3
3	PEC	1MCS2-11	Machine Learning	3	0	0	3	30	70	100	3
		1MCS2-12	Security Assessment and Risk Analysis								
		1MCS2-13	Computer Vision								
4	PEC	1MCS2-14	Computational Intelligence	3	0	0	3	30	70	100	3
		1MCS2-15	Malware Analysis & Reverse Engineering								
		1MCS2-16	Data Preparation and Analysis								
5	MCC	1MCC3-21	Research Methodology and IPR	2	0	0	2	30	70	100	2
6	PCC	1MCS1-06	IoT Based Systems Design Lab	0	0	4	4	60	40	100	2
7	PCC	1MCS1-07	Network Simulation and Security Analysis Lab	0	0	4	4	60	40	100	2
8	SODE CA	1MCS5-00	Social Outreach Discipline & Extra Curriculum Activities							100	0.5
			Total	14	0	8		270	430	800	18.5

L: Lecture, T: Tutorial, P: Practical, Cr: Credits
ETE: End Term Exam, IA: Internal Assessment

Office of Dean Academic Affairs
Rajasthan Technical University, Kota

RAJASTHAN TECHNICAL UNIVERSITY, KOTA

1MCS1-01: Statistical Methods in Computer Science

Core Subjects:

Course Code	
Course Name	Statistical Methods in Computer Science
Credits	3
Pre-Requisites	Discrete Mathematics

Total Number of Lectures:40

COURSE OBJECTIVE
• To understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.
• To develop the understanding of the mathematical and logical basis to many modern techniques in information technology like machine learning, programming language design, and concurrency.
• To study various sampling and classification problems.

LECTURE WITH BREAKUP	NO. OF LECTURES
Unit 1 Introduction: Probability mass, density, and cumulative distribution functions, Parametric families of distributions, Expected value, variance, conditional expectation, Applications of the univariate and multivariate Central Limit Theorem, Probabilistic inequalities, Markov chains	6
Unit 2 Sampling: Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood,	4
Unit 3 Introduction to multivariate statistical models: Statistical inference, Introduction to multivariate statistical models: regression and classification problems, principal components analysis, The problem of overfitting model assessment.	5
Unit 4 Graph Theory: Isomorphism, Planar graphs, graph colouring, Hamilton circuits and Euler cycles. Permutations and Combinations with and without repetition. Specialized techniques to solve combinatorial enumeration problems.	10
Unit 5 Computer science and engineering applications: Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.	10
Unit 6 Recent Trends: Recent Trends various distribution functions in mathematical field of computer science for varying fields like bioinformatic, soft computing, and computer vision.	5

References:

1. John Vince, Foundation Mathematics for Computer Science, Springer.
2. K. Trivedi Probability and Statistics with Reliability, Queuing and Computer Science Applications. Wiley.

3. M. Mitzenmacher and E. Upfal.Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
4. Alan Tucker, Applied Combinatorics, Wiley
5. An Introduction to Statistical. Learning. Gareth James. Daniela Witten. Trevor Hastie.

Course Outcome:

Course Code	Course Name	Course Outcome	Details
	Statistical Methods in Computer Science	CO 1	To understand the basic notions of discrete and continuous probability.
		CO 2	To understand the methods of statistical inference, and the role that sampling distributions play in those methods.
		CO 3	To be able to perform correct and meaningful statistical analyses of simple to moderate complexity.