Course Code	Course Title	L	T	P	C
PMAT501L	Probability and Statistics	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			

Course Objectives:

1. To understand and apply relevance of Probability and Statistical Theory to various data analysis situations.
2. To analyse distributions and relationship of real-time data.
3. To compare and conclude on testing methods making inference to predict modelling techniques for decision making.

Course Outcomes:

1. Identifying the basic probability concepts using real time problems.
2. Understanding the facts of random variables and find an appropriate distribution for analysing data specific to an experiment.
3. Apply statistical methods like correlation, regression analysis in analysing, interpreting experimental data.
4. Make appropriate decisions using statistical inference that is the central to experimental research.
5. Analyse estimation and relate the testing methods to make inference and modelling techniques for decision making.

Module:1	Probability	6 hours

Probability – The axioms of probability – Conditional probability – Multiplication rule- Theorem of total probability- Bayes theorem – Independence of events.

Module:2	Random Variables	6 hours

Discrete and continuous random variables – probability mass, probability density and cumulative distribution functions - Joint distributions – Marginal and conditional distributions – Product moments – Covariance.

Module:3	Correlation and Regression	6 hours

Mathematical expectation - Moments – Moment generating functions – Characteristic function - Correlation and linear regression – Partial correlation- Multiple correlation - Multiple linear regression.

Module:4	Distributions	6 hours

Discrete distributions - Binomial, Poisson, Geometric – Continuous distributions – Uniform - Exponential – Gamma – Weibull – Beta -Normal distributions.

Module:5	Testing of Hypothesis – Large samples	7 hours

Sampling distributions – Estimation of parameters – Statistical hypothesis – Large sample tests based on Normal distribution for single mean - Difference of means – single proportion - difference of proportion – Difference of standard deviations.

Module:6	Testing of Hypothesis – Small samples	6 hours

Tests based on t, F distributions for mean, variance and proportion – Chi-square test - Contingency table – Goodness of fit.

Module:7	Non parametric Test	6 hours

Sign test-Rank sum test-Run test- Kruskal Wallis test-Mann Whitney U test-The Kolmogorov Smirnov and Anderson-Darling Tests.

Module:8	Contemporary Issues	2 hours

Industry Expert Lecture – Reliability Concepts		
	Total Lecture hours:	**45 hours**
Text Book(s)		
1.	Richard A Johnson, Probability and Statistics for engineers, 2018, 9th edition, Pearson Education Ltd, Malaysia.	
Reference Books		
1.	Ronald E Walpole, Raymond H Myers, Sharaon L Myers and Keying Ye, Probability Statistics for Engineers and Scientists, 2011, 9th Edition, Prentice Hall, Delhi.	
2.	Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, 2016, 6th Edition, John Wiley & Sons.	
3.	Robert V. Hogg, J.W. McKean, and Allen T. Craig, Introduction to Mathematical Statistics, 2012, 7th Edition, Pearson Education, Asia.	
Mode of Evaluation: CAT, Written Assignment, Quiz, FAT.		
Recommended by Board of Studies	06-06-2023	
Approved by Academic Council	No. 70	Date 30-06-2023