

## EC421: Data Analytics

Details of course:-

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Data Analytics	3	1	0	Undergraduate courses on probability theory, signal and system, and linear algebra.

### Course Objective:

The course objectives of this course are as follows:

1. To explore the fundamental concepts of data analytics.
2. To learn the statistical analysis techniques and probability distributions so that you can analyze different types of data.
3. Interpret the tools required to manage and analyze data analytics
4. To comprehend the various visualization and data exploratory techniques.
5. To learn descriptive statistics, inferential statistics, predictive statistics and Prescriptive analytics.
6. To develop the skills in using recent techniques for solving practical problems.

### Course Outcomes:

CO1: Explain the fundamental concepts of data analytics.

CO2: Demonstrate descriptive analytics.

CO3: Explain inferential statistics techniques.

CO4: Apply linear and multiple linear regression analyses.

CO5: Implement different methods of predictive analytics and their applications.

CO6: Design efficient algorithms to solve real-world problems using prescriptive analytics.

S. No.	Content	Contact Hours
Unit 1	Introduction to data analytics, Introduction to probability, sampling and sampling distributions, Hypothesis testing, Hypothesis Formulation, Handling Unstructured Data.	6
Unit 2	Descriptive Statistics: Introduction to the Descriptive Statistics, Probability Distributions, Data Visualization, Exploratory Data Analysis.	8
Unit 3	Inferential Statistics: Inferential Statistics through hypothesis tests,	8

	Permutation & Randomization Test.	
Unit 4	Basic analysis techniques include the Chi-Square test, t-Test, Analysis of variance, correlation analysis, two-sample testing, introduction to ANOVA (Analysis of Variance), Two-way ANOVA, and ANOVA regression.	8
Unit 5	Linear regression and multiple regression, Concepts of Maximum likelihood test (MLE) and Logistic regression, ROC and Regression Analysis Model Building.	6
Unit 6	Regression: Ordinary Least Squares, Ridge Regression, Lasso Regression, Elastic-Net Regression, K Nearest Neighbours Regression & Classification.	6
	Total	42

Books: -

S. No	Name of Books/Authors/Publisher
1.	Hastie, Trevor, et al., The elements of statistical learning. Vol. 2. No. 1. New York: Springer, 2009.
2.	Montgomery, Douglas C., and George C. Runger., Applied statistics, and probability for engineers. John Wiley & Sons.
3	Ian Goodfellow, Yoshua Bengio, and Aaron Courville Deep Learning MIT Press Ltd, Illustrated edition
4	Christopher M. Bishop Pattern Recognition and Machine Learning - Springer, 2nd edition