

Branch Name:	Artificial Intelligence & Data Science
Program Code	ET108
Course Name:	Data Science for Engineers
Course Code:	2ET1080401T
Pre-requisite Course:	-

Course Objective:

1. Understand engineering fundamentals and problem analysis.
2. Data science helps in managing, analysing and understanding trends in data leading to design the strategy for better profitability and results.
3. Available data need to be analysed to make quicker and better decisions. Data science helps in managing, analysing and understanding trends in data leading to design the strategy for better profitability and results.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)									Total (Marks)
					Theory (Marks)				Practical (Marks)					
	L	T	P	Total	SEE		CCA		SEE		CCA			
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
3	3	-	-	3	24	60	16	40	-	-	-	-	100	

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction to Business Analytics Why Analytic Business Analytics: The Science of Data-Driven Decision Making, Descriptive Analytics, Predictive Analytics, Prescriptive Analytics Descriptive, Predictive and Prescriptive Analytics Techniques, Big Data Analytics, Web and Social Media Analytics, Machine Learning Algorithms, Framework for Data-Driven Decision Making, Analytics Capability Building, Roadmap for Analytics Capability Building, Challenges in Data-Driven Decision Making and Future	6	15
2.	Descriptive Analytics Introduction to Descriptive Analytics, Data Types and Scales, Types of Data Measurement Scales, Population and Sample, Percentile, Decile and Quartile, Measures of Variation, Measures of Shape – Skewness and Kurtosis	6	15
3.	Introduction to Probability Introduction to Probability Theory, Probability Theory–Terminology, Fundamental Concepts in Probability – Axioms of Probability, Application of Simple Probability Rules – Association Rule Learning, Bayes’ Theorem, Random Variables, Probability Density Function (PDF) and Cumulative, Distribution Function (CDF) of a Continuous Random Variable, Binomial Distribution, Poisson Distribution, Geometric Distribution, Parameters of Continuous Distributions, Uniform Distribution, Exponential Distribution, Chi-Square Distribution, Student’s t-Distribution, F-Distribution	9	25
4.	Sampling and Estimation Introduction to Sampling, Population Parameters and Sample Statistic, Sampling Probabilistic Sampling, Non-Probability Sampling, Sampling Distribution, Central Limit Theorem(CLT), Sample Size Estimation for Mean of the Population, Estimation of Population Parameters, Method of Moments, Estimation of Parameters Using Method of Moments, Estimation of Parameters Using Maximum Likelihood Estimation	6	15

5	Simple Linear Regression Introduction to Simple Linear Regression, History of Regression–Francis Galton’s Regression Model, Simple Linear Regression Model Building, Estimation of Parameters Using Ordinary Least Squares, Interpretation of Simple Linear Regression Coefficients, Validation of the Simple Linear Regression Model, Outlier Analysis, Confidence Interval for Regression Coefficients b_0 and b , Confidence Interval for the Expected Value of Y for a Given X, Prediction Interval for the Value of Y for a Given X	7	20
6	Decision Trees Introduction Chi-Square Automatic Interaction Detection (CHAID), Classification and Regression Tree ,Cost-Based Splitting Criteria, Ensemble Method Random Forest	5	10

Course Outcome:

After learning this course student will analyse complex engineering problems.

- Student can analyse the whole natural sciences, and engineering sciences.
- Understand the impact of the professional engineering solutions in societal.
- Identify the data types, relation between data and visualization technique for data

List of Text Books:

1. Dinesh Kumar, Business Analytics, Wiley India
2. Data Science for Engineers By Raghunathan Rengaswamy, Resmi Suresh.
3. Data Science with Jupyter Author: Prateek Gupta, BPB publication

List of reference books:

1. V.K. Jain, Data Science & Analytics, Khanna Book Publishing, New Delhi
2. Data Science For Dummies by Lillian Pierson , Jake Porway

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom’s Taxonomy Level
CLO1	Determine the fundamental principles and algorithms of data science and engineering	1 Remembering
CLO2	Understand the data collection, data integration, data cleansing, data representation, model construction, model selection, model averaging, model evaluation, and model interpretation components in data science and engineering.	2 Understanding
CLO3	Apply how to identify data science and engineering components and provide efficient solutions in solving real-world problems.	3 Applying
CLO4	Get the ability to effectively communicate to impact technological decisions.	3 Applying, 2 Understanding

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes(POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1		M	M	L	L	M			L				H	L		
CLO2			M		L	M					L	L	H	M		
CLO3	L		L	H	M			M		L			L	M		
CLO4	M	M		L	M	H		M	L				M	L		

H:High, M:Medium, L:Low