

INTEGRATED MBA COURSE IN UNIVERSITY WITH SAMATRIX**2 Year MBA with Data Analytics and Data Visualization**

Semester	Name of Course	Total Credits
Sem 1	Overview of Data Science, Data Analytics and AI	3
Sem 2	Statistics and advance Data Analytics	3
Sem 3	Machine Learning for Business	3
Sem 3	Data Analysis and Visualization, Consumer behavior Analytics-tools &Tech	3
Sem 4	Project and Case Studies	6

OVERVIEW OF DATA SCIENCE, DATA ANALYTICS AND AI

SEMESTER: 1	Credit: 2-0-1
Software Req: MS Office 2013/2016 Version	Hours: 4 per Week

Objectives: The objective of this course is to teach students the vital data science, Data Analytics and AI concepts

UNIT – I

Introduction to Data Science: Defining Data Science and Big Data, Benefits and Uses of Data Science and Big Data, Facets of Data, Structured Data, Unstructured Data, Natural Language, Machine-generated Data, Graph based or Network Data, Audio, Image, Video, Streaming data, Data Science Process, Big data ecosystem and data science, Distributed file systems, Distributed programming framework, data integration framework, machine learning framework, No SQL Databases, scheduling tools, benchmarking tools, system deployments

UNIT – II

Data Science Processes: Six steps of data science processes, define research goals, data retrieval, cleansing data, correct errors as early as possible, integrating – combine data from different sources, transforming data, exploratory data analysis, Data modelling, model and variable selection, model execution, model diagnostic and model comparison, presentation and automation.

UNIT – III

Introduction to Machine Learning: What is Machine Learning, Learning from Data, History of Machine Learning, Big Data for Machine Learning, Leveraging Machine Learning, Descriptive vs Predictive Analytics, Machine Learning and Statistics, Artificial Intelligence and Machine Learning, Types of Machine Learning – Supervised, Unsupervised, Semi-supervised, Reinforcement Learning, Types of Machine Learning Algorithms, Classification vs Regression Problem, Bayesian, Clustering, Decision Tree, Dimensionality Reduction, Neural Network and Deep Learning, Training machine learning systems

UNIT – IV

Introduction to AI: What is AI, Turing test, cognitive modelling approach, law of thoughts, the relational agent approach, the underlying assumptions about intelligence, techniques required to solve AI problems, level of details required to model human intelligence, successfully building an intelligent problem, history of AI

Introduction to Data Analytics: Working with Formula and Functions, Introduction to Charts, Logical functions using Excel, Analyzing Data with Excel.

STATISTICS AND ADVANCE DATA ANALYTICS

SEMESTER: 2	Credit: 2-0-1
	No of Hours: 4 per week

Objectives: The objective of this course is to teach students the concepts of Statistics, probability, probability distribution, and other statistical methods to solve various engineering problems

UNIT – I

Introduction to Statistics: Introduction to Statistics. Role of statistics in scientific methods, current applications of statistics.

Scientific data gathering: Sampling techniques, scientific studies, observational studies, data management.

Data description: Displaying data on a single variable (graphical methods, measure of central tendency, measure of spread), displaying relationship between two or more variables, measure of association between two or more variables.

UNIT – II

Probability Theory: Sample space and events, probability, axioms of probability, independent events, conditional probability, Bayes' theorem.

Random Variables: Discrete and continuous random variables. Probability distribution of discrete random variables, binomial distribution, poisson distribution. Probability distribution of continuous random variables, The uniform distribution, normal (gaussian) distribution, exponential distribution, gamma distribution, beta distribution, t-distribution, χ^2 distribution. Expectations, variance and covariance. Probability Inequalities. Bivariate distributions

UNIT -III

Point Estimations: Methods of finding estimators, method of moments, maximum likelihood estimators, bayes estimators. Methods of evaluating estimators, mean squared error, best unbiased estimator, sufficiency and unbiasedness

Interval Estimations: Confidence interval of means and proportions, Distribution free confidence interval of percentiles

UNIT - IV

Test of Statistical Hypothesis and p-values: Tests about one mean, tests of equality of two means, test about proportions, p-values, likelihood ratio test, Bayesian tests

Bayesian Statistics: Bayesian inference of discrete random variable, Bayesian inference of binomial proportion, comparing Bayesian and frequentist inferences of proportion, comparing Bayesian and frequentist inferences of mean

MACHINE LEARNING FOR BUSINESS

SEMESTER: 3	Credit: 2-0-1
	No of Hours: 4 per week

Objectives: The objective of this course is to teach students the basic concepts of machine learning, supervised learning, unsupervised learning, and reinforcement learning

UNIT – I

Introduction: Learning systems, real world applications of machine learning, why machine learning, variable types and terminology, function approximation

Types of machine learning: Supervised learning, unsupervised learning, reinforcement learning

Important concepts of machine learning: Parametric vs non-parametric models, the trade-off between prediction accuracy and model interpretability, the curse of dimensionality, measuring the quality of fit, bias-variance trade off, overfitting, model selection, no free lunch theorem

UNIT – II

Linear Regression: Linear regression, estimating the coefficients, accessing the accuracy of coefficient estimates, accessing the accuracy of the model

Classification: Logistic regression, estimating regression coefficients, making predictions, multiple logistic regressions, linear discriminant analysis, bayes' theorem of classification,

UNIT – III

Resampling Methods, Model Selection and Regularization: Cross-validation, leave-one-out cross-validation, k-fold cross-validation, the bootstrap, subset selection, shrinkage methods, ridge and lasso regression, dimension reduction methods, principal components regression

Tree Based Methods: Advantages and disadvantages of trees, regression Trees, classification trees, bagging, random forest, boosting

UNIT – IV

Support Vector Machine: Maximum margin classifier, classification using a separating hyperplane, the maximal margin classifier, support vector classifier, support vector machines, classification with non-linear decision boundaries, support vector machine

Unsupervised Learning: Principle component analysis, what are principal components, clustering methods, k-means clustering, hierarchical clustering,

DATA ANALYSIS AND VISUALIZATION – TOOLS AND TECHNIQUES

SEMESTER: 3	Credit: 2-0-1
Software: Microsoft Office 2013 or 2016, Tableau Desktop, Power BI	No of Hours : 4 Per Week

UNIT - I

INTRODUCTION TO DATA HANDLING Overview of Data analysis, Introduction to Data visualization, Working with Logical and financial functions, Data Validation & data models, Power Map for visualize data , Power BI-Business Intelligence , Dashboard designing.

UNIT - II

INTRODUCTION TO DATA MANIPULATION USING FUNCTION: Heat Map, Tree Map, Smart Chart, Azure Machine learning , Column Chart, Line Chart , Pie,Bar, Area, Scatter Chart, Data Series, Axes , Chart Sheet , Trendline , Error Bars, Thermometer Chart , Gantt Chart , Pareto Chart etc , Frequency Distribution, Pivot Chart, Sensitivity Analysis, Histogram, Descriptive, Statistics, Anova, F-Test, t-Test, Moving, Average, Exponential Smoothing | Correlation model | Regression model, Practical Lab

UNIT – III

TABLEAU SOFTWARE: GETTING STARTED WITH TABLEAU SOFTWARE: What is Tableau? What does the Tableau product suite comprise of? How Does Tableau Work? Tableau Architecture, What is My Tableau Repository? Connecting to Data & Introduction to data source concepts, Understanding the Tableau workspace, Dimensions and Measures, Data Types & Default Properties, Building basic views, Saving and Sharing your work-overview, Practical Lab

UNIT - IV

Data Strategy & Consumer behaviour Analytics - Understanding Product & Category, Competitive Analysis, Market Share understanding- Market potential Index, Seasonality-Sales Trending, Consumer behaviour Analytics-MIND AND MARKET FACTORS, Budget planning & Execution- MIMI, Regression & Correlation Analysis for Sales trending, Forecasting method with predictive investment modelling.