Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2023-2024

Course Handout Part II

Date: 09-01-2024

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : MGTS F315
Course Title : Foundations of Business Analytics
Instructor-in-Charge : Prof. Rishi Kumar
Instructor : Prof. Vamsidhar Ambatipudi

Scope and Objective of the Course:

The scope of this course is to equip students with a deep understanding of advanced techniques and tools in the field of Business Analytics and Decision Science. The course will cover a wide range of topics spanning data analysis, statistical modeling, forecasting, optimization, and decision-making. It will enable students to apply these concepts to real-world business scenarios, fostering critical thinking and problem-solving skills.

Textbooks:

1. Evans, J. R. (2017). *Business analytics: Methods, models, and decisions*. Pearson.

Reference books

1. Albright, S. C., & Winston, W. L. (2020). *Business analytics: Data analysis and decision making*. Cengage Learning, Inc.
2. Kumar, U. D. (2017). *Business analytics: The science of data-driven decision making*. Wiley.

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1	Excel Basics for Business Analytics	Explore basic Excel functions and formulas relevant to business analytics.	Chapter 2
2	Advanced Excel Functions	Delve into more complex Excel functions (e.g., VLOOKUP, INDEX-MATCH)	Chapter 2
3	Data Cleaning	Practice data cleaning on sample datasets	Chapter 2

	Techniques in Excel		
4	Introduction to Excel Charts	Create basic charts (bar, line, pie) for data representation	Chapter 3
5	Advanced Charting and Dashboard Creation	Develop advanced charts (scatter plots, histograms) and simple dashboards.	Chapter 3
6	PivotTables in Excel	Create and manipulate PivotTables to analyze a dataset	Chapter 2
7	Descriptive Statistics with Excel Tools	Use Excel's statistical tools to calculate measures of central tendency and dispersion	Chapter 4
8	Data Visualization Best Practices	Create an informative, visually appealing Excel dashboard using a given dataset.	Chapter 3
9	Probability Concepts Application	Simulate probability scenarios using Excel functions	Chapter 5
10	Discrete Distribution Simulation	Model and simulate discrete distributions (e.g., binomial, Poisson).	Chapter 5
11	Continuous Distribution Simulation	Model and simulate continuous distributions (e.g., normal, uniform).	Chapter 5
12	Sampling Techniques and Applications	Execute different sampling techniques on a dataset.	Chapter 6
13	Confidence Intervals and Estimations	Calculate confidence intervals for given datasets.	Chapter 6
14	Hypothesis Testing in Excel	Perform one-sample and two-sample hypothesis tests using Excel.	Chapter 7
15	ANOVA and Chi-Square Tests	Conduct ANOVA and Chi-Square tests for a provided dataset.	Chapter 7
16	Simple Linear Regression Analysis	Perform simple linear regression analysis and interpret the results.	Chapter 8
17	Multiple Linear Regression Analysis	Conduct multiple linear regression and model validation.	Chapter 8
18	Regression Diagnostics and Assumption Testing	Check regression model assumptions and perform diagnostics.	Chapter 8
19	Time Series Analysis Basics	Analyze a time series dataset and identify trends.	Chapter 9

20	Advanced Time Series Analysis	Apply exponential smoothing and seasonality models to time series data.	Chapter 9
21	Forecasting Techniques	Create and compare different forecasting models.	Chapter 9
22	Introduction to Data Mining	Use basic data mining techniques on a sample dataset.	Chapter 10
23	Classification Techniques in Data Mining	Apply classification algorithms using Excel or other tools	Chapter 10
24	Clustering and Association Analysis	Conduct clustering and association rule mining on a dataset.	Chapter 10
25	Spreadsheet Model Building	Create a basic decision-making model in Excel.	Chapter 11
26	Advanced Spreadsheet Modeling	Develop an advanced, multi-functional business model in Excel.	Chapter 11
27	Sensitivity Analysis in Spreadsheet Models	Conduct sensitivity analysis on a business model.	Chapter 11
28	Monte Carlo Simulation Basics	Implement a simple Monte Carlo simulation in Excel.	Chapter 12
29	Advanced Monte Carlo Simulations	Create a complex Monte Carlo simulation for risk assessment.	Chapter 12
30	Linear Optimization Modeling	Build and solve linear optimization problems in Excel.	Chapter 13
31	Advanced Linear Optimization Challenges	Tackle more complex linear optimization scenarios.	Chapter 14
32	Integer and Binary Optimization	Solve integer and binary optimization problems	Chapter 15
33	Decision Analysis with Decision Trees	Construct and analyze decision trees for business decisions.	Chapter 16
34	Scenario Analysis in Decision Making	Perform scenario analysis on a business case.	Chapter 16
35	Applying Descriptive Analytics on Real-World Data	Use a real-world dataset to apply descriptive analytics techniques.	Chapter 4

36	Predictive Analytics Case Study	Work through a case study focusing on predictive analytics.	Chapter 10
37	Prescriptive Analytics through Optimization	Apply prescriptive analytics to a business optimization problem.	Chapter 14
38	Data Integration and Preparation	Practice integrating and preparing diverse data sources for analysis.	All
39-40	End-to-End Analytics Project	Execute a mini-project covering all phases of business analytics on a given dataset.	All

Learning Outcome:

1. **Data Mastery**: Acquire comprehensive data analytics skills, including data manipulation, visualization, statistical analysis, and modeling, to extract valuable insights from data.
2. **Probabilistic Decision Making**: Develop proficiency in probability theory, statistical inference, and hypothesis testing, enabling informed and confident decision-making under uncertainty.
3. **Predictive Analytics**: Learn regression techniques, time series analysis, and forecasting methodologies to make accurate predictions and identify trends in business data.
4. **Optimization and Risk Assessment**: Apply optimization techniques, both linear and integer, to optimize resource allocation and solve complex decision problems. Utilize Monte Carlo simulation to assess and mitigate risks in decision-making.
5. **Decision Support and Insights**: Gain expertise in decision analysis, data mining, and multi-criteria decision-making, allowing for data-driven insights and the formulation of effective strategies in diverse business scenarios.

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Quiz 1	15 min	10%	30-Jan-24	Closed Book
Quiz 2	15 min	10%	20-Feb-24	Closed Book
Integrated Project (Individual)		30%	7-May-24	Open Book
Mid-Sem		20%	14/03 - 2.00 - 3.30PM	Closed Book
Compre		30%	15/05 FN	Open Book

Chamber Consultation Hour: 9:00 AM to 2:30 PM on Tuesdays and Thursdays (K 226)

Notices: All notices pertaining to this course shall be displayed on the **Economics and Finance (or) CMS Notice Board.**

Make-up Policy: Make-up will be granted only on genuine grounds and if prior permission is taken. Make-up application via sms/ messages is not acceptable; only communication through official email will be entertained.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE
MGTS F315