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**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:**

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| **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 Techniques in Excel | Practice data cleaning on sample datasets | Chapter 2 |
| 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:**

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| **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***