FOUNDATIONS OF BUSINESS ANALYTICS

23MBPE661

(COURSE HANDBOOK)

MBA

COURSE CO-ORDINATOR:

Asso. Prof. Dr Jayashri Shetty

1. GENERAL INFORMATION

Welcome to Foundations of Business Analytics course!

This course provides a comprehensive introduction to the principles, techniques, and tools of business analytics, a critical skill for leveraging data to drive strategic decision-making in today's competitive environment. Designed for aspiring analysts, business professionals, and decision-makers, this course focuses on using data to uncover insights, predict outcomes, and support informed decision-making.

The curriculum is structured into five interconnected modules, beginning with an overview of business analytics, including its importance, evolution, and ethical considerations. Subsequent modules will explore data preparation and cleaning, descriptive analytics, predictive modeling techniques, and the use of leading analytics tools such as Excel, Power BI, and Python libraries like Pandas and Scikit-learn. You will also learn to interpret analytical outputs critically and communicate insights effectively to stakeholders.

Throughout the course, you will engage in hands-on, project-based activities aimed at enhancing your ability to apply business analytics concepts in practical scenarios. These activities will include analyzing datasets, building predictive models, and creating dashboards that provide actionable business insights. Collaborative projects and case studies will further develop your problem-solving skills and ability to work effectively in teams.

This course emphasizes experiential learning and practical application. You will be encouraged to explore real-world business problems, apply analytics techniques to solve them, and reflect on the value of data-driven decision-making. By the end of this module, you will not only have a strong foundation in business analytics theory but also the ability to apply analytics tools and methodologies to drive organizational success.

We are excited to begin this analytical journey with you and are confident that this course will equip you with the skills and knowledge to excel in the field of business analytics. Be sure to review the course handbook, as it includes essential information on learning outcomes, assessment criteria, and additional resources. Let's make this semester a productive and transformative learning experience

1.1.Course Objectives

This course is designed to:

- **Impart Knowledge of Business Analytics Basics** and its significance in enhancing business decision-making.

- **Introduce Basic Programming techniques for Data Analysis to** students to perform effective data analysis.

- **Acquaint with Database Systems and SQL Queries by** familiarizing students with the fundamentals of database systems and the process of framing SQL queries.

- **Familiarize with Descriptive Analytics and Data Transformation** for meaningful data interpretation.

1.2.Course Outcomes

At the end of the course, students will be able to:

- **CO1**: Summarize the basics of analytics and its importance in business decisions.
- **CO2**: Make use of Excel and Python to perform descriptive data analysis.
- **CO3**: Experiment with cleaning, transforming, and aggregating data for analysis.
- **CO4**: Analyze business data for effective managerial decision-making.
- **CO5**: Employ SQL for querying and managing business data in databases.

1.3.Set Text and Suggested Sources

All the below mentioned books are available in the 1st Floor Library.

Key Text Books:

1. U. Dinesh Kumar, "Business Analytics: The Science of Data-Driven Decision Making", Wiley, 2nd Edition, November 2021
2. Alexander, Michael. "Microsoft Excel Power Pivot & Power Query for Dummies". Wiley, 2016
3. William McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2017
4. Cathy Tanimura, "SQL for Data Analysis", O'Reilly, 1st Edition, 2021.

Reference Books:

1. Thomas H. Davenport and Jeanne G. Harris , "Competing on Analytics" , Harward Business Press, 2007
2. Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts", McGraw-Hill, 7th Edition, 2019

2. THE COURSE

2.1.Course Description

FOUNDATIONS OF BUSINESS ANALYTICS			
Semester	**III**	CIE Marks	**50**
Course Code	**23MBPE661**	SEE Marks	**50**
Teaching Hrs/Week (L:T:P)	**2:0:2**	Exam Hrs	**03**
Total Hrs	**50 (26+24)**	Credits	**03**

The Foundations of Business Analytics course designed to provide students with a comprehensive understanding of analytical techniques, programming skills, and data management tools necessary to transform raw data into actionable insights that drive informed business decisions. The course will run for 13 weeks during Semester III and consists of 5 modules that cover essential topics in data visualization. Each week includes 4 lectures, delivered by Mr. Raghupati Pai (Professor of Practise), focusing on theoretical concepts, practical applications, and course-related activities. Spanning a

total of 50 hours, this 3-credit course is assessed through Continuous Internal Evaluation (CIE) for 50 marks and a Semester-End Examination (SEE) for 50 marks.

2.2.Initiating Contact with Staff and Other Students

We value your inquiries about the course; please use in-class hours, office hours and emails thoughtfully and check previous materials such as this handbook and MITE's official website before reaching out. Engaging with peers will also enhance your understanding and foster a supportive academic community.

2.3.Resources

Resources encompass a range of dynamic tools, including digital libraries, e-learning platforms, and research databases that facilitate modern learning. These resources provide students with convenient access to academic materials, interactive courses, and the latest research, empowering them to excel in their fields. Through the college website, students can access additional resources such as the VTU Consortium, open-access repositories, and government portals like NPTEL and NDLI, which offer e-books, research papers, video lectures, and interactive tutorials for a flexible learning experience.

E-learning and digital library can be accessed via the college website https://mite.ac.in/ (Campus Life section > Library > VTU Consortium/e-learning platforms/additional sources).

2.4.Staff

Course Co-odinator: Dr. Jayashri Shetty
Cabin: 3rd floor, PG Block
Email: jayashri@mite.ac.in

2.5.Topics and Reading materials for each module

Module 1 *No. of Hours: 10*

- **Topic: Introduction to Business Analytics**
  - Business Analytics- meaning, evolution and scope; Need for data-driven decision making, Real- world Applications of Business Analytics across various industry verticals; Types of Business Analytics; Overview of Analytical cycle; Skills required for Successful Business Analytics Professional - Understand BA roles and Responsibilities; Popular Business Analytics Tools – MS Excel, R, SPSS, MS Power BI, Tableau, Python Libraries.

- **Essential Readings:**
  - U. Dinesh Kumar, "Business Analytics: The Science of Data-Driven Decision Making", Wiley, 2nd Edition, November 2021. (Chapter 1)

- **Additional Reading:**
  - Thomas H. Davenport and Jeanne G. Harris , "Competing on Analytics" , Harward Business Press, 2007. (Chapter 1)

Module 2 *No. of Hours: 6+6*

- **Topic: Descriptive data analytics with Spread sheets**
  - Excel charts – Histograms, Bar and pie charts, multi-category bar charts, Box plots, pair plots, scatter plots, plotting mathematical expressions, Matrix plots, and heat maps.
    Data analysis using Pivot tables - Power Pivot, Descriptive statistics and data distributions, Simple Hypothesis testing and linear regression.

- **Lab Components:**
  - Generate histograms, Bar and pie charts, multi-category bar charts, Box plots, pair plots, scatter plots, Matrix plots, and heat maps using MS Excel.

- **Essential Reading:**
  - Essential Reading: Alexander, Michael. "Microsoft Excel Power Pivot & Power Query for Dummies". Wiley, 2016. (Chapter 1 to 5)

- **Additional Reading:**
  - Etheridge Denis, "Microsoft Excel Data Analysis", Wiley, 2010. (Chapter 10)

Module 3 *No. of Hours: 6+6*

- **Topic: Data Transformation**
  - Power Query, Importing and combining data from different sources such as files, web and databases; data clean up, formatting, handling missing and duplicate values; splitting, merging and aggregating data.

- **Lab Component:**
  - Extract, transform and load through power query.

- **Essential Reading:**
  - Alexander, Michael. "Microsoft Excel Power Pivot & Power Query for Dummies". Wiley, 2016. (Chapter 8 & 9)

- **Additional Reading:**
  - You Tube Video - Why every Excel User Needs Power Query and Power Pivot. https://www.youtube.com/watch?v=CLClvAGr0EY\

Module 4 *No. of Hours: 2+6*

- **Topic: Introduction to data analysis**
  - Introduction to Python libraries – Numpy, Pandas, Matplotlib; Data structures in pandas – Series and Data Frames, creation of data frames from dictionary of series and text/CSV files, operations on row and columns, joining/merging/concatenation of data frames, exporting data from data frame to csv files. Data frame operations – Aggregation, group by and sorting; Descriptive statistics using Pandas.

- **Lab Components:**
  - Join/merge/concatenate data frames in Pandas.

- **Essential Reading**:
  - Python for Data Analysis: Data Wrangling with Pandas, NumPy, and python (Chapter 1 to 5)

- **Additional Links:**
  - YouTube Video: Python for Data Analytics - Full Course for Beginners https://www.youtube.com/watch?v=wUSDVGivd-8

Module 5 *No. of Hours: 2+6*

- **Topic: Introduction to DBMS and SQL**
  - Introduction, Database Environment, Working of a Simple Centralized Database System, Properties of Database, Traditional File System svs. Modern Database Management Systems, Types of Data base users, Advantages of using DBMS, Applications of traditional Database. Overview of SQL, Basic Queries

- **Lab Component:**
  - DDL(create/update/delete tables) and DML (select, insert, update and delete) queries in SQL

- **Essential Reading:**
  - Cathy Tanimura, "SQL for Data Analysis", O'Reilly, 1st Edition, 2021. (Chapter 1 and 2)

- **Additional Reading:**
  - Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts", McGraw-Hill, 7th Edition, 2019. (Chapter 3 and 4)

3. ASSESSMENT

The assessment for the Foundations of Business Analytics course is divided into two components: Continuous Internal Evaluation (CIE) and Semester End Examination (SEE), each accounting for 50% of the total marks.

Continuous Internal Evaluation (CIE) comprises two internal tests, scheduled for 8th and 14th week, which together contribute 30% of the total marks. Additionally, students can earn 20% through the completion of assignments. (10 marks is allotted for exercises in analytical tools and 10 marks is allotted for LAB Experiment (Practical Component).

Semester End Examination (SEE) constitutes the remaining 50% of the total marks which is in the form of a 3 hour examination. Key information regarding examination dates and related details can be accessed via the college website (Academics and Courses section > Calendar of Events > PG Odd Sem).

Rubrics for Assignment Evaluation (Total: 20 Marks / 40% of CIE)

1. Exercises in Analytical tools (10 Marks)				
Criteria	**10-9 Marks (Excellent)**	**8-7 Marks (Good)**	**6-5 Marks (Fair)**	**4-1 Marks (Poor)**
Completion	Completed all exercises with correct output. Works for all scenarios.	Completed all exercises with correct output. However, few defects found.	Completed most exercises with few defects	Incomplete or multiple defects found
Articulation	Able to articulate the solution clearly and able to explain the logic.	Somewhat able to articulate the solution	Significant gaps in articulation	Unable to articulate submitted solutions
Timeliness	Completed on time.	Completed slightly late.	Completed much later than due.	Missed the deadline.

2. Lab Experiment (10 marks)			
Practical Component	Experiment Conduction, Record & Viva	5	10
	Test	5	