BUSINESS STATISTICS AND ANALYTICS
25MBPC504

(COURSE HANDBOOK)

MBA

COURSE FACULTY:

Mr. Akshathraj Jain

1. GENERAL INFORMATION

Welcome to Business Statistics and Analytics!

This course serves as an essential introduction to the principles of Business Statistics and Analytics, tailored for students aiming to develop analytical and statistical proficiency in a dynamic business environment. Throughout this course, you will explore the theoretical foundations and practical applications of business analytics and statistics, preparing you to address real-world challenges effectively.

The curriculum is structured into five comprehensive modules, each designed to build upon the last. You will begin with the foundational concepts such as data analysis, probability distributions, and hypothesis testing, alongside advanced topics like business analytics, time series analysis, and descriptive statistics. Emphasis is placed on the integration of theoretical knowledge with practical exercises, fostering skills in data interpretation, prediction, and problem-solving using tools like Excel and Power BI.

As you progress through the course, you will be encouraged to actively participate in discussions and collaborative projects, which will not only deepen your comprehension but also foster essential skills such as teamwork and problem-solving. We emphasize a hands-on approach to learning; aiming to bridge academic insights with real-world scenarios, ensuring they are well-equipped for analytical roles in diverse domains.

We hope that this module will not only equip you with theoretical knowledge but also inspire you to apply these insights practically in your future careers. Please ensure you familiarize yourself with this handbook as it contains vital information regarding assessments, learning outcomes, and resources that will support your academic journey. We look forward to an engaging and productive semester together!

1.1 Course Objectives

- **Analytics Familiarization**: Familiarize foundational principles and importance of analysing data to derive meaningful insights for improving business strategies.
- **Data-driven decisions**: Analysing data to identify trends, probabilities, and risks, enabling informed, evidence-based choices.
- **Enhance Data Optimization**: Apply concepts of Analytics in data-based management.
- **Digital Literacy**: Familiarise students with use of computers and analytical techniques in decision making.

1.2 Course outcome

CO1: Apply statistical concepts to solve business problems
CO2: Analyze measures of descriptive statistics to identify patterns and insights in business data.
CO3: Utilize probability concepts and theoretical distributions to predict business outcomes.
CO4: Apply trends and seasonal variations in time series data to make informed business decisions.
CO5: Analyze and perform hypothesis testing using parametric and non-parametric methods to validate assumptions and support business strategies.

1.3 Set Text and Suggested Sources

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

Key Text Books:

1. S C Gupta (2024), Fundamentals of Mathematical Statistics, 12ed, Sultan Chand &Sons.
2. U. Dinesh Kumar (2022), Business Analytics- The science of data driven decision making - 2ed by Wiley Publication

Reference Books:

1. Levin RI and Rubin D.S. Statistics for management, 7th edition, Printice Hall of India Pvt ltd, New Delhi, 2021
2. J K Sharma (2020), Business Statistics 5 ed, Vikas Publishing House.
3. Dr Deepak Chawla & Dr Neena Sondhi (2022), Research Methodology, 2ed, Vikas Publications.
4. William E. Wagner, III (2020), Using IBM SPSS- Statistics for Research Methods and Social Science Statistics 7ed Sage Publications.

2. THE COURSE

2.1 Course Description

BUSINESS STATISTICS AND ANALYTICS			
Semester	**I**	CIE Marks	**50**
Course Code	**25MBPC504**	SEE Marks	**50**
Teaching Hours/Week (L:T:P)	**4:0:0**	Exam Hrs	**03**
Total Hours	**52**	Credits	**04**

The Business Statistics and Analytics course designed to provide students with foundational knowledge in business statistics and data analytics. The course will run for 13 weeks during Semester 1 and consists of 5 modules that cover essential topics in quantitative and an application to business/ management related problems. Each week includes 4 lectures,

delivered by Mr. Akshathraj Jain, focusing on theoretical concepts, practical applications, and course-related activities. Spanning a total of 52 hours, this 4-credit course is assessed through Continuous Internal Evaluation (CIE) for 50 marks and a Semester-End Examination (SEE) for 50 marks, with 3-hour exam duration. This structure ensures a balanced and engaging learning experience for students.

2.2 Initiating Contact with Staff and Other Students

We encourage open communication and value your inquiries about the Course. However, given the large number of students in this course, we encourage that you use email and any other forms of correspondence thoughtfully. Before reaching out with course questions, please check if your query has already been addressed in previous communications or in the materials provided in this handbook and on our website. Additionally, we encourage you to engage with your peers for discussions and collaborative learning, as this will enhance your understanding of the course material and foster a supportive academic community.

2.3 Resources

Resources go beyond just books—they include dynamic tools like digital libraries, e-learning platforms, and research databases. These modern learning environments offer anytime, anywhere access to academic materials, interactive courses, and cutting-edge research, empowering students to explore knowledge and excel in their fields.

Students can access a variety of resources through the college website. These include the VTU Consortium, e-learning platforms, and additional sources like open-access repositories, government portals (e.g., NPTEL, NDLI), These digital tools provide access to e-books, research papers, video lectures, and interactive tutorials, offering flexible and comprehensive learning environments.

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 Convenor: Mr. Akshathraj Jain
Cabin: 2nd floor, PG Block Email:
akshathraj@mite.ac.in

2.5 Topics and Reading materials for each module

Module 1 *No. of Hours: 10*

- **Topic: Business Analytics**
  - Meaning of Business Analytics, Analysis v/s Analytics, Data Analytics v/s Business Analytics v/s data science, Evolution of Business Analytics, Types of Business Analytics - Descriptive, Predictive, Prescriptive, Perspectives of Business Analytics – statistics, Computer science and Domain Knowledge. Role, Skills and responsibilities of an Analyst, Application of analytics in different domains of business (Marketing Analytics, Financial Analytics, HR Analytics, Supply chain Analytics, healthcare analytics Sports analytics, Web analytics, Weather Analytics)

- **Essential Readings:**
  - U. Dinesh Kumar (2022), Business Analytics- The science of data driven decision making - 2ed by Wiley Publication– Chapter 1 and 2

- **Additional Reading:**
  - Business Analytics: Data Analysis and Decision Making with MindTap, 7th Edition by S. Christian Albright/Wayne L. Winston - Chapter 1.

Module 2 *No. of Hours: 12*

- **Topic: Descriptive Statistics**
  - Measures of central tendency – Arithmetic men, Geometric mean, Harmonic mean. Mode, Median.
  - Measures of dispersion: Range deviation, Mean deviation, standard deviation variance, Coefficient of variation.
  - Measures of distribution – Quartiles, deciles, percentiles, z scores. Measures of association – Scatter charts, Co variance, correlation coefficient Types, and Methods, Karl Pearson correlation, Spearman's Rank correlation.

  Activities:
  - Students are required to select a publicly listed company from either the Bombay Stock Exchange (BSE) or the National Stock Exchange (NSE). For the selected company, students must collect the daily closing prices for a period of one year. Using the collected data, students are expected to perform a comprehensive analysis by applying all the descriptive statistical tools covered in this module. The objective of this activity is to help students understand and apply descriptive statistics in a real-world financial context.

- **Essential Reading:**
  - S C Gupta (2024), Fundamentals of Mathematical Statistics, 12ed, Sultan Chand &Sons – Chapter 5 & 6

- **Additional Reading:**
  - J K Sharma (2020), Business Statistics 5 ed, Vikas Publishing House – Chapter 3 & 4

Module 3 *No. of Hours: 11*

- **Topic: Probability Distribution**
  - Concept of probability, Baye's Theorem. Concept of Probability Distribution, Theoretical Probability Distributions - Binomial, Poisson, Normal.

- **Essential Reading:**
  - S C Gupta (2024), Fundamentals of Mathematical Statistics, 12ed, Sultan Chand &Sons – Chapter 12

- **Additional Reading:**
  - J K Sharma (2020), Business Statistics 5 ed, Vikas Publishing House – Chapter 7

Module 4 *No. of Hours: 10*

- **Topic: Time Series Analysis**
  - Objectives, Variations in Time Series. Measurement of Trend, Graphic Method, Moving Average Method, Semi-Average Method, Least Square Method. Measurement of Seasonal Variations- Method of Simple Averages, Ratio to trend method.

- **Activities:**
  - Students are required to select a publicly listed company and must collect the daily closing prices for a period of one year. Using the collected data, students are expected to perform a comprehensive analysis by applying Time Series tools covered in this module. The objective of this activity is to help students understand and apply descriptive statistics in a real-world financial context.

- **Essential Reading**:
  - S C Gupta (2024), Fundamentals of Mathematical Statistics, 12ed, Sultan Chand &Sons – Chapter 11

- **Additional Reading:**
  - J K Sharma (2020), Business Statistics 5 ed, Vikas Publishing House – Chapter 16

Module 5 *No. of Hours:09*

- **Topic: Hypotheses Testing**
  - Definition, Types – Null Hypothesis and alternate Hypothesis, Procedure for testing, Errors in hypotheses testing. Parametric and Non-Parametric Tests -t-test, z-test, f-test, Chi-square test, Analysis of Variance (ANOVA).

- **Activities:**
  - Students will select a research topic, collect data, formulate a hypothesis, and design a methodology for data collection. They will analyse the data using statistical methods to test the hypothesis. This activity provides hands-on experience in research design, data analysis, and applying statistical tools for problem-solving and decision-making.
- **Essential Reading:**
  - S C Gupta (2024), Fundamentals of Mathematical Statistics, 12ed, Sultan Chand &Sons – Chapter 16,17,18 &23

- **Additional Reading:**
  - J K Sharma (2020), Business Statistics 5 ed, Vikas Publishing House – Chapter 10

3 ASSESSMENT

The assessment for the Business Statistics and Analytics module 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 are allotted for descriptive analysis of selected stock under NSE /BSE, 10 marks are allotted for a hypothesis testing in module).

Semester End Examination (SEE) constitutes the remaining 50% of the total marks. 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 Other Assessment (Total: 20 Marks / 40% of CIE)

Descriptive Statistics Analysis (10 Marks)					
Criteria	**10 Marks**	**8 Marks**	**6 Marks**	**4 Marks**	**3 Marks**
Data Collection and Accuracy	Data is accurately collected and fully complete for the specified period. High integrity ensured.	Data is mostly accurate with minor gaps or inconsistencies .	Data is adequately collected but may have some missing points.	Data has noticeable gaps or errors.	Data is incomplete or inaccurate.
Application of Descriptive Statistics	All required statistics tools are correctly applied and accurately calculated.	Most statistics are correctly calculated, with minor errors.	Some statistics are miscalculated or missing.	Many errors in statistical application.	Little to no correct application of statistics.
Report Quality	Well-organized, professionally presented, and adheres to academic standards.	Mostly well-organized with minor errors.	Adequate structure but has some clarity and formatting issues.	Poorly structured with multiple errors.	Disorganized, unprofessional, or incomplete.

Hypothesis Testing (10 Marks)					
Criteria	**10 Marks**	**8 Marks**	**6 Marks**	**4 Marks**	**3 Marks**
Selection of Research Topic	The research topic is highly relevant, clear, original, and well-aligned with study objectives.	The topic is relevant and clear with minor gaps in originality or alignment.	The topic is somewhat relevant but lacks originality or clarity.	The topic is weakly relevant or unclear.	The topic is irrelevant or lacks clarity.
Hypothesis Formulation	A clear, well-structured, and testable hypothesis is formulated, demonstrating strong research understanding.	Hypothesis is clear and testable but could be more refined.	Hypothesis is somewhat testable but lacks clarity.	Hypothesis is vague and difficult to test.	No clear or testable hypothesis is formulated.
Report Presentation	Report is well-structured, error-free, professional, and meets academic standards.	Report is mostly well-structured with minor errors.	Report has clarity or formatting issues but remains readable.	Report is poorly structured with multiple errors.	Report is disorganized, unprofessional, or incomplete.