S P Mandali's
R. A. PODAR COLLEGE OF COMMERCE AND ECONOMICS
(EMPOWERED AUTONOMOUS),
Matunga, Mumbai-400019

Syllabus and Question Paper Pattern
for
Level 6
Honours (Business Analytics)

Syllabus as per the National Education Policy 2020
To be implemented from Academic Year 2026 - 2027

College Website: www.rapodar.ac.in

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R. A. PODAR COLLEGE OF COMMERCE AND ECONOMICS
(EMPOWERED AUTONOMOUS)

Matunga, Mumbai-400019

Syllabus and Question Paper Pattern
for

Honours (Business Analytics)

Level 6

Semester I and II

Syllabus as per the National Education Policy 2020
To be implemented from Academic Year 2026 - 2027

College Website: www.rapodar.ac.in

POST GRADUATE PROGRAM OUTCOMES :

Program Outcomes	Description
PO 1	Learners will acquire advanced knowledge in accounting principles, financial reporting, and taxation policies
PO 2	Learners will master the effective communication of complex financial information to diverse stakeholders through oral and written means
PO 3	Learners will develop critical thinking skills to analyze financial statements, interpret accounting regulations, and propose strategic financial solutions
PO 4	Learners will apply accounting principles to solve real-world financial challenges and make informed business decisions.
PO 5	Learners will employ analytical reasoning to interpret financial data, assess business performance, and support strategic planning.
PO 6	Learners will excel in conducting advanced research in accounting, showcasing proficiency in data collection, analysis, and interpretation.
PO 7	Learners will collaborate effectively with interdisciplinary teams to address complex accounting issues and achieve organizational goals.
PO 8	Learners will apply scientific reasoning to evaluate and propose innovative financial strategies and models.
PO 9	Learners will engage in reflective thinking, identifying areas for improvement and continuous learning in the field of accountancy
PO 10	Learners will leverage digital tools for effective access, evaluation, and synthesis of financial information.
PO 11	Learners will take initiative in ongoing professional development, engaging in self-directed learning to stay updated with evolving accounting standards
PO 12	Learners will demonstrate multicultural competence, showing sensitivity to diverse cultural perspectives in the global business environment.
PO 13	Learners will exhibit a strong ethical foundation, making decisions with integrity and considering the societal impact of financial practices.
PO 14	Learners will showcase leadership qualities, being capable of guiding financial teams and contributing to organizational success.
PO 15	Learners will recognize the importance of continuous learning, adapting to advancements in the field of accountancy throughout their professional careers.

Program Specific Outcomes: Honours. Business Analytics

Program Specific Outcomes	Description
PSO 1	Explain and interpret fundamental concepts of business analytics, financial analytics, and data visualization to understand their role in business decision-making.
PSO 2	Apply statistical computing tools (R, Excel) and analytical techniques to collect, process, and analyze business data for practical problem-solving.
PSO 3	Analyze structured and unstructured data using techniques such as data modeling, time series forecasting, and Machine Learning algorithms to identify patterns and trends.
PSO 4	Evaluate business strategies and decisions using analytical models in areas like marketing analytics, financial decision-making, and cyber risk management.
PSO 5	Design and develop data-driven solutions, predictive models, and visualization dashboards to address complex business problems.
PSO 6	Conduct research using appropriate methodologies while applying ethical standards and critically evaluating findings in academic and business contexts.
PSO 7	Develop innovative solutions through practical exposure in R-Lab and field projects by integrating analytical knowledge with real-world applications.
PSO 8	Assess emerging technologies and create analytics-driven strategies to enhance organizational performance and competitiveness.

Honours (Business Analytics) Programme
Syllabus as per National Education Policy 2020
Course Structure
(Level 6)
(To be implemented from Academic Year 2026-27)

No of Courses	Course Code	Semester I	Credits	No of Courses	Course Code	Semester II	Credits
1	**Major (08 Credits)**			**1**	**Major (08 Credits)**		
1.A.a		Introduction to Business Analytics	**04**	1.A.a		Financial Analytics and Decision Making using Excel	**04**
1.A.b		R-Lab	**04**	1.A.b		Data Visualization and Communication	**04**
1.B	**Major Elective (08 Credits)**			**1.B**	**Major Elective (08 Credits)**		
1.B.a		Introduction to Data Science - I	**04**	1.B.a		Introduction to Data Science - II	**04**
1.B.b		Statistical Computing	**04**	1.B.b		Time Series and Forecasting	**04**
1.B.c		Marketing Analytics and Customer Intelligence using R	**04**	1.B.c		Cyber Risk Management	**04**
2	**Research Methodology (06 credits)**			**2**	**On Job Training/ Field Project (06 Credits)**		
2.A.a		Research Methodology	**04**	2.A.a		On Job Training/ Field Project	**06**
2.A.b		Research Ethics and Academic Writing	**02**				
TOTAL CUMULATIVE CREDITS			**22**	**TOTAL CUMULATIVE CREDITS**			**22**

Exit option at the end of the First year (on completion of semester I and semester II):
A Post Graduate Diploma in Business Analytics will be awarded to a learner upon fulfillment of the following condition:
The learner must have acquired a total of 44 credits in Semesters I and II, considered together.

Semester I

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Introduction to Business Analytics (4 Credits)

1. Major	
1.A.a Introduction to Business Analytics (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To enable the learners to understand the scope of Business analytics in today's era.
CObj 2	To provide information pertaining to basics and principles of Business analytics
CObj 3	To develop learning and analytical skills of the learners to enable them to for Data visualization of multidimensional data
CObj 4	To acquaint the learners with recent developments and trends in Business analytics
Course Outcomes	
COut 1	Analyze and interpret data visualization, recognizing its importance in conveying complex information effectively and efficiently.
COut 2	Acquire the skill to Compare and contrast structured, semi-structured, and unstructured data, appreciating the challenges and opportunities each type presents in analytics.
COut 3	Understand the importance of data quality, and learn strategies for dealing with missing or incomplete data to ensure accurate and reliable analysis
COut 4	Evaluate the ethical and legal considerations in business analytics, recognizing the importance of responsible data usage and privacy protection.

Modules at a Glance

Introduction to Business Analytics		
Sr. No.	**Modules**	**No. of Lectures**
1	Basics of Business analytics	15
2	Visualization/ Data Issues	15
3	Introduction to Data Mining	15
4	Business analytics future trends	15
Total		**60**

Sr. No.	**Modules**
1	**Basics of Business analytics**
Concept of analytics, Types of Analytics, Application fields - Marketing Analytics, Finance Analytics, HR Analytics, Operation Analytics, Retail Analytics, Healthcare Analytics, Supply Chain Analytics - Role of Data Scientist in Business & Society	
2	**Visualization/ Data Issues**
Organization/sources of data - Structured Vs Semi structured Vs Unstructured data, Importance of data quality - Dealing with missing or incomplete data - Data Classification Types of Data Sources- Data Warehouse Vs Databases, Relational Database vs NonRelational Database, RDBMS Data structures, Columnar Data structures	
3	**Introduction to Data Mining**
Introduction to Data Mining -Data Mining meaning - Data Mining Process - Data mining tool - Market Basket Analysis, Association Rules and clustering, Decision trees, Random forests	
4	**Business analytics future trends**
Role of Artificial Intelligence in Business, Machine Intelligence, Competitive Intelligence, Text Mining, Web Analytics (Web content mining, Web usage mining, Web structure mining), Role of Intelligent Agents in e-business, e-commerce, m-commerce, Location Analytics, Intelligent Agent in search & retrieval, Personalization and Comparison), Social Networking Analysis, Big Data Tools & Techniques, Content Analytics (Sentimental Analysis & Opinion Analysis). Ethical and Legal considerations in Business Analytics	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Essentials of Business Analytics: An Introduction to the methodology and its application, Bhimasankaram Pochiraju, Sridhar Seshadri, Springer
- Ben Fry- Visualizing Data. Released December 2007. Publisher(s): O'Reilly Media, Inc.
- An Introduction to Business Analytics, Ger Koole, Lulu.com, 2019

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
R-Lab (4 Credits)

1. Major	
1.A.b R - Lab (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To equip students with a solid foundation in R programming syntax and core data structures (Vectors, Matrices, Lists) required for statistical computing.
CObj 2	To train students in managing and aggregating tabular business data (Data Frames) and handling temporal data for time-series analysis.
CObj 3	To introduce modern data wrangling techniques and advanced data visualization for generating automated, corporate-ready business reports.
CObj 4	To teach the application of statistical rigor and machine learning algorithms.
Course Outcomes	
COut 1	Write foundational R scripts to create, manipulate, and query diverse data structures for baseline data processing.
COut 2	Perform comprehensive exploratory data analysis (EDA) and time-series aggregations using modern R packages to clean and prepare messy business data.
COut 3	Design compelling, multi-variable data visualizations and synthesize them into automated, reproducible business reports using R Markdown.
COut 4	Build, interpret, and evaluate predictive statistical models to extract actionable insights and drive data-driven business decisions.

Modules at a Glance

R - Lab		
Sr. No.	**Modules**	**No. of Lectures**
1	Foundations of R & R Data Structures	15
2	Data Frames, Aggregation & Time Series	15
3	Modern Data Wrangling & Business Visualization	15
4	Predictive Modeling & Decision Analytics	15
Total		**60**

Sr. No.	**Modules**
1	**Foundations of R & R Data Structures**
Introduction to R Environment: R Data Structures, Help functions in R. **Vectors & Scalars:** Declarations, recycling, Common Vector operations, Using all and any, Vectorised operations, Handling NA and NULL values, Filtering, Vectorised if-then-else, Vector Equality, Vector Element names. **Matrices & Arrays:** Creating matrices, Matrix operations, Applying Functions to Matrix Rows and Columns, Adding and deleting rows and columns, Vector/Matrix Distinction, Avoiding Dimension Reduction, Higher Dimensional arrays. **Lists:** Creating lists, General list operations, Accessing list components and values, applying functions to lists, recursive lists.	
2	**Data Frames, Aggregation & Time Series**
Data Frames (The Business Standard): Creating Data Frames, Matrix-like operations in frames, Merging Data Frames, Applying functions to Data frames. **Categorical Data:** Factors and Tables, factors and levels, Common functions used with factors, Working with frequency tables. **Querying & Aggregation:** Indexing and Loading Dataframes, Querying a DataFrame, Merging Dataframes, Data Aggregation, and Group Operations. **Time Series Analytics:** Time Series basics in R, Date and Time Data Types and Tools, Date Ranges, Frequencies, and Shifting, Time Zone Handling, Periods and Period Arithmetic, Resampling and Frequency Conversion, Time Series Plotting, Moving Window Functions.	
3	**Modern Data Wrangling & Business Visualization**
Modern Data Manipulation (dplyr): Transitioning from base R to the tidyverse. Core verbs: select(), filter(), mutate() (creating business metrics), arrange(), and summarize() with group_by(). Using the pipe operator (|>) for readable workflows. **Handling Real-World Data:** Strategies for managing missing data (imputation vs. deletion) in business datasets. **Visual Storytelling (ggplot2):** The Grammar of Graphics. Creating corporate-ready visuals:	

Histograms (distributions), Bar charts (comparisons), Boxplots (outlier detection in transactions), and Scatter plots (correlations). **Advanced Visuals & Reporting:** Faceting (trellis graphs for multi-variable comparisons). Introduction to R Markdown for generating automated, reproducible HTML/PDF business reports.	
4	**Predictive Modeling & Decision Analytics**
Applied Business Statistics: Brief recap of central tendency/dispersion. **Hypothesis Testing in R:** T-tests (A/B testing for marketing campaigns) and ANOVA (comparing performance across multiple branches). **Forecasting with Regression:** Simple & Multiple Linear Regression. Predicting continuous outcomes (e.g., forecasting future sales revenue based on advertising budgets). Interpreting R-squared and p-values in a business context. **Classification Models:** Logistic Regression for predicting binary business outcomes (e.g., Customer Churn Analysis, Credit Default Scoring). **Market Segmentation:** Unsupervised Learning using K-Means Clustering. Applying the Elbow method. Case Study: Customer Segmentation (e.g., RFM analysis to group customers by purchasing behavior).	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- R Cookbook", Paul Teetor
- "R for Data Science", Garrett Grolemund and Hadley Wickham
- "Hands-On Programming with R", Garrett Grolemund
- "An Introduction to Statistical Learning: With Applications in R", Daniela Witten, Gareth James Robert Tibshirani, and Trevor Hastie
- "Introduction to Machine Learning with Python: A Guide for Data Scientists", Andreas C. Muller and Sarah Guido

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Introduction to Data Science - I (4 Credits)

1. Major	
1.B Major Elective	
1.B.a Introduction to Data Science - I (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To familiarize the learners with the concept and Foundation of Data Science
CObj 2	To enable learners to understand the scope and complexity of data science
Course Outcomes	
COut 1	Learn the importance of data pre-processing in ensuring data quality, consistency, and compatibility for analysis.
COut 2	Recognize the issues of overfitting and underfitting and their impact on model performance. Select appropriate models using model selection techniques.
COut 3	Applying polynomial regression and using pipelines for data preprocessing and modeling. Understand the benefits and limitations of these techniques.
COut 4	Understand the limitations and uncertainties associated with predictions based on regression models.

Modules at a Glance

Web Mining		
Sr. No.	**Modules**	**No. of Lectures**
1	Introduction to Data Science	15
2	Data Collection and Data Pre-Processing	15
3	Model Development	15
4	Model Evaluation	15
Total		**60**

Sr. No.	**Modules**
1	**Introduction to Data Science**
What is Data Science? Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues.	
2	**Data Collection and Data Pre-Processing**
Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization.	
3	**Model Development**
Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot – Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sample Evaluation – Prediction and Decision Making	
4	**Model Evaluation**
Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Overfitting – Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing Multiple Parameters by using Grid Search.	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:
Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
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Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Jojo Moolayil, “Smarter Decisions: The Intersection of IoT and Data Science”, PACKT, 2016.
- Cathy O’Neil and Rachel Schutt , “Doing Data Science”, O'Reilly, 2015.
- David Dietrich, Barry Heller, Beibei Yang, “Data Science and Big data Analytics”, EMC 2013
- Raj, Pethuru, “Handbook of Research on Cloud Infrastructures for Big Data Analytics”, IGI Global.

Teaching Pedagogy:

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Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Statistical Computing (4 Credits)

1. Major	
1.B Major Elective	
1.B.b Statistical Computing (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To learn techniques for cleaning, organizing, and visually exploring data to extract meaningful insights.
CObj 2	To understand probability concepts, random variables, and sampling distributions as the foundation for statistical inference.
CObj 3	To learn methods for estimating population parameters and testing statistical hypotheses using parametric and non-parametric techniques.
CObj 4	To understand simulation-based approaches for probability estimation and model validation using computational methods.
Course Outcomes	
COut 1	Learners will be able to **apply** data cleaning, transformation, and exploratory analysis methods using Python or R to prepare datasets for further analysis.
COut 2	Learners will be able to **analyze** probabilistic scenarios, compute probabilities, and describe sampling distributions for statistical modeling.
COut 3	Learners will be able to **evaluate and perform** hypothesis tests and confidence interval estimation to make data-driven decisions.
COut 4	Learners will be able to **design and implement** Monte Carlo simulations, bootstrap, and permutation methods for statistical inference and model validation.

Modules at a Glance

Statistical Computing		
Sr. No.	**Modules**	**No. of Lectures**
1	Data Handling and Exploratory Analysis	15
2	Probability and Sampling Distributions	15
3	Estimation and Hypothesis Testing	15
4	Computational and Simulation Techniques	15
Total		**60**

Sr. No.	**Modules**
1	**Data Handling and Exploratory Analysis**
Types of data, measurement scales, missing values, and outliers. Data cleaning, reshaping, merging/joining datasets. Exploratory Data Analysis (EDA): summary statistics, boxplots, histograms, scatterplots, correlation, and pair plots. Software: R (dplyr, ggplot2) and Python (pandas, matplotlib, seaborn)	
2	**Probability and Sampling Distributions**
Probability axioms, conditional probability, Bayes' theorem. Random variables (discrete and continuous), PMF, PDF, CDF, expectation, variance, covariance, correlation. Common distributions: Binomial, Poisson, Normal, Exponential. Central Limit Theorem and sampling distributions (mean & proportion).	
3	**Estimation and Hypothesis Testing**
Point and interval estimation (mean, proportion, variance). Properties of estimators: unbiasedness, consistency, efficiency (conceptually). Parametric tests: z, χ^2, t, and F tests. Analysis of Variance (ANOVA): One-way ANOVA, interpretation of F-statistic. Non-parametric tests: Sign test, Wilcoxon, Chi-square test of independence.	
4	**Computational and Simulation Techniques**
Monte Carlo simulation for probability estimation. Bootstrap and permutation methods for resampling. Random number generation and sampling from distributions. Application: Simulation-based inference and model validation.	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

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Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
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Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
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Books and References:

- Montgomery, D. C., & Runger, G. C. (2018). Applied Statistics and Probability for Engineers (7th Ed.). Wiley.
- Moore, D. S., McCabe, G. P., & Craig, B. A. (2017). Introduction to the Practice of Statistics (9th Ed.). W. H. Freeman.
- Navidi, W. (2019). Statistics for Engineers and Scientists (6th Ed.). McGraw-Hill.
- Dalgaard, P. (2008). Introductory Statistics with R (2nd Ed.). Springer.
- Field, A., Miles, J., & Field, Z. (2012). Discovering Statistics Using R. Sage Publications..
- Downey, A. (2014). Think Stats: Exploratory Data Analysis in Python. O'Reilly Media.

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Marketing Analytics and Customer Intelligence using R (4 Credits)

1. Major	
1.B Major Elective	
1.B.c Marketing Analytics and Customer Intelligence using R (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To understand and apply R programming and fundamental concepts of customer value, segmentation, and targeting for marketing analysis.
CObj 2	To analyze and evaluate demand patterns, pricing strategies, and marketing effectiveness using analytical models.
CObj 3	To apply and analyze predictive techniques for understanding customer behavior, including recommendations, churn, and lifetime value.
CObj 4	To analyze and create insights from unstructured data and networks using text mining and social network analysis.
Course Outcomes	
COut 1	Learners will be able to analyze customer data and implement basic segmentation and targeting strategies using R.
COut 2	Learners will be able to evaluate pricing decisions and assess marketing campaign performance using forecasting and marketing mix models.
COut 3	Learners will be able to build and interpret predictive models such as recommender systems and churn models for customer decision-making.
COut 4	Learners will be able to design and develop advanced analytics solutions for sentiment analysis, product innovation, and network-based marketing strategies.

Modules at a Glance

Marketing Analytics and Customer Intelligence using R		
Sr. No.	**Modules**	**No. of Lectures**
1	Foundations of Marketing Analytics & R	15
2	Pricing, Demand & Marketing Effectiveness	15
3	Customer Analytics & Predictive Modeling	15
4	Advanced Analytics & Emerging Applications	15
Total		**60**

Sr. No.	Modules
1	**Foundations of Marketing Analytics & R**
Introduction to R Programming, Data handling and visualization basics in R Understanding customer value Conjoint Analysis (measuring customer preferences) Customer segmentation techniques Targeting strategies using analytics	
2	**Pricing, Demand & Marketing Effectiveness**
Demand Forecasting methods Pricing strategies and optimization Marketing Mix Models (MMM) Advertising effectiveness models ROI measurement for marketing campaigns	
3	**Customer Analytics & Predictive Modeling**
Recommender Systems Market Basket Analysis RFM (Recency, Frequency, Monetary) Analysis Customer Churn prediction Customer Lifetime Value (CLV) modeling	
4	**Advanced Analytics & Emerging Applications**
Text Mining fundamentals Sentiment Analysis Text analytics for product innovation Social Network Analysis in marketing Applications of AI in marketing analytics	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- R for Marketing Research and Analytics – Chris Chapman & Elea McDonnell Feit Publisher: Springer (Springer Nature)
- Applied Marketing Analytics Using R – Gokhan Yildirim & Raoul Kübler Publisher: SAGE Publications
- Marketing Analytics – Seema Gupta & Avadhoot Jathar Publisher: Wiley India
- Marketing Data Science: Modeling Techniques in Predictive Analytics with R and Python – Thomas W. Miller Publisher: Pearson Education
- Text Analytics in Marketing – Daniel Dan & Thomas Reutterer Publisher: Springer
- Marketing Analytics – IIT Kharagpur https://onlinecourses.nptel.ac.in

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Research Methodology (4 Credits)

2. Research Methodology	
2.A.a Research Methodology(4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	Enable students to understand the conceptual foundations, types, and selection criteria of advanced research tools used in Commerce and Management studies.
CObj 2	Develop the ability to design structured and semi-structured research instruments aligned with specific research objectives.
CObj 3	Build competence in managing, organizing, and documenting research data ethically and systematically.
CObj 4	Foster critical interpretation of research findings using appropriate analytical tools and methodological rigor.
Course Outcomes	
COut 1	Explain key research concepts, types of research, and components of a sound research design.
COut 2	Formulate research problems, objectives, and hypotheses based on literature review and research gaps.
COut 3	Apply appropriate data processing and statistical techniques for analysis and interpretation of research data.
COut 4	Prepare well-structured, ethical, and professionally written research reports using modern research practices.

Modules at a Glance

Research Methodology		
Sr. No.	**Modules**	**No. of Lectures**
1	Foundations of Research	15
2	Research Design and Process	15
3	Data Processing and Statistical Analysis	15
4	Testing of hypotheses and Research Reporting	15
Total		**60**

Sr. No.	Modules
1	**Foundations of Research**
Introduction to Research- Meaning, objectives, and motivations of research; Characteristics and limitations of research; Components of research work; Criteria of good research; Types of research Literature Review- Purpose, sources, and Procedure for conducting a literature review Research Objectives- Meaning and definition of research objectives; Formulation of research objectives Research Problem and Hypothesis- Identification, selection, and analysis of the research problem; Formulation of the problem statement; Concept and formulation of research hypotheses	
2	**Research Design and Process**
Research Design- Definition and essentials of research design; Types of research design; Errors in research design; Stages of the Research Process- Sequential steps involved in conducting research Variables and Measurement- Types of variables in research; Measurement and scaling concepts; Types of measurement scales; Research Instruments- Construction of research instruments; Validity and reliability of instruments; Questionnaire design and validation Sampling- Significance of sampling; Sampling methods and techniques; Sample design; Factors determining sample size; Sample size determination Data Collection Methods- Primary and secondary data; Methods of data collection	
3	**Data Processing and Statistical Analysis**
Data Analysis Approaches- Concepts of qualitative research; Concepts of quantitative research; Qualitative vs. quantitative data analysis; Measurement, causality, generalization, and replication Data Processing- Editing, coding, and classification of data; Formation of statistical series Statistical Analysis-Tools and Techniques; Measures of Central Tendency; Measures of Dispersion; Correlation Analysis and Regression Analysis.	
4	**Testing of hypotheses and Research Reporting**
Parametric and Non-Parametric Test – Parametric Test-t test, f test, z test; Non-Parametric Test - Chi-square test, ANOVA, Factor Analysis	

Interpretation of data- Significance and Precautions in data interpretation Research Reporting- Types of research reports; Structure and contents of a research report; Executive summary; Chapterization and chapter contents; Report writing principles
Role of the audience; Readability, comprehension, and tone; Final proofreading and formatting; Title of the research report

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Creswell, J.W. and Creswell, J.D., 2017. Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications.
- Kothari, C.R., 2004. Research methodology: Methods and techniques. New Age International.
- Sekaran, U. and Bougie, R., 2016. Research methods for business: A skill building approach. John Wiley & Sons.
- Research Methodology – Text and Cases with SPSS Applications, by Dr. S.L. Gupta and Hitesh Gupta, International Book House Pvt Ltd
- Business Research Methodology by T N Srivastava and Shailaja Rego, Tata McGraw-Hill Education Private Limited, New Delhi
- Research Methods in Economics and Business by R. Gerber and P.J. Verdoom

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Research Ethics and Academic Writing (2 Credits)

2. Research Methodology	
2.A.b Research Ethics and Academic Writing (2 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To familiarize learners with the principles of research ethics and academic integrity.
CObj 2	To sensitize learners to ethical issues in research, publication, and academic writing.
CObj 3	To develop responsible academic writing and ethical publication practices.
Course Outcomes	
COut 1	Learners will be able to understand and apply ethical principles in research and academic practices.
COut 2	Learners will be able to identify and avoid unethical practices in academic writing and scholarly publication.

Modules at a Glance

Research Ethics and Academic Writing		
Sr. No.	**Modules**	**No. of Lectures**
1	Research Ethics and Responsible Conduct of Research	15
2	Academic Writing, Publication Practices, And Research Evaluation	15
Total		**30**

Sr. No.	**Modules**
1	**Research Ethics and Responsible Conduct of Research**
Introduction to research ethics: meaning, nature, and importance Philosophy of ethics and moral reasoning in research, Ethics in academics and academic integrity, Research integrity and intellectual honesty Scientific misconduct: Fabrication, Falsification, and Plagiarism (FFP) Redundant publications: duplicate publication, salami slicing, Selective reporting and misrepresentation of data, Authorship and contributorship ethics, Conflicts of interest in research Institutional mechanisms: complaints, appeals, and ethical accountability	
2	**Academic Writing, Publication Practices, And Research Evaluation**
Principles of academic writing: clarity, coherence, originality, Review of literature and formulation of the research problem, Integrating theory and data in academic writing, Use of ICT tools in academic writing Publication ethics: COPE, WAME, CARE guidelines Predatory journals and publishers: identification and risks Plagiarism detection tools: Turnitin, Urkund, and open-source tools, Introduction to open access publishing and self-archiving Academic databases: Web of Science, Scopus (overview) Research metrics: Impact Factor, CiteScore, h-index, altmetrics	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 25
Duration: 1 Hour
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	05
	Total Marks	**25**

Note: Full-Length questions of 10 Marks may be divided into two sub-questions of 05 and 05 marks

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 25 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Bird, A. (2006). Philosophy of Science. Routledge.
- MacIntyre, A. (1967). A Short History of Ethics. London.
- Chaddah, P. (2018). Ethics in Competitive Research: Do Not Get Scooped, Do Not Get Plagiarized. Springer.
- National Academy of Sciences, National Academy of Engineering & Institute of Medicine. (2009). On Being a Scientist: A Guide to Responsible Conduct in Research. National Academies Press.
- Resnik, D. B. (2011). What Is Ethics in Research & Why Is It Important. National Institute of Environmental Health Sciences.
- Indian National Science Academy (INSA). (2019). Ethics in Science Education, Research and Governance. New Delhi.
- Suber, P. (2012). Open Access. MIT Press.
- Beall, J. (2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179.
- Das, A. K. (2015). Research Evaluation Metrics. UNESCO Curriculum for Researchers, Module 4.
- UGC. (2020). Good Academic Research Practices. University Grants Commission, New Delhi.

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Semester II

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Financial Analytics and Decision Making using Excel (4 Credits)

1. Major	
1.A.a Financial Analytics and Decision Making using Excel (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To develop and apply Excel-based analytical skills to analyze, evaluate, and support financial decision-making in areas such as forecasting, investment, and budgeting.
CObj 2	To understand and apply Excel tools and basic financial concepts for decision-making.
CObj 3	To analyze and evaluate financial data using forecasting and investment techniques.
CObj 4	To apply and analyze valuation techniques and financial planning tools.
Course Outcomes	
COut 1	Learners will be able to build, interpret, and evaluate financial models and dashboards to support strategic business decisions.
COut 2	Learners will be able to perform break-even analysis and use Excel functions for financial data analysis.
COut 3	Learners will be able to assess investment decisions and forecast trends using time series and regression models.
COut 4	Learners will be able to develop business valuation models and design financial dashboards.

Modules at a Glance

Financial Analytics and Decision Making using Excel		
Sr. No.	**Modules**	**No. of Lectures**
1	Foundations of Excel and Financial Analytics	15
2	Forecasting and Investment Decisions	15
3	Valuation and Financial Planning	15
4	Budgeting and Data Analysis Tools	15
Total		**60**

Sr. No.	Modules
1	**Foundations of Excel and Financial Analytics**
Introduction to Excel (functions, formulas, data handling) Basics of Financial Analytics Break-even analysis and decision-making	
2	**Forecasting and Investment Decisions**
Time Series Forecasting techniques Capital Budgeting (NPV, IRR, Payback) Regression Analysis for financial decision-making	
3	**Valuation and Financial Planning**
Business Valuation (Part I & II) Financial modeling concepts Financial dashboards and visualization in Excel	
4	**Budgeting and Data Analysis Tools**
Budget management and financial planning Pivot Tables (Part I & II) Advanced Excel tools for decision-making	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Financial Modeling in Excel – Danielle Stein Fairhurst Publisher: Wiley
- Excel for Finance – John Carver Publisher: Business Expert Press
- Principles of Corporate Finance – Richard Brealey, Stewart Myers & Franklin Allen Publisher: McGraw-Hill
- Business Analytics Using Excel – Nitin K. Jaiswal Publisher: Oxford University Press
- Financial Analytics (NPTEL – IIT Roorkee / IIT Kharagpur)
- Introduction to Business Analytics using Excel (NPTEL) https://onlinecourses.nptel.ac.in (Search relevant course titles)

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Data Visualization and Communication (4 Credits)

1. Major	
1.A.b Data Visualization and Communication (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To enable the learners to understand the scope of Data Visualisation and Communication in today's era
CObj 2	To provide information pertaining to basics and principles of Data Visualisation and Communication
CObj 3	To develop learning and analytical skills of the learners to enable them to for Data visualization of multidimensional data
CObj 4	To acquaint the learners with recent developments and trends in Data Visualisation and Communication
Course Outcomes	
COut 1	Acquire the skills to identify patterns, trends, and relationships in complex data sets through visualization. Communicate data effectively to different audiences, considering their needs and level of understanding.
COut 2	Understand the role of context and audience in data communication and adapt visualizations accordingly.
COut 3	Develop the understanding of being updated with emerging trends and technologies in data visualization for continuous improvement and innovation.
COut 4	Learn how to create visually appealing and informative data visualizations using appropriate tools and techniques.

Modules at a Glance

Data Visualization and Communication		
Sr. No.	**Modules**	**No. of Lectures**
1	Basics of Data Visualization	15
2	Principles of Data Visualization	15
3	Data visualization of multidimensional data	15
4	Introduction to data communication	15
Total		**60**

Sr. No.	**Modules**
1	**Basics of Data Visualization**
Introduction to Data Visualization, Challenges of Data Visualization, Definition and Types of Dashboard, Evolution of Dashboard, Dashboard Design and Principles, Display Media for Dashboard, Types of Data Visualization: Basic Charts Scatter Plots, Histogram, Advanced Visualization Techniques Like Streamline and Statistical Measures, Plots, Graphs, Networks, Hierarchies, Reports.	
2	**Principles of Data Visualization**
The Seven Stages of Visualizing Data: Why Data Display Requires Planning, Iteration and Combination, Principles, Getting Started with Processing: Sketching with Processing, Exporting and Distributing Your Work, Examples and Reference, Functions, Sketching and Scripting, Mapping: Drawing a Map, Locations on a Map, Data on a Map Using Your Own Data.	
3	**Data visualization of multidimensional data**
Need of Data Modeling, Multidimensional Data Models, Mapping of High Dimensional Data into Suitable Visualization Method-Principal Component Analysis, Clustering Study of High Dimensional Data, Visualization Tools.	
4	**Introduction to data communication**
Data Communication, Networks, Protocols and Standards, Standards Organizations. Line Configuration, Topology, Transmission Modes, Categories of Networks Internetworks, Study of OSI and TCP/IP protocol suit, The Model, Functions of the layers, TCP/IP Protocol Suites	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Alice Zheng- Evaluating Machine Learning Models: A Beginner's Guide to Key Concepts and Pitfalls, O'Reilly Media, 2015
- Big data black book, Dream Tech Publication.
- Ben Fry- Visualizing Data. Released December 2007. Publisher(s): O'Reilly Media, Inc.
- Data Science Using Python and R by Chantal D. Larose and Daniel T. Larose, Wiley Publication.
- Python for Data Science and Visualization -Beginners to Pro, Udemy.
- Data communication & Networking by Bahrouz Forouzan.
- Data and Computer Communications by William Stallings

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Introduction to Data Science - II (4 Credits)

1. Major	
1.B Major Elective	
1.A.a Introduction to Data Science - II (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To familiarize the learners with the concept and Foundation of Data Science.
CObj 2	To enable learners to understand the scope and complexity of data science.
CObj 3	To Handle Missing Or Inconsistent Data Using Appropriate Data Processing Methods.
CObj 4	To Use relevant tools and software for data processing, machine learning, and clustering tasks.
Course Outcomes	
COut 1	Develop the knowledge of understanding the fundamental concepts and processes involved in data processing, machine learning algorithms, and clustering
COut 2	Acquire the skills to select and apply appropriate data processing, machine learning, and clustering techniques for specific tasks and datasets
COut 3	Learn how to communicate and present the results of data processing, machine learning, and clustering analyses effectively.
COut 4	Understand the practical applications and potential benefits of data processing, machine learning, and clustering in various domains.

Modules at a Glance

Introduction to Data Science - II		
Sr. No.	**Modules**	**No. of Lectures**
1	Introduction	15
2	Data Processing	15
3	Basic Machine Learning Algorithms	15
4	Clustering	15
Total		**60**

Sr. No.	**Modules**
1	**Introduction**
Big Data and Data Science – Datafication – Current landscape of perspectives – Skill sets needed; Matrices – Matrices to represent relations between data, and necessary linear algebraic operations on matrices -Approximately representing matrices by decompositions (SVD and PCA).	
2	**Data Processing**
Data cleaning – data integration – Data Reduction Data Transformation and Data Discretization. Evaluation of classification methods – Confusion matrix, Students T-tests and ROC curvesExploratory Data Analysis – Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA – The Data Science Process.	
3	**Basic Machine Learning Algorithms**
Association Rule mining - Linear Regression- Logistic Regression - Classifiers - k-Nearest Neighbours (k-NN), k-means -Decision tree - Naive Bayes- Ensemble Methods - Random Forest. Feature Generation and Feature Selection - Feature Selection algorithms - Filters; Wrappers; Decision Trees; Random Forests.	
4	**Clustering**
Clustering: Choosing distance metrics - Different clustering approaches - hierarchical agglomerative clustering, k-means (Lloyd's algorithm), - DBSCAN - Relative merits of each method - clustering tendency and quality	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Cathy O'Neil and Rachel Schutt, "Doing Data Science, Straight Talk from The Frontline", O'Reilly, 2014.
- Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining: Concepts and Techniques", Third Edition. ISBN 0123814790, 2011.
- Mohammed J. Zaki and Wagner Miera Jr, "Data Mining and Analysis: Fundamental Concepts and Algorithms", Cambridge University Press, 2014.ferences
- Matt Harrison, "Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization, O'Reilly, 2016.
- Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly Media, 2015.

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
1.B.b Time Series and Forecasting (4 Credits)

1. Major	
1.B Major Elective	
1.B.b Time Series and Forecasting (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To introduce learners to fundamental concepts of time-dependent data and its characteristics.
CObj 2	To develop skills in analyzing, visualizing, and modeling time series data.
CObj 3	To understand methods of forecasting using statistical and computational techniques.
CObj 4	To apply time series models to real-world data using Python, R, and Excel.
Course Outcomes	
COut 1	Understand the basic components, patterns, and visualization of time series data.
COut 2	Apply smoothing, trend, and decomposition techniques for time series analysis.
COut 3	Fit and interpret forecasting models such as ARIMA and Exponential Smoothing.
COut 4	Implement forecasting and model evaluation using statistical software tools.

Modules at a Glance

Time Series and Forecasting		
Sr. No.	**Modules**	**No. of Lectures**
1	Introduction to Time Series Data	15
2	Smoothing and Decomposition Techniques	15
3	ARIMA and Box–Jenkins Methodology	15
4	Advanced and Applied Forecasting	15
Total		**60**

Sr. No.	**Modules**
1	**Introduction to Time Series Data**
Concept of time series and examples from business, finance, and environment. Components: trend, seasonality, cyclical, and irregular variations. Time series plots, transformations, and stationarity. Autocorrelation and partial autocorrelation – interpretation (no derivations).	
2	**Smoothing and Decomposition Techniques**
Moving averages and exponential smoothing (simple, double, and Holt's method). Seasonal adjustment and decomposition of time series (additive/multiplicative). Trend estimation using least squares and growth models. Forecast accuracy measures: MSE, MAE, MAPE.	
3	**ARIMA and Box–Jenkins Methodology**
Concepts of AR, MA, and ARIMA models (no derivation). Identification using ACF and PACF plots. Model estimation, diagnostics, and forecasting. Seasonal ARIMA: concept and example.	
4	**Advanced and Applied Forecasting**
Introduction to regression-based forecasting and dummy variables for seasonality. Introduction to machine learning–based forecasting: Decision Trees, Random Forest (conceptual + demo). Forecast evaluation and model comparison. Case study: Sales, stock prices, or climate data.	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, project, case study analysis, Case lets, PowerPoint presentations, group discussion, book review, Research paper, article analysis and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

- Chatfield, C. (2000). Time-Series Forecasting. Chapman & Hall/CRC.
- Box, G. E. P., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2016). Time Series Analysis: Forecasting and Control. Wiley.
- Hyndman, R. J., & Athanasopoulos, G. (2021). Forecasting: Principles and Practice (3rd Ed., free online).
- Makridakis, S., Wheelwright, S. C., & Hyndman, R. J. (1998). Forecasting: Methods and Applications. Wiley.
- Cowpertwait, P. S. P., & Metcalfe, A. V. (2009). Introductory Time Series with R. Springer.
- Downey, A. (2014). Think Stats: Exploratory Data Analysis in Python. O'Reilly.

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
Cyber Risk Management (4 Credits)

1. Major	
1.B Major Elective	
1.B.c Cyber Risk Management (4 Credits)	
Course Objectives and Course Outcomes	
Course Objectives	
CObj 1	To provide foundational understanding of cyber risk, principles, and governance frameworks across finance, insurance, and logistics sectors.
CObj 2	To develop knowledge of data privacy, AML/CFT regulations, and third-party risk management, focusing on legal compliance and secure data handling practices.
CObj 3	To introduce students to risk assessment, cyber risk quantification, and fraud analysis concepts relevant to actuarial and financial decision-making.
CObj 4	To build practical skills in incident response, audit processes, and policy/report drafting for non-technical roles in cybersecurity governance.
Course Outcomes	
COut 1	Explain cyber risk, core principles, and regulatory frameworks applicable to finance, insurance, and logistics industries.
COut 2	Interpret and apply data privacy laws, AML regulations, and vendor risk management practices in real-world business scenarios.
COut 3	Analyze cyber risks, fraud patterns, and operational disruptions, and assess their impact on financial and supply chain systems.
COut 4	Prepare structured documents such as policies, compliance reports, audit summaries, and incident response plans aligned with GRC roles.

Modules at a Glance

Cyber Risk Management		
Sr. No.	**Modules**	**No. of Lectures**
1	Introduction to Cyber Risk	15
2	Privacy, Governance & Business Continuity	15
3	Frauds, AML/CFT & Third-Party Risk	15
4	Incident Response, Audit & Role Based Tasks	15
Total		**60**

Sr. No.	Modules
1	**Introduction to Cyber Risk**
● Introduction to Cyber Risk in Business Domains: Concept of cyber risk and business impact, Types of risks: Financial risk (banking fraud, payment failures), Operational risk (system failures, disruptions), Supply chain risk (logistics disruptions, vendor dependency) ● Fraud exposure across: Banking, Insurance, Logistics ● Core Security Principles: CIA Triad, Non-repudiation, Least Privilege Principle, Identity & Access Management (IAM) ● Security & Regulatory Frameworks: NIST CF 2.0, ISO 27001 basics, RBI's cyber security guideline, SEBI's cyber resilience framework, Role of regulators in audits and compliance ● Corporate Governance & Policy: Role of Board/management in cyber policy, Policy Hierarchy, Policy Lifecycle and Documentation Practices ● Compliance Fundamentals: Compliance vs Risk vs Audit, Compliance Analyst, GRC Integration, Cyber Risk Quantification ● Risk Register & Risk Assessment: Risk identification, Risk classification (low/medium/high), Risk mitigation strategies, Maintaining a basic risk register	
2	**Privacy, Governance & Business Continuity**
● Data Privacy Laws: GDPR, CCPA, DPDP Act (2023), Consent and Rights ● Privacy in Business Domains: Financial data (KYC, transaction records), Logistics data (Shipment & trade data confidentiality), Insurance data (policy holder and claims data), Data classification (sensitive vs non-sensitive), Customer confidentiality ● Privacy Governance & Roles: Data Protection Officer, Privacy Impact Assessment (PIA) ● Business Continuity / Disaster Recovery: BCP vs DRP, Logistics-specific scenarios: Port shutdown due to cyber attack, Warehouse management system failure, Shipment delay due to IT outage, Financial scenarios like System downtime and Payment failures, Recovery Time Objective (RTO) vs Recovery Point Objective (RPO) ● Documentation & Reporting Skills: Policy drafting basics, Incident report writing, Compliance checklist preparation, Executive summary writing	
3	**Frauds, AML/CFT & Third-Party Risk**

● AML/CFT Regulations: FATF recommendations, PMLA 2002, Roles of AML Officer, suspicious transaction reporting, Risk-based customer classification ● Fraud Risk & Financial Crimes: Identity theft, Account takeover, Insider fraud, Fraud triangle (pressure, opportunity, rationalization), Moral hazard & adverse selection, Banking fraud, Insurance claims fraud, Trade fraud in logistics ● Actuarial Perspective of Risk: Risk exposure and expected loss (conceptual), Fraud pattern recognition (non-technical), Role of actuarial thinking in cyber risk ● Vendor & Third-Party Risk: Vendor onboarding, Due diligence process, Outsourcing risks under RBI/SEBI guidelines, SLA (Service Level Agreement), Data sharing agreements, Cloud risk, Supply Chain Cyber Risk (Trade data confidentiality), Third-party logistics (3PL) vulnerabilities	
4	**Incident Response, Audit & Role Based Tasks**
● Governance Integration: Policy + Risk + Audit + Incident Response, End-to-end lifecycle ● Incident Response in Finance: Incident lifecycle, IRT Types and Roles, Communication matrix (internal vs regulator) ● Internal Audit & Compliance: Types of audit (Internal, External, Compliance audit), Audit Lifecycle, Role of auditors in IT/GRC compliance audit process ● Cyber Insurance: Concept of cyber risk transfer, Coverage (Data breach, Business interruption) ● Threat Modelling & Intelligence: Threat Modelling (Identifying risks), Threat Intelligence (Gathering information), Risk scoring (low, medium, high), Scenario-based thinking ● Role-based simulation: Full compliance lifecycle in finance for Compliance officer, Risk manager, Auditor	

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)

(With effect from Academic Year 2026-2027)

Semester End Examination and Internal Evaluation

Semester End Examination:

Maximum Marks: 50
Duration: 2 Hours
Note: 1) All questions are compulsory, subject to internal choice.

2) Figures to the right indicate full marks.

Question No.	Particulars (Nature of questions)	Marks (To be attempted)
Q.1	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.2	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.3	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q.4	**Answer the following questions: Any One**	
	A. Theory/Application based OR B. Theory/Application based	10
Q. 5	**Case Study analysis**	10
	Total Marks	**50**

Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE) - 50 Marks
The internal evaluation of 50 marks for Honours each semester would be of tests and of class participation, **Mini Case Studies/ Policy Drafting/ Compliance Analysis, RACI Chart/Awareness Poster/ Stakeholder Communication** and any other mode depending on the nature and scope of the course. Continuous Internal Evaluation (CIE), to be conducted by the subject teacher all through the semester. The total mark break up would be suitably divided and the total marks scored by the learner would be submitted to the Controller of Examination.

Books and References:

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- Wood, C. C. (2005). Information security policies, procedures, and standards: Guidelines for effective information security management. Auerbach Publications. Retrieved from https://www.taylorfrancis.com/books/mono/10.1201/9781420031408
- Weill, P., & Ross, J. W. (2004). IT governance: How top performers manage IT decision rights for superior results. Harvard Business School Press. Retrieved from https://hbr.org/product/it-governance-how-top-performers-manage-it-decision-rights/3016-HBK-ENG
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- Unger, B., & van der Linde, D. (2013). Research handbook on money laundering. Edward Elgar Publishing.
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- Davis, C., Schiller, M., & Wheeler, K. (2011). IT auditing: Using controls to protect information assets (2nd ed.). McGraw-Hill Education. Retrieved from https://www.mheducation.com/highered/product/it-auditing-using-controls-protect-information-assets-davis/M9780071836318.html

Teaching Pedagogy:

Lectures/ tutorials/ field work/ outreach activities/ project work/ vocational training/ viva /seminars/term papers/assignments/presentations/self-study/case studies, etc., or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.

Honours (Business Analytics) Programme
(With effect from the Academic Year 2026-2027)
On Job Training/ Field Project (6 Credits)

Proposed Guidelines

Inclusion of project work in the course curriculum is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research work challenging the potential of the learner as regards to his/ her eagerness to enquire and ability to interpret particular aspects of the study in his/ her own words. It is expected that the guiding teacher should undertake the counselling sessions and make the learners about the methodology of formulation.

Preparation and Evaluation Pattern Of The Project Work.

There are two modes of preparation of project work

1. Project work based on research methodology in the study area

2. Project work based on internship in the study area

Guidelines for preparation of Project Work

- ***Work Load***

Work load for Project Work is 01 (one) hour per batch of 15-20 learners per week for the teacher. The learner (of that batch) shall do field work and library work in the remaining 03 (three) hours per week.

1. General guidelines for preparation of project work based on research methodology

The project topic may be undertaken in any area of Elective Courses.

Each of the learners has to undertake a Project individually under the supervision of a teacher-guide.

The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.

University/college shall allot a guiding teacher for guidance to the students based on her / his specialization.

The project report shall be prepared as per the broad guidelines given below:

♣ Font type: Times New Roman

♣ Font size: 12-For content, 14-for Title

♣ Line Space: 1.5-for content and 1-for in table work

♣ Paper Size: A4

♣ Margin: in Left-1.5, Up-Down-Right-1

♣ The Project Report shall be bound.

♣ The project report should be 60 to 80 pages

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work:

(Model Structure of the Project Work)

Chapter No. 1: Introduction

In this chapter Selection and relevance of the problem, historical background of the problem, brief profile

of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem

etc. can be incorporated by the learner.

Chapter No. 2: Research Methodology

This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance

of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and

tools to be used, etc. can be incorporated by the learner.

Chapter No. 3: Literature Review

This chapter will provide information about studies done on the respective issue. This would specify how

the study undertaken is relevant and contribute for value addition in information/ knowledge/ application

of study area which ultimately helps the learner to undertake further study on the same issue.

Chapter No. 4: Data Analysis, Interpretation and Presentation

This chapter is the core part of the study. The analysis pertaining to collected data will be done by the

learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of

information, presentation of graphs etc. can be provided with interpretation by the learner.

Chapter No. 5: Conclusions and Suggestions

In this chapter of project work, findings of work will be covered and suggestions will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

• Bibliography

• Appendix

2. Guidelines for Internship based project work

Minimum 20 days/ 100 hours of Internship with an Organization/ NGO/ Charitable Organization/ Private firm.

• The theme of the internship should be based on any study area of the elective courses

• Project Report should be of minimum 50 pages

• Experience Certificate is Mandatory

• A project report has to be brief in content and must include the following aspects:

Executive Summary: A bird's eye view of your entire presentation has to be precisely offered under this category.

Introduction on the Company: A Concise representation of the company/ organization defining its scope, products/ services and its SWOT analysis.

Statement and Objectives: The mission and vision of the organization need to be stated enshrining its broad strategies.

Your Role in the Organization during the internship: The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.

Challenges: The challenges confronted while churning out theoretical knowledge into the practical world.

Conclusion: A brief overview of your experience and suggestions to bridge the gap between theory and practice.

The project report based on internship shall be prepared as per the broad guidelines given below:

- Font type: Times New Roman
- Font size: 12-For content, 14-for Title
- Line Space: 1.5-for content and 1-for in table work
- Paper Size: A4
- Margin: in Left-1.5, Up-Down-Right-1
- The Project Report shall be bounded

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
Evaluation of Project Report (Bound Copy)	***60 Marks***
Introduction and other areas covered	30 Marks
Research Methodology, Presentation, Analysis and interpretation of data	20 Marks
Conclusion & Recommendations	10 Marks
Conduct of Viva-voce	**40 Marks**
In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
Overall Impression (including Communication Skill)	10 Marks

Note:

The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of the project shall conduct the viva-voce examination as per the evaluation pattern.

Passing Standard

Minimum of Grade D in the project component

In case of failing in the project work, the same project can be revised for ATKT examination.

Absence of student for viva voce:

If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.