

S.P. Mandali's

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

Matunga, Mumbai-400019

Course Structure

For

Post Graduate Program

M.Com. (Business Analytics)

Semester III

www.rapodar.ac.in

S.P. Mandali's

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

MATUNGA, MUMBAI-400019

Syllabus

And

Question Paper Pattern of Course

Post Graduate Program

M.Com. (Business Analytics)

Semester III

Syllabus as per National Education Policy 2020
To be implemented from Academic Year 2024-2025

www.rapodar.ac.in

POST GRADUATE PROGRAM OUTCOMES :

PROGRAM OUTCOME No.	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.
PO14	Learners will showcase leadership qualities, being capable of guiding financial teams and contributing to organizational success.
PO15	Learners will recognize the importance of continuous learning, adapting to advancements in the field of accountancy throughout their professional careers.

Program Specific Outcomes

(M.Com. Business Analytics)

Academic Year: 2024-25

Program Specific Outcomes No.	Program Specific Outcomes
PSO1	Learners will acquire disciplinary knowledge in Analytics and Data Science, preparing them to meet the demands of businesses worldwide and making them business-ready professionals in analytics.
PSO2	Learners will gain disciplinary knowledge in Marketing, Retail Analytics, Finance and Risk Analytics, supply chain and logistics Analytics, social and web media analytics.
PSO3	Learners will apply problem-solving techniques using Data mining, predictive modeling and Time series forecasting and Machine learning
PSO4	Learners will strengthen their analytical reasoning through hands-on experience with software like Python, R, and Tableau.
PSO5	Learners will acquire research-related skills essential for conducting analytics projects.
PSO6	Learners will engage in reflective thinking to continuously assess and improve their analytical approaches.
PSO7	Learners will develop critical thinking to evaluate complex business scenarios and make informed decisions.

Master in Commerce

(Business Analytics)

Under Choice Based Credit, Grading and Semester System Course Structure

M.com-I

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
Mandatory			Mandatory		
1	Introduction Business Analytics	06	1	Introduction To Financial Analytics	02
2	Introduction To Data Science - 1	06	2	Data Visualization And Communication	06
3	Business Ethics	02	3	Data Science	06
Electives			Electives		
4	R-Lab Course	04	4	Python Data Science – Lab Course	04
Research Methodology			Research Methodology		
5	Research Methodology for Business	04	--	-----	--
On Job Training/Field Project			On Job Training/Field Project		
--	-----	--	6	Business Analytics Related Project	04
Total Credits		22	Total Credits		22

M.com II

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
Mandatory			Mandatory		
1	Machine Learning And Mining Algorithms	06	1	Predictive Analysis	06
2	Financial Model - Based Analytics - I	06	2	Financial Model - Based Analytics - II	06
Electives (Any One)			Electives(Any One)		
3	Sales and Marketing Analysis	04	3	International Financial Reporting Standards	04
4	Tools for Data Analytics – Lab Course - II	04	4	Supply Chain Design And Management	04
5	Financial Accounting And Analysis	04	5	Foundation of Behavioural Financial Analysis	04
Research Methodology			Research Methodology		
6	Statistical Tools and Techniques	02	--	-----	--
Research Project			Research Project		
7	Research Project/Internship	04	7	Research Project	06
Total Credits		22	Total Credits		22

**Revised Syllabus of Courses of Master of Commerce (M.Com) Business
Analytics Program at Semester III**

(Mandatory Course)

Machine Learning And Mining Algorithms

Modules at a glance

SN	Modules	No. of Lectures
1	Introduction	15
2	Artificial Neural networks and Deep learning	15
3	Data Mining Algorithms	15
4	Web mining and other data mining	15
	Total	60

SN	Objectives
1	To understand basic human learning concepts
2	To understand primitivities in learning process by computer
3	To understand nature of problems solved with machine learning

Course Outcome No	Course Outcomes
CO1	Gain a foundational understanding of machine learning principles and algorithms, and their applications across various domains.
CO2	Explore the intricacies of artificial neural networks and delve into the advanced concepts of deep learning for solving complex problems.
CO3	Master various data mining algorithms to extract valuable insights from large datasets and make informed decisions.
CO4	Develop expertise in web mining and other data mining techniques for uncovering patterns and knowledge from web-based information sources.

SN	Modules/Units
1	Introduction
	<p>AI Basics: Foundations, History and State of the Art of AI. Intelligent Agents: Agents and Environments, Nature of Environments, Structure of Agents, Search strategies.</p> <p>Types of learning: -Basics and applications of supervised, unsupervised, evolutionary, inductive, Analytical and reinforcement learning.</p>
2	Artificial Neural networks and Deep learning
	<p>Artificial Neural Networks-Artificial neuron, activation function, Neural networks- Multi-layered Neural Network, Feedforward network, Backpropagation network.</p> <p>Deep Learning-Deep neural networks-overview of Convolutional Neural networks, Recurrent neural networks and multi-layer perceptron. Deep Learning frameworks.</p> <p>Applications of Deep Learning in Business: Customer service, Marketing Campaign, Financial Fraud detection, Quality Control.</p>
3	Data Mining Algorithms
	<p>Classification: Neural Network based Algorithms, Distance Based Algorithms.</p> <p>Clustering-Density Based methods, outlier detection and analysis, Clustering high dimensional data.</p> <p>Mining frequent patterns: Rule Based analytics, Apriori.</p> <p>Prediction-Time Series Forecasting, Accuracy of prediction.</p> <p>Ensemble Methods: Bagging, Boosting and cross validation</p> <p>Case Studies : Market basket analysis, stock market analytics, financial Risk Assessment.</p>
4	Web mining and other data mining
	<p>Web Mining: Introduction to Web Mining- Web content mining-Web usage mining- Web Structure mining- Web log structure and issues regarding web logs.</p> <p>Advanced techniques: - Text Analytics , Sentiment Analysis, Spatial data mining, Temporal mining</p>

REFERENCES

- Introduction To Algorithms For Data Mining And Machine Learning by Yang Xin-She, Acad Pr.
- Data Mining and Machine Learning: Fundamental Concepts and Algorithms by Mohammed J. Zaki (Author), Wagner Meira Jr (Author)
- Leskovec, J & Rajaraman, A. & Ullman, J (2014). *Mining of Massive Datasets*. The book is available online from [here](#).
- Bishop, C. (2007). *Pattern Recognition and Machine Learning*. More information supporting the book can be found [here](#).
- James, G. & Witten, D. & Hastie, T. & Tibshirani, R. (2014). *An introduction to Statistical Learning: with Applications in R*. The book is available online from [here](#).
- Murphy, K.P. (2012). *Machine Learning: A Probabilistic Perspective*. MIT Press. More information supporting the book can be found [here](#).
- Mitzenmacher, M. and Upfal, E. (2005). *Probability and Computing*. Cambridge University Press.
A PDF version of the book is available [here](#)

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)
(With effect from Academic Year: 2024-2025)
(Evaluation pattern)

1. Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE)	40 Marks
The internal evaluation of 40 marks for M.Com for 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.	

2. Question Paper Pattern (Practical/ Theory Courses) :

Maximum Marks: 60

Questions to be set: 04

Durations: 02 hrs

All Questions are compulsory carrying 15 Marks each:

Question No	Particulars	Marks
Q1	A) Practical/ Theory Question OR	15 Marks
	B) Practical/ Theory Question	15 Marks
Q2	A) Practical/ Theory Question OR	15 Marks
	B) Practical/ Theory Question	15 Marks
Q3	A) Practical/ Theory Question OR	15 Marks
	B) Practical/ Theory Question	15 Marks
Q4	A) Practical/ Theory Question OR	15 Marks
	B) Practical/ Theory Question	15 Marks

Note: Full-Length questions of 15 Marks may be divided into two sub-questions of 08 and 07 marks.

**Revised Syllabus of Courses of Master of Commerce (M.Com) Business
Analytics Program at Semester III**

(Mandatory Course)

Financial Model Based Analytics - I

Modules at a glance

SN	Modules	No. of Lectures
1	Interest rates: an introduction.	15
2	Interest rate models	15
3	Valuation of forwards, futures and swaps.	15
4	Credit risk models.	15
	Total	60

SN	Objectives
1	To appreciate interest rates and their types
2	To introduce various models around the term structure of interest rates
3	To educate on valuation techniques and its application in BFSI industry.

Course Outcome No	Course Outcomes
CO1	Gain a foundational understanding of interest rates and their significance in financial markets
CO2	Explore advanced interest rate models used in financial analysis and decision-making
CO3	Master the techniques for valuing forwards, futures, and swaps in the context of financial markets.
CO4	Develop expertise in credit risk modelling to assess and manage potential risks in financial transactions

SN	Modules/Units
1	Interest rates: an introduction.
	Nominal and effective interest rates including drivers in domestic and international markets Continuous compounding and force of interest Spot rate, par yield, gross redemption yield, forward rates, instantaneous forward rates and the term structure of interest rates Forward rates from expectations theory, liquidity preference theory and market segmentation theory Modified duration, discounted mean term and convexity calculations with impact on bond prices. Immunisation theory for bond portfolios.
2	Interest rate models
	Term structure of interest rates, Vasicek model, Cox-Ingersoll-Ross model, Hull and White model, Pricing of zero-coupon bonds, Credit spreads for risky bonds, Forward rate agreements (FRA) and FRA pricing, Introduction to interest-rate swaps (IRS).
3	Valuation of forwards, futures and swaps.
	System of margins underlying exchange-traded futures, Valuation of interest rate forwards and futures, Valuation of commodity forwards and futures, Valuation of cross-currency forwards, Valuation of index- forwards, Valuation of swaps e.g., nominal, cash flow exchanges, settlements.
4	Credit risk models.
	Introduction to structural and intensity-based models, Merton model and its quantitative applications for credit risks, Intensity based models viz. two-state and Jarrow Lando Turnbull models, Appreciation of credit rating and credit spreads from these “model based” approach, Expected credit loss (ECL) models for IFRS 9/ Ind AS 109 in banks and other lenders, Calculation of ECL using frequency and severity, including the ‘Loss Given Default’ parameters.

REFERENCES

- Davis, Mark, and Alison Etheridge. "Louis Bachelier's theory of speculation." URL: <https://f-origin.hypotheses.org/wp-content/blogs.dir/1596/files/2014/12/Mark-Davis-Talk.pdf> (2006).
- Hull, John C. *Options, futures and other derivatives*. Pearson Education India, 2003.
- Cairns, Andrew JG. *Interest rate models: an introduction*. Vol. 10. Princeton University Press, 2004.
- Baxter, Martin, Andrew Rennie, and Andrew JO Rennie. *Financial calculus: an introduction to derivative pricing*. Cambridge university press, 1996.
- Panjer, Harry H., D. Dufresne, H. U. Gerber, H. H. Mueller, H. W. Pedersen, S. R. Pliska, M. Sherris, E.
- S. Shiu, and K. S. Tan. *Financial Economics: With Applications to Investments, Insurance, and Pensions*. Edited by Phelim P. Boyle, and Samuel H. Cox. Schaumburg, Ill.: Actuarial Foundation, 1998.
- Johnson, Timothy. *Ethics in quantitative finance: A pragmatic financial market theory*. Springer, 2017.
- Macdonald, Robert L. *Derivatives Markets*. Pearson new international edition 2013.

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2. Question Paper Pattern (Practical/ Theory Courses) :

Maximum Marks: 60

Questions to be set: 04

Durations: 02 hrs

All Questions are compulsory carrying 15 Marks each:

Question No	Particulars	Marks
Q1	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 arks
Q2	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 arks
Q3	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 Marks
Q4	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 Marks

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**Revised Syllabus of Courses of Master of Commerce (M.Com) Business
Analytics Program at Semester III**

(Elective Course)

Sales And Marketing Analysis

Modules at a glance

SN	Modules	No. of Lectures
1	Introduction to Marketing Analytics	15
2	Segmentation and Targeting	15
3	Positioning	15
4	Analyzing Customer satisfaction	15
	Total	60

SN	Objectives
1	To understand various tools for generating marketing insights from data in such areas as segmentation, targeting and positioning, satisfaction management, customer lifetime analysis, customer choice, product and price decisions using conjoint analysis, and text analysis and search analytics
2	To develop insights through application in MS-excel and other technical softwares

Course Outcome No	Course Outcomes
CO1	Gain foundational knowledge in marketing analytics, understanding key concepts and tools for effective decision-making in the modern business landscape.
CO2	Master the art of market segmentation and targeting strategies, enabling precision in marketing efforts to reach and engage specific customer segments.
CO3	Develop expertise in brand positioning strategies, learning how to create a distinctive market presence and establish a competitive advantage.
CO4	Acquire skills in assessing and interpreting customer satisfaction data, empowering businesses to enhance customer experience and loyalty through data-driven insights.

SN	Modules/Units
1	Introduction to Marketing Analytics
	The new realities of marketing decision making, Need for Better Marketing Decision making, Challenges in Marketing Decision making Marketing Engineering (ME), Skills needed for Marketing Engineering, The role of models in ME
2	Segmentation and Targeting
	The segmentation-targeting-positioning (STP) framework , Segmentation - The concept of market segmentation - Managing the segmentation process , Deriving market segments and describing the segments -Cluster analysis and Discriminant analysis , Targeting, Portfolio analysis, BCG matrix, Steps in constructing a market attractiveness/competitive position matrix for selecting target markets, Formulation of strategies based on market Attractiveness/Competitive Position Matrix
3	Positioning
	The concept of product positioning , Conducting a positioning study, Perceptual mapping using principal component analysis, Incorporating preferences into perceptual maps, Derive marketing insights based on the distribution of preferences, Metrics for Measuring Brand Assets
4	Analyzing Customer satisfaction
	The psychology of customer satisfaction, The concept of customer satisfaction, Determinants of customer satisfaction, The expectancy-disconfirmation model of customer satisfaction ,Designing a customer satisfaction survey , Measuring customer satisfaction and related concepts , Analyzing customer satisfaction

REFERENCES:

- Gurley, B. (2012). The dangerous seduction of the lifetime value (LTV) formula. Above the Crowd. [optional, grumpy]
- Seward, Z.M. (2013). The first-ever hashtag, @-reply and retweet, as Twitter users invented them. Quartz. [optional]
- Teehan, G. (2016). Reactions: Everything in life is not Likable. Facebook Design blog.
- Guo, J. (2015). Seriously, here's one amazing math trick to learn what can't be known. Wonkblog. Washington Post. [optional, on synthetic control methods]
- Kohavi, R., Tang, D., & Xu, Y. (2020). Trustworthy Online Controlled Experiments. Ch. 3-4 & 7.
- Zhuo, J. (2019). The agony and ecstasy of building with data.

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2. Question Paper Pattern (Practical/ Theory Courses) :

Maximum Marks: 60

Questions to be set: 04

Durations: 02 hrs

All Questions are compulsory carrying 15 Marks each:

Question No	Particulars	Marks
Q1	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 arks
Q2	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 arks
Q3	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 arks
Q4	A) Practical/ Theory Question OR B) Practical/ Theory Question	15 Marks 15 Marks

Note: Full-Length questions of 15 Marks may be divided into two sub-questions of 08 and 07 marks.

**Revised Syllabus of Courses of Master of Commerce (M.Com) Business
Analytics Program at Semester III**

(Elective Course)

Tools For Data Analytics – Lab Course - II

Modules at a glance

SN	Modules	No. of Lectures
1	Tableau	15
2	PowerBI	15
3	Frameworks and API	15
4	Other Tools	15
	Total	60

SN	Objectives
1	To use visual analytics platform to transforming the way data is used to solve problems
2	To learn the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.

Course Outcome No	Course Outcomes
CO1	Master data visualization and analytics through Tableau, gaining expertise in creating insightful dashboards and reports.
CO2	Develop proficiency in leveraging PowerBI for dynamic data analysis, visualization, and reporting to make informed business decisions.
CO3	Acquire skills in utilizing frameworks and APIs to build robust and scalable applications, enhancing your software development capabilities.
CO4	Explore and harness the potential of various tools, expanding your toolkit for diverse applications in data analysis, project management, and more.

SN	Modules/Units
1	Tableau
	<p>Charts: Connecting to data source, Bar chart, Pie chart, Line chart</p> <p>Tables: Grid table, Table calculations</p> <p>Grouping, Filtering, Sorting, Data hierarchy,</p> <p>Drill down Dash board: Creating Dashboard, storyboarding, interactive dashboard</p>
2	PowerBI
	<p>Components Features</p> <p>Data modelling</p> <p>Charts and graphs : donught, Pie, Maps, Tree maps, Bubble, gauge ,Waterfall. DAX</p> <p>functions: Date and Time, logical, information, Mathematical, text, Statistical</p> <p>PowerBI dashboard and reports</p>
3	Frameworks and API
	<p>Machine learning:Sci-kit learn,</p> <p>Deep learning :Keras, Pytorch, Tenserflow,</p> <p>Web : Jupyter, Visualization Matplotlib, ggplot2()</p>
4	Other Tools
	<p>Weka-Installation, Connecting to various data sources , Data Pre-processing,</p> <p>Classification, clustering, Association, Select Attribute, Visualization, Evaluating accuracy Nltk-Tokenizing, Filtering, stemming, tagging part of speech, lemmatizing, syntax and semantic analysis of text.</p>

REFERENCES:

- Ronen Feldman and James Sanger, —The Text Mining Handbook:
- Advanced Approaches in Analyzing Unstructured Data, Cambridge University Press, 2006.

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2. Question Paper Pattern (Practical/ Theory Courses) :

Maximum Marks: 60

Questions to be set: 04

Durations: 02 hrs

All Questions are compulsory carrying 15 Marks each:

Question No	Particulars	Marks
Q1	i. Practical/ Theory Question OR	15 Marks
	ii. Practical/ Theory Question	15 Marks
Q2	i. Practical/ Theory Question OR	15 Marks
	ii. Practical/ Theory Question	15 Marks
Q3	i. Practical/ Theory Question OR	15 Marks
	ii. Practical/ Theory Question	15 Marks
Q4	iii. Practical/ Theory Question OR	15 Marks
	iv. Practical/ Theory Question	15 Marks

Note: Full-Length questions of 15 Marks may be divided into two sub-questions of 08 and 07 marks.

**Revised Syllabus of Courses of Master of Commerce (M.Com) Business
Analytics Program at Semester III**

(Elective Course)

Financial Accounting and Analysis

Modules at a glance

SN	Modules	No. of Lectures
1	Introduction to Accounting	15
2	Inventory Valuation	15
3	Financial Analysis-I Financial Statement Analysis	15
4	Capital Structure Decisions	15
	Total	60

SN	Objectives
1	To provide the information that is needed for sound economic decision making.
2	To provide information about firm's performance to external parties such as investors, creditors, bankers, researchers and Government Agencies.
3	To use the analytical techniques and arriving at conclusions from financial information for the purpose of decision making.

Course Outcome No	Course Outcomes
CO1	Gain foundational knowledge of accounting principles and concepts, and develop the ability to record and analyse basic financial transactions.
CO2	Acquire skills in determining and valuating inventory, including various methods such as FIFO and LIFO, contributing to effective financial management.
CO3	Learn to analyse financial statements to assess a company's performance, liquidity, and profitability, enabling informed decision-making and strategic planning.
CO4	Understand the principles of capital structure and develop the ability to make optimal financing decisions for a firm, considering factors like debt and equity, to enhance long-term financial sustainability.

SN	Modules/Units
1	Introduction to Accounting
	<p>Importance - Objectives – Principles. GAAP: Accounting Concepts and Conventions. Accounting System: Double Entry System - Recording Business Transactions - Classification of Accounts - Accounting Cycle - Users of Accounting Information. The Accounting Process Overview: Accounting Process. Books of Original Record: Journal - Ledger - Trial Balance (Problems) - Classification of Capital and Revenue Expenses - Final Accounts with Adjustments (Problems) - Cash Book and other Subsidiary books. (Only Theory)</p>
2	Inventory Valuation
	<p>Methods of Inventory Valuation and Valuation of Goodwill, Methods of Valuation of Goodwill, Accounting from Incomplete Records, Advantages and Disadvantages of Single Entry and Double Entry System and the Differences Between the Two, Preparation of Accounts and Ascertainment of Profit from Incomplete Records, Accounting Treatment as per the Statement of Affairs Method and Calculation of Missing Figures.</p>
3	Financial Analysis-I Financial Statement Analysis
	<p>Analysis and Interpretation of Financial Statements from Investor and Company point of view - Horizontal Analysis and Vertical Analysis of Company Financial Statements - Liquidity - Leverage - Solvency and Profitability Ratios. (Problems) Techniques: Du Pont Chart - Window Dressing - Limitations of Financial Statements. Accounting Standards (AS) Issued by ICAI-IFRS. Case Study on Financial Reporting & Analysis (FRAs).</p>
4	Capital Structure Decisions
	<p>Capital Structure Decisions - Meaning, Choice of Capital Structure, Importance, Optimal Capital Structure, EBIT-EPS Analysis, Cost of Capital, Capital Structure and Market Price of Share, Capital Structure Theories, Dividend Policy - Pay Out Ratio Business Risk and Financial Risk - Introduction, Debt v/s Equity Financing, Types of Investment Objective/Criteria for Individuals/Non-business Purpose.</p>

REFERENCES

- Dhanesh K. Khatri, Financial Accounting & Analysis, TMH, New Delhi.
- PK Jain and K. L. Narang, Financial Accounting & Analysis, Kalyani Publications.
- Narayana Swamy, Financial Accounting & Analysis, PHI.
- V. Rajasekharam, Financial Accounting & Analysis, Pearson Education, New Delhi.
- Ranjan Kumar Bal, Financial Accounting & Analysis, S. Chand, New Delhi.
- Maheswari, Financial Accounting, IBH.

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<p>The internal evaluation of 40 marks for M.Com for 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.</p>	

2. Question Paper Pattern (Practical/ Theory Courses) :

Maximum Marks: 60

Questions to be set: 04

Durations: 02 hrs

All Questions are compulsory carrying 15 Marks each:

Question No	Particulars	Marks
Q1	A) Practical/ Theory Question	15 Marks
	OR	
Q2	B) Practical/ Theory Question	15 arks
	A) Practical/ Theory Question	15 Marks
Q3	OR	
	B) Practical/ Theory Question	15 arks
Q4	A) Practical/ Theory Question	15 Marks
	OR	
Q4	B) Practical/ Theory Question	15 Marks

Note: Full-Length questions of 15 Marks may be divided into two sub-questions of 08 and 07 marks.

**Revised Syllabus of Courses of Master of Commerce (M.Com) Business
Analytics Program at Semester III**

Statistical Tools and Techniques

Modules at a glance

SN	Modules	No. of Lectures
1	Measures of Central Tendency and Dispersion	15
2	Regression Analysis	15
3	Time Series and Forecasting	15
4	Theoretical Frequency Distributions	15
	Total	60

SN	Objectives
1	Students will acquire an understanding of descriptive statistical tools like measures of central tendency & measures of variation and apply these tools to real life situations.
2	Students will be able to identify and establish relationships between real life variables using tools like correlation and regression and comprehend the concepts of probability & probability distributions

Course Outcome No	Course Outcomes
CO1	Understand and apply statistical measures such as mean, median, mode, and standard deviation to analyse and describe data distributions.
CO2	Develop proficiency in using regression techniques to model and interpret relationships between variables, enabling effective predictive analysis.
CO3	Acquire skills in analysing time-dependent data and applying forecasting methods to make informed predictions for future trends and patterns.
CO4	Gain a deep understanding of theoretical frequency distributions and their applications in statistical analysis, providing a foundation for advanced data modelling and interpretation.

SN	Modules/Units
1	Measures of Central Tendency and Dispersion
	<p>Concept of central tendency, Location parameters: Median, Quartiles, Deciles, and Percentiles. Mathematical averages Arithmetic mean, Geometric mean, Harmonic mean, Mode. The empirical relation between mean, median, and mode.</p> <p>Concept of dispersion, Absolute and Relative measures of dispersion: Range, Quartile Deviation, Interquartile Range, Mean absolute deviation, Standard deviation. Variance and Combined variance, raw moments and central moments, and relations between them and their properties.</p> <p>Measures of Skewness: Karl Pearson's, Bowley's, Kelly and Coefficient of skewness based on moments. The measure of Kurtosis. Absolute and relative measures of skewness. Box Plot: Outliers.</p>
2	Probability Theory
	<p>Definitions of probability and its properties. Theorems on Addition and Multiplication of probabilities. Independence of events, Pairwise and Mutual Independence for three events, Conditional probability, Bayes' theorem and its applications.</p> <p>Definition of random variable, discrete and continuous r.v., properties of the probability distribution function, and cumulative distribution function. Mathematical expectation, its properties, Variance and Covariance.</p> <p>Uniform, Bernoulli, Binomial, Poisson Distribution with their mean and variance.</p>
3	Distributions
	<p>Rectangular, Triangular, Exponential Distribution with their mean and variance. Normal distribution, Properties of Normal distribution/curve (without proof). Use of normal tables. Central Limit theorem for i.i.d. random variables.</p> <p>Chi-Square Distribution, t-distribution, F-distribution: Mean and standard deviation and Application. (Test of significance).</p>
4	Testing of Hypothesis and ANOVA
	<p>Concept of hypothesis, Null and Alternative Hypothesis, Types of Errors, Critical region, Level of significance, and Power. Large sample tests, Concept of the p-value. ANOVA, Uses, One-way classification with equal and unequal observations per class, Two-way classification with one observation per cell. For both cases: the Mathematical Model, Assumptions, Expectation of various sums of squares, F- test, and Analysis of variance table. Least square estimators of the parameters, Expectation, and Variance of the estimators, Estimation of treatment contrasts, Standard Error, and Confidence limits. Testing for the significance of elementary treatment contrasts.</p>

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- M. K. Goon, A. M. Gupta and B. Dasgupta, Fundamentals of statistics, vol. II, The World Press Private Limited, Calcutta, 1968
- Robert V. Hogg and Elliot A. Tannis, Probability and statistical inference, McMillan Publishing Co. Inc., 2001
- Statistics for Management, Levin and Rubin, 7th Edition, Pearson
- Statistics for Business and Economics, Anderson, Sweeney and Williams, 11th Edition, Cengage Learning 11
- Business Statistics in Practice, Bruce Bowerman, Richard T. O' Connell and Emily Murphree, 5th Edition, Tata McGraw hill
- Statistical Methods, S. P. Gupta, 34th Edition, Sultan Chand & Sons
- Business Statistics for Contemporary Decision Making, Ken Black, 5th Edition, Wiley Publications (India Edition)

EXAMINATION PATTERN
(Under Choice Based Credit, Grading and Semester System)
(With effect from Academic Year: 2024-2025)
(Evaluation pattern)

1. Continuous Internal Evaluation System:

Continuous Internal Evaluation (CIE)	40 Marks
The internal evaluation of 40 marks for M.Com for 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.	

2. Question Paper Pattern (Practical/ Theory Courses) :

Maximum Marks: 60

Questions to be set: 04

Durations: 02 hrs

All Questions are compulsory carrying 15 Marks each:

Question No	Particulars	Marks
Q1	A) Practical/ Theory Question	15 Marks
	OR	
	B) Practical/ Theory Question	15 Marks
Q2	A) Practical/ Theory Question	15 Marks
	OR	
	B) Practical/ Theory Question	15 Marks
Q3	A) Practical/ Theory Question	15 Marks
	OR	
	B) Practical/ Theory Question	15 Marks
Q4	A) Practical/ Theory Question	15 Marks
	OR	
	B) Practical/ Theory Question	15 Marks

Note: Full-Length questions of 15 Marks may be divided into two sub-questions of 08 and 07 marks.

Syllabus of Courses of Master of Commerce (M.Com) Business Analytics Program at Semester III

Research / Internship Project

Inclusion of project work in the course curriculum of the M.Com. Program is one of the ambitious aspects in the program structure. The main objective of inclusion of project work is to inculcate the element of research work challenging the potential of learner as regards to his/her eager to enquire and ability to interpret particular aspect of the study in his/ her own words. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

Guidelines for preparation of Project Work

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.

General guidelines for preparation of project work

- 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 bounded. The project report should be 60 to 80 pages
