NEP and Learning Outcomes based Curriculum Framework (LOCF)

For Postgraduate Programme

Master of Business Administration- Business Analytics

(Applicable from the Academic Session 2025-26)

Department of Management
Gurugram University, Gurugram (Haryana)
(A State Govt. University Established Under Haryana Act 17 of 2017

Chairperson
Department of Management
Gurugram University
Gurugram

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1. About The Department

Established in 2018, the Department of Management aims at developing global citizens of tomorrow through research, innovation, life skills, technical skills, and ethical training. The Department focuses on the education ecosystem through enshrined core values of intellectual excellence, collegiality, diversity, and integrity. As of today, it offers two-year full time MBA (General), MBA (Super Specialization), MBA(Integrated), MBA (Hospitality Management), MBA (Business Analytics) and Ph.D. programme from the University campus. The courses offer a unique and inspirational academic model designed to match the international standards. A wide spectrum of programs is paired with flexibility, experiential learning, and interdisciplinary orientation. The Department has a dynamic academic fraternity drawn from top universities nationally and internationally. The Department is the epitome of excellence and has created dynamic industry leaders and aspires to develop into a destination of choice for future managers. Department attracts a great diversity of students who have the drive, confidence, and a burning desire to advance the progress for business and society. Students here get the platform to train themselves with a view to face the challenges of the corporate world with confidence. Special emphasis is given to their holistic development through a healthy and collaborative learning environment. An integrated approach that combines field work, case studies, presentations and group discussions is followed by the department to inculcate pedagogical and conceptual knowledge along with practical exposure of management concepts and theories in students.

2. Programme Outcomes

Programme Outcomes (PO) of Post Graduate Programmes/Courses in the Faculty of Commerce and Management, Gurugram University, Gurugram are as under:

PO1	Apply knowledge of management theories and practices to solve business problems.
PO2	Foster Analytical and critical thinking abilities for data-based decision making.
PO3	Ability to develop Value based Leadership.
PO4	Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of business.
PO5	Ability to lead themselves and others in the achievement of organizational goals, contributing effectively to a team environment.
PO6	Develop deeper understanding, creativity, originality, and critical skills in chosen specialized areas of social science disciplines leading to employability.
PO7	Articulate and apply ethics, values and ideals that demonstrate awareness of current societal challenges leading to better quality of life.
PO8	Communicate conclusions, interpretations, and implications clearly, concisely and effectively, both orally and in writing for different types of audiences.

3. Programme Specific Outcomes (PSOs)

The MBA is a highly prominent management programme of modern times and prepares the participants

for taking up middle and top-level challenging executive assignments in private and public sectors. Accordingly, they are imparted adequate conceptual knowledge and practical training in various functional areas of management i.e., Finance, Marketing, Organizational Behaviour and Human Resource Management, Data Analytics, and supply chain management. MBA programme is a two years programme divided into four semesters. The programme is aimed at following outcomes:

PSO1	Developing the ability to think strategically, gaining competency in quantitative and qualitative techniques, gaining an understanding of global business dynamics, inculcating multicultural outlook, learning to navigate and manage organizational change effectively and understanding the role of technology in business transformation to derive business growth and competitiveness.
PSO2	Developing responsiveness to contextual social issues and exploring solutions, understanding business ethics and resolving ethical dilemmas, cultivating a mindset of lifelong learning and professional development to adapt to evolving business trends and challenges throughout their career, fostering an entrepreneurial mindset by encouraging innovation, creativity, and risk-taking abilities to identify and capitalize on business opportunities.

4. Qualification Descriptors

- Students shall be admitted to a two-year programme with the second year devoted entirely to specialization.
- A programme of study leading to the MBA degree is open to those who have met the entrance requirements, including specified levels of attainment, in the programme admission regulations. Admission to a programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake MBA study.

5. Scheme of Programme

MBA - a four-semester postgraduate programme is of 106 credits; weightage consisting of **Core Courses (CC), Skill Enhancement Courses (SEC), Ability Enhancement Courses (AEC), Value Addition Courses (VAC), Discipline Specific Elective Courses (DSE), Multidisciplinary Courses (MDC) Specialization Specific Elective Course (SSE) and Internship/ Dissertation/ Research Project/ Seminar.**

Course and Credit Scheme

Semester	Core Courses (CC)		Multidisciplinary Courses (MDC)		Skill Enhancement Courses (SEC)		Ability Enhancement Courses (AEC)		Value Addition Courses (VAC)		Discipline Specific Elective Courses (DSEC)		Specialization Specific Elective Courses (SSEC)		Internship/ dissertation / Research project / Seminar		Total Credits
	No. of Courses	Total Credits	No. of Courses	Total Credits	No. of Courses	Total Credits	No. of Courses	Total Credits	No. of Courses	Total Credits	No. of Courses	Total Credits	No. of Courses	Total Credits	No. of Courses	Total Credits	
I	3	12	1	3	-	-	1	2	1	2	1	3	-	-	-	-	22
II	3	12	1	3	1	2	1	2	-	-	1	3	-	-	-	-	22
III	3	12	1	3	1	2	-	-	1	2	1	3	2	6	2	6	34
IV	2	8	1	3	-	-	1	2	-	-	1	3	2	6	1	6	28
Total	11	44	4	12	2	4	3	6	2	4	4	12	4	12	3	12	106
%age	Core Credits	42	MDC Credits	11	SEC Credits	4	AEC Credits	6	VAC credits	4	DSEC credits	11	Specialization Specific Elective Course	11	Internship/ dissertation/ Research project / Seminar	11	100

6. Course Outcomes and Mapping Matrix:

- Each Course of the MBA Programme results in few Course/Learning Outcomes (COs) which are broadly mapped or associated with POs as well as PSOs.
- Mapping is a process of representing the correlation between COs and POs, COs and PSOs in the scale of 1 to 3 as follows.

Scale of Mapping between COs and POs & COs and PSOs

Scale 1	If the contents of course have low correlation (less than 50 %) with the particular Programme Outcomes and particular Programme Specific Outcomes.
Scale 2	If the contents of course have medium correlation (50%-70%) with the particular Programme Outcomes and Programme Specific Outcomes.
Scale 3	If the contents of course have strong correlation (more than 70%) with the particular Programme Outcomes and Programme Specific Outcomes.

7. Scheme of Examination

MBA First Year First Semester (Total Credits: 22, Marks -550)

Course Code	Course Title	Course Id	Theory Marks		Practical Marks		Total Marks	Credits
			External Marks	Internal Marks	External Marks	Internal Marks		
Core Courses								
241MGCC1	Management Principles and Organizational Behaviour	241/MBA/CC101	70	30	-	-	100	4
241MGCC2	Accounting for Managers	241/MBA/CC102	70	30	-	-	100	4
241MGCC3	Python programming	241/MBA/CC104	70	30	-	-	100	4
Multidisciplinary Course								
	To be picked up from the pool OR Equivalent MOOC Course*						75	3
Ability Enhancement Course								
	To be picked up from the pool						50	2
Discipline Specific Elective Course**								
241MGDSE1	Managerial Economics (Basic)	241/MBA/DSEC101	50	25	-	-	75	3
241MGDSE2	Managerial Economics (Advanced)	241/MBA/DSEC102	50	25	-	-		
Value Addition Course								
	(To be picked from						50	2

	Pool)							
	Total						**550**	**22**

*Each student is required to opt at least one course from MOOC of equivalent course credits. It is mandatory for the student to submit passing certificate of the same to the department, to be able to appear for the viva. For MOOC courses, 50 marks will be for the certificate earned (external practical) and 25 marks will be allotted on the basis of internal (internal practical) viva.

**Students may opt for either Managerial Economics (Basic) or Managerial Economics (Advanced), based on their interest in the course. (Students may refer to the syllabus for further clarity)

MBA First Year Second Semester (Total Credits: 22, Marks - 550)

Course Code	Course Title	Course Id	Theory Marks		Practical Marks		Total Marks	Credits
			External Marks	Internal Marks	External Marks	Internal Marks		
Core Courses								
242MGCC1	Human Resource Management	241/MBA/CC201	70	30	-	-	100	4
242MGCC2	Financial Management	241/MBA/CC202	70	30	-	-	100	4
242MGCC3	Marketing Management	241/MBA/CC203	70	30	-	-	100	4
Multidisciplinary Course								
	To be picked up from the pool OR Equivalent MOOC Course*						75	3

Ability Enhancement Course								
	To be picked up from the pool						50	2
Skill Enhancement Course								
	To be picked up from the pool						50	2
Discipline Specific Elective Course**								
242MGDSE 1	Statistics with R	241/MBA/DSEC201	50	25	-	-	75	3
242MGDSE 2	Business Research Methods (Advanced)	241/MBA/DSEC202	50	25	-	-		
	Total						**550**	**22**

*Each student is required to opt at least one course from MOOC of equivalent course credits. It is mandatory for the student to submit passing certificate of the same to the department, to be able to appear for the viva. For MOOC courses, 50 marks will be for the certificate earned (external practical) and 25 marks will be allotted on the basis of internal (internal practical) viva.

**Students may opt for either Business Research Methods (Basic) or Business Research Methods (Advanced), based on their interest in the course. (Students may refer to the syllabus for further clarity)

Summer Training: At the end of second semester, all the students will have to undergo summer training of 4-6 weeks with an industrial, business or service organization. The condition of successfully completing the programme shall not be deemed to have been satisfied unless a student undergoes summer training under the supervision of faculty from the department. Each student will be required to submit a summer training report to the department for the work undertaken for evaluation in the third semester. Internal evaluation of 30 marks will be done by Internal Guide /Mentor and 70 marks will be based on External viva before the committee of three members constituted by the Dean/Chairperson of the Department.

Exit Policy: For MBA-Business Analytics programme, there are two exit points, one, at the end of the first year of the MBA programme after successfully earning 44 credits of

First and Second semesters and second, on the completion of the two-year programme, after successfully earning 106 credits of all the four semesters. Students who exit after the first year shall be awarded the Post-Graduate Diploma in Management and students who exit after the completion of the second year will be awarded 'Master of Business Administration- Business Analytics'.

MBA Second Year Third Semester (Total Credits: 34, Marks - 850)

After completing 1st and 2nd Semesters, students are required to study four courses pertaining to Business Analytics Specialization in both the third and the fourth semesters.

Course Code	Course Title	Course Id	Theory Marks		Practical Marks		Total Marks	Credits
			External Marks	Internal Marks	External Marks	Internal Marks		
Core Courses								
243MBCC1	Strategic Management	241/MBABA/CC301	70	30	-	-	100	4
243MBCC2	Business Law	241/MBABA/CC302	70	30	-	-	100	4
243MBCC3	Basic Data Analytics using R and Python	241/MBABA/CC303	70	30	-	-	100	4
Multidisciplinary Course (MDC)								
	To be picked up from the pool						75	3
Skill Enhancement Course								
	To be picked up from the pool OR Equivalent MOOC Course*						50	2
Value Addition Course								
	To be picked up from the pool OR Equivalent MOOC Course*						50	2
Internship/ Dissertation/ Research Project								

243MBIDR1	Summer Training Project Report	241/MBABA/IDR301	-	-	70	30	100	4
243MBIDR2	Seminar	241/MBABA/IDR302	-	-	35	15	50	2
Discipline Specific Elective Course#								
243MBDSE1	Predictive Modeling	241/MBABA/DSEC301	50	25	-	-	75	3
243MBDSE2	Machine Learning with Python	241/MBABA/DSEC303	50	25	-	-		
Specialization Specific Elective Courses##								
243MBBA1	Social Media Analytics	241/MBABA/SSEC301	50	25	-	-	75	3
243MBBA2	Relational Database Management and SQL	241/MBABA/SSEC302	50	25	-	-		
243MBBA3	Data Visualization with Power BI	241/MBABA/SSEC304	50	25	-	-		
Total							**850**	**34**

*Each student is required to opt at least one course from MOOC of equivalent course credits. It is mandatory for the student to submit passing certificate of the same to the department, to be able to appear for the viva. For MOOC courses, 35 marks will be for the certificate earned (external practical) and 15 marks will be allotted on the basis of internal (internal practical) viva.

Students have to elect one Discipline Specific Elective Course based on their interest.

Students have to select any two Specialization Specific Elective Courses based on their interest.

Course Code	Course Title	Course ID	Theory Marks		Practical Marks		Total Marks	Credits
			External Marks	Internal Marks	External Marks	Internal Marks		
Core Courses								
244MBCC1	Entrepreneurship and Innovation	241/MBABA/CC401	70	30	-	-	100	4

244MBCC2	Advanced Analytics with Python	241/MBABA/CC403	70	30	-	-	100	4
Multidisciplinary Course								
	To be picked up from the pool OR Equivalent MOOC Course*						75	3
Ability Enhancement Course								
	To be picked up from the pool OR Equivalent MOOC Course**						50	2
Internship/ Dissertation/ Research Project								
244MBIDR1	Specialization based Research Project	241/MBABA/IDR401	-	-	100	50	150	6
Discipline Specific Elective Course#								
244MBDSE1	Data Visualization with Tableau	241/MBABA/DSEC401	50	25	-	-	75	3
244MBDSE2	Machine Learning with Python	241/MBABA/DSEC402	50	25	-	-		
Specialization Specific Elective Course##								
244MBBA1	Natural Language Processing	241/MBABA/SSEC401	50	25	-	-	75	3
244MBBA2	Python Programming for Analytics	241/MBABA/SSEC402	50	25	-	-		
244MBBA3	Cloud Computing	241/MBABA/SSEC403	50	25	-	-		
						Total	**700**	**28**

*Each student is required to opt at least one course from MOOC for equivalent course credits. It is mandatory for the student to submit passing certificate of the same to the department, to be able to appear for the viva. For MOOC courses, 50 marks will be for the certificate earned (external practical) and 25 marks will be allotted on the basis of internal (internal practical) viva.

**Each student is required to opt at least one course from MOOC for equivalent course credits. It is mandatory for the student to submit passing certificate of the same to the department, to be able to appear for the viva. For MOOC courses, 35 marks will be for the certificate earned (external practical) and 15 marks will be allotted on the basis of internal (internal practical) viva.

 # Students have to elect one Discipline Specific Elective Course based on their interest.

Students have to select any two Specialization Specific Elective Courses based on their

	interest.

MBA Second Year Fourth Semester (Total Credits: 28, Marks - 700)

Specialization Based Research Project: During the 4th semester the students will have to work on a research project of their specialized area under the supervision of faculty member of the department. Each student will be required to submit a project report to the department for the work undertaken for evaluation in the 4th semester. Internal evaluation of 50 marks will be done by Internal Guide /Mentor and 100 marks will be based on External viva before the committee of three members constituted by the Dean/Chairperson of the Department.

Notes:

1. PLP Stand for Personal Leadership Programme
2. It is mandatory to teach at least two cases per subject per semester.
3. Spreadsheet is the recommended software for doing basic calculations in subjects applicable, hence shall be used for teaching, practice, problem solving and assignments during all the four semesters.
4. The duration of all the end term theory examinations shall be 3 hours

Instructions for the Examiner:

Instructions for the External Examiner: The question paper shall be divided in two sections as follows:

	Theory Marks	**70**	**50**	**35**
Section A	Seven (7/6) short answer type questions from whole of the syllabus carrying equal marks each, this section will be compulsory	7*2=14 Marks	6*1= 6 Marks	7*1=7 Marks
Section B	8 questions (2 questions from each unit). The students will be required to attempt four questions selecting one question from each unit.	14*4= 56 Marks	11*4= 44 Marks	7*4= 28 Marks
	Total Theory Marks	**70 Marks**	**50 Marks**	**35 Marks**

Instructions for the Internal Examiner: The internal assessment should be spread evenly throughout the semester and must include at least 3 independent components including a mid-term exam. Below are the suggested components for internal marks.

	Marks out of			
Total Marks	**100**	**75**	**50**	**25**
Internal Assessment	**30**	**25**	**15**	**5**
Attendance Below 55= 0 Marks Between 55 to < 65= 1Marks Between 65 to < 70 = 2 Marks Between 70 to < 75 = 3 marks Between 75 to < 80= 4 Marks 80 and more than 80 = 5 Marks	5	5	5	5
Assignment/ Presentations/ Seminars and Class Participation	5	5	-	-
Sessional Examination*	20	15	10	-
Total Marks	**30**	**25**	**15**	**5**

*Sessional will consist of class tests, mid-semester examination(s), homework assignments, class presentations, case analysis, role play etc., as determined by the faculty in charge of the courses of study.

8. Detailed Syllabus

First Semester

Management Principles and Organizational Behaviour

PAPER CODE: 241MGCC1

Credits: 4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objectives:

Management Principles and Organizational Behaviour is a course which offers insights to understand personality characteristics, work, and team structures, evolving workplace challenges, and interpersonal problems and to apply such understanding to enhance the quality of human dynamics and performance in organizations.

Course Outcomes: On the completion of this course the student will be able to:

CO1: Provide the knowledge and understanding of the tasks and functions of management.

CO2: Comprehend and apply the behavioral patterns of human beings at individual & group levels in the context of an organization.

CO3: Analyze human behavior for prediction and management of human resources in an organization while following ethical code of conduct.

CO4: Evaluate the understanding of the dynamics of interaction and integration between the individual and the organization.

Detailed Syllabus

UNIT I

Fundamentals of Management & Management Process: Evolution of Management thought, Meaning and Nature of Management, Management Approaches, Processes, Managerial functions & competencies, Tasks and Responsibilities of a Managers, Issues in Managing: Change, Technology, Diversity & Globalization, Fundamentals of social responsibility, areas of corporate social responsibility, Social responsiveness and decision making, Basic approaches to Ethics, Tools of Ethics: Values, rights, duties & moral rules, Creating an ethical workplace.

UNIT II

Foundations of Planning, Organizing, Controlling and Managerial Decision making: Importance of Planning, Types & elements of Planning, strategic Planning, and Strategy formulation tools: SWOT analysis, Porter's five forces model, Mc Kinsey's 7-S framework, Types & process of decision making, Decision making models, Decision making under risk, certainty & uncertainty, Effective Delegation, Boundary less Organizations, Meaning, need & process of Control, Importance of Control, Types of Control, Designing an integrated control system, Ethical Issues of Control.

UNIT III

Introduction to Organizational Behaviour :Nature, importance and determinants of OB; Subsequent Phases of Hawthorne studies and Human Relations Approaches; Predecessors of OB; Relationship with other fields; Understanding, Attribution theories; Individual Learning: Nature and process, Application of learning principles in organizational context; Attitudes: Types & work related attitudes. Managing emotions in organizations – emotional intelligence and emotional labour, stress management; Motivation concept and applications.

UNIT IV

Individual, Group and Organizational level Behaviour: Individual Determinants of Organization Behaviour-Person Perception, Perceptual Process, Importance, and factors affecting perception, Individual Differences - Understanding Self, Nature Vs. Nurture, Johari Window; Personality Traits and Attributes of Personality - Self-Esteem, Type A & B, Locus of Control, Machiavellianism. Group Dynamics and Interpersonal,

Relationships, Group processes and group decision making, Dysfunctions of groups, Team: Creating effective teams and turning individuals into team players, Contemporary issues in managing teams. Leadership theories and contemporary issues in leadership, Management of Organizational Conflicts and negotiations, Understanding Power, and Politics.

SUGGESTED READINGS:

1. Organizational Behaviour by Robbins, P., Judge, and Sanghi (2009). Pearson Education.
2. Essentials of Mgmt. by Harold Koontz & Heinz Weichrich (1st ed., Excel Books)
3. Management: Text & Cases by V S P Rao& V Hari Krishna (Excel Books)
4. Management by James A. F. Stoner, r Edward Freeman, Daniel R Gilbert (6th edition, Pearson Education)
5. Organizational Behaviour by Fred Luthans (Tata McGraw-Hill).

Mapping Matrix of Course: 241MGCC1

Table 1: CO-PO & CO-PSO Matrix for the Course 241MGCC1: Management Principles and Organizational Behavior

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

ACCOUNTING FOR MANAGERS
241MGCC2

Credits: 4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objective:

The Objective of this course is to provide students with a conceptual understanding of cost and managerial accounting and the skills required in applying knowledge for decision making. This course emphasizes on the development and use of accounting information for internal decisions in business management. Aim of this course is to equip participants with a systematic and rigorous knowledge of management accounting practices that can be strategically applied across various functions of an organization to improve its' performance. The course also reviews contemporary developments in cost & management accounting for strategic decision

Course Outcome:

On the completion of this course the student will be able to:

CO1: Understand theories, concepts and basic principles of accounting.

CO2: Apply theories, concepts and principles of accounting for problem solving and financial decision making.

CO3: Analyze the need & relevance of application of accounting knowledge in managerial decision making.

CO4: Emphasize on the evaluation and use of accounting information for financial appraisals at individual and organizational levels.

DETAILED SYLLABUS:

UNIT -I

Financial Accounting-concept, importance and scope, accounting principles, journal, ledger, trial balance, depreciation (straight line and diminishing balance methods), Preparation of final accounts (in vertical format only) with adjustments.

UNIT -II

Analysis and interpretation of financial statements – meaning, importance and techniques, ratio analysis; trend analysis; Altzman's Z Model for analyzing financial health, cash flow analysis (AS-3)

UNIT -III

Cost accounting-meaning, importance, methods, techniques; classification of costs and cost sheet; inventory valuation; an elementary knowledge of activity-based costing.

UNIT -IV

Management accounting- concept, need, importance and scope; Budgetary control-meaning, need, objectives, essentials of budgeting, different types of budgets; standard costing and variance analysis (materials, labour); marginal costing and its application in managerial decision making.

SUGGESTED READINGS:

1. Malhotra A K, Accounting for Managers, Arya Publication, Rohtak, Haryana
2. Khan, M.Y. and Jain, P.K., Management Accounting, TMH, New Delhi.
3. Pandey, I.M., Management Accounting, Vikas Publishing House, New Delhi
4. Horngren, Sundem & Stratton, Introduction to Management Accounting, Pearson Education, New Delhi.
5. Hansen & Mowen, Cost Management, Thomson Learning
6. Mittal, S.N., Management Accounting and Financial Management, Shree Mahavir Book Depot, New Delhi.

Mapping Matrix of Course :241MGCC2

Table 1: CO-PO & CO-PSO Matrix for the Course 241MGCC2: Accounting for Managers

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2

CO1	3	2	1	3	1	2	1	2	3	2
CO2	3	3	2	2	3	3	3	2	2	2
CO3	2	3	2	3	2	3	3	2	2	2
CO4	2	2	2	2	2	2	2	3	2	3
Average	2.5	2.5	1.75	2.5	2	2.5	2.25	2.25	2.25	2.25

Python Programming
241MGCC3

Credits: 4
External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hours

Type of Course: Core Course

Course Objectives: Python Programming module is intended for students who wish to learn the Python programming language. The module comprises of Programming basics with regards to Python Language such as Data Types, Operators, Functions, Classes and Exception Handling. This module will help students gain much needed knowledge pertaining to Python Programming, so as to prepare them for the advanced modules such as ML. Python scripting is user-friendly and is the most used language in industry when it comes to designing and scripting applications with respect to Emerging Technologies.

Course Outcomes:

On the completion of this course the student will be able to:

CO1: Memorize and develop conceptual understanding of Python.

CO2: Apply the conceptual knowledge of lists, tuples, and dictionaries to develop python programs.

CO3: Analyze the relevance of application Python for data analysis and solving complex business problems.

CO4: Evaluate and design programs for data processing for providing solutions to complex business problems.

Detailed Syllabus:

Unit-I

History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions.

Unit-II

Lists, Operations, Slicing, Methods, Tuples, Sets, Dictionaries, Sequences, Comprehensions, Conditional blocks using If, Else and El-if, For Loop, For loop using Ranges, String, list and Dictionaries, While Loop, Loop Manipulation using Pass, Continue, Break and Else, Conditional

and Loops Block.

Unit-III

Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Function Returning Values, Scope of the Variables in a Function - Global and Local Variables. Creating modules, Name Spacing, Introduction to PIP, Installing Packages via PIP, Using Python Packages. **Unit-IV**

Classes, Self-Variable, Methods, Constructor Method, Inheritance, Overriding Methods, Data Hiding, Difference between an Error and Exception, Handling Exception, Try Except Block, Raising Exceptions, and User Defined Exceptions.

Suggested Readings:

1. R.Nageswara Rao, 2018, Core Python Programming, Dreamtech.
2. John Hearty, 2016, Advanced Machine Learning with Python, Packt.
3. Jake VanderPlas, 2016, Python Data Science Handbook: Essential Tools for Working with Data, O'Reilly.
4. Mark Lutz, 2010, Programming Python, O'Reilly.
5. Tim Hall and J-P Stacey, 2009, Python 3 for Absolute Beginners, Apress..

Mapping Matrix of Course: 244MBBA2

Table 1: CO-PO & CO-PSO Matrix for the Course 244MBBA2: Python Programming

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	1	1	3	1	1	2	2
CO2	2	2	2	2	2	2	2	2	3	2
CO3	2	3	1	2	1	2	1	3	2	2
CO4	2	2	2	2	2	2	2	2	2	2
Average	2.25	2.25	1.5	1.75	1.5	2.25	1.5	2	2.25	2

Managerial Economics (Basic)
241MGDSE1

External Marks: 50
Internal Marks: 25
Time Allowed: 3 hours

Credits: 3

Type of Course: Discipline Specific Elective Course

Course Objectives:

'Managerial Economics' is a core course to acquaint the students with concepts and techniques used in the field of economics and to enable them to apply this knowledge in business decision making. Emphasis is given to changes in the nature of business firms in the context of globalization.

Course Outcomes:

On the completion of this course the student will be able to:

CO1: Understand the basic elements of managerial economics.

CO2: Apply the concepts of managerial economics for the optimum utilization of resources within ethical boundaries.
CO3: Analyze theories and principles of managerial economics for problem solving at individual and organizational level.
CO4: Critically evaluate the policies at micro economic level for inclusive growth and development.

Detailed Syllabus:

UNIT I
Managerial Economics: Nature, Scope and Principle; Theory of demand and consumer equilibrium-utility and indifference curve approach; Demand function; Elasticity of demand and its significance in managerial decision-making; Demand forecasting and its techniques.

UNIT II
Theory of Cost: Short run and long run cost curves, relation between cost and revenue, break-even point; Economies and diseconomies of scale and scope; Production function: Short term and long run production function, law of variable proportion and return to scale, Iso-quant curves.

UNIT III
Market Structure and Competition: Price and output determination under perfect competition, monopoly, monopolistic competition and oligopoly. Duopoly

UNIT IV
Modern theories of the firm: Baumol's theory of sales maximization, Profit Maximization. National Income: Concept and Measurement, Business Cycle.

Suggested Readings:

1. Brigham, E. F., Pappas, J. L., Managerial Economics, Dryden Press, Illinois.
2. Dwivedi, D.N., Managerial Economics, Vikas Publication, New Delhi.
3. Jhingan, M.L., Managerial Economics, Vrinda Publication, New Delhi.
4. Peterson, Lewis, Managerial Economics, Prentice Hall of India, New Delhi.
5. Salvatore, Managerial Economics in Global Economy, Thomson Learning, Mumbai.

Mapping Matrix of Course :241MGDSE1
Table 1: CO-PO & CO-PSO Matrix for the Course 241MGDSE1: Managerial Economics (Basic)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	2	1	2	2	1	2	2	2
CO2	3	3	2	3	2	3	3	2	3	2
CO3	3	3	2	3	3	3	2	2	2	3
CO4	2	2	2	2	2	2	3	2	2	2
Average	2.75	2.5	2	2.25	2.25	2.5	2.25	2	2.25	2.25

Managerial Economics (Advanced)
241MGDSE2

External Marks: 50
Internal Marks: 25
Time Allowed: 3 hours

Credits: 3

Type of Course: Discipline Specific Elective Course

Course Objectives:

'Managerial Economics' is a core course to acquaint the students with concepts and techniques used in the field of economics and to enable them to apply this knowledge in business decision making. Emphasis is given to changes in the nature of business firms in the context of globalization.

Course Outcomes:

On the completion of this course the student will be able to:

CO1: Understand the basic elements of managerial economics.
CO2: Apply the concepts of managerial economics for the optimum utilization of resources within ethical boundaries.
CO3: Analyze theories and principles of managerial economics for problem solving at individual and organizational level.
CO4: Critically evaluate the policies at micro economic level for inclusive growth and development.

Detailed Syllabus:

UNIT I
Managerial Economics: Nature, Scope and Principle; Theory of demand and consumer equilibrium-utility and indifference curve approach; Demand function; Elasticity of demand and its significance in managerial decision-making; Demand forecasting and its techniques.
UNIT II
Theory of Cost: Short run and long run cost curves, relation between cost and revenue, break-even point; Economies and diseconomies of scale and scope; Production function: Short term and long run production function, law of variable proportion and return to scale, Iso-quant curves.
UNIT III
Market Structure and Competition: Price and output determination under perfect competition, monopoly, monopolistic competition and oligopoly. Duopoly
UNIT IV
Risk analysis; investment and capital replacement decisions; locational choice of a firm; measures of national income; business cycles; operative aspects of macroeconomic policies; inflation analysis; tariff analysis.

Suggested Readings:

1. Brigham, E. F., Pappas, J. L., Managerial Economics, Dryden Press, Illinois.
2. Dwivedi, D.N., Managerial Economics, Vikas Publication, New Delhi.
3. Jhingan, M.L., Managerial Economics, Vrinda Publication, New Delhi.
4. Peterson, Lewis, Managerial Economics, Prentice Hall of India, New Delhi.
5. Salvatore, Managerial Economics in Global Economy, Thomson Learning, Mumbai.

Mapping Matrix of Course :241MGDSE2

Table 1: CO-PO & CO-PSO Matrix for the Course 241MGDSE2: Managerial Economics (Advanced)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	2	1	2	2	1	2	2	2
CO2	3	3	2	3	2	3	3	2	3	2
CO3	3	3	2	3	3	3	2	2	2	3
CO4	2	2	2	2	2	2	3	2	2	2
Average	2.75	2.5	2	2.25	2.25	2.5	2.25	2	2.25	2.25

Second Semester

Human Resource Management
PAPER CODE: 242MGCC1

Credits:4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs

Type of Course: Core Course

Course Objectives:

The Objective of this course is to provide students with a conceptual understanding of HR Concepts and its usage in organizations. This will also impart the skills required in applying theory to practice for effective decision making.

Course Outcomes: On the completion of this course the student will be able to:

CO1: Understand the theories and concepts of Human Resource Management for strategic human resource planning.
CO2: Apply the knowledge of HRM concepts for holistic development of an individual at group as well as organizational level.
CO3: Analyze the significance of HR practices for the enhancement of competitive advantage in the globalized environment.
CO4: Evaluate the HR policies and strategies under different scenarios and its effectiveness for goal attainment, change management and critical problem solving.

Detailed Syllabus:

UNIT-I

Strategic importance of HRM; objectives of HRM; challenges to HR professionals; role, responsibilities and competencies of HR professionals; HR department operations; human resource planning – objectives and process; human resource information system; Linkage between HRM and Strategic Management; Introduction to Strategic Human Resource Management and HRD

UNIT-II

Talent acquisition: Job Analysis, recruitment and selection strategies, career planning and management, succession planning, socialization and induction of new employees; training and development, investment in training, training need assessment, designing and administering training programme; executive development programme, evaluation of T & D programme

UNIT-III

Performance Appraisal: Conceptual Understanding: developing and instituting performance appraisal system, Methods of Performance Appraisal, Performance Management, linking rewards to organizational objectives, Job Evaluation, Compensation Management and incentive plans, Executive Compensation, designing and administering benefits and services

UNIT-IV

HR in knowledge era: HR in knowledge industry, HR in virtual organizations, HR in mergers and acquisitions, outplacement, outsourcing HR functions, employee leasing, HR audit, international HRM, Theories of Cultural Analysis, Managing Cross Cultural Teams, Cultural Intelligence and Impact on Work.

SUGGESTED READINGS:

1. Ivanceivich, John M., Human Resource Management, Tata McGraw Hill, New Delhi
2. Gomez. Megia, Luis, David Balkin, and Roberty Cardy, Managing Human Resources, Pearson Education
3. Dessler, G., & Biju, V, Human Resource Management. Pearson Education., New Delhi
4. Mathis, Robert, and John Jackson, Human Resource Management, Thomson Learning Inc.
5. Shell, Scott and George Bohlander, Human Resource Management, Thomson Learning Inc.
6. Pattanayak, Biswajert, Human Resource Management, PHI, New Delhi
7. Jyothi P., and D.N.Venkatesh, Human Resource Management, Oxford University Press, New Delhi
8. Hodegetts, R.M., Luthans, F., Doh, J., International Management: Culture, Strategy and Behaviour, Tata McGraw Hill, New York.

Mapping Matrix of Course: 242MGCC1

Table 1: CO-PO & CO-PSO Matrix for the Course 242MGCC1: Human Resource Management

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	2	2	3	2	2	2	2
CO2	3	2	2	2	3	2	3	3	3	3
CO3	2	3	2	3	2	2	2	2	3	2
CO4	2	3	2	2	3	3	2	3	2	3
Average	2.5	2.5	1.75	2.25	2.5	2.5	2.25	2.5	2.5	2.5

Financial Management
242MGCC2

Credits:4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 hours

Type of Course: Core Course

Course Objectives:
The objective of this course is to develop the ability to analyze, evaluate and interpret the financial information provided in the financial statements. It also serves as a fundamental tool for financial analysis and helps in successful decision making and forward planning through enhancing various skills of the students. Major objective of this course is the development of analytical and decision-making skills in finance through the usage of theoretical underpinnings and practical knowledge.

Course Outcomes:
On the completion of this course the student will be able to:

CO1: Understand the fundamental concepts in financial management.
CO2: Apply the financial theories and principles for long term and short-term financial planning.
CO3: Analyze information relating to sources and uses of finance from a financial manager's perspective.
CO4: Evaluate the financial statements presented to various stakeholders for financial decision making.

Detailed syllabus:

UNIT-I

Financial management-scope finance functions and its organization, objectives of financial management; time value of money; sources of long-term finance.

UNIT-II

Investment decisions importance, difficulties, determining cash flows, methods of capital

budgeting; risk analysis (risk adjusted discount rate method and certainty equivalent method); cost of different sources of raising capital; weighted average cost of capital.

UNIT-III

Capital structure decisions-financial and operating leverage; capital structure theories - NI, NOI, traditional and M-M theories; determinants of dividend policy and dividend models -Walter, Gordon & M.M. models.

UNIT-IV

Working Capital- meaning, need, determinants; estimation of working capital need; management of cash, inventory and receivables.

Note: The topic of capital budgeting, management of cash, inventory management, and receivable management will cover theoretical concepts and simple numerical questions.

SUGGESTED READINGS:

1. Pandy, I.M., Financial Management, Vikas Publishing House, New Delhi
2. Khan M.Y, and Jain P.K., Financial Management, Tata McGraw Hill, New Delhi
3. Keown, Arthur J., Martin, John D., Petty, J. William and Scott, David F, Financial Management, Pearson Education
4. Chandra, Prasanna, Financial Management, TMH, New Delhi
5. Van Horne, James C., Financial Management and Policy, Prentice Hall of India
6. Brigham & Houston, Fundamentals of Financial Management, Thomson Learning, Bombay.
7. Kishore, R., Financial Management, Taxman's Publishing House, New Delhi
8. Ross, Stephen. A; Westfield, Randolph W; Jafee, Jeffery &Kakani, Kumar, Ram,(2014) Corporate Finance, Special Indian Edition, 10th edition, Tata McGraw Hill Publication, New Delhi
9. Brealey, Richard; Myers, Stewart; Franklin Allen; Mohanty, Pitabas (2012). Principles of Corporate Finance, Tata McGraw Hill Publication, New Delhi.

Mapping Matrix of Course :242MGCC2

Table 1: CO-PO & CO-PSO Matrix for the Course 242MGCC2: Financial Management

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	3	1	2	2	3	2	2	2	2
CO2	3	2	2	3	2	2	2	2	2	2
CO3	2	2	1	2	2	2	2	3	3	2
CO4	2	3	2	2	2	2	2	3	3	2
Average	2.5	2.5	1.5	2.25	2	2.25	2	2.5	2.5	2

Marketing Management
242MGCC3

Credits: 4 **External Marks: 70**

Internal Marks: 30
Time Allowed: 3 Hours

Type of Course: Core Course

Course Objectives:
Marketing management course enables a student to understand the fundamentals of marketing concept and the role marketing plays in business. This course enables a student to understand the 'Marketing mix' elements and the strategies and principles underlying the modern marketing practices. Students should be able to demonstrate their comprehension of marketing concepts and knowledge by applying those in their written exams, case studies discussions, presentations and projects. The assignments/projects would enable students to apply the marketing concepts and marketing mix elements practically and illustrate those through a written report and presentation. The course methodology encourages students to explore for themselves the role of a marketing manager and the boundaries of marketing.

Course Outcomes:
On the completion of this course the student will be able to:

CO1: Memorize and understand the various concepts of marketing and their relevance in the global business environment.
CO2: Apply marketing process and tools for value based strategic decision making for global market leadership.
CO3: Analyze the significance of marketing communication for competitive positioning of products or services.
CO4: Evaluate the marketing strategies through creative thinking ability under various scenarios.

Detailed Syllabus:

UNIT I
Meaning, Scope, Nature, Importance, Recent Trends and application; Challenges in Marketing, Core concepts of Marketing, Marketing Myopia, elements of marketing environment, creation of value chain.

UNIT II
Marketing Plan and Strategy; Market Segmentation, Bases for Segmentation, Market Targeting, Developing and Communicating Positioning Strategy, identification and managing competition, new product development

UNIT III
Consumer and Business Markets; Product Classification, Product life cycle – stages and strategies, managing product and services along PLC and Product Differentiation, Developing Pricing Strategies and Programs, Responding to Price Changes, Role of Marketing Channels, Channel Design Decision and Managing Channel Conflict.

UNIT IV
Marketing communication framework and personal selling; Communication (viral marketing, experiential marketing), Marketing Control, Emerging trends of digital marketing, role of social media in marketing, understanding the challenges of global

marketing

SUGGESTED READINGS:

1. Kotler Philip and Keller; Marketing Management; PHI, New Delhi
2. Kotler, Philip, Kevin Keller, A. Koshy and M. Jha, Marketing Management in South Asian Perspective, Pearson Education, New Delhi
3. Kerin, Hartley, Berkowtz and Rudelius, Marketing, TMH, New Delhi
4. Etzel, Michael J, Marketing: Concepts and Cases, TMH, New Delhi
5. Dhunna, Mukesh, Marketing Management – Text and Cases, Wisdom Publications, New Delhi

Mapping Matrix of Course :242MGCC3

Table 1: CO-PO & CO-PSO Matrix for the Course 242MGCC3: Marketing Management

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	2	2	3	2	2	2	2
CO2	3	3	3	3	3	2	3	2	3	3
CO3	2	2	2	3	3	2	2	3	3	2
CO4	3	3	2	2	2	3	3	2	2	3
Average	2.75	2.5	2	2.5	2.5	2.5	2.5	2.25	2.5	2.5

Statistics with R
242MGDSE1

Credits:3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hours

Type of Course: Discipline Specific Elective Course

Course Objectives:

This course comprises of R programming basics and application of several Statistical Techniques using it. It aims to provide exposure in terms of Statistical Analysis, Hypothesis Testing, Regression and Correlation using R programming language. The objective of this module to make students exercise the fundamentals of statistical analysis in R environment. They would be able to analysis data for the purpose of exploration using Descriptive and Inferential Statistics. Students will understand Probability and Sampling Distributions and learn the creative application of Linear Regression in multivariate context for predictive purpose.

Course Outcomes:

On the completion of this course the student will be able to:

CO1: Memorize and understand the terminology of R.

CO2: Apply the knowledge of R programming language in R Studio to resolve business problems.

CO3: Analyze the business problems statistically using R programming Language.

CO4: Evaluate the reliability and validity of data and design programmes to resolve complex business problems.

Detailed Syllabus:

Unit -I

R and R Studio, Logical Arguments, Missing Values, Characters, Factors and Numeric, Help in R, Vector to Matrix, Matrix Access, Data Frames, Data Frame Access, Basic Data Manipulation Techniques, Usage of various apply functions – apply, lapply, sapply and tapply, Outliers treatment.

Unit II

Types of Data, Nominal, Ordinal, Scale and Ratio, Measures of Central Tendency, Mean, Mode and Median, Bar Chart, Pie Chart and Box Plot, Measures of Variability, Range, Inter-Quartile- Range, Standard Deviation, Skewness and Kurtosis, Histogram, Stem and Leaf Diagram, Standard Error of Mean and Confidence Intervals. Experiment, Sample Space and Events, Classical Probability, General Rules Of Addition, Conditional Probability, General Rules For Multiplication, Independent Events, Bayes' Theorem, Discrete Probability Distributions: Binomial, Poisson, Continuous Probability Distribution, Normal Distribution & t-distribution, Sampling Distribution and Central Limit Theorem.

Unit III

Population and Sample, Null and Alternate Hypothesis, Level of Significance, Type I and Type II Errors, One Sample t Test, Confidence Intervals, One Sample Proportion Test, Paired Sample t Test, Independent Samples t Test, Two Sample Proportion Tests, One Way Analysis of Variance and Chi Square Test.

Unit IV

Analysis of Relationship, Positive and Negative Correlation, Perfect Correlation, Correlation Matrix, Scatter Plots, Simple Linear Regression, R Square, Adjusted R Square, Testing of Slope, Standard Error of Estimate, Overall Model Fitness, Assumptions of Linear Regression, Multiple Regression, Coefficients of Partial Determination, Durbin Watson Statistics, Variance Inflation Factor.

Suggested Readings:

1. Ken Black, 2013, Business Statistics, New Delhi, Wiley.
2. Lee, Cheng. et al., 2013, Statistics for Business and Financial Economics, New York: Heidelberg Dordrecht.
3. Anderson, David R., Thomas A. Williams and Dennis J. Sweeney, 2012, Statistics for Business and Economics, New Delhi: South Western.
4. Waller, Derek, 2008, Statistics for Business, London: BH Publications.
5. Levin, Richard I. and David S. Rubin, 1994, Statistics for Management, New Delhi: Prentice Hall.

Mapping Matrix of Course: 242MGDSE1

Table 1: CO-PO & CO-PSO Matrix for the Course 242MGDSE1: Statistics with R

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	1	1	3	1	1	2	2
CO2	2	2	2	2	2	2	2	2	2	2
CO3	2	3	1	2	1	2	1	3	2	2
CO4	2	2	2	2	2	2	2	2	2	2
Average	2.25	2.25	1.5	1.75	1.5	2.25	1.5	2	2	2

Business Research Methods (Advanced)
242MGDSE2

Credits: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hours

Type of Course: Discipline Specific Elective Course

Course Objectives:

The overarching aim of this course is to acquire a basic knowledge of scientific paradigms and research methods. Further, the aim is to develop the student's ability to first, plan and in written form report a scientific study, and second, to evaluate and use scientific as well as other reports.

Course Outcomes: On the completion of this course the student will be able to:
CO1: Develop understanding of research concepts and the research process.
CO2: Apply the knowledge of research tools and techniques for critical problem solving and decision making.
CO3. Analyze the insights gained about concepts of research designs and methodology aimed at solving business problems and to communicate results to various stakeholders via research reports.
CO4. Evaluate the effectiveness of research tools and techniques for strategic decision making.

Detailed Syllabus:

UNIT-I

Introduction to Business Research and Research Design: Meaning of research; Types of research, the research process, Research applications, Features of a Good research study, Research Problem, writing a research proposal, Research Design, Meaning of Research Designs, Nature and Classification of Research Designs, Errors affecting Research Design.

UNIT-II

Data Source and Data Collection and Sampling: Primary and Secondary Data: Classification of Data;

Secondary Data: Uses, Advantages, Disadvantages, Types and sources; Primary Data Collection: Observation method, Focus Group Discussion, Personal Interview method, Data Processing, Data Editing, Coding, Classification and Tabulation of Data Sampling Design: Census v/s Sampling, Sampling Methods, Errors in sampling. Determination of Sample Size.

UNIT-III

Hypothesis Formulation, Measurement and Scaling and Questionnaire designing, Hypothesis: Types, characteristics, sources and formulation of hypotheses, errors in hypotheses. Attitude Measurement and Scaling, Measurement Error, Criteria for Good Measurement. Questionnaire Designing, Types of Questionnaires, Process of Questionnaire Designing, Advantages and Disadvantages of Questionnaire Method, Concepts of Reliability and Validity.

UNIT-IV

Data Analysis: Editing and coding of data, tabulation, graphic presentation of data, cross tabulation. Type I and II errors, one tailed and two tailed tests of significance. Parametric and nonparametric tests for univariate and bivariate data. Tests of association. Chi-square Analysis: Chi square test for the Goodness of Fit. Analysis of Variance: Completely randomized design in a one-way ANOVA. Research Report Writing: Types of research reports – Brief reports and Detailed reports; Report writing: Structure of the research report- Preliminary section, Main report, Interpretations of Results and Suggested Recommendations. Ethics in Research: Responsibility of ethics in research. References & Bibliography.

SUGGESTED READINGS:

1. Copper, D. R., Schindler P. S. & Sharma, J. K. Business Research Methods, McGraw Hill Education.
2. Zikmund, W. G. Business Research Methods. Thomson.
3. Burns, R. B. & Burns, R. A. Business Research Methods and Statistics using SPSS, SAGE Publications Ltd.
4. Bajpai, N, Business Research Methods, Pearson.
5. Chawla, D. & Sondhi N., Research Methodology: Concepts and Cases, Vikas Publishing House.
6. Panneerselvam, R, Research Methodology, Prentice Hall India.
7. Kothari, C.R. Research Methodology & Technique, New Age International Publishers.

Mapping Matrix of Course: 242MGDSE2

Table 1: CO-PO & CO-PSO Matrix for the Course 242MGDSE2: Business Research Methods (Advanced)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	3	2	3	1	2	2	2
CO2	3	3	2	2	2	2	2	2	2	2
CO3	2	3	2	2	2	2	1	3	3	2
CO4	2	3	1	2	2	3	2	3	3	2
Average	2.5	2.75	1.5	2.25	2	2.5	1.5	2.5	2.5	2

Third Semester

Strategic Management

243MBCC1

Credits: 4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objectives:

The course aims at imparting knowledge of formulation, implementation and evaluation of business strategies, for effective planning and to introduce key strategy concepts to the students for facilitating better decision making.

Course Outcomes: On the completion of this course the student will be able to:

CO1: Develop understanding of the type of decisions taken at different levels of management. .
CO2: Apply various tools and techniques for strategic decision making and problem solving through critical thinking.
CO3: Analyze the significance of strategies and policies for gaining competitive advantage globally.
CO4: Evaluate the strategy which best fits in achieving the organizational goals under various scenarios.

DETAILED SYLLABUS:

UNIT I
Strategy: Concept and Levels, Strategic Decision Making; Schools of thought on Strategy Formulation; Strategic Management: Elements and Models in Strategic Management Process; Strategic Intent, Vision, Mission, Goals and Objectives, Strategic Business Unit.

UNIT II
Strategy Formulation: Environmental Appraisal, Organizational Appraisal, Corporate Level and Business Level Strategies.

UNIT III
Strategic Analysis and Choice: Strategic Analysis, Tools and Techniques for Strategic Analysis - BCG Matrix, Porter's Model, GE Matrix, SWOT Analysis; Strategic Choice - Process of Strategic Choice, Factors in strategic Choice.

UNIT IV
Strategy Implementation: Activating Strategies, Structural, Behavioural, Functional and Operational Implementation; Strategic Evaluation and Control.

SUGGESTED READINGS:

1. Gupta, Gollakota and Srinivasan, Business Policy and Strategic Management – Concepts and Applications, PHI, New Delhi.
2. Jauch and Glueck, Business Policy and Strategic Management, TMH, New Delhi.
3. Kazmi, Azhar, Strategic Management and Business Policy, Tata McGraw Hill Publishing Company Ltd., New Delhi.

4. Pearce and Robinson, Strategic Management–Formulation, Implementation and Control, McGraw Hill Publishing, New Delhi.

Mapping Matrix of Course: 243MBCC1
Table 1: CO-PO & CO-PSO Matrix for the Course 243MBCC1: Strategic Management

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	2	2	3	1	2	2	2
CO2	3	3	1	2	3	3	1	2	3	2
CO3	1	2	2	3	2	2	2	2	3	2
CO4	2	2	2	2	2	2	2	3	2	2
Average	2.25	2.25	1.5	2.25	2.25	2.5	1.5	2.25	2.5	2

Business Law
243MBCC2

Credits: 4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objectives: This course gives an exposure to the students of some of the major commercial laws affecting the businesses and equip them with the deeper understanding of various provisions of the laws pertaining to businesses.

Course Outcomes:
On the completion of this course the student will be able to:

CO1: Remember different laws applicable to a business.
CO2: Apply the knowledge of laws for solving business problems while following ethical code of conduct.
CO3: Analyze cases of law and develop critical thinking to formulate plans as per the regulatory framework.
CO4: Evaluate the existing business laws in India and analyse their relevance in today's globalized environment.

Detailed Syllabus:
UNIT I
The Indian Contract Act, 1872: Meaning of a Contract, Classification of Contracts, Essentials of a Valid Contract; Performance of a Contract; Discharge of a Contract; Breach of Contract; Quasi Contracts.

UNIT II
Contracts of Indemnity: Meaning, Rights of Indemnity holder, Time of commencement of Indemnifier's Liability Are Insurance Contracts the Contracts of Indemnity?
Contracts of Guarantee: Meaning & Features of Contract of Guarantee, Difference between a Contract of Indemnity & Contract of Guarantee, Nature & Extent of Surety's

Liability, Meaning & Revocation of Continuing Guarantee, Rights of Surety against Principal Debtor, Creditor & Co-Surety.
Contracts of Bailment: Definition & Essentials of Contract of Bailment, Duties and Rights of Bailor and Bailee, Duties & Rights of Finder of Goods.
Contracts of Agency: Meaning & Essentials of Contract of Agency, Different kinds of Agents- Auctioneers, Brokers & Del Credere Agents, Extent of Agent's Authority – Actual, Apparent, Authority in Emergency, Duties of Agent, Termination of Agency

UNIT III

The Sales of Goods Act, 1930: Meaning and essentials of a valid contract of sale, Distinction between sale and agreement to sell, Meaning of goods and their classification, Conditions and warranties, Doctrine of Caveat Emptor, Rights of an unpaid seller, Rights of buyer.

UNIT IV

Negotiable Instruments Act: Meaning, Characteristics and Types of Negotiable Instruments; Holder and Holder-in-due-course; Negotiation by Endorsements; Crossing of Cheque and Dishonour of Cheque.

SUGGESTED READINGS:

1. Aggarwal, S. K., Singhal, K., Business Laws, Galgotia Publications, New Delhi.
2. Datey, V. S., Business and Corporate Laws, Taxmann Publications, New Delhi.
3. Gulshan, S. S., Business Law, New Age International Publication, New Delhi.
4. Kapoor, N. D., Elements of Mercantile Law, Sultan Chand & Sons, New Delhi.
5. Kuchhal and Prakash, Business Legislation for Management, Vikas Publishing, New Delhi.
6. Tulsian P. C., Business Law, Tata McGraw Hill, New Delhi.

Mapping Matrix of Course: 243MBCC2

Table 1: CO-PO & CO-PSO Matrix for the Course 243MBCC2: Business Law

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	2	2	2	1	3	2	2	2	2
CO2	3	2	2	3	2	2	3	2	3	2
CO3	2	3	2	3	1	3	2	2	2	2
CO4	1	2	2	2	2	2	2	2	2	2
Average	2	2.25	2	2.5	1.5	2.5	2.25	2	2.25	2

Basic Data Analytics using R and Python

243MBCC3

Credit: 4

External Marks: 70
Internal Marks: 30

Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objectives:

This course presents a gentle introduction into the concepts of business analysis, the role of a business Analyst, and the tools that are used to perform daily functions. The participants will gain an understanding of the data ecosystem and the fundamentals of data analysis through R and Python, such as data gathering or data mining. The participants will then learn the soft skills that are required to effectively communicate the data to stakeholders, and how mastering these skills can give them the option to become a data driven decision maker.

Course Outcomes:

On the completion of this course the student will be able to:

CO1: Memorize the terminology of Big Data Analytics and develop conceptual understanding of R and Python.

CO2: Apply and incorporate the technologies behind big data in business context.

CO3: Analyze the relevance of application of R and Python for data analysis and solving complex business problems.

CO4: Evaluate and design programs for data processing for providing solutions to complex business problems.

Detailed Syllabus:

UNIT I

Understanding data: Importing, plotting, understanding and cleaning the data. Understand Univariate and multivariate, categorical and quantitative data, visual presentations of data, descriptive statistics, data tables, interpretation from graphical charts-bar plots, box plots, scatter diagrams. Hands on case study using software.

UNIT II

Introduction to R: R Data Types (Character, Numeric, Integer, Logical Complex), Different Data

Structures in R, Basics of R Syntax, install R / RStudio, RStudio interface, import, export, and view files, save files. Data types in R and its appropriate uses, Program Structure in R, Flow Control: For loop, If condition, While conditions, Concatenation of Data, Combining Vars, cbind, rbind, Sapply, apply, tapply functions, Introduction to Data Structure in R, Vectors, Lists, Scalars, Data Frames, Matrices, Arrays, Factors.

UNIT III

Data Visualization using R: Introduction to ggplot, Univariate Graph, Bivariate Graph, Multivariate Graph, Customizing Graphs, Saving Graphs. Descriptive Analysis in R:

Using Summary Command, Using Name Command, Summary command: Single value result, Summary command: Multiple Result cumulative commands, Descriptive Statics for R Data Frames, Descriptive statistics in R for Matrix Objects.

UNIT IV

Introduction to Python: Python Data Types: Functions, String and List, Python Data Types: Tuples and Dictionaries, Files and Exceptions, Types of Operators, Classes and Objects, Reading files with Open, writing files with Open, loading data with Pandas, working with and saving with Pandas, Array oriented Programming with Numpy, Data cleaning and preparation, Plotting and Visualization, data Aggregation and Group Operations.

SUGGESTED READINGS:

1. Levin & Rubin, Statistics for Business, Prentice Hall of India, Delhi.
2. Anderson, Quantitative Methods in Business, Thomson Learning, Bombay.
3. Anderson, Statistics for Business & Economics, Thomson Learning, Bombay.
4. Kothari C.R., Quantitative Techniques, Vikas Publishing House, New Delhi
5. Andy Field, Discovering Statistics Using SPSS, Pearson Press.
6. Damodar Gujrati, Basic Econometrics, McGraw Hill Education, 5th Edition
7. Joseph F. Hair Jr, William C. Black, Barry J. Babin, Rolph E. Anderson, Multivariate Data Analysis, Pearson Press.

Mapping Matrix of Course: 243MBCC3
Table 1: CO-PO & CO-PSO Matrix for the Course 243MBCC3: Basic Data Analytics using R and Python

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	1	1	3	1	1	2	2
CO2	2	2	2	2	2	2	2	2	3	2
CO3	2	3	1	2	1	2	1	3	2	2
CO4	2	2	2	2	2	2	2	2	2	2
Average	2.25	2.25	1.5	1.75	1.5	2.25	1.5	2	2.25	2

Predictive Modeling
243MBDSE1

Credit: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs.

Type of Course: Discipline Specific Elective Course

Course Objective:
This course aims to equip students with essential data analytics skills including data preprocessing, regression, classification, association rule mining, and clustering using Python. It emphasizes practical model-building techniques, statistical evaluation metrics, and real-world implementation of predictive models.

Course Outcomes (COs):

- **CO1:** Perform data cleaning, transformation, and feature engineering for predictive model preparation.
- **CO2:** Build and evaluate linear regression models, understanding assumptions, diagnostics, and error metrics.
- **CO3:** Apply logistic regression for classification problems and assess model performance using classification metrics.
- **CO4:** Develop association rule mining models for market basket analysis and evaluate the quality of rules.

Detailed Syllabus

Unit I: Data Cleaning and Preparation
Data Import and Exploration: Understanding different data formats, basic exploratory data analysis (EDA), EDA with R/Python Programming. Data Cleaning: Handling missing values, outlier detection and treatment, data normalization and standardization. Data Transformation, feature engineering.

Unit II: Linear Regression
Simple Linear Regression: Model assumptions, estimation, hypothesis testing, and interpretation of coefficients. Multiple Linear Regression: Model building, interpretation of coefficients, multicollinearity, and model diagnostics. Model Evaluation: R-squared, adjusted R-squared, Mean Squared Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE).

Unit III: Logistic Regression
Introduction to Classification, confusion matrix, accuracy, precision, recall, F1-score. Logistic Regression Model: Developing the model with R/Python Programming, Odds and logit, model estimation, interpretation of coefficients. Model Evaluation: ROC curve, AUC, sensitivity, specificity.

Unit IV: Clustering
Unsupervised learning, distance metrics, K-Means Clustering: Model building of K-Means with R/Python Programming, Algorithm, determining the optimal number of clusters, evaluation. Hierarchical Clustering: Agglomerative and divisive methods, dendrograms, Model building with R/Python Programming.

SUGGESTED READINGS:

- Aurélien Géron, 2019, *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*, O'Reilly.
- Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, 2021, *An Introduction to Statistical Learning with Applications in R*, Springer.
- Peter Bruce, Andrew Bruce, Peter Gedeck, 2020, *Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python*, O'Reilly.
- Ankur A. Patel, 2020, *Unsupervised Learning with Python*, O'Reilly.
- Eric Matthes, 2019, *Python Crash Course: A Hands-On, Project-Based Introduction to Programming*, No Starch Press.
- Edward P. Herbst, Frank Schorfheide, 2021, *Statistics for Data Science and Policy Analysis*, Springer.

Mapping Matrix of Course: 243MBDSE1

Table 1: CO-PO & CO-PSO Matrix for the Course 243MBDSE1: Predictive Modelling

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Machine Learning with Python
243MBDSE2

Credit: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs.

Type of Course: Discipline Specific Elective Course

Course Objectives:

This course provides a solid introduction to machine learning, focusing on practical implementation using R/Python. Students will gain hands-on experience in data preparation, exploration, and applying machine learning algorithms to solve business problems.

Course Outcomes: On the completion of this course the student will be able to:

CO1: Demonstrate understanding of data cleaning, preparation, and exploratory data analysis (EDA) techniques using R/Python.

CO2: Apply linear and logistic regression models to real-world datasets, interpreting coefficients and evaluating model performance.

CO3: Build and evaluate association rule mining models for market basket analysis using

R/Python.

CO4: Implement clustering algorithms such as K-Means and hierarchical clustering, determining optimal clusters and evaluating their effectiveness.

Detailed Syllabus

UNIT I

Data Cleaning and Preparation: Data Import and Exploration: Understanding different data formats, basic exploratory data analysis (EDA), EDA with R/Python Programming. Data Cleaning: Handling missing values, outlier detection and treatment, data normalization and standardization. Data Transformation, feature engineering.

UNIT II

Linear and Logistic Regression: Simple Linear Regression: Model assumptions, estimation, and interpretation of coefficients. Multiple Linear Regression: Model building, interpretation of coefficients, multicollinearity, accuracy checking. Logistic Regression: Logistic Regression Model: Developing the model with R/Python Programming, confusion matrix, accuracy, precision, recall, F1-score, ROC curve, AUC.

UNIT III

Market Basket Analysis: Introduction to Association Rule Mining, Apriori Algorithm, Support, Lift, Confidence, Market Basket Analysis Applications, Evaluation Metrics for Association Rules. Model building with R/Python.

UNIT IV

Clustering: Unsupervised learning, distance metrics, K-Means Clustering: Model building of K-Means with R/Python Programming, Algorithm, determining the optimal number of clusters, evaluation. Hierarchical Clustering: Agglomerative and divisive methods, dendrograms, Model building with R/Python Programming.

SUGGESTED READINGS:

1. Han, Jiawei & Kamber, Micheline (2012). *Data Mining: Concepts and Techniques*. Morgan Kaufman Publishers.
2. Tang, P.N., Steinback, M., & Kumar, V. (2014). *Introduction to Data Mining*. Pearson.
3. Myatt, Glenn & Johnson, Wayne (2009). *Making Sense of Data II*. Wiley.
4. Anand Rajaraman (2011). *Mining of Massive Datasets*. Cambridge University Press.
5. Mitchell, Tom (2013). *Machine Learning*. McGraw Hill.
6. Géron, Aurélien (2019). *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*. O'Reilly Media.

Mapping Matrix of Course: 243MBDSE2

Table 1: CO-PO & CO-PSO Matrix for the Course 243MBDSE2: Machine Learning with Python

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Social Media Analytics

243MBBA1

Credit: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs.

Type of Course: Specialization Specific Elective Course

Course Objectives: This course comprises advanced disciplines and units pertaining to Analytics, Data Acquisition via web, Understanding and analyzing unstructured data along with the future implementations and growth in the discipline of Analytics. This course aims at giving exposure on the advanced aspects with regards to Analytics. The course comprises social media, Mobile, Text Analytics along with Web Scraping and the future advancements in the field of Analytics.

Course Outcomes:
On the completion of this course the student will be able to:
CO1: Understand the meaning and scope of Social Media Analytics.
CO2: Apply the tools and techniques of Social Media Analytics for solving complex business problems for the betterment of the businesses.
CO3: Analyze the patterns and techniques in Social Media & Mobile Analytics to solve complex problems.
CO4: Evaluate the effectiveness of various analytics techniques for better output.

Detailed Syllabus:

Unit I

Social Media, On-Line Social Network, Off-Line Social Network, Metrics and Measurement, Dashboard, Target Audience, Desired Action, Content, Market Research Online Communities, Cluster Analysis, Conjoint Analysis, Multidimensional Scaling,

Social Media Listening, Social Media Scoring, Social Media Modelling. Understanding Mobile Analytics Concepts, difference between Mobile Analytics and Site Analytics, Natural language Processing with Mobile Analytics, Text Mining for Mobile Analytics, Mobile Analytics Tools, Churn Analytics.

Unit II

Unit -II

Text Data, Sources of Text Data, Information Clusters, Patterns, Trends, Tagging, Natural Learning Process, Lexical Analysis, Social Network Nodes, Linkage Structure, Node Labelling, Content- Based Classification, Word Stemming, Stemming Algorithms, Polarity of the Attitude, Psychological Profiling, Sentiment Analysis.

Unit -III

Unit -III

Unit III

Web Scraping of unstructured data, Gathering data from HTTP and HTTPS format, Web Scraping from XML and JSON file, Regular expressions, Extraction Strategies, Term Document Matrix, Data Cleansing, Data Manipulation and Data Transformation after Scrapping.

Unit IV

Introduction to Big Data, Predictive Analysis for Business, Social Information Processing and Distributed Computing, Advances in Machine Learning, Traditional Data Models Evolve, Analytics to Solve Social Problems, Location Based Data Explosion, Data Privacy Backlash, Internet of Things, Artificial Intelligence.

Suggested Readings:

1. Galit Shamuelli, 2017, Data Mining for Business Analytics: Concepts, Techniques and Applications with R, Wiley.
2. Luis Torgo, 2017, Data Mining with R: Learning Case Studies, Chapman.
3. Zaki & Meira, 2014, Data Mining and Analysis Fundamental Concepts and Algorithms, Cambridge.
4. Han, Kamber & Pei, 2013, Data Mining: Concepts and Techniques, Morgan Kaufmann.
5. Han, Jiawei and Kamber, Micheline, 2012, Data Mining: Concepts and Techniques, Morgan Kaufman.

Mapping Matrix of Course: 243MBBA1

Table 1: CO-PO & CO-PSO Matrix for the Course 243MBBA1: Social Media Analytics

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	1	1	3	1	1	2	2

CO2	2	2	2	2	2	2	2	2	2	2
CO3	2	3	1	2	1	2	1	3	2	2
CO4	2	2	2	2	2	2	2	2	2	2
Average	2.25	2.25	1.5	1.75	1.5	2.25	1.5	2	2	2

Relational Database Management and SQL
243MBBA2

Credit: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs.

Type of Course: Specialization Specific Elective Course

Course Objective:
This course introduces the principles of database systems, including data modeling, relational database design, SQL querying, and database administration. It also provides a foundation in advanced concepts such as transactions, normalization, and NoSQL systems to prepare students for modern data-driven application development.

Course Outcomes (COs):

- **CO1**: Understand the architecture, components, and functions of database management systems and apply data modeling using ER diagrams.
- **CO2:** Create and manage database structures using SQL commands and apply constraints to ensure data integrity.
- **CO3:** Formulate complex queries to retrieve, filter, and aggregate data from relational databases using SQL.
- **CO4:** Implement table joins and set operations to extract meaningful information from multiple relational tables.

Detailed Syllabus

Unit I: Introduction to Database Management Systems

Introduction-Database System Applications, Purpose of Database Systems, Instances and Schemas, Data Models, Database Languages, Database Architecture, Database Users and Administrators, ER Diagrams.

Unit II: Creating Table

Creating and Managing Tables, DROP TABLE, ALTER TABLE, TRUNCATE TABLE, Inserting and Updating Data: INSERT INTO, UPDATE, DELETE, Constraints and Indexes: PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK, DEFAULT.

Unit III: Select Query

Forms of Basic SQL Query, Nested Queries, Filtering Data, Logical Operators (AND, OR,

NOT), Comparison Operators, Aggregate Functions (COUNT, SUM, AVG, MIN, MAX), NULL values, SELECT, WHERE, ORDER BY, GROUP BY, HAVING, DISTINCT.

Unit IV: Joining Tables and Advance SQL

INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL OUTER JOIN, CROSS JOIN, SELF JOIN, Indexes, Other Operations: UNION and UNION ALL, INTERSECT, EXCEPT.Transactions, Normalization, CASE and When, Sub Queries, Overview of No SQL, Types of No SQL Databases, MongoDB, Migrating from RDBMS to No SQL, No SQL in Cloud, Database Administration.

SUGGESETD READINGS:

- Alan Beaulieu, 2020, *Learning SQL: Master SQL Fundamentals*, O'Reilly.
- Shashank Tiwari, 2019, *Professional NoSQL*, Wrox.
- Kristina Chodorow, 2019, *MongoDB: The Definitive Guide*, O'Reilly.
- Yuli Vasiliev, 2020, *Data Science with SQL Server Quick Start Guide*, Packt Publishing.
- Dr. S. Sumathi and S. Esakkirajan, 2019, *Fundamentals of Relational Database Management Systems*, Springer.

Mapping Matrix of Course: 243MBBA2

Table 1: CO-PO & CO-PSO Matrix for the Course 243MBBA2: Relational Database Management and SQL

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Data Visualisation with Power BI
243MBBA3

Credit: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs.

Type of Course: Specialization Specific Elective Course

Course Objectives:
This course provides a detailed introduction to data visualization using Power BI. It is designed to equip students with essential skills in data preparation, transformation, and interactive dashboard development using Power BI's desktop interface. The course focuses on building professional-quality visual reports to support data-driven decision-making across industries.

Course Outcomes: On the completion of this course the student will be able to:

- **CO1:** Understand Power BI deployment modes, project collaboration, dataset design, and licensing.
- **CO2:** Prepare and transform datasets using Power BI's M Query interface, staging queries, and direct query models.
- **CO3:** Create and format interactive reports, dashboards, and custom visuals using Power BI's visualization tools.
- **CO4:** Apply advanced filtering, drill-through reports, bookmarks, and other analytical features to design dynamic dashboards.

Detailed Syllabus

UNIT I
Introduction to Power BI
Power BI Deployment Modes, Project Discovery and Ingestion, Power BI Project Roles, Admin and Project Role Collaboration, Power BI Licenses, Data Warehouse Bus Matrix, Dataset Design Process, Data Profiling, Dataset Planning, Data Transformations, Import Mode, Direct Query Mode.

UNIT II
Data Transformation and M Query Design
Query Design per Dataset Mode, Connecting to Data Sources, Authentication, Privacy Levels, Power BI Desktop Options, M Queries, Data Source Parameters, Staging Queries, Fact and Dimension Queries, M Query Summary, Data Types. Direct Query Data Models: Views, Tables, Relationships.

UNIT III
Creating and Formatting Reports
Report Planning, Connecting Live to Power BI Datasets, Choosing Visuals, Visual Interactions, Slicers, Report Filter Scopes, Report Filter Conditions, Visual-Level Filtering, Visualization Formatting, conditional formatting in visuals, themes and custom color palettes, the Performance Analyzer tool.

UNIT IV
Custom Visuals, Dashboards and Analytics
Designing Interactive Dashboards, Drill-through Report Pages, Bookmarks, Analytics Pane, Quick Insights, Custom Visuals, Dashboard Design, Connecting Multiple Reports and Dashboards for Comprehensive Analysis. Multi-Dashboard Architectures:

Suggested Readings:

1. Chandraish Sinha, 2021, *Mastering Power BI: Build Business Intelligence Applications*

Powered with DAX Calculations, Insightful Visualizations, and Loads of Data Sources, BPB.
2. Kieran Healy, 2018, *Data Visualization: A Practical Introduction*, Princeton University Press.
3. Julia Steele & Noah Iliinsky, 2010, *Beautiful Visualization*, O'Reilly Media.
4. Hadley Wickham, Garrett Grolemund, 2017, *R for Data Science: Import, Tidy, Transform, Visualize and Model Data*, O'Reilly.
5. Reza Rad, 2023, *Power BI DAX Simplified: DAX and Calculation Concepts for Power BI Users*, *RADACAD*.

Mapping Matrix of Course:

Table 1: CO-PO & CO-PSO Matrix for the Course: Data Visualization with Power BI

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Fourth Semester

Entrepreneurship and Innovation

244MBCC1

Credit: 4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objectives:

The course provides a framework for comprehending the process of forming and leading creative businesses. This will prepare students to deal effectively with changing market and client needs as they become more sophisticated and knowledgeable. Entrepreneurship has a significant impact on the country's economic growth and development. The dynamic of the corporate world is shifting in tandem with the global economy. The goal of this course is to instil and ignite an entrepreneurial spirit in pupils.

Course Outcomes:
On the completion of this course the student will be able to:

CO1: Identify and understand various constituents and environmental factors for innovation and entrepreneurship development.
CO2: Apply SWOT analysis for internal and external environmental assessment for devising a creative strategy for feasible business plans, within ethical boundaries.

CO3: Analyze feasibility of businesses under the constantly changing global environment for sustainable global competitiveness.
CO4: Evaluate the alternatives in order to be able to create successful business plans.

Detailed Syllabus:

UNIT-I
Entrepreneurship: India's startup evolution, Concept, trends, benefits; Rural entrepreneurship, social entrepreneurship, women entrepreneurship; role of entrepreneurship in economic development; Entrepreneur: - characteristics, Entrepreneurial decision process, functions, need for an entrepreneur, types of entrepreneurs.

UNIT-II
Starting the venture: generating business idea – sources of new ideas, methods of generating ideas, creative problem solving, opportunity recognition; environmental scanning, competitor and industry analysis; feasibility study – market feasibility, technical/operational feasibility, financial feasibility: drawing business plan; preparing project report; Business plan- How to develop it, what all should it have, what it shouldn't have presenting business plan to investors

UNIT-III
Need for finance, sources of finance, Venture capital, Nature and Overview, Venture capital process,

locating venture capitalists; Functional Plans: Marketing Plan- Market Segmentation, Market sizing, pricing strategy; Organizational Plan- form of ownership, designing organization structure, job design, manpower planning and Financial Plan.

UNIT-IV
Project Planning & Project appraisal; legal issues – intellectual property rights patents, trademarks, copyrights, trade secrets, licensing and franchising; Team Formation, Team Work Planning; Role of Government in Promoting Entrepreneurship; Entrepreneurial environment: factors affecting entrepreneurship growth, entrepreneurial motivation; Digital haves and Have-nots, Digital economy as a resource.

Suggested Readings:

1. Holt, David H. Entrepreneurship: New venture creation. prentice hall, 1992.
2. Entrepreneurship in Action, PHI B.K. Mohanty, Sangram Publication, 2005
3. Jayshree Suresh, Entrepreneurial Development, Margham Publications, 2015
4. Poornima M Charantimath, Entrepreneurship Development Small Business Enterprises, Pearson Education, 2006.
5. Mohanty, Sangram Keshari. Fundamentals of entrepreneurship. PHI Learning Pvt. Ltd., 2005.

Mapping Matrix of Course: 244MBCC1
Table 1: CO-PO & CO-PSO Matrix for the Course 244MBCC1: Entrepreneurship and Innovation

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	2	2	2	3	2	2	2	2
CO2	3	3	3	3	3	3	3	2	2	3
CO3	2	2	2	3	3	2	3	2	3	2
CO4	2	2	2	2	2	2	2	3	2	2
Average	2.5	2.25	2.25	2.5	2.5	2.5	2.5	2.25	2.25	2.25

Advanced Analytics with Python
244MBCC2

Credit: 4

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs.

Type of Course: Core Course

Course Objectives:

This course delves into advanced machine learning and artificial intelligence techniques, focusing on decision trees, random forests, SVMs, NLP, neural networks, and AI. It equips students with the skills to build, evaluate, and deploy sophisticated models for solving complex data-driven challenges.

Course Outcomes: On the completion of this course the student will be able to:

CO1: Understand decision trees, random forests, and SVMs, including their principles, construction, and evaluation metrics.
CO2: Build and evaluate advanced machine learning models, applying them to classification, regression, and text analysis problems using Python.
CO3: Develop and apply NLP techniques for text preprocessing, sentiment analysis, and text classification.
CO4: Implement neural networks and understand their role in AI, exploring applications, ethical considerations, and the distinction between machine learning and AI.

Detailed Syllabus

UNIT I

Decision Trees and Random Forests: Concept, building a decision tree, pruning, and interpretation. Random Forests: Ensemble learning, bagging, and feature importance. Model

Evaluation: Accuracy, precision, recall, F1-score, confusion matrix. Model building with R/Python Programming.

UNIT II

Support Vector Machines (SVM): Introduction to Support Vector Machines, Linear SVM and Kernel Trick, Non-linear SVM, SVM for Classification and Regression, Model Evaluation and Hyperparameter Tuning. SVM Model building with Python.

UNIT III

Natural Language Processing (NLP):Introduction to Natural Language Processing, Text Preprocessing, Feature Extraction and feature engineering, Sentiment Analysis, Named Entity Recognition, Text Classification. NLTK Library in Python.

UNIT IV

Neural Networks and Artificial Intelligence: Introduction to Artificial Neural Networks, Activation Functions, Deep Learning. NN Model building with Python. Introduction to Artificial Intelligence, Search Algorithms, Knowledge Representation and Reasoning, Machine Learning vs. Artificial Intelligence, AI Applications and Ethics.

SUGGESTED READINGS:

1. Kevin Knight, Elaine Rich, & B. Nair (2017). *Artificial Intelligence*. McGraw Hill.
2. Han, Jiawei & Kamber, Micheline (2012). *Data Mining: Concepts and Techniques*. Morgan Kaufmann Publishers.
3. Anand Rajaraman (2011). *Mining of Massive Datasets*. Cambridge University Press.
4. Mitchell, Tom (2013). *Machine Learning*. McGraw Hill.
5. Géron, Aurélien (2019). *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*. O'Reilly Media.
6. Russell, Stuart J., & Norvig, Peter (2020). *Artificial Intelligence: A Modern Approach*. Pearson Education.

Mapping Matrix of Course:

Table 1: CO-PO & CO-PSO Matrix for the Course: Advanced Analytics with

Python

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Data Visualisation with Tableau

244MBDSE1

Credit: 3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs

Type of Course: Discipline Specific Elective Course

Course Objectives

This course provides a comprehensive overview of data visualization techniques using Tableau. Participants will learn to communicate complex data effectively through visually appealing and interactive dashboards. The course emphasizes data preparation, exploration, visualization, and storytelling to support data-driven decision-making.

Course Outcomes: On completion of this course, the student will be able to:
CO1: Explain the role of Tableau in data visualization and its significance in business intelligence.
CO2: Create a variety of visualizations using Tableau, including advanced techniques such as mapping and parameterization.
CO3: Design and publish comprehensive dashboards and stories, following best practices for interactivity and visualization.
CO4: Analyze and interpret data visualizations to draw actionable insights and support decision-making processes.

Detailed Syllabus

Unit I

Tableau Software Ecosystem, Toolbar Icons, Data Window and Aggregation, Tableau Data Source, Heat Maps, Tree Maps, Bar Charts, Line Charts, Area Fill Charts, Pie Charts, Scatter Plots, Circle Views.

Unit II

Bullet Graphs, Packed Bubbles, Histograms, Boxplots, Gantt Charts, Cross-tabulation, Sorting Data, Enhancing Views with Filters, Sets, Groups, and Hierarchies.

Unit III

Dashboard Designing, Dashboard Actions, Joining Database, Functions in Tableau (Aggregate, Numeric, and Date Functions), Advanced Mapping, Advanced Parameters, Tableau Best Practices, Combining Multiple Dashboards into Stories, Publishing Stories and Dashboards.

Unit IV

Report Planning, Live Connections to Datasets, Choosing the Visual, Visual Interactions, Slicers, Report Filter Scopes, Report Filter Conditions, Visual-Level Filtering, Visualization Formatting, Custom Visuals and Dashboards: Drill-through Report Pages, Bookmarks, Analytics Pane, Quick Insights, Custom Visuals, Dashboard Design, Multi-Dashboard Architectures.

SUGGESTED READINGS

1. Kieran Healy (2018). *Data Visualization: A Practical Introduction*. Princeton University Press.
2. Hadley Wickham & Garrett Grolemund (2017). *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. O'Reilly Media.
3. Julia Steele & Noah Iliinsky (2010). *Beautiful Visualization*. O'Reilly Media.
4. Chandraish Sinha (2021). *Mastering Tableau: Build Business Intelligence Applications Powered with DAX Calculations, Insightful Visualizations, and Loads of Data Sources*. BPB.
5. Steve Wexler, Jeffrey Shaffer, & Andy Cotgreave (2017). *The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios*. Wiley.

Mapping Matrix of Course:

Table 1: CO-PO & CO-PSO Matrix for the Course: Data Visualization through Tableau

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Machine Learning with Python

244MBDSE2

Credit:3 **External Marks: 50**

Internal Marks: 25
Time Allowed: 3 Hrs

Type of Course: Discipline Specific Elective Course

Course Objectives:

This course provides a solid introduction to machine learning, focusing on practical implementation using R/Python. Students will gain hands-on experience in data preparation, exploration, and applying machine learning algorithms to solve business problems.

Course Outcomes: On the completion of this course the student will be able to:
CO1: Demonstrate understanding of data cleaning, preparation, and exploratory data analysis (EDA) techniques using R/Python.
CO2: Apply linear and logistic regression models to real-world datasets, interpreting coefficients and evaluating model performance.
CO3: Build and evaluate association rule mining models for market basket analysis using R/Python.
CO4: Implement clustering algorithms such as K-Means and hierarchical clustering, determining optimal clusters and evaluating their effectiveness.

Detailed Syllabus

UNIT I

Data Cleaning and Preparation: Data Import and Exploration: Understanding different data formats, basic exploratory data analysis (EDA), EDA with R/Python Programming. Data Cleaning: Handling missing values, outlier detection and treatment, data normalization and standardization. Data Transformation, feature engineering.

UNIT II

Linear and Logistic Regression: Simple Linear Regression: Model assumptions, estimation, and interpretation of coefficients. Multiple Linear Regression: Model building, interpretation of coefficients, multicollinearity, accuracy checking. Logistic Regression: Logistic Regression Model: Developing the model with R/Python Programming, confusion matrix, accuracy, precision, recall, F1-score, ROC curve, AUC.

UNIT III

Market Basket Analysis: Introduction to Association Rule Mining, Apriori Algorithm, Support, Lift, Confidence, Market Basket Analysis Applications, Evaluation Metrics for Association Rules. Model building with R/Python.

UNIT IV

Clustering: Unsupervised learning, distance metrics, K-Means Clustering: Model building of K-Means with R/Python Programming, Algorithm, determining the optimal number of clusters, evaluation. Hierarchical Clustering: Agglomerative and divisive methods, dendrograms, Model building with R/Python Programming.

SUGGESTED READINGS:

7. Han, Jiawei & Kamber, Micheline (2012). *Data Mining: Concepts and Techniques*. Morgan Kaufman Publishers.

8. Tang, P.N., Steinback, M., & Kumar, V. (2014). *Introduction to Data Mining*. Pearson.

9. Myatt, Glenn & Johnson, Wayne (2009). *Making Sense of Data II*. Wiley.

10. Anand Rajaraman (2011). *Mining of Massive Datasets*. Cambridge University Press.

11. Mitchell, Tom (2013). *Machine Learning*. McGraw Hill.

12. Géron, Aurélien (2019). *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*. O'Reilly Media.

Mapping Matrix of Course:

Table 1: CO-PO & CO-PSO Matrix for the Course: Machine Learning with Python

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Natural Language Processing

244MBBA1

Credit:3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs

Type of Course: Specialization Specific Elective Course

Course Objective:
This course introduces students to the principles, methodologies, and tools used in text mining and natural language processing. It focuses on extracting patterns, relationships, and insights from unstructured text using both statistical and machine learning techniques, with hands-on applications in feature extraction, sentiment analysis, clustering, and topic modeling.

Course Outcomes (COs):

- **CO1:** Understand the foundations of text mining, NLP tasks, and apply core preprocessing techniques.

- **CO2:** Extract features, opinions, and semantic relationships using statistical and kernel-based methods.
- **CO3:** Apply classification and clustering methods to categorize and group textual data using machine learning approaches.
- **CO4:** Implement topic modeling and probabilistic models like LDA, HMM, and CRFs for text-based information extraction.

Detailed Syllabus

Unit I Introduction to Text Mining

Basics of Text Mining, Natural Language Content Analysis, Core Text Mining Operations, Associations, Using Background Knowledge for Text Mining, Domain Ontologies, Domain Lexicons. Text Mining Pre-processing Techniques, Task Oriented Approaches, NLP Tasks, Tokenization, Part-of-Speech Tagging, Syntactical Parsing and Shallow Parsing.

Unit II Relationships between Words ,Extracting Features, Relations from Text

Tokenizing by N-gram, Counting and Filtering N-gram, Analysing Bigrams to provide Context in Sentiment Analysis, visualizing a Network of Bigrams , Counting and Correlating Pairs of Words , Counting and Correlating among Sections, Examining Pairwise Correlation.
Finding Implicit Features, Finding Opinion Phrases and their Polarity, Context-Specific Word Semantic Orientation, Analysis of Word and Document Frequency, tf-idf, Zipf's Law, bind tf_idf Function, Subsequence Kernels for Relation Extraction, Capturing Relation Patterns with a String Kernel.

Unit III Text Categorization and Clustering

Applications of Text Categorization, Document Representation, Knowledge Engineering Approach to Text Categorization, Machine Learning Approach to Text Categorization, Evaluation of Text Classifiers. Clustering Tasks in Text Analysis, Clustering Algorithms and Clustering of Textual Data.

Unit IV Topic Modelling and Probabilistic Models for Information Extraction

Latent Dirichlet Allocation, Word Topic Probabilities, Per-Document Classification, By words Assignments, Alternative LDA Implementations. Hidden Markov models, Stochastic Context Free Grammar, Conditional Random fields, Parallel Learning Algorithms.

Suggested Reading

- Steven Bird, Ewan Klein, Edward Loper, 2019, *Natural Language Processing with Python: Analyzing Text with the Natural Language Toolkit*, O'Reilly.
- Koshik Raj, 2019, *Practical Natural Language Processing with Python*, Packt Publishing.
- Sidharth Ramachandran, 2021, *Hands-On Natural Language Processing with Python*,

Apress.
- Dipanjan Sarkar, 2019, *Text Analytics with Python: A Practitioner's Guide to Natural Language Processing*, Apress.
- Yuli Vasiliev, 2020, *Natural Language Processing with Python and spaCy: A Practical Introduction*, No Starch Press.
- Dmitry Zinoviev, 2021, *Data Science and Analytics with Python*, Pragmatic Bookshelf.

Mapping Matrix of Course:

Table 1: CO-PO & CO-PSO
Matrix for the Course : Natural Language Processing

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Python Programming for Analytics

244MBBA2

Credit:3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs

Type of Course: Specialization Specific Elective Course

Course Objectives:

This course is designed to provide students with foundational programming skills using Python. It prepares students for advanced modules in machine learning and data analysis, covering essential programming concepts and the application of Python libraries for data manipulation, analysis, and visualization.

Course Outcomes: On the completion of this course the student will be able to:

CO1: Explain the history, applications, and basic concepts of Python programming, including setting up Python development environments like Anaconda and Colab.
CO2: Utilize Python's data types, operators, and data structures for data manipulation and analysis.
CO3: Implement conditional statements, loops, and functions to develop efficient Python scripts.
CO4: Apply Python packages such as NumPy, Pandas, and Matplotlib for data analysis and visualization.

Detailed Syllabus

UNIT I

Introduction to Python Programming: History of Python, Need for Python Programming, Applications, Basics of Python Programming, Running Python Scripts, Variables, Keywords, Input-Output, Indentation, Introduction to Anaconda and its Applications for Python, Google Colab.

UNIT II

Data Types, Operators, and Data Structures Data Types: Integers, Strings, Booleans. Operators: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators. Data Structures: Lists, Operations, Slicing, Methods, Tuples, Sets, Dictionaries.

UNIT III

Conditional Statements, Looping, and Functions: Conditional Statements: if, else, elif. Looping: for Loop, for Loop with Ranges, String, List, and Dictionaries, while Loop. Loop Manipulation: Pass, Continue, Break, and Else Blocks. Functions: Defining Functions, Calling Functions, Passing Arguments (Keyword and Default Arguments), Returning Values, Scope of Variables - Global and Local Variables.

UNIT IV

Modules, Packages, and Data Analysis with Python: Introduction to PIP, Installing Packages via PIP, Using Python Packages. NumPy: Introduction to NumPy, Arrays, Operations. Pandas: Introduction to Pandas, DataFrames, loc & iloc Functions, Describe Function. Matplotlib: Charting with Matplotlib, Formatting Charts, Histogram, Bar Plot, Box Plot, Scatter Plot, Line Plot, and Other Visualizations.

SUGGESTED READINGS:

1. R. Nageswara Rao (2018). *Core Python Programming*. Dreamtech.
2. John Hearty (2016). *Advanced Machine Learning with Python*. Packt.
3. Jake VanderPlas (2016). *Python Data Science Handbook: Essential Tools for Working with Data*. O'Reilly.
4. Mark Lutz (2010). *Programming Python*. O'Reilly.
5. Tim Hall & J-P Stacey (2009). *Python 3 for Absolute Beginners*. Apress.
6. Wesley J. Chun (2012). *Core Python Applications Programming*. Prentice Hall.

Mapping Matrix of Course:

Table 1: CO-PO & CO-PSO Matrix for the Course: Python Programming for

Analytics

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	1	1	2	2	2	1	2	2	3
CO2	2	3	2	3	3	2	2	1	3	3
CO3	3	2	2	3	3	2	1	2	2	2
CO4	3	2	3	2	3	1	2	3	2	2
Average	2.75	2	2	2.5	2.75	1.75	1.5	2	2.25	2.5

Cloud Computing

244MBBA3

Credit:3

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs

Type of Course: Specialization Specific Elective Course
Course Objectives: The objective of the course is to give students a comprehensive view understanding of the vision and impact of Cloud, cloud and IoT Market perspective and IoT and Cloud architecture.

Course Outcomes:

On the completion of this course the student will be able to:
CO1. Define and understand the concepts related to internet of things and cloud computing.
CO2: Apply cloud computing techniques for various applications for solving critical problems.
CO3: Analyse cloud computing services used at various levels.
CO4: Evaluate the efficacy of cloud computing techniques and designing cloud-based applications

Detailed Syllabus:
Unit - I
Overview of Cloud Computing: Brief history and evolution - history of cloud computing, evolution of cloud computing, traditional vs. cloud computing, cloud service models (IaaS, PaaS & SaaS), cloud deployment models (public, private, hybrid and community cloud), benefits and challenges of cloud computing, introduction to AWS public cloud vendor, cost optimization in AWS, basics of virtualization, virtualization technologies, server virtualization, VM migration techniques, role of virtualization in cloud computing, introduction to EC2 service of AWS.
Unit – II
Working with Private Cloud: Private cloud definition, characteristics of private cloud, private cloud deployment models, private cloud vendors - CloudStack, OpenStack, Eucalyptus Microsoft, private cloud ± benefits and challenges, private cloud implementation in Amazon EC2 service.
Unit – III
Working with Public Clouds: What is public cloud, why public cloud, when to opt for public cloud, public cloud service models, public cloud players, infrastructure as a service

offering, IaaS vendors, PaaS offerings, PaaS vendors, software as a service, demonstrating public cloud with AWS ± storage and database services, private vs. public cloud ± when to choose.

Unit - IV

IoT Architecture- Introduction, State of the art: Architecture reference modelintroduction, reference model and architecture, IoT reference model. IoT Reference Architecture: IoT reference architecture- introduction, functional view, information view, deployment and operational view, other relevant architectural views, realworld design constraints-introduction, technical design constraints-hardware is popular again, data representation and visualization, interaction and remote control.

Suggested Readings:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Hwang Kai, Fox Geoffrey C, Dongarra Jack G, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2011.
3. Rittinghouse John W. and Ransome James F., "Cloud Computing: Implementation, Management, and Security", CRC Press,2009.
4. Velte Toby, Velte Anthony, Elsenpeter Robert, "Cloud Computing, A Practical Approach", TMH, 2013. 5. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on- approach)", 1st Edition, VPT, 2014.

Mapping Matrix of Course: 244MBBA3

Table 1: CO-PO & CO-PSO Matrix for the Course 244MBBA3: Cloud Computing

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	2	1	2	2	3	2	1	2	2
CO2	3	2	1	2	2	2	2	2	3	2
CO3	2	3	2	3	2	2	2	2	2	2
CO4	2	3	2	3	2	2	2	3	2	2
Average	2.25	2.5	1.5	2.5	2	2.25	2	2	2.25	2

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