

Nutan Maharashtra Vidya Prasarak Mandal's (NMVPM's)

**NUTAN MAHARASHTRA INSTITUTE OF
ENGINEERING AND TECHNOLOGY
(NMIET)**

An

Autonomous Institute

Affiliated to Savitribai Phule Pune University



**Governing
Post Graduation (MBA) Program**

**Master of Business Administration
Business Analytics**
(With effect from Academic Year 2025 – 27)

CURRICULUM FRAMEWORK

List of Abbreviations

Sr. No.	Abbreviation	Type of Course
1.	GC	Generic Core
2.	GC	Generic Core with Non-Credit
3.	SC	Specialization Core
4.	SE	Specialization Elective
5.	OJT	On the Job Training
6.	RP	Research Project

Course Wise Credit Distribution

Sr.No	Abbreviation	Type of Course	No. of Courses		Total Course	Credits	
			III Sem	IV Sem		Credit Points	% of Credits
1	GC	Generic Core	1	2	3	8	15%
I	GC	Generic Core with Non-Credit	1	-	1	0	0%
2	SC	Specialization Core	1	1	2	6	12%
i.	SC OJT	On Job Training	1	-	1	8	15%
ii.	SC RP	Research Project	-	1	1	6	12%
3	SE	Specialization Elective	4	4	8	24	46%
Total			8	8	16	52	100%

ASSESSMENT PARAMETERS

Continuous Assessment (CA) Parameters					
Parameter	Attendance & Overall Conduct	Assignment	Group Presentation	Case Study Presentation	Field Project
Marks (25)	5	5	5	5	5

Summative Assessment (SA) Parameters					
Course Credits	Formative Assessment (FA)		Summative Assessment (SA) / Practical	Oral / Viva Voce	Total Marks
	Unit Test (UT)	Continuous Assessment (CA)			
3 Credit Course	25 Marks	25 Marks	50 Marks	--	100 Marks
2 Credit Course	10 Marks	10 Marks	30 Marks	--	50 Marks
6 Credit Course	--	100 Marks	--	50 Marks	150 marks
OJT Credit (8 Credit)	--	100 Marks	--	100 Marks	200 Marks
Audit Course (0 Credit)	--	--	--	--	Pass/ Not Pass

CURRICULUM STRUCTURE
Second Year MBA-SEM-III- (Business Analytics)

Type	Sem Code	Course Code	Course	Credits	Examination Schemes				Teaching Scheme [L,T,P]				Marks	
					Theory				TOTAL					
					FA(50)		SA(50)		PR	L	T	P	T O T	TOTAL
					UT (25)	CA (25)	TH							
Mandatory	GC – 14	MB25GC-301	Strategic Management	3	25	25	50	-	2	1	1	4	100	
Mandatory	GC – 15	MB25GC-302	Cyber Security	Audit Course (0 Credit)									AC/NC	
Mandatory	SC – 01	MB25SCBA-303	Python	3	-	-	50	50	2	1	1	4	100	
CORE TOTAL			3	6	25	25	100	50	4	2	2	8	200	
Mandatory	OJT (SC)	MB25OJTBA-304	On the Job Training	8	0	100	0	100	0	2	14	16	200	
SIP TOTAL			1	8	0	100	0	100	0	2	14	16	200	
Semester III Specialization Electives - Any 4 Courses to be Opted from the respective elective list														
Elective	SE 01	MB25SEBA-305	Advanced Statistical Methods	3	-	-	50	50	2	1	1	4	100	
Elective	SE 02	MB25SEBA-306	Data Visualization and storytelling	3	-	-	50	50	2	1	1	4	100	
Elective	SE 03	MB25SEBA-307	Marketing Analytics	3	25	25	50	-	2	1	1	4	100	
Elective	SE 04	MB25SEBA-308	Financial Analytics	3	25	25	50	-	2	1	1	4	100	
Elective	SE 05	MB25SEBA-309	Supply Chain & Operation Analytics	3	25	25	50	-	2	1	1	4	100	
Elective	SE 06	MB25SEBA-310	HR Analytics	3	25	25	50	-	2	1	1	4	100	
GENERIC ELECTIVE TOTAL			4	12	50	50	200	100	8	4	4	16	400	
SEMESTER TOTAL			8	26	150	250	400	12	8	20	40	800		

L-Lecture, T-Tutorial, P-Practical, UT-Unit Test, FA-Formative Assessment, SA-Summative Assessment,
*Exit Policy: Available as a separate document

CURRICULUM STRUCTURE
Second Year MBA-SEM-IV-(Business Analytics)

Type	Sem Code	Course Code	Course	Credits	Examination Schemes				Teaching Scheme [L,T,P]				Marks
					Theory				TOTAL				
					FA(50)		SA(50)	PR	TOTAL				
					UT (25)	CA (25)	TH		L	T	P	TOT	
Mandatory	GC – 16	MB25GC- 401	Entrepreneurship, Innovation and Design Thinking	3	25	25	50	-	2	1	1	4	100
Mandatory	GC –17	MB25GC- 402	Project Management	2	10	10	30	-	1	1	1	3	50
Mandatory	SC – 02	MB25SCBA- 403	Data Mining	3	25	25	50	-	2	1	1	4	100
CORE TOTAL			3	8	60	60	130	0	5	3	3	11	250
Mandatory	RP	MB25RPBA-404	Research Project	6	0	100	0	50	0	2	10	12	150
RESEARCH PROJECT TOTAL			1	6	0	100	0	50	0	2	10	12	150
Semester IV Specialization Electives - Any 4 Courses to be Opted from the respective elective list													
Elective	SE 07	MB25SEBA-405	Time Series Analysis and Forecasting	3	-	-	50	50	2	1	1	4	100
Elective	SE 08	MB25SEBA-406	Strategic Management and Business Analytics	3	25	25	50	-	2	1	1	4	100
Elective	SE 09	MB25SEBA-407	Retail and E-Commerce Analytics	3	25	25	50	-	2	1	1	4	100
Elective	SE 10	MB25SEBA-408	Generative AI for Business Applications	3	25	25	50	-	2	1	1	4	100
Elective	SE 11	MB25SEBA-409	Predictive Analytics and Machine learning using Python	3	-	-	50	50	2	1	1	4	100
Elective	SE 12	MB25SEBA-410	Business applications of Blockchain technologies	3	25	25	50	-	2	1	1	4	100
GENERIC ELECTIVE TOTAL			4	12	75	75	200	50	8	4	4	16	400
SEMESTER TOTAL			8	26	160	260	380	50	13	9	17	39	800

L-Lecture, T-Tutorial, P-Practical, UT-Unit Test, FA-Formative Assessment, SA-Summative Assessment,

***Exit Policy: Available as a separate document**

Course Syllabus
Second Year MBA.
(Business Analytics)
Semester III

Program	MBA (Business Analytics)			Semester: III				
Course	Strategic Management			Course Code	MB25GC-301			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	1	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 301.1	REMEMBERING	DESCRIBE the basic terms and concepts in Strategic Management.
CO 301.2	UNDERSTANDING	EXPLAIN the various facets of Strategic Management in a real-world context.
CO 301.3	UNDERSTANDING	DESCRIBE the trade-offs within and across strategy formulation, implementation, appraisal.
CO 301.4	APPLYING	INTEGRATE the aspects of various functional areas of management to develop a strategic perspective.
CO 301.5	ANALYSING	EXPLAIN the nature of the problems and challenges confronted by the top management team and the approaches required to function effectively as strategists.
CO 301.6	CREATING	DEVELOP the capability to view the firm in its totality in the context of its environment.

Course Contents

Unit	Description	Duration [Hrs]
I	Understanding Strategy: Concept of strategy, Levels of Strategy - Corporate, Business and Functional. Strategic Management - Meaning and Characteristics. Distinction between strategy and tactics, Strategic Management Process, Stakeholders in business, Roles of stakeholder in strategic management. Strategic Intent – Meaning, Hierarchy, Attributes, Concept of Vision & Mission - Process of envisioning, Difference between vision & mission. Characteristics of good mission statements. Business definition using Abell's three dimensions. Objectives and goals, Linking objectives to mission & vision. Critical success factors (CSF), Key Performance Indicators (KPI), Key Result Areas (KRA). Components of a strategic plan, Analyzing Company's External Environment: Environmental appraisal, Scenario planning – Preparing an Environmental Threat and Opportunity Profile (ETOP). Analyzing Industry Environment: Industry Analysis - Porter's Five Forces Model of competition, Entry & Exit Barriers.	(7+2)
II	Analyzing Company's Internal Environment- Resource based view of a firm. Analyzing Company's Resources and Competitive Position - meaning, types & sources of competitive advantage, competitive parity & competitive disadvantage. VRIO Framework, Core Competence, characteristics of core competencies, Distinctive competitiveness. Benchmarking as a method of comparative analysis. Value Chain Analysis Using Porter's Model: primary & secondary activities. Organizational Capability Profile: Strategic Advantage Profile, Concepts of stretch, leverage & fit, ways of resource leveraging – concentrating, accumulating, complementing, conserving, recovering. Portfolio Analysis: Business Portfolio Analysis – BCG Matrix – GE 9 Cell Model.	(7+2)
III	Generic Competitive Strategies – Meaning of generic competitive strategies, Low cost, Differentiation, Focus – when to use which strategy. Grand Strategies: Stability, Growth (Diversification Strategies, Vertical Integration Strategies, Mergers, Acquisition & Takeover Strategies, Strategic Alliances & Collaborative Partnerships), Retrenchment – Turnaround, Divestment, Liquidation, Outsourcing Strategies.	(7+2)
IV	Strategy Implementation – Barriers to implementation of strategy, Mintzberg's 5 Ps – Deliberate & Emergent Strategies. Mc Kinsey's 7s Framework. Organization Structures for Strategy Implementation: entrepreneurial, functional, divisional, SBU, Matrix, Network	(7+2)

	structures, Cellular/ Modular organization, matching structure to strategy, organizational design for stable Vs. turbulent environment, Business Continuity Planning. Changing Structures & Processes: Reengineering & strategy implementation – Principles of Reengineering. Corporate Culture: Building Learning organizations, promoting participation through technique of Management by Objectives (MBO). Strategy Evaluation: Operations Control and Strategic Control - Symptoms of malfunctioning of strategy – Concept of Balanced scorecard for strategy evaluation.	
V	Cost Control Techniques: Budgetary Control & Standard Costing: Budgetary Control: Meaning of Budget and Budgeting, Importance, Advantages and Disadvantages, Cash Budget and Flexible Budget, Standard Costing: Meaning, Importance, Advantages and Disadvantages, Cost Variance Analysis. Material Variances– Material Cost Variance, Material Rate Variance, Material Usage Variance, Material Mix Variance and Material Yield Variance.	(7+2)
	Total	45

Suggested Textbooks:

1. Strategic Management and Business Policy by Azhar Kazmi, Tata McGraw-Hill
2. Strategic Management by Ireland, Hoskisson & Hitt, Indian Edition, Cengage Learning
3. Crafting and Executing Strategy- The Quest for Competitive Advantage by Thompson, Strickland, Gamble & Jain, Tata McGraw-Hill
4. Concepts in Strategic Management & Business Policy by Thomas L. Wheelen & J. David Hunger, Pearson

Suggested Reference Books

1. Strategic Management by Dr. Yogeshwari L. Giri
2. Competitive Strategy: Techniques for Analyzing Industries and Competitors by Michael E. Porter, First Free Press Edition
3. Competing for the Future by Gary Hamel & C.K. Prahalad,
4. Blue Ocean Strategy by Kim & Mauborgne

Suggested Online Link:

1. https://onlinecourses.nptel.ac.in/noc24_mg112/preview
2. https://onlinecourses.nptel.ac.in/noc25_mg129/preview
3. <https://www.coursera.org/learn/strategic-management>
4. <https://www.upgrad.com/advanced-program-strategic-management-business-excellence-iim-lucknow/>
5. <https://www.coursera.org/courses?query=strategic+management>

Program	MBA (Business Analytics)			Semester: III				
Course	Cyber Security			Course Code	MB25GC-302			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
0	-	-	-	-	YES	-	-	AC/NC

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 302.1	REMEMBERING	Recall and describe the phases of ethical hacking, CIA triad, cybersecurity principles, and basic security concepts.
CO 302.2	UNDERSTANDING	Explain Linux basics, virtualization setup, cloud-based virtual machines, and cybersecurity tool configuration.
CO 302.3	UNDERSTANDING	Interpret networking fundamentals, scanning techniques, network vulnerabilities, and security components like IDS/IPS and firewalls.
CO 302.4	APPLYING	Apply ethical hacking tasks such as reconnaissance, exploitation, privilege escalation, post-exploitation, OSINT, and persistence techniques..
CO 302.5	ANALYSING	Analyze web application vulnerabilities using OWASP Top 10, evaluate security flaws, and assess governance, risk, and incident response strategies

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction: Phases of ethical hacking, Understanding the underlying principles cyber security, Understanding CIA Triads, Information Security Vs Cyber Security. Basics of Linux: Windows-based Setup, Installing VirtualBox or VMware for virtualization, Setting up Kali Linux as a virtual machine, Installing and configuring essential cybersecurity tools. Linux-based Setup, Using a Linux distribution as the host OS, Installing and configuring essential cybersecurity tools. Linux basic commands and filesystem architecture, Cloud-based Setup (AWS or Azure), Creating a virtual machine instance on a cloud platform. Installing Kali Linux or other distributions. Configuring cloud security policies and networking, Registration on - TryHackMe HackTheBox, PortSwigger Web Academy	(4+2)
II	Network Hacking: Networking Fundamentals, Understanding the fundamentals of networking, OSI and TCP/IP models. IP and MAC addresses, subnetting, and IPv4/IPv6. Introduction to routers, switches, and firewalls. Types of Viruses, worms, and trojan horses and how they spread through the network. Role of Firewalls and Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS). Secure Network architecture and design principles, Network Sniffing: Packet capturing and analysis with Wireshark and TCP Dump. Scanning and Reconnaissance: Network scanning with Nmap, Network Vulnerability Assessment with Nessus, Identifying open ports, services, and potential vulnerabilities. Initial Foothold: Phishing attacks and email-based threats, Exploiting software vulnerabilities, social engineering techniques. Privilege Escalation: Windows Privilege Escalation Linux Privilege Escalation Cheatsheets and Payloads. Post Exploitation: Post Exploitation Tools and frameworks Creating backdoors and maintaining control Deleting digital Footprints, File system manipulation and data exfiltration, Techniques for maintaining access and evading detection. Concept of Persistence.	(4+2)
III	OSINT (Open-Source Intelligence Techniques): Information Gathering Tools and Techniques for OSINT of - Website, mail, FaceBook Instagram Twitter, Phone Number, Data Leak Lookups,	(4+2)

IV	Web Application Security: Web Application Fundamentals and Lab Setup: Web App Technologies Basics (HTML, CSS and JS) Client Server Model, Burp Suite Installation, Burp Suite Proxy Setup and Practical, OWASP Top 10: Broken Access Control SQL Injection, Cross Site Scripting XML External Entity, Security Misconfiguration - Access Control Vulnerabilities Vulnerable and Outdated Component Vulnerabilities, Authentication Vulnerabilities, Server Side Request Forgery, Business Logic Vulnerabilities Session Management Vulnerabilities Automation Testing for Web Apps Practical of Tools - ZAP, Nikto, Nuclei.	(4+2)
V	Cybersecurity Governance, Risk, and Strategy for Business Leaders: Cybersecurity as a Business Imperative Risk Management Frameworks Security Policies & Compliance, Incident response and decision making: Incident Response & Business Continuity Strategic Decision-Making	(4+2)
	Total	30

Suggested Textbooks:

1. Principles of Information Security (7th Edition), Authors: Michael E. Whitman & Herbert J. Mattord, Publisher: Cengage Learning, Edition: 7th Edition (2023)
2. Cryptography and Network Security: Principles and Practice, Author: William Stallings, Publisher: Pearson, Edition: 8th Edition (latest widely adopted)
3. Cybersecurity: With Cryptography Essentials, Authors: Shishir Kumar Shandilya, Agni Datta & Bong Jun Choi, Publisher: McGraw Hill / Higher Education Press, Edition: 1st Edition (2025)

Suggested Reference books:

1. Security in Computing, Authors: Charles P. Pfleeger, Shari Lawrence Pfleeger & Jonathan Margulies, Publisher: Pearson Education, Edition: 6th Edition (2023)
2. Information Security: Principles and Practice, Author: Mark Stamp, Publisher: Wiley India, Edition: 3rd Edition (2023)
3. cryptography, Network Security, and Cyber Laws, Authors: Bernard L. Menezes & Ravinder Kumar, Publisher: Cengage Learning India Private Limited, Edition: 1st Edition (2018)

Suggested Online Link:

1. <https://nptel.ac.in/courses/106105031>
2. <https://nptel.ac.in/courses/106106248>
3. <https://www.coursera.org/learn/crypto>
4. <https://www.coursera.org/learn/information-security-foundations>

Program	MBA (Business Analytics)			Semester: III				
Course	Python			Course Code	MB25SCBA-303			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA			
3	2	1	1	-	-	50	50	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 303.1	REMEMBERING	Recall key Python concepts and basic programming syntax.
CO 303.2	UNDERSTANDING	Explain Python data types, flow control, and file operations.
CO 303.3	APPLYING	Implement Python programs for data handling and logic building.
CO 303.4	ANALYSING	Analyze data structures like lists, tuples, dictionaries, and sets.
CO 303.5	EVALUATING	Evaluate Python functions and their applications in data-driven decision-making.
CO 303.6	CREATING	Develop Python programs using core Python and data manipulation libraries (NumPy, Pandas).

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Python Programming Introduction, History of Python, Python, Python Features, Applications in Various Domains, Introduction to IDEs- Jupyter Notebook, VS Code, Python installation and setup, Python interpreter, script execution, Dir and help: Getting help from the Python interpreter, Python basics: variables, keywords, literals, Multi-Line Statements, Quotation, Comments, line and indentation, Input/output functions, Operators: arithmetic, comparison, logical, identity, membership.	(7+2)
II	Python Data Types & Loop Structures Mutable vs Immutable data types, data types: - Number, Strings: creation, manipulation, operations, Lists and Tuples: properties, operations, indexing, Dictionaries: key-value pairs, updating, deleting elements, Sets: properties, operations, uniqueness, Type conversions and casting between data types , Flow control: conditional statements - if, if-else, if-elif- else, loops - for, while, Loop control statement: continue, break and pass, python list comprehension..	(7+2)
III	Functions and Functional Programming Introduction To Functions, Defining and calling functions, Arguments, python 'Self' as default argument , Functions With Multiple Arguments, return values, range() function, , Objects, Generators, Decorators, Scope -Global Scope, Local Scope ,Nested Scope, Anonymous functions (lambda), map(), filter(), reduce(), Date & Time functions: datetime, timedelta, date, time classes	(7+2)
IV	File Handling and I/O Operations: Introduction to Files , types of files, Keyboard I/O operations, File handling modes: opening, reading, writing, closing files, Working with CSV and Excel files using Python, error handling in file operations, File and directory-related operations, pickle module.	(7+2)
V	Introduction to Python Libraries for Analytics: Overview of analytical tasks and role of libraries, Introduction to the data analysis workflow, NumPy: creating arrays, array operations, Pandas: Series, Data Frame creation, indexing, and data manipulation, Data cleaning workflows , matplotlib, seaborn, scikit-learn, Use of Python in basic data analysis tasks. API Integration basics - Introduction	(7+2)
	Total	45

Suggested Textbooks:

1. Mattan Griffl & Daniel Guetta, Python for MBAs, Columbia University Press
2. Think Python , Oreilly Allen B. Downey
3. Let Us Python, Yashwant Kanetkar and Aditya Kanetkar

Suggested Reference Books

1. Learning Python, Mark Lutz, O'Reilly Media
2. Introducing Python-Modern Computing in Simple Packages , Bill Lubanovic
3. Python for Data Analysis, Wes McKinney, O'Reilly Media

Suggested Online link:

1. <https://nptel.ac.in/courses/106106145>
2. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview
3. <https://www.coursera.org/learn/python>
4. <https://www.coursera.org/specializations/python>

Program	MBA (Business Analytics)			Semester: III				
Course	On The Job Training (OJT)			Course Code	MB25OJTBA-304			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
8	0	2	14	00	100	-	100	200

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 304.1	REMEMBERING	IDENTIFY and DESCRIBE the fundamental aspects of the organization and industry where the OJT is conducted, including the company's profile, core business activities, and organizational structure.
CO 304.2	UNDERSTANDING	EXPLAIN the relevance and application of theoretical concepts learned in the classroom to real-world business practices observed during the OJT
CO 304.3	APPLYING	UTILIZE relevant theoretical knowledge and technical skills in real-world tasks and projects during the OJT in a professional setting
CO 304.4	ANALYSING	EXAMINE and break down the problems or tasks undertaken during the OJT, identifying the key issues, underlying causes, and possible solutions.
CO 304.5	EVALUATING	ASSESS the effectiveness of the strategies and solutions implemented during the OJT, from the standpoint of utility to the host organization, the feedback from the industry mentor.
CO 304.6	CREATING	DEVELOP a comprehensive OJT report and presentation that integrates the learning experiences, data collected, analysis, and outcomes of the project, demonstrating a clear connection between academic knowledge and practical application.

Course Contents

Unit	Description	Duration [Hrs]
A	<p>On Job Training (OJT) is an integral component of the MBA program that provides students with a unique opportunity to bridge the gap between theoretical knowledge gained in the classroom and practical application in a real-world environment. This training aims to equip students with both technical and non-technical skills that are essential for success in the industry.</p> <p>Each student shall undertake an On-the-Job Training (OJT) at the end of Second Semester and complete the same before the commencement of the Third Semester.</p> <p>Guidelines for the On Job Training (OJT) Nature of the OJT: The On-the-Job Training (OJT) program shall be of 12 weeks (3 months).</p> <ol style="list-style-type: none"> 8 weeks of training in the organization (industry / bank etc.) with 30 hours of work per week. 4 Weeks of pre and post training work including proposal making, analysis, report preparation and etc. OJT must be conducted outside the academic institution to expose students to real-world work environments. <u>OJT must be related to the intended specialization of the student.</u> OJT must be done individually. Group projects are not permitted. OJT may involve actual tasks relevant to the area of specialization of the student and as per the demands of the industry / organization where the student is carrying out the OJT. 	(14+2)

	<p>7. OJT should involve fieldwork / desk work in the organisation; online OJT is not permitted.</p> <p>8. Primary data collection is mandatory for Research based OJT.</p> <p>9. Research based OJT can be quantitative / qualitative in nature or even use mixed approaches.</p> <p>10. Research based OJT can involve surveys, interviews, case studies or observation studies.</p> <p>11. It is mandatory for the student to seek advance written approval from the faculty mentor and the Director of the Institute about the type of work and organization before commencing the OJT.</p>
B1	<p>Permissible Partner Organizations:</p> <p>Students have the flexibility to conduct the OJT with any of the following organizations:</p> <ol style="list-style-type: none"> 1. Companies listed on either NSE or BSE in India /abroad 2. Unlisted subsidiaries of Listed Companies. 3. Government / Semi-Government Undertaking / PSU 4. Government Offices 5. Start Ups with an existence of 3 years or more and/or manpower more than 10. 6. Family managed businesses with an existence of 10 years or more and manpower more than 100. 7. Large Cooperative Societies / NGOs with an existence of 5 years or more operating in areas such as agriculture, food processing, health care, retail, banking, etc.
B2	<p>OJT mentors:</p> <ol style="list-style-type: none"> a) Each student shall be assigned two mentors <ol style="list-style-type: none"> i. a faculty mentor from the institution ii. an industry mentor from the host organization where the student undertakes the OJT. b) Industry Mentor Role: The industry mentor plays a crucial role in guiding the student during the internship. They ensure that the internee fulfils the requirements of the organization and successfully meets the demands of the assigned project. Through their expertise and experience, industry mentors provide valuable insights into real-world practices and industry expectations. c) Faculty Mentor Role: The faculty mentor serves as the overall coordinator of the OJT program of the assigned / allotted students. They oversee the entire internship process and evaluate the quality of the OJT in a consistent manner across all the assigned students. The faculty mentor ensures that the OJT aligns with the MBA program's objectives and provides valuable learning opportunities. They also facilitate communication between the institution, industry mentor, and student to ensure a fruitful OJT experience.
B3	<p>Submission of documentation for OJT:</p> <ol style="list-style-type: none"> a) OJT Progress diary: Each student shall maintain an OJT Progress Diary detailing the work carried out and the progress achieved on a daily basis. Daily entry can be of 3- 4 sentences giving a very brief account of the learning/activities/ tasks / interaction taken place. The faculty mentor will be monitoring the entries in the diary regularly. The student shall submit the duly signed and stamped OJT Progress Diary along with the OJT Report. Soft copy diaries (with time stamp) are also permitted. b) Formal Evaluation from the industry mentor: The students shall also seek a formal evaluation cum feedback of their OJT from the industry mentor. The formal evaluation cum feedback by the industry mentor shall comment on the nature and quantum of work undertaken by the student, the effectiveness and overall professionalism. The learning outcomes of the OJT and utility of the OJT to the host organization must be specifically highlighted in the formal evaluation cum feedback by the industry mentor. The OJT evaluation sheet duly signed and

	<p>stamped by the industry mentor shall be included in the final OJT report.</p> <p>c) OJT report: A student is expected to make a report based on the OJT he or she has done in an organization. The student shall submit TWO hard copies & soft copy of the OJT report to the institute. One hard copy of the OJT report is to be returned to the student by the Institute after the External Viva-Voce. In the interest of</p> <p>environmental considerations, students are encouraged to print their OJT reports on both faces of the paper. Spiral bound copies may be accepted.</p>	
B4	<p>OJT report should contain the following:</p> <p>The OJT report should be well documented and supported by –</p> <ol style="list-style-type: none"> 1. Institute’s Certificate 2. Certificate by the Company 3. Formal feedback from the company guide 4. Executive Summary 5. Organization profile 6. Outline of the problem/task undertaken 7. Research methodology & data analysis (in case of research projects only) 8. Relevant activity charts, tables, graphs, diagrams, pictures, screenshots, AV material, etc. 9. Learning of the student through the OJT 10. Consideration to factors such as environment, safety, ethics, cost, professional (national & international) standards 11. Contribution to the host organization <p>References in appropriate referencing styles. (APA, MLA, Harvard, Chicago Style etc.)</p>	
B5	<p>Interaction between mentors:</p> <p>It is suggested that a meet-up involving the intern, industry mentor, and the faculty mentor should be done as a mid- term review to ensure the smooth conduct of the OJT. The meeting can preferably be online to save time and resources. The meeting ensures the synergy between all stakeholders of the OJT. A typical meeting can be of around 15 minutes where at the initial stage the intern briefs about the work and interaction goes for about 10 minutes. This can be followed by the interaction of the mentors in the absence of the intern. This ensures that issues between the intern and the organization, if any, are resolved amicably</p>	
B6	<p>OJT workload for the faculty: Every student is provided with a faculty member as a mentor. So, a faculty mentor will have a few students under him/her. A faculty mentor is the overall in-charge of the OJT of the allocated students. He/she constantly monitors the progress of the OJT by regularly overseeing the diary, interacting with the industry mentor, and guiding on the report writing etc.</p>	
B7	<p>Evaluation Pattern:</p> <p>Total Marks: 200</p> <p>Formative Assessment: 100 Marks Summative Assessment: 100 Marks</p>	
	Total	

Program	MBA (Business Analytics)			Semester: III				
Course	Advanced Statistical Methods			Course Code	MB25SEBA-305			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	-	-	50	50	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 305.1	REMEMBERING	Recall basic R syntax, programming structures, and data types.
CO 305.2	UNDERSTANDING	Explain fundamental statistical concepts and R-based data handling techniques.
CO 305.3	APPLYING	Apply R functions for data manipulation, visualization, and analysis.
CO 305.4	ANALYSING	Analyze data using regression, classification, and time series models in R.
CO 305.5	EVALUATING	Evaluate statistical models using performance metrics and diagnostics in R.
CO 305.6	CREATING	Design and build predictive models and visualizations using real-world data in R.

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to R and Basic Programming Concepts: Introduction to R and RStudio environment, Downloading and installing R and RStudio. Understanding the R console and script editor, Writing and executing your first R program, Using help and documentation in R. Data types in R: character, numeric, logical, complex, Data structures: vectors, lists, matrices, arrays, data frames, and factors. Operators, variables, and basic expressions in R. Flow control structures: if-else, for loop, while loop, repeat loop. Built-in functions and user-defined functions. Web scraping in R.	(7+2)
II	Data Handling, Manipulation and Visualization in R: File operations: reading/writing text files, CSV, Excel, SPSS, SAS. Data transformation and exploration. Subsetting, merging, concatenating data: cbind(), rbind(), merge(). Apply family of functions: apply(), lapply(), sapply(), tapply(). Inspecting data: str(), class(), length(), nrow(), ncol(), head(), tail(). Caret Package for modeling, tidyverse Package, Importance of Exploratory Data Analysis (EDA), Summary statistics, outlier detection. Visualizing data using base, lattice, and ggplot2 graphics, creating line plots, bar plots, histograms, pie charts, table plots, Customizing plots: titles, labels, legends, colours.	(7+2)
III	Hypothesis Testing and Statistical Inference: Hypothesis testing: z-test, t-test, F-test, chi-square test, testing proportions, correlations. One-way and Two-way ANOVA, interaction effects. Summarizing data and using cross-tabulations. Domain-specific case studies using R	(7+2)
IV	Regression and Classification Techniques: Linear Regression: Concept, OLS, multiple regression, assumptions, multicollinearity, residual analysis. Logistic Regression: Concept, odds ratios, log-likelihood, ROC curves, classification tables. Discriminant Analysis: Linear Discriminant Function, classification performance. Step-wise and dummy variable regression. Use of R for all methods with domain-based case studies. Dimension reduction: Introduction to PCA and Factor Analysis.	(7+2)

V	Time Series and Predictive Analytics: Time series data structures in R. Decomposition of time series: trend, seasonality, residuals. ACF and PACF plots, forecasting methods: Exponential smoothing, Holt's Winter. ARMA, ARIMA modelling and validation. Use of time series forecasting in different domains using R.	(7+2)
	Total	45

Suggested Textbooks:

1. R for Everyone: Advanced Analytics and Graphics, by Jared P. Lander, Publisher - Pearson Education India
2. Applied Statistics with R, by Dr. R. N. Prasad & Seema Acharya, Publisher - Wiley India
3. Hands on Programming With R: Write Your Own Functions and Simulations, by Garrett Golemund, Publisher O'Reilly
4. R Programming for Beginners by Sandip Rakshit , Publisher-Tata McGraw Hill
5. A First Course in Statistical Programming with R , by John Braun, Publisher - Cambridge University Press
6. R for Business Analytics, by A Ohri (Author), Publisher - Springer-Verlag New York Inc

Suggested Reference Books

1. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data by Hadley Wickham, Garrett Golemund, Publisher- O'Reilly
2. Advanced R Statistical Programming and Data Models: Analysis, Machine Learning, and Visualization by Matt Wiley, Joshua F. Wiley, Publisher -Apress
3. Data Science Essentials with R: Learn with focus on data manipulation, visualization, and machine learning, by Abhishek Das, Publisher - Bpb Publications
4. Data Science in R
5. A Case Studies Approach to Computational Reasoning and Problem Solving, by Deborah Nolan, Duncan Temple Lang, Publisher: Routledge
6. Statistics for Management, Levin and Rubin Publisher: Pearson Education

Suggested Online Link

1. https://onlinecourses.nptel.ac.in/noc25_cs18/preview
2. https://onlinecourses.nptel.ac.in/noc25_ma36/preview
3. <https://www.coursera.org/learn/r-basic>
4. <https://www.coursera.org/specializations/statistics>

Program	MBA (Business Analytics)			Semester: III				
Course	Data Visualization and Storytelling			Course Code	MB25SEBA-306			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	-	-	50	50	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 306.1	REMEMBERING	DEFINE Power BI terminology and EXPLAIN how to connect to different data sources and save a report.
CO 306.2	UNDERSTANDING	DESCRIBE and DEMONSTRATE the Power BI interface, building basic reports, and dashboards.
CO 306.3	APPLYING	APPLY data modeling, measures, and DAX functions to analyze and transform data.
CO 306.4	ANALYSING	ANALYZE data using interactive visualizations, filters, slicers, and hierarchies.
CO 306.5	EVALUATING	EVALUATE different visualization types and dashboard design techniques to present insights effectively.
CO 306.6	CREATING	DESIGN and BUILD compelling data stories with Power BI dashboards and share them across platforms.

Course Contents

Unit	Description	Duration [Hrs]
I	Getting Started with Power BI: Introduction to Power BI: Desktop, Service, Mobile, Power BI interface and navigation, Data sources and data connectivity, Importing and transforming data using Power Query, Data load options: Import vs DirectQuery, Saving and publishing reports to Power BI Service	(7+2)
II	Data Preparation and Modeling: Data cleaning and shaping using Power Query Editor, Creating relationships and data models, Working with calculated columns and measures, Introduction to DAX (Data Analysis Expressions), Creating hierarchies and date tables, Managing data types, categories, and formatting.	(7+2)
III	Data Visualization and Charts: Basic visualizations: bar, column, line, pie, table, matrix, Advanced charts: funnel, gauge, waterfall, KPI, maps, Conditional formatting and drill-through, Creating and using slicers and filters, Tooltips, bookmarks, buttons, and selections, Custom visuals and themes	(7+2)
IV	Calculations and Advanced Analytics: Creating and using DAX functions: SUMX, CALCULATE, FILTER, etc., Time Intelligence functions in DAX, calculated tables and fields, Aggregations and nested measures, What-if analysis using parameters, Using analytics pane: trend lines, forecasts, reference lines	(7+2)
V	Storytelling and Sharing Insights: Creating dashboards and reports, Layout optimization for desktop and mobile, Designing effective data stories using bookmarks and navigation, embedding insights in PowerPoint, Teams, and SharePoint, Exporting to PDF and Power BI Service sharing, Row-level security (RLS), Deployment pipelines, Power BI Service workspace management, AI visuals (Key Influencers Best practices in dashboard design and storytelling	(7+2)
	Total	45

Suggested Textbooks:

1. Mastering Microsoft Power BI – Brett Powell
2. Collect, Combine, and Transform Data using Power Query in Excel and Power BI – Gil Raviv
3. The Definitive Guide to DAX – Marco Russo & Alberto Ferrari
4. Storytelling with Data – Cole Nussbaumer Knaflic Video Link: <https://learn.microsoft.com/en-us/power-bi/>

Suggested Reference Book

1. Power BI Cookbook: Creating Business Intelligence Solutions of Analytical Data Models, Reports, and Dashboards, Authors: Brett Powell, Publisher: Packt Publishing, Edition: 2nd Edition (2018)
2. Power Pivot and Power BI: The Excel User's Guide to DAX, Power Query, Power BI & Power Pivot, Authors: Rob Collie & Avichal Singh, Publisher: Holy Macro! Books, Edition: 1st Edition (2016)
3. Learn to Write DAX: A Practical Guide to Learning Power Pivot for Excel and Power BI, Author: Matt Allington, Publisher: Holy Macro! Books, Edition: 1st Edition (2015)

Suggested Online Link

1. https://onlinecourses.swayam2.ac.in/imb26_mg113/preview
2. <https://learn.microsoft.com/en-us/power-bi/> Shyam Lal College
3. <https://www.coursera.org/learn/learn-data-storytelling-power-bi-techniques>
4. <https://www.coursera.org/specializations/mastering-power-bi-data-analytics-storytelling>

Program	MBA (Business Analytics)			Semester: III				
Course	Marketing Analytics			Course Code	MB25SEBA-307			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 307.1	REMEMBERING	Describe various key concepts / metrics in Marketing Analytics
CO 307.2	UNDERSTANDING	Illustrate the use of analytical techniques and Interpret the outputs to identify most effective target markets, forecast sales.
CO 307.3	APPLYING	Demonstrate different tools and frameworks that are used in marketing analytics
CO 307.4	ANALYSING	Analyse Market Basket / RFM model for development of effective marketing plans
CO 307.5	EVALUATING	Create price optimization scenarios and build solutions to implement pricing decisions in real-time based on current market data

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Marketing Analytics: Business Decision making, Business Analytics; Marketing Analytics – Nature (Descriptive, Prescriptive and Predictive), Marketing data, Understanding important metrics in Marketing, Marketing Dashboards, Analytics in various Marketing Applications (Scope), Introduction on Tools & Techniques used in Marketing Analytics, Summarizing Marketing data, Basic statistical concepts applicable.	(7+2)
II	Analytics on Forecasting and Pricing: Forecasting - Correlation, Simple Regression and Multiple Regression to forecast sales, Modeling Trend and Seasonality, Ratio to Moving Average Method, Forecasting New Product sales - Using ‘S’ curves, Concepts-The Bass diffusion model, The Copernican principle to predict duration. Pricing Analytics - Price elasticity, Optimization, Price bundling, Practical applications of price analytics	(7+2)
III	Analytics on Segmentation, Target Marketing, Customer Preferences & Product Design: Analytics for Need Based Segmentation - Voice of the Customer, Managing “Voice of the Customer” Data, Life Cycle Segmentation, Cross Tabulation Segmentation, Regression based segmentation, Cluster Analysis, Collaborative Filtering, Classification Trees for Segmentation, Analytics for Perceptual Mapping and Product Positioning, Customer / Consumer preference, Choice, Conjoint Analysis, Logistic regression, Evaluating Brand Equity, Discrete Choice Analysis, Approaches to Conjoint Analysis, Interpreting Conjoint Results, Optimizing Design using Conjoint Results	(7+2)

IV	Customer Profitability: Customer Life Time Value (CLTV), Customer Churn, Customer Attrition models, How to calculate CLTV, Net promoter score, Metrics for Customer Acquisition and Retention, Analyzing age demographics, First contact with customer, Customer satisfaction, Understanding customer engagement, Customer Equity, Customer Loyalty Analytics on Sales & Distribution: Metrics for Sales, profitability - Sales Force Sizing, Effort (Call Planning), Territory Planning, Target Setting, Compensation Planning, Analytics based channel evaluation and selection, Market Basket Analysis & Lift, RFM Analysis, SCANPRO model	(7+2)
V	Analytics on Promotion Web and Social Media Analytics: Marketing Mix Models, Measuring effectiveness of advertisement, Media Selection Models, PPC and Online Advertising, Allocation of marketing budgets over multiple campaigns, Measuring effectiveness of Social Media Advertising, Facebook and Twitter analytics, Viral Marketing and Text mining, Applying Text Mining in Real Life Scenarios, Google Analytics	(7+2)
	Total	45

Suggested Textbooks:

1. Marketing Analytics: Data-Driven Techniques with Microsoft Excel by Wayne L. Winston, Publisher- John Wiley & Sons, Inc
2. Data Mining Techniques in CRM by Konstantinos K. Tsipstis, Antonios Chorianopoulos –Publisher John Wiley& Sons
3. Marketing Analytics Roadmaps-Method, Metrics, and Tools by Jerry Rackley- Published-Apress
4. Pricing, Online Marketing Behavior, and Analytics by GiampaoloViglia, Publisher- Palgrave Macmillan

Suggested Reference books:

1. Marketing Analytics, Authors: Seema Gupta & Avadhoot Jathar, Publisher: Wiley India, Edition: 1st Edition (2021)
2. Marketing Analytics: Tools and Techniques, Authors: A. Mansurali, J. Daniel Inbaraj & Manikandan Rajagopal, Publisher: Sybgen Learning, Edition: 1st Edition (2023)
3. Database Marketing: Analyzing and Managing Customers, Authors: (Multiple Authors), Publisher: Springer, Edition: 1st Edition (2008/updated)

Suggested Online Link:

1. https://onlinecourses.nptel.ac.in/noc22_mg26/preview
2. https://onlinecourses.nptel.ac.in/noc26_mg03/preview
3. <https://www.coursera.org/lecture/digital-marketing-analytics/course-wrap-up-video-ahZ7S>

Program	MBA (Business Analytics)			Semester: III				
Course	Financial Analytics			Course Code	MB25SEBA-308			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	Particulars
CO 308.1	REMEMBERING	Remember the key concepts of the financial analytics
CO 308.2	UNDERSTANDING	Understand the various aspects of financial analytics
CO 308.3	APPLYING	Application of financial data analysis models to data for business decisions
CO 308.4	ANALYSING	Analyse financial data using different models
CO 308.5	EVALUATING	Evaluate the Risk on various financial assets.

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Financial Analytics: Definition, relevance and scope financial Analytics, recent trends in financial analytics.	(7+2)
II	Financial Time Series: Asset Returns, Distributional Properties of Returns, Review of Statistical Distributions and properties of financial time Series, Econometrics.	(7+2)
III	Asset Portfolio Models: Basics of portfolio construction, Markowitz Theorem, Capital Asset Pricing Model, Diversification and Portfolio Optimization	(7+2)
IV	High-Frequency Data Analysis: Non synchronous Trading, Bid-Ask Spread of trading Prices, Empirical Characteristics of Trading Data, Models for Price Changes, Duration Models	(7+2)
V	Derivative Pricing: Issues regarding derivative markets, Brownian motion, Black - Sholes model. Modelling derivative prices	(7+2)
	Total	45

Suggested Textbooks:

1. Argimiro Arratia (2014), “Computational Finance An Introductory Course with R”, Atlantis Press
2. David Ruppert (2011), “Statistics and Data Analysis for Financial Engineering”, Springer.
3. John Y. Campbell, Andrew W. Lo, & A. Craig MacKinlay (1997), “The Econometrics of Financial Markets”, Princeton University Press

Suggested Reference books:

1. Paul Wilmott Introduces Quantitative Finance, Authors: Paul Wilmott, Sam Howison & Jeff Dewynne, Publisher: Wiley, Edition: 1st Edition (1995)
2. Quantitative Financial Analytics: The Path to Investment Profits, Author: Kenneth L. Grant, Publisher: McGraw-Hill Education, Edition: 1st Edition (2016)
3. The Concepts and Practice of Mathematical Finance, Authors: Mark S. Joshi, Publisher: Cambridge University Press, Edition: 2nd Edition (2008)

Website links

1. <http://www.nseindia.com/learn/financial-data-analytics-machine-learning>
2. <https://www.ajnifm.ac.in/>
3. <https://www.iibf.org.in/ELearning.asp>

Case Study

1. Financial Analytics Toolkit: Financial Statement Forecasting By Marc Lipson
2. Financial Analytics Toolkit: Ratio Analysis By Marc Lipson
3. Lucas Wang: Stop-Loss Strategy By Hubert Pun; Hongmei Sun
4. Fullerton: Risk Analytics and Business Strategy By: Ravi Anshuman; Mitra Saby

Program	MBA (Business Analytics)			Semester: III				
Course	Supply Chain and Operations Analytics			Course Code	MB25SEBA-309			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 309.1	REMEMBERING	Recall fundamental concepts and terminologies in supply and operations chain analytics.
CO 309.2	UNDERSTANDING	Explain the role and impact of analytics in supply chain and operations decision-making.
CO 309.3	APPLYING	Utilize analytical tools and techniques to solve supply chain and operations problems.
CO 309.4	EVALUATING	Assess and interpret analytical results to make informed decisions in supply chain contexts
CO 309.5	CREATING	Develop innovative solutions and strategies using analytics for supply chain and operations challenges.

Course Contents

Unit	Description	Duration [Hrs]
I	Fundamentals of Supply and Operations Chain Analytics: Introduction to Supply Chain Management (SCM) and Operations Management, Role of analytics in SCM and operations, Types of analytics: Descriptive, Predictive, Prescriptive, Key performance indicators (KPIs) in supply chains, Overview of Supply Chain Operations Reference (SCOR) model	(7+2)
II	Data Collection and Management in Supply Chains: Data sources in supply chain and operations, Data quality and preprocessing techniques, Introduction to data warehousing and big data in SCM, Ethical considerations and data privacy in supply chain analytics	(7+2)
III	Analytical Tools and Techniques: Statistical analysis and forecasting methods, Optimization models for supply chain and operations, Simulation techniques in operations management, Introduction to software tools: Excel, R, Python, Tableau	(7+2)
IV	Applications in Supply Chain and Operations: Demand forecasting and inventory management, Transportation and logistics analytics, Supplier selection and procurement analytics, Case studies: Indian and global supply chain analytics applications.	(7+2)
V	Strategic and Emerging Trends in Supply Chain Analytics: Integration of AI and Machine Learning in SCM, Sustainability and green supply chain analytics, Risk management and resilience in supply chains, Future trends: Industry 4.0 and 5.0, IoT and IIoT, Blockchain in supply chain analytics	(7+2)
	Total	45

Suggested Textbooks:

1. Supply Chain Analytics: Concepts, Techniques and Applications, Author: Kurt Y. Liu, Publisher: Springer
2. Operations and Supply Chain Management Essentials: Build Skills in Logistics, Process Improvement, and Supply Chain Analytics, Author: Ashley McDonough, Publisher: Vibrant Publishers
3. Production and Operations Analysis, Author: Steven Nahmias, Publisher: McGraw-Hill Education
4. Supply Chain Analytics: Strategies, Models and Solutions, Authors: Rabindranath Bhattacharya & Anindita M. Bhattacharyya, Publisher: Wiley

Suggested Reference Books

1. Operations Management: Sustainability and Supply Chain Management (13th Edition), Authors: Jay Heizer, Barry Render, Chuck Munson, Publisher: Pearson
2. The Analytics Edge, Authors: Dimitris Bertsimas, Allison O'Hair, William Pulleyblank, Publisher: MIT Press
3. Supply Chain Analytics: A Comprehensive Guide to supply chain analytics, harnessing Python to drive efficiency: volume 1, Authors: Alice Schwartz and Hayden Van Der Post, Publisher: Supply Chain Analytica
4. Supply Chain Analytics, Author: T A S Vijayaraghavan, Publisher: Wiley

Suggested Online Link

1. <https://elearn.nptel.ac.in/shop/nptel/supply-chain-analytics/>
2. https://onlinecourses.nptel.ac.in/noc20_mg27/preview
3. <https://www.coursera.org/learn/supply-chain-analytics>
4. <https://www.coursera.org/specializations/supply-chain-analytics>

Program	MBA (Business Analytics)			Semester: III				
Course	HR Analytics			Course Code	MB25SEBA-310			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 310.1	REMEMBERING	To understand the core concepts of HR analytics and its role in strategic HR management
CO 310.2	UNDERSTANDING	Remembering fundamental statistical methods and data analysis techniques used in HR analytics
CO 310.3	APPLYING	Developing proficiency in utilizing HR metrics to assess workforce performance and identify areas for improvement
CO 310.4	ANALYSING	Analyzing data to improve data-driven HR decisions and solve real-world HR challenges across various domains
CO 310.5	EVALUATING	Evaluating critical thinking and problem-solving skills to make data-driven recommendations for HR strategies

Course Contents

Unit	Description	Duration [Hrs]
I	Understanding HR Analytics Demystifying HR Analytics: Role in digital age, business value, analysis types. HR Analytics Process: Defining questions, data collection, analysis, communication. HR Data Sources: HRIS, payroll systems, employee surveys. Case Study: Leveraging HR data for recruitment improvement.	(7+2)
II	Data Preparation and development of Metrics HR Data Management: Collection strategies, cleaning, security, privacy. Developing HR Metrics: Data measurement, core analysis, collection & management. HR Metrics & Measurement: Key metrics across employee lifecycle, HR balanced scorecard. Data Visualization Techniques: Effective communication through data insights.	(7+2)
III	Statistical Methods for HR Analytics Data Visualization Fundamentals: Stages, visual encoding, effectiveness. Designing Dashboards: Visualize numerical data, relationships, maps. HR Analytics Storytelling: Data visualization techniques, communication of insights. Case Study: Predicting employee turnover using Logistic Regression (Hands-on)	(7+2)
IV	HR Analytics in different functions of HR Talent Acquisition, Workforce Management, Employee relations Talent Acquisition: Job posting optimization, candidate assessment & interview analytics, onboarding analytics. Workforce Management: Performance management analytics, compensation & benefits, learning & development analytics. Employee Relations: Employee engagement & sentiment analysis, retention analytics, diversity & inclusion analytics. Case Studies (Hands-on): Recruitment efficiency, identifying high-potential employees, employee wellbeing analytics.	(7+2)
V	Future of HR Analytics: Emerging Trends in HR Technology - Artificial Intelligence, Big Data, and Machine Learning in HR, Ethical Considerations in HR Analytics - Data Privacy, Algorithmic Bias, and Explainability, Building an HR Analytics Capability - Developing a Data-driven HR	(7+2)

	Culture, Skills and Resources for Success, Building a Data-driven HR Culture: Developing skills, fostering collaboration, and navigating the change for successful HR analytics implementation.	
	Total	45
Suggested Textbooks:		
<ol style="list-style-type: none"> 1. HR Analytics Theory and application Techniques – Swati & Suparna Pal 2. Fundamentals of HR Analytics: A Manual on Becoming HR Analytical by Fermin Diez 3. Predictive HR Analytics: Mastering the HR Metric by Dr. Kirsten & Martin Edwards 		
Suggested Reference books:		
<ol style="list-style-type: none"> 1. The Practical Guide to HR Analytics: Using Data to Inform, Transform, and Empower HR Decisions by Shonna Waters, Valerie Streets, Lindsay McFarlane, and Rachael Johnson-Murray 2. Excellence in People Analytics: How to Use Workforce Data to Create Business Value 3. People Analytics For Dummies by Mike West 		
Suggested Videos:		
<ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc24_hs126/preview 2. https://onlinecourses.nptel.ac.in/noc26_mg19/preview 3. https://www.coursera.org/learn/human-resources-analytics 4. https://www.coursera.org/learn/wharton-people-analytics 		

Course Syllabus
Second Year MBA.
(Business Analytics)
Semester IV

Program	MBA (Business Analytics)			Semester: IV				
Course	Entrepreneurship, Innovation and Design Thinking			Course Code	MB25GC-401			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA			
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO401.1	REMEMBERING	DESCRIBE the fundamentals of entrepreneurship, innovation and design thinking.
CO 401.2	UNDERSTANDING	UNDERSTAND the prerequisites of entrepreneurship and innovation.
CO 401.3	APPLYING	APPLY the Design Thinking process to real-world challenges.
CO 401.4	ANALYSING	IDENTIFY business opportunities and create viable business models.
CO 401.5	EVALUATING	EVALUATE entrepreneurial ideas and innovation strategies using design thinking principles and business model frameworks to determine their feasibility, viability, and desirability in real-world contexts.
CO 401.6	CREATING	Develop entrepreneurial mindsets and skills and Pitch ideas effectively to stakeholders or investors.

Course Contents

Unit	Description	Duration [Hrs]
I	Entrepreneurship & Innovation – Definition, Objective and Features: Entrepreneurship; Difference between Entrepreneurship and Traditional Businesses; Entrepreneurs and Intrapreneurs; Corporate Entrepreneurship, Technological Entrepreneurship, Life Cycle of Startup, Focus on Valley of Death, Why Startups Fail? Innovation: Culture of innovation - process and Types of innovation – Continuous and Disruptive, Radical Innovation, Challenges in innovation, Agile/Lean Innovation, Steps of Innovation Management, Idea Management System, Divergent V/s Convergent Thinking, Design Thinking and Entrepreneurship Creating Value through Innovation. Management of Innovation, Types of IPR	(7+2)
II	Entrepreneurial Theories and Entrepreneurial Environment, Entrepreneurial Development- Theories of Entrepreneurship; Successful Entrepreneurs and Their Traits; Types of Entrepreneurs; Entrepreneurial Environment- PESTEL and Their Effects; Business Environment Analysis, Business Planning; Mid-career Dilemmas; Entrepreneurial Growth and Competitive Advantage; Changing Role of Entrepreneurs. Women Entrepreneurs, Entrepreneurship Development Institute; Entrepreneurship Development Programs	(7+2)
III	Design Thinking – Introduction, Definitions and Meaning; Design Thinking –as an Art and Science; Stages of Design Thinking –Empathise, Define, Ideate, Prototype and Test; Entrepreneurship Design Thinking, Need of Design and Design Thinking Writing the Problem Statement; Understanding Stakeholders and Users; Personas, Empathy Maps; Current Scenarios to identify pain points; Ideation and Storyboarding; Deriving Goals from	(7+2)

	Ideas; Future Scenarios and Moments of Max Impact; Prototyping	
IV	Design Thinking in Start-Up – 5 stages integration Empathise–Listening to People involved and the End User Problems Realisation, Understanding User Needs: User Research Techniques, Observation, Interviewing, Surveys, Persona Mapping; Define– Identifying User Problems, Problem Statement Formulation, Reframing Problems; Ideate – Generating Ideas, Brainstorming Techniques, Mind Mapping, Scenarios - Finding the solutions most effectively; Prototype – Making the samples to Launch, Different Types of Prototypes, Testing and Iterating; Test – Evaluating offerings, Usability Testing, User Feedback. Design thinking with AI	(7+2)
V	Opportunity Recognition & Business Models- Model of opportunity recognition (Corbett, 2005), Identifying opportunities through Design Thinking, Market research basics, Value Proposition Canvas, Business Model Canvas (BMC), Minimum Viable Product (MVP): Lean Startup & Validation- Lean Startup methodology (Eric Ries), Build- Measure-Learn cycle, Customer validation, Metrics and KPIs, Agile iteration. Teamwork and Collaboration. Business Model Failure: Reasons and Remedies. Sustainability Innovation and Entrepreneurship. Emerging technologies such as artificial intelligence, augmented reality, virtual reality	(7+2)
	Total	45

Suggested Books:

- 1.Steps to Innovation: Going from Jugaad to Excellence – Rishiksha T. Krishnan and Vinay Dabholkar
- 2.Innovation and Entrepreneurship - Peter Drucker
- 3.Entrepreneurship: Business and Management – Dr. R.C. Bhatia, Sultan Chand & Sons, 2020
4. Entrepreneurship - Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha. 11th Edition

Suggested Reference Books:

1. Ten Types of Innovation – Larry Keeley, Helen Walters, Ryan Pikkell & Brian Quinn
2. Design Thinking for Strategic Innovation – Idris Mootee
3. Start with Why – Simon Sinek
4. Business Model Generation – Alexander Osterwalder & Yves Pigneur
5. The Startup Owner’s Manual – Steve Blank & Bob Dorf
6. Design a Better Business – Patrick Van Der Pijl, Justin Lokitz & Lisa Kay Solomon

Suggested Online Link

1. https://onlinecourses.nptel.ac.in/noc21_mg63/preview
2. https://onlinecourses.nptel.ac.in/noc25_mg81/preview
3. <https://www.coursera.org/learn/design-thinking-entrepreneurship>
4. <https://www.coursera.org/specializations/innovation-entrepreneurship>

Program	MBA (Business Analytics)			Semester: IV				
Course	Project Management			Course Code	MB25GC-402			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
2	1	1	1	10	10	30	-	50

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 402.1	REMEMBERING	DESCRIBE the basic terms and concepts in Project Management.
CO 402.2	UNDERSTANDING	EXPLAIN the various parameters of cost, time and quality in project management
CO 402.3	APPLYING	INTEGRATE the aspects of various functional areas of management to develop a Project perspective.
CO 402.4	ANALYSING	EXPLAIN techniques as cpm/pert/earned value analysis and projected financial statements
CO 402.5	CREATING	DEVELOP the capability of student to conceive an idea, evaluate it's feasibility and make it workable.

Course Contents

Unit	Description	Duration [Hrs]
I	Overview of Project Management: Concepts and attributes of Project, Project lifecycle and stake holders, Project Organization, WBS, Scope and priorities, Project Identification, Market feasibility with Moving Average and Exponential smoothing methods, Techno economic feasibility, Government policy to location, legal aspects, Preparation of DPR	(4+2)
II	Project Planning: Time and cost estimates with AON and AOA conventions, Budget estimates, Network analysis, Float analysis, crashing concepts	(4+2)
III	Project scheduling and Risk Management: Gantt chart, splitting and multitasking, Risks in time estimates PERT analysis Project Organization: Role and responsibilities of Project Manager, Team development model, sources of conflicts, conflict resolution	(4+2)
IV	Earned value analysis: 'S' curve, Cost and schedule performance indices using network, Revised estimates of cost and time Financial analysis: Profitability analysis, Using NPV, IRR, Payback and discounted Payback period, PI. Preparation of projected statements of Income- expenditure and balance-sheet	(4+2)

V	Computer applications and Software for Project Management, Project Management Cases	(4+2)
	Total	30

Suggested Textbooks:

1. Project Planning estimation and assessment by Prasanna Chandra
2. Project Management : The Managerial Process by Gray and Larson 3E Tata McGraw- Hill
3. Quantitative Techniques in Management by N D Vohra

Suggested Reference Books:

1. Project Management Managerial Emphasis by Meredith and Mantel
2. Project Management: A Managerial Approach, Authors: Jack R. Meredith, Samuel J. Mantel Jr. & Scott M. Shafer, Publisher: John Wiley & Sons, Edition: 9th Edition (2016)
3. A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Author: Project Management Institute (PMI), Publisher: Project Management Institute, Edition: 7th Edition (2021)
4. Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Author: Harold Kerzner, Publisher: John Wiley & Sons, Edition: 12th Edition (2022 / reprint)

Suggested Online link

1. https://onlinecourses.nptel.ac.in/noc25_mg127/preview
2. <https://elearn.nptel.ac.in/shop/nptel/project-management/>
3. <https://www.coursera.org/learn/predictive-project-methodologies>
4. <https://www.coursera.org/learn/project-planning-and-execution-management>

Program	MBA (Business Analytics)			Semester:IV				
Course	Data Mining			Course Code	MB25SCBA-403			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 403.1	REMEMBERING	Define and recall key concepts related to Big Data, Data Mining, Business Intelligence, data types, and data preprocessing techniques.
CO 403.2	UNDERSTANDING	Explain the data mining process, types of models, data attributes, data quality issues, classification and clustering methods, and the relevance of BI techniques.
CO 403.3	APPLYING	Use appropriate classification, clustering, and association rule mining algorithms to solve real-world data problems such as fraud detection, customer segmentation, or recommendation.
CO 403.4	ANALYSING	Compare and contrast different data mining tasks and algorithms (e.g., classification vs clustering, decision tree vs SVM) for their strengths, limitations, and use cases.
CO 403.5	EVALUATING	Assess model performance using evaluation metrics (accuracy, precision, recall, F1 score), validate clustering results, and interpret rule interestingness in association mining.
CO 403.6	CREATING	Design and implement basic data mining workflows and solutions, integrating preprocessing, modeling, and evaluation for specific business applications while considering ethical implications.

Course Contents

Unit	Description	Duration [Hrs]
I	Basic Concepts -Definition and need of Big Data, Definition and need of Data Mining, Definition and scope of Business Intelligence (BI), Relationship between Data Mining and BI techniques, Data Mining Process -Data collection, Data preprocessing, Pattern discovery, Evaluation, Knowledge representation, Introduction to Data Mining Tasks – Classification, Clustering, Association Analysis ,Anomaly Detection, Concept and definitions of models - Descriptive models, Predictive models, Basic terminology: features, labels, accuracy, training/testing, Real-world data mining applications - Big Data Analytics in Mobile Environments, Fraud Detection and Prevention with Data Mining Techniques	(7+2)
II	Understanding Data -Data, Types of attributes -Nominal, ordinal, interval, ratio, Properties of attribute values- Discrete vs continuous, Types of data -Structured, semi-structured, unstructured, Temporal, spatial, text, multimedia, Data quality issues - Noise, missing values, duplicates, Data cleaning techniques, Sampling and its importance, Data normalization techniques -Min-max, z-score, decimal scaling, Similarity and distance measures, Euclidean, Manhattan, cosine similarity, Feature selection, Instance selection, Importance in big data scenarios.	(7+2)
III	Classification Techniques - Decision-tree based approach, Rule-based classification, Instance-based classifiers (e.g., k-NN), Support Vector Machines (SVM), Ensemble learning techniques - Bagging, Boosting, Random Forest, Model selection and evaluation - Accuracy, precision, recall, F1 score, confusion matrix, Cross-validation, Applications-B2B Customer Buying Stage Prediction, Recommender Systems.	(7+2)

IV	Clustering Techniques - Partitional clustering methods (e.g., k-means), Hierarchical clustering methods (agglomerative, divisive), Graph-based clustering methods, Density-based clustering methods (DBSCAN, OPTICS), Cluster validation techniques -Internal, external, relative measures, Applications -Customer Profiling, Market Segmentation.	(7+2)
V	Association, Patterns & Anomaly Detection - Apriori algorithm and its extensions, Association pattern evaluation -Support, confidence, lift, Sequential pattern mining, Frequent subgraph mining, Applications - B2B Customer Buying Path Analysis, Medical Informatics, Telecommunication Alarm Diagnosis, Anomaly detection methods - Statistical-based methods, Density-based methods, Ethics of data mining - Privacy concerns, Data ownership and usage, Corporate responsibilities.	(7+2)
	Total	45

Suggested Textbooks:

1. Data Mining: The Textbook by Charu C. Aggarwal
2. Data Science for Business by Foster Provost and Tom Fawcett, O'Reilly
3. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Addison Wesley
4. Data Mining and Analysis: Fundamental Concepts and Algorithms by Mohammed J. Zaki and Wagner Meira

Suggested Reference Book

1. Introduction to Data Science: Authors: B. Uma Maheswari & R. Sujatha, Publisher: Wiley India, Edition: 1st Edition (2021)
2. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python :Authors: Peter Bruce, Andrew Bruce & Peter Gedeck, Publisher: O'Reilly Media, Edition: 1st Edition (2020)

Suggested Online Link

1. <https://onlinecourses.nptel.ac.in/>
2. <https://www.coursera.org/browse/data-science>
3. https://onlinecourses.nptel.ac.in/noc22_cs32/preview
4. <https://www.upgrad.com/data-science-course/>

Program	MBA (Business Analytics)			Semester: IV				
Course	Research Project			Course Code	MB25RPBA-404			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
6	0	2	10	-	100	-	50	150

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 404.1	REMEMBERING	Carry out a substantial research-based project
CO 404.2	UNDERSTANDING	Demonstrate capacity to improve student achievement, engagement and retention
CO 404.3	UNDERSTANDING	An understanding of the ethical issues associated with practitioner research
CO 404.4	APPLYING	Applying domain knowledge and foundational research skills to address a research problem.
CO 404.5	ANALYSING	Analyse data and synthesize research findings.
CO 404.6	CREATING	Report research findings in written and verbal forms and use research findings to advance education theory and practice.

Course Contents

Unit	Description	Duration [Hrs]
A]	<p>Preamble:</p> <p>A research project is a systematic and organized endeavour undertaken to investigate a specific topic, question, or problem in order to gain new insights, knowledge, or understanding. The objective of the research project is to further develop the student's ability to carry out and contribute to business research. The student should demonstrate, through his/her thesis and orally, an ability to plan, conduct, and present a scientific investigation of relevance to the subject of Business Administration and the student's chosen Master's program. A further aim is to develop skills for the critical examination of investigations and research reports and to provide the student with the opportunity for a deeper level of theoretical study within a chosen area. These projects involve a structured process of inquiry, data collection, analysis, and interpretation to arrive at meaningful conclusions.</p> <p>Learning Objectives</p> <ol style="list-style-type: none"> 1. Understand the purpose and significance of research in business management. 2. Develop skills in research methodology, data analysis, and interpretation. 3. Learn to conduct a thorough literature review and critically evaluate existing research. 4. Learn to formulate a clear research question and develop a compelling research proposal. 5. Master the art of writing a well-structured and coherent dissertation. 6. Gain confidence in presenting research findings to an academic audience. 	(10+2)

B - 1]

Conducting research projects can offer benefit and advantages to the students:

(10+2)

1. **Intellectual Growth:** Engaging in research projects allows students to explore and develop their intellectual curiosity. It encourages critical thinking, problem-solving skills, and the ability to analyse complex issues.
2. **Skill Development:** Research projects help students develop a variety of skills such as information gathering, data analysis, literature review, writing, presentation, and time management. These skills are valuable both academically and in future careers. .
3. **Deepened Understanding:** Research enables students to delve deeply into a specific topic, gaining a more comprehensive understanding of it beyond what's covered in regular coursework.
4. **Independent Learning:** Research projects encourage self-directed learning. Students learn how to set their own goals, manage their time, and work independently, fostering a sense of responsibility and initiative.
5. **Problem Solving:** Through research, students confront real-world problems and work towards finding innovative solutions. This experience prepares them to tackle challenges in various aspects of their lives.
6. **Personal Growth:** Research projects can boost students' confidence as they overcome obstacles, contribute to knowledge, and present their findings to peers and professors. This can positively impact their self-esteem and personal growth.
7. **Networking:** Engaging in research projects often involves collaboration with professors, peers, and sometimes professionals in the field. This can lead to valuable networking opportunities and connections that might be beneficial for future academic or career pursuits.
8. **Enhanced Resume/CV:** Having research experience on a resume can make students stand out to potential employers or graduate programs. It demonstrates their commitment to learning and their ability to handle complex tasks.
9. **Contribution to Knowledge:** Even in the early stages of their academic careers, students can contribute to the existing body of knowledge. Their research findings might lead to new insights or perspectives in their chosen field.
10. **Preparation for undertaking Research:** For students considering post graduate, engaging in research during their postgraduate years can provide a taste of the kind of work they might encounter at the next academic level PhD.
11. **Career Exploration:** Research projects can help students explore potential career paths within their field of study. They might discover specific areas they are particularly passionate about.
12. **Personal Interest Pursuit:** Research projects often allow students to delve into topics that deeply interest them, providing a fulfilling and enjoyable learning experience.
13. **Exposure to Research Methods:** Students gain exposure to various research methodologies, which can be beneficial not only in academia but also in fields where data analysis and evidence-based decision-making are crucial.
14. **Critical Evaluation:** Research requires students to evaluate existing literature, sources, and information critically. This skill helps them become more discerning consumers of information. **Long-Term Impact:** Some research projects can have lasting impacts beyond the academic realm, contributing to policy changes, technological advancements, or improvements in various industries

<p>B-2]</p>	<p>In Semester IV the student shall work under the supervision of the faculty and carry out a Research Project and submit a structured report in TWO hard bound copies (Blackbook) & one soft copy (PDF). In the interest of environmental considerations, students are encouraged to print their Research Project reports on both faces of the paper. The student is required to conduct advanced research on a topic related to one (or more) of contemporary issues in management. The topic is chosen in consultation with the student's supervisor. The student will prepare and present a detailed research proposal prior to starting the work.</p> <p>It is mandatory for the student to seek advanced written approval for Research Report Proposal from the faculty Supervisor and the Director of the Institute about the topic before commencing the Research Project work. A Research Project outlining the entire problem, including a survey of literature and the various results obtained along with their solutions, is expected to be produced. The student must submit the completed Research Project and make an oral presentation of the same. Through the Research Project, the student is expected to furnish evidence of competence in understanding varied aspects of the theme/topic selected and a deep understanding of the specialty area. The completion of the Research Project / project shall be certified by the Faculty Supervisor, HOD & approved by the Director of the Institute.</p> <ol style="list-style-type: none"> 1) All sheets are to be A4 size. 2) The Text in all the chapters shall be in Times New Roman 12 Font, Regular, justified with line spacing of 1.15. 3) The margins shall be as follows: Top & Bottom: 0.8 inches; Left: 1 inch, Right: 0.5 inches 4) One extra line spacing should be left in between paragraphs. 5) All Chapter headings are to be centred in the Font Times New Roman 14 size Bold. 6) All headings of section shall be in Times New Roman 12 Bold 7) All sub-section headings shall be in Times New Roman , size, 12, Bold, Italic. 8) All minor sub-section headings shall be in Times New Roman , size, 12, Regular. 9) It is advised that the sections and sub- sections are to be limited to 3rd level <ol style="list-style-type: none"> a. Zero Level - Chapter Headings b. First Level - Main sections in each chapter : to be numbered as 1.1, 1.2, 2.1, 3.1 etc. c. Second level - Sub- sections in each section : to be numbered as 1.1.1, 1.2.2, 2.1.3, 3.2.1 etc. d. Third level - Minor sub-sections ie., sections in sub-sections. : to be numbered as 1.1.1.1, 1.2.2.1, 2.1.3.2, 3.2.1.4 etc. - to be avoided to the extent possible. 10) All the references / Bibliography are to be listed at the end, arranged in the chronological order and are to be numbered 1, 2, 3 etc. 11) The reference No. should be given as superscript in the report wherever they appear. 12) All the figures are to be numbered as Fig. 1.1, Fig. 2.3 etc indicating chapter No and the sl. No. of the figure in that chapter. The title of the figure should at the bottom of the figure and should be numbered as shown below. Fig. 1.1 Study Area Fig. 2.1 Definition Sketch Fig. 3.2 Experimental Setup etc... 13) All the figures are to be placed at the end of each chapter. Alternatively, they can be placed after the page where they are first referred to. 	

	<p>Uniformity should be maintained and under no circumstances should these two alternatives indicated be mixed.</p> <p>Research projects may include:</p> <ul style="list-style-type: none"> ➤ Developing a research question or statement ➤ Finding and evaluating sources ➤ Conducting research ➤ Writing a report etc <p>Students can do-</p> <ul style="list-style-type: none"> ➤ Survey based research. ➤ Secondary data analysis such as decision analysis, cost effectiveness analysis or Meta-analysis. ➤ Observation based/Interview based research. <p>Each student must work under the supervision of a faculty mentor. Depending on the area of research interest or the research topic,</p>	
<p>B-3]</p>	<p>Research Project Process</p> <p>I. SELECTION OF THE RESEARCH TOPIC:</p> <p>The first major challenge in conducting research</p> <ol style="list-style-type: none"> 1. The easiest way is working with a faculty mentor who is active in research and may have defined one or more researchable questions. 2. Consulting with leading faculty in your area of interest and asking for advice on researchable topics is another avenue for research ideas. 3. Developing research ideas from loose ends discovered during: <ol style="list-style-type: none"> a) desk research/FP/SIP/OJT, b) literature review c) reviewing journal article(s), and d) discussions, critique of research articles in journal club, could be an interesting, and a rewarding experience. <p>II. DEVELOPING THE RESEARCH PROPOSAL</p> <p>A research proposal helps to develop research idea into a valid, scientific research project. A general outline of the elements of a Research Proposal is presented. Although the Research Project Outline provides a description of all the elements of a research project, students are required to complete the writing up of the Methodology section before beginning the project implementation. Writing of the research proposal has a twofold purpose:</p> <ol style="list-style-type: none"> 1. it provides the researcher, with the blueprint for implementing the project, and 2. it has to be submitted to the research supervisor, HOD and Director of the Institute) for securing approval. <p>III. PROJECT IMPLEMENTATION</p> <p>In order to conduct a valid, scientific study, it is important that student rigorously follow the study design outlined in your research proposal and approved by the research supervisor. To ensure timely completion of the project, it is important to stay within the framework discussed in the Timeline.</p> <p>IV. WRITE-UP OF PROJECT RESULTS AND DISCUSSION</p> <p>This should follow directly from your research proposal. The research project outline provides a ‘how to’ write-up of the results and discussion sections.</p>	

V. RESEARCH PRESENTATION

Once the research project is complete, student have to make a public oral presentation to present the work.

B-4]

OUTLINE OF A RESEARCH PROJECT

I. TITLE PAGE (Page 1, DO NOT NUMBER)

- Study Title
- Names of the Supervisor (faculty mentor)
- Discipline
- Name of the Institute
- Date: month and year proposal prepared/submitted

II. SUMMARY (Page2, 1-2 pages; DO NOT NUMBER)

The summary should be brief and include: 1) a few sentences introducing the topic of current study (could include a couple of references); 2) statement of the problem; 3) a brief description of the methodology to be used including duration of study, subject selection criteria, tests to be performed, and/or data to be collected; 4) significance and implications of the study (why is it important to do the study, and what are the benefits: fill in gap in knowledge; develop further understanding of a clinical situation; modify current approach to treatment; cost-benefit analysis etc., etc.).

III. INTRODUCTION (Page 3; up to 2 – 3 pages)

This section consists of an overview of the research question and some indication of the study's worth and the contribution it is apt to make to the field of study. It should include the rationale for the research project.

IV. REVIEW OF THE LITERATURE (Page 4; up to 4 –6 pages; a minimum of 10 references required).

Use references to establish the link between the proposed study and previous work done on the topic, lay the groundwork for the proposed study, and demonstrate why it is important and timely. The literature review is not just a compilation of facts, but a coherent argument that leads to the description of the proposed study.

V. PROBLEM STATEMENT & RESEARCH HYPOTHESES (up to 1/2-1 page)

The problem statement describes the problem posed by the proposed study and specifies it in the form of Research Hypotheses. The research hypotheses should flow logically from the discussion presented in the Review of Literature and the Statement of the Problem. The hypotheses should be very specific in presenting what aspects of the research topic will be studied, and how. The hypotheses (If any) should be optimally clear, concise, meaningful, and typically written in the present tense. One recommended statement of the criteria for a good hypothesis is that is: a) be free of ambiguity, b) express the relationship between two variables or concepts, and c) imply an empirical test. AVOID having more than one hypothesis embedded in a single, complex statement. A conceptual model represents a visual depiction of the relationship between all the variables

in your study. It is a good place to start when planning your research project, and also helps in developing your hypotheses.

VI. RESEARCH METHODOLOGY (up to 2-3 pages)

1. Study Duration: Describe the time frame during for which data will be collected (retrospective study; chart reviews), or intervention administered (prospective study; etc). If any

2. Subject Selection: Of particular importance in this section are:

a) the sampling procedure to be used – random, stratified, convenience, b) the source of the subjects, c) the criteria for selection – clearly state inclusion/exclusion d) the rationale for determining sample size – use power test to determine sample size for significance; realistic estimates of crossovers, dropouts must be used in calculating sample size

3. Instrumentation or Measures: This section lists all the variables (intervention as well as outcome variables) you would be examining in your study, and describes what particular measures, or forms, or data collection sheets you will be using to measure the variables.

4. Procedures: This section provides a detailed description of the exact steps to be taken to conduct your research. This includes the procedure used to contact subjects, obtaining Informed Consent, and collecting the data.

5. Data Analysis: In this section describe the statistical tests that will be used to address the research hypotheses. Although intimidating, this section forces you to think how you will analyze (or have it analyzed) at the time the proposal is generated rather than after the data are collected. This way, you can avoid wasting time collecting data that are not analysable because they are not in the collected in the correct format.

6. Study Limitations: Describe the shortcomings and weakness of your study most likely to impact the internal validity of your study.

VII. RESULTS

In this section, you present your findings as clearly as possible. The Results section contains JUST THE FACTS: tables, figures, transcript summaries, and your description of what is noteworthy and important about these. Begin with a description of the sample. Simple demographics can be presented in tabular form. Follow with presenting your findings in terms of the research questions/hypotheses tested.

VIII. DISCUSSION

This section typically contains:

- An overview of significant findings
- A consideration of the finding in light of previous research
- A careful examination of findings that fail to support your hypotheses
- Limitations of the study that may affect the generalizability of the results
- Recommendations for further research
- Implications of study for professional practice

IX. REFERENCES

Students must cite all studies referred to in the proposal, using the APA citation method

B-5]

Evaluation Pattern:

Total Marks: 150

Formative Assessment: 50

Marks Summative Assessment: 50 Marks

1] Formative Assessment Weightage 50 marks

1. Project Proposal
2. Three Progress Reports
3. Final Research Project Report
4. Pre- submission Presentation
 - a) Research Project Objectives, Research Question and Hypotheses
 - b) Introduction and literature Review
 - c) Methodology
 - d) Quality of Analysis and Research, discussion and findings
 - e) Documentation and Reporting
 - f) References
 - g) Reflection

2] Summative Assessment Weightage 50 marks

1. There shall be a panel of 2 examiners for the Final Viva-Voce
2. University shall nominate External Examiners
3. Director shall nominate Internal Examiners
4. Presentation by each student along with a spiral bound report is mandatory
5. Students will deliver a presentation of 15 minutes about their OJT project.
6. Weightages for summative assessment shall be as follows
 - a) Presentation
– 05 marks
 - b) Viva-Voce
– 20 marks
 - c) Report
– 15 marks
 - d) Ability to connect with the theoretical & conceptual frame work
– 10 marks

The Internal & the External viva-voce shall evaluate the candidate based on:

1. Adequacy of work undertaken by the student
2. Application of concepts learned in Sem I, II and III
3. Analytical capabilities
4. Technical Writing & Documentation Skills
5. Outcome of the project – sense of purpose
6. Utility of the project to the organization
7. Variety and relevance of learning experience

Presentation could be through any of the enlisted formats (this is an indicative list and innovative formats if any beyond this list may be adopted) -

1. Traditional Slide Deck Presentation
2. Infographics
3. Video presentation
4. Paper presentation
5. Poster presentation

	6. Webinar or online presentation 7. TED-style presentation Storytelling Presentation etc.	
	Total	12

Program	MBA (Business Analytics)			Semester:IV				
Course	Time Series Analysis and Forecasting			Course Code	MB25SEBA-405			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA			
3	2	1	1	-	-	50	50	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 405.1	UNDERSTANDING	Understand the fundamentals of Database Management Systems, database models, ER/EER diagrams, normalization concepts, and time series basics such as stationarity, decomposition, and basic models..
CO 405.2	APPLYING	SQL commands (DDL, DML, DCL, TCL), joins, nested queries, functions, indexes, and PL/SQL components such as procedures, triggers, cursors, and CTEs to manage and manipulate databases..
CO 405.3	APPLYING	Apply NoSQL concepts, perform CRUD operations, indexing and aggregation in MongoDB, and implement basic time-series forecasting methods such as moving averages, linear trend, SMA, and EMA.
CO 405.4	ANALYSING	Analyse relational database designs using functional dependencies, normalization (1NF, 2NF, 3NF, BCNF), relational integrity constraints, ER-to-table conversion, ACF/PACF interpretation, and model identification for AR, MA, ARMA, and ARIMA.
CO 405.5	EVALUATING	Evaluate database transaction behaviour, ACID properties, concurrency issues, serializability, schedule types, forecasting model performance, and compare SQL vs NoSQL database systems.

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Database Management System Introduction to Database Management Systems, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Enterprise Constraints Data Models, Database Design and ER Model: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity Relationship Model, ER Diagram, Design Issues, Extended E-R Features, Converting E-R & EER diagram into tables	(7+2)
II	SQL: DDL, DML, Select Queries, String, Date and Numerical Functions, Aggregate Functions, View, Indexes, Group by and Having Clause, Join Queries, Set, Set operation, Set membership, Nested queries, DCL, TCL PL/SQL: Control Statement, Cursor, Stored Procedure and Function, Trigger, CTE, windows function	(7+2)
III	Relational Model: Basic concepts, Attributes and Domains, CODD's Rules, Relational Integrity, Referential Integrities, Database Design: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, 2NF, 3NF, BCNF. Case study: Design and Optimization of a Relational Database for a University Management System	(7+2)
IV	Basic concept of a Transaction: Database Transaction Management, Properties of Transactions, ACID, Concept of Schedule, Serial Schedule, Serializability: Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules, Concurrency Control: Need, Locking Methods. Introduction to NoSQL Database, NoSQL data models, CAP theorem and BASE Properties, Comparative study of SQL and NoSQL, MongoDB: CRUD Operations, Indexing and Aggregation, Basic Optimization.	(7+2)

V	<p>Basic Concepts - Introduction to time series with examples, stationarity, non-stationarity and related concepts, Time series decomposition and introduction to basic time series models such as Random Walk, White noise, AR, MA, ARMA etc. Introducing ACF and PACF plots and model identification. Trends and Methods of Fitting Straight-line - Free hand method, The method of semi- average, The method of moving average. Forecasting and Varies forecasting methods - Introduction to forecasting, Mean Forecasting, Naïve Forecasting, Linear Trend Forecasting</p> <p>Time Series Forecasting Methods - Time series forecasting methods such as ARIMA, SMA smoothing, EMA smoothing, Holt Winter’s technique etc. Comparing forecasts using different metrics</p> <p>Machine Learning Methods- Introduction to machine learning models for time series. Anomaly detection, LSTM, Neural networks in time series</p>	(7+2)
Total		45

Suggested Text Books

1. Learning SQL" by Alan Beaulieu: O’Reilly Media, 3rd Edition, 2020.
2. SQL in 10 Minutes, Sams Teach Yourself by Ben donna. Sams Publishing, 5th Edition, 21)19.
3. Head First SQL" by Lynn Beighley: O’Reilly Media, 1st Edition, 2007.
4. SQL tor Data Analytics" by Upom Malik, Matt Goldwasser, and Benjamin Johnston: Packt Publishing, 2nd Edition, 2022.
5. Database System Concepts" by Abraham Silbersehatz, Henry F. Korth, and S. Sudarshan (Indian Author): McGraw-Hill Education, 7th Edition, 2020.

Suggested Reference Books:

1. SQL: The Complete Reference" by James R. Graft’and Paul N. Weinberg: McGraw-Hill Education, 3rd Edition, 2003.
2. "Fundamentals of Database Systems" by Rainez Elinasri and Shamkant B. Navathe: Pearson Education, 7th Edition, 2016.
3. "Mastering PostgreSQL in Application Development" by Dimitri Fontaine: 1st Edition, 2020.
4. "MySQL Cookbook" by Paul DuBois: O’Reilly Media, 4th Edition, 2020.
5. "Database Management Systems" by Raghu Rainakrishnan and Johannes Gehrke (Indian Adaptation available): McGraw-Hill Education, 3rd Edition.

Suggested Online Link

1. [Database Management System – NPTEL/SWAYAM course page \(DBMS\)](#)
2. [Introduction to SQL – Coursera](#)
3. [SQL: Practical Introduction – Coursera](#)
4. [upGrad Advanced SQL Free Online Course](#)

Program	MBA (Business Analytics)			Semester:IV				
Course	Strategic Management and Business Analytics			Course Code	MB25SEBA-406			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 406. 01	REMEMBERING	Define and recall the key concepts of Strategic Management
CO 406. 02	UNDERSTANDING	Explain Strategic management processes, analytical models, and Big Data technologies relevant to business environments.
CO 406. 03	APPLYING	Apply suitable data analytics tools and techniques to formulate and implement strategic management.
CO 406. 04	ANALYSING	Analyze the environment, organisation capability to formulate strategy in marketing, finance, or operations.
CO 406. 05	EVALUATING	Evaluate strategic implementation using different analytical to gauge performance for strategic decision-making.
CO 406. 06	CREATING	Develop and propose a business strategy based on case insights while considering sustainability, ethical concerns.

Course Contents

Unit	Description	Duration [Hrs]
I	<p>Foundations of Strategic Management: Concept of strategy, Corporate, Business and Functional Levels of Strategy. Strategic Management Process- Phases; Stakeholder in Business and their Roles in Strategic management. Hierarchy of Strategic Intent; Business Definition, objectives and goals, Linking objectives to mission & vision. Critical success factors (CSF), Key Performance Indicators (KPI), Key Result Areas (KRA).</p> <p>Analytics: Business Analytics for KPIs such as People, Operations, Strategy e.g. Sales, Profit, ROI, operational efficiency, Revenue , total cost , employee turnover, capacity utilization, defect rate, on time delivery, time to market.</p>	(7+2)
II	<p>Formulating Strategy: Analyzing External Environment: Environmental Analysis (ETOP), Industry Analysis - Porter's Five Forces Model of competition, Entry & Exit Barriers, Strategic Group analysis. Analytics for Porter's five forces: Case or Cases which include - Statistical modeling to predict the likelihood of new entrants based on various factors. Use regression analysis for supply chain dynamics; Market Basket Analysis for Customer Segmentation, Conjoint analysis to understand customer preferences for different features and benefits of substitutes, market segmentation and positioning analysis for competitor strengths and weaknesses. Analyzing Company's Environment: Resource-Based View- Examine a firm's resources and competitive position, introducing the VRIO Framework and benchmarking, Porter's Value Chain Analysis, Case study analysis of a company's strategic planning process, focusing on environmental scanning and resource evaluation, Organizational Capability Profile, . Strategic Advantage Profile, Concepts of stretch, leverage & fit.</p> <p>Analytics: Five-stage model of analytical competition, Gartner Analytics Maturity Model. Cases and Applications in different sectors.</p>	(7+2)

III	<p>Strategic Planning: Portfolio Analysis: Business Portfolio Analysis - BCG Matrix – GE 9 Cell Model, Generic Competitive and Grand Strategies:</p> <p>Analytics: Market trends, competitor strategies, and emerging opportunities, Strategic Insights for Managers, Forecasting, Business Simulations, Uncertainty estimations, Use Cases involving Predictive tools and Applications in solving problems using Marketing, Finance, M & A, Operations and Supply chain analytics, Competitive advantage through data-driven decisions. Cases and Applications in different sectors</p>	(7+2)
IV	<p>Strategic Implementation and Evaluation:</p> <p>Structural, Functional Behavioural Implementation, Strategy, Mintzberg’s 5 Ps – Deliberate & Emergent Strategies , Mc Kinsey’s 7s Framework, Benchmarking, Six Sigma</p> <p>Analytics: Employee engagement and performance measurement, Case studies: Enhancing HR practices with analytics</p>	(7+2)
V	<p>Sustainability and Strategic Management: Balanced Score Card, Business Models, New Business Models for Internet economy (e-Commerce models, Cases and Applications in different sectors, Sustainability: Integration of social and environmental sustainability in strategic management and the concept of the triple bottom line. Case studies of startups and established firms to understand the role of innovation and sustainability in long-term strategic success, Ethical and legal issues in Big Data, Future trends: AI, machine learning, real-time analytics, Capstone discussion: building a data-driven strategy</p>	(7+2)
Total		45

Suggested Text Books:

1. Foster Provost and Tom Fawcett, Data Science for Business: What You Need to Know About Data Mining and Data-Analytic Thinking, O’Reilly Media, 2013.
2. Viktor Mayer-Schönberger and Kenneth Cukier, Big Data: A Revolution That Will Transform How We Live, Work, and Think, Houghton Mifflin Harcourt, 2013.
3. Ullman, J., & Rajaraman, A., Mining of Massive Datasets, Cambridge University Press, 2011.

Suggested Reference Books:

1. Seema Acharya and Subhasini Chellappan, Big Data and Analytics, Wiley India, 2015.
2. Thomas H. Davenport, Competing on Analytics: The New Science of Winning, Harvard Business Review Press, 2007

Suggested online link

1. https://onlinecourses.nptel.ac.in/noc25_cs131/preview
2. https://onlinecourses.nptel.ac.in/noc24_cs65/preview
3. <https://www.coursera.org/learn/big-data-introduction>
4. <https://www.coursera.org/courses?query=big+data+analytics>

Program	MBA (Business Analytics)			Semester:IV				
Course	Retail and e-Commerce Analytics			Course Code	MB25SEBA-407			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO407.1	REMEMBERING	Define key concepts and terminologies in retail and e-commerce analytics.
CO407.2	UNDERSTANDING	Explain the role and impact of analytics in retail and e-commerce decision- making.
CO407.3	APPLYING	Utilize analytical tools to interpret retail and e-commerce data for business insights.
CO407.4	EVALUATING	Assess the effectiveness of analytics-driven strategies in retail and e-commerce contexts.
CO407.5	CREATING	Develop innovative analytics solutions to address challenges in retail and e- commerce.

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Retail and E-Commerce Analytics: Evolution and significance of analytics in retail and e- commerce, Key performance indicators (KPIs) in retail and online businesses, Overview of retail formats and e- commerce business models (B2B, B2C, C2C), Role of analytics in customer acquisition, retention, and personalization, Case studies: Flipkart, Amazon India, Reliance Retail	(7+2)
II	Data Collection and Management: Types of data: transactional, customer, behavioral, supplier and sellers' data, and inventory data, Data sources: POS systems, CRM, web analytics, social media, Data warehousing and ETL processes, Data privacy, security, and ethical considerations in India, Tools: SQL, Google Analytics, CRM platforms	(7+2)
III	Analytical Tools and Techniques: Descriptive, predictive, and prescriptive analytics, Customer segmentation and RFM (Recency, Frequency, and Monetary value) analysis, Market basket analysis and recommendation systems, Pricing analytics and dynamic pricing strategies, Tools: Excel, Python (pandas, scikit-learn), R, Tableau	(7+2)
IV	Applications in Retail and E-Commerce: Inventory management and demand forecasting, Supply chain optimization using analytics, Personalization and customer journey mapping, Omni-channel analytics and integration, Case studies: Big Bazaar, Myntra, D-Mart	(7+2)
V	Emerging Trends and Strategic Implications: Artificial Intelligence and Machine Learning (AIML) in retail, Chatbots and virtual assistants in customer service, Augmented Reality (AR) and Virtual Reality (VR) in shopping experiences, Ethical AI and data governance, Future of retail: phygital experiences and sustainability	(7+2)
	Total	45

Suggested Text Books

1. Ecommerce Analytics: Analyze and Improve the Impact of Your Digital Strategy (FT Press Analytics) 1st Edition, Author: Judah Phillips, Publisher: FT Press
2. Retail Analytics: The Secret Weapon, Author: Emmett Cox, Publisher: Wiley

Suggested Reference Books

1. "Style & Statistics: The Art of Retail Analytics" Author: Brittany Bullard, Publisher: Wiley
2. "The New Science of Retailing", Authors: Marshall Fisher and Ananth Raman, Publisher: Harvard Business Press
3. Mastering Google Analytics 4 For Ecommerce Success: The Ultimate Guide to Measure Your Online Store, Author: Anton Koekemoer

Suggested Online link

1. Retail Analytics Explained – Simplilearn An overview of retail analytics concepts and applications. Link: <https://www.youtube.com/watch?v=XYZ123>
2. E-Commerce Analytics Tutorial – Analytics Vidhya
A tutorial on key metrics and tools in e-commerce analytics. Link: <https://www.youtube.com/watch?v=ABC456>
3. Data Analytics in Retail Industry – Great Learning Insights into how data analytics is transforming retail. Link: <https://www.youtube.com/watch?v=DEF789>

Program	MBA (Business Analytics)			Semester:IV				
Course	Generative AI for Business Applications			Course Code	MB25SEBA-408			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA	TH		
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 408.1	REMEMBERING	Define the core concepts, evolution, and components of Generative AI such as LLMs, GANs, and Transformers.
CO 408.2	UNDERSTANDING	Explain the application of Generative AI tools like ChatGPT, Midjourney, and DALL·E in diverse business domains such as sales, marketing, operations, and customer service.
CO 408.3	APPLYING	Apply Generative AI techniques for tasks like content generation, personalization, customer interaction, and data preparation in real-world business settings.
CO 408.4	ANALYSING	Analyze the impact of Generative AI on decision-making, productivity, and innovation in business functions such as HR, finance, and service delivery.
CO 408.5	EVALUATING	Evaluate ethical, legal, and strategic considerations while deploying Generative AI in organizations.
CO 408.6	CREATING	Design AI-enabled solutions and strategies that align with organizational goals and foster an AI-ready culture.

Course Contents

Unit	Description	Duration [Hrs]
I	Fundamentals of Generative AI in Business - Define Generative AI, Evolution of AI: From Rule-Based Systems to Generative Models , Key Concepts: Large Language Models (LLMs), Agentic workflows and protocols like MCP, A2A, Generative Adversarial Networks (GANs), Transformers, Generative AI vs. Predictive AI, Common Tools in the Industry: ChatGPT, DALL·E, Midjourney, Claude, , Open-source Platforms (Hugging Face, LangChain), Stable diffusion too, Real-world Business Use Cases: Retail, Banking, Healthcare, Education.	(7+2)
II	Generative AI in Sales and Marketing - AI-Driven Content Generation: Marketing Campaigns, Blog Posts, Social Media Captions, Email Writing, Personalization and Engagement: AI for Product Recommendations, Dynamic Pricing, Customer Journey Mapping, Virtual Assistants and AI Chatbots: AI in Pre-Sales and Customer Support, Conversational AI and NLP, Multimodal Multi-turn models, Planning and execution AI agents, Business Cases from E-Commerce and Financial Services	(7+2)
III	Generative AI in Product and Service Innovation -AI in Product Design: Generating Ideas, Creating Digital Prototypes, User Testing, AI in Market Research: Competitor Insights, Customer Trends, AI in report generation, AI for Superior Service: Automated Customer Support, Sentiment Detection, Feedback Systems, AI for “Retrieval augmented generation”, Use Cases: Telecom, Travel, and Hospitality, Embedding AI into Service Workflows	(7+2)
IV	Generative AI in Business Analytics and Decision-Making -AI for Data Preparation: Synthetic Data Generation, Cleaning, and Preprocessing, Enhancing Business Intelligence: Automated Dashboards, Report Writing, Scenario Planning, AI in Decision Support: Strategic	(7+2)

	Insights for Managers, Forecasting, Business Simulations, Uncertainty estimations, Use Cases in HR, Finance, and Operations..	
V	Ethics, Risk, and Strategy in Generative AI - Ethical Concerns: AI Bias, Fake Content, Copyright Issues, Regulatory and Legal Aspects: GDPR, HIPAA, CCPA – Implications for Business, Responsible Use of AI in Business, Aligning AI with Business Goals, Explainability techniques like SHAP and LIME Preparing for the AI-Driven Workplace, Building an AI-Ready Culture and Workforce	(7+2)
	Total	45

Suggested Textbooks

1. Marr, B. (2024). Generative AI in practice: 100+ amazing ways it is changing business and society. Wiley.
2. Cronin, I. (2024). Understanding generative AI business applications. Apress.
3. Kurniawan, T. (2023). AI for marketing and product innovation: Powerful new tools for predicting trends, connecting with customers, and closing sales. Wiley.
4. Bhatnagar, R. (2024). Artificial Intelligence and Generative AI for Business Applications. McGraw-Hill Education India.
5. Jain, V., & Sharma, P. (2023). Generative AI and Business Applications. BPB Publications.

Suggested Reference Books

1. The book Artificial Intelligence: A Modern Approach by Stuart J. Russell and Peter Norvig, 4th Edition (2020), Prentice Hall/Pearson
2. Generative AI: How ChatGPT and Other AI Tools Will Revolutionize Business by Tom Taulli, 1st Edition (2023), Apress
3. Generative AI: Current Trends and Applications, edited by Khalid Raza, Naeem Ahmad, and Deepak Singh, 1st Edition (2024), Springer Singapore

Suggested Online Link

1. <https://www.coursera.org/learn/generative-ai-introduction-and-applications>
2. <https://www.coursera.org/learn/building-gen-ai-powered-applications>
3. https://swavam.gov.in/nc_details/NPTEL
4. <https://www.upgrad.com/generative-ai-for-business-leaders-iiit-bangalore/>

Program	MBA (Business Analytics)			Semester:IV				
Course	Predictive Analytics and Machine learning using Python			Course Code	MB25SEBA-409			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA			
3	2	1	1	-	-	50	50	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 409.1	REMEMBERING	Recall key concepts, types, and terminologies of predictive analytics and machine learning.
CO 409.2	UNDERSTANDING	Explain the working of various supervised and unsupervised ML algorithms.
CO 409.3	APPLYING	Implement predictive models using Python on structured datasets.
CO 409.4	ANALYSING	Analyze and evaluate the performance of different ML models.
CO 409.5	EVALUATING	Compare multiple models and select the most appropriate algorithm for a given problem.
CO 409.6	CREATING	Design and develop a predictive model pipeline using Python libraries and tools.

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Predictive Analytics and Python Basics Introduction to Predictive Analytics and its Applications in Business, Types of Predictive Models (Regression, Classification, Time Series, Clustering), Python Basics for Data Science: Lists, Dictionaries, Functions, Loops, Introduction to Jupiter Notebook and Anaconda, Libraries: NumPy, Pandas, Matplotlib, Seaborn, Exploratory Data Analysis (EDA) using Pandas and Visualization Libraries	(7+2)
II	Data Preprocessing and Feature Engineering Understanding Data Types and Handling Missing Values, Data Cleaning Techniques, Encoding Categorical Variables (Label Encoding, One-Hot Encoding), Feature Scaling: Standardization and Normalization, Feature Selection Techniques (Correlation, Chi-Square)	(7+2)
III	Supervised Machine Learning Techniques Regression Models: Linear Regression, Multiple Linear Regression, Ridge & Lasso Regression, Classification Models: Logistic Regression, K-Nearest Neighbours (KNN), Decision Trees, Random Forest, SVM, Model Evaluation Metrics: RMSE, R ² , Accuracy, Precision, Recall, F1-Score, ROC-AUC, Hyperparameter Tuning using Grid Search CV and Randomized Search CV, Train-Test Split and Cross-Validation	(7+2)
IV	Unsupervised Learning and Clustering Introduction to Unsupervised Learning, Clustering Techniques: K-Means, Hierarchical Clustering, DBSCAN, Evaluation of Clustering Models: Elbow Method, Dimensionality Reduction: Principal Component Analysis (PCA), Use Cases: Customer Segmentation, Market Basket Analysis	(7+2)
V	End-to-End ML Project Development & Ethical Considerations Designing a Machine Learning Workflow, Model Deployment Introduction: Using Pickle, Case Study: End-to-End Business Problem Solving using ML, Introduction to Responsible AI and Bias in Machine Learning, Privacy and Ethical Implications of Predictive Analytics	(7+2)
	Total	45

Note:

1. The course should be delivered from as skills building perspective.
2. Principles should be supplemented by live exercises on personal selling

Suggested Text Books:

1. Machine Learning using Python - Manaranjan Pradhan, U Dinesh Kumar
2. Ultimate Step by Step Guide to Machine Language using Python: Predictive modelling concepts explained in simple terms for beginners by Daneyal Anis
3. Machine Learning by Anuradha Srinivasaraghavan and Vincy Joseph
4. Machine Learning in Python – Michael Bowles
6. Machine Learning for Absolute Beginners: A Plain English Introduction (First Edition by Oliver Theobald)

Suggested Reference Books

1. Python Machine Learning, Sebastian Raschka
2. Introduction to Machine Learning with Python, Andreas Müller & Sarah Guido
3. Machine Learning: A Probabilistic Perspective , Kevin P. Murphy
4. Python for Data Analysis by Wes McKinney
5. Machine Learning by Peter Flach
6. Machine Learning: A step-by-Step Guide to Learning and Understanding from Beginner to Expert (Beginner, Intermediate and Advanced) – Ronald Anthony

Suggested Online Link

1. https://onlinecourses.nptel.ac.in/noc22_cs32/preview
2. <https://onlinecourses.swayam2.ac.in/>
3. <https://www.coursera.org/learn/machine-learning-with-python>
4. <https://www.coursera.org/learn/python-machine-learning>

Program	MBA (Business Analytics)			Semester: IV				
Course	Business Applications of Blockchain Technologies			Course Code	MB25SEBA-410			
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Tutorial	Practical	FA		SA	PR	Total
				UT	CA			
3	2	1	1	25	25	50	-	100

Course Outcomes:

After learning the course, the students should be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 410.1	REMEMBERING	Memorizing the principles of blockchain technology
CO 410.2	UNDERSTANDING	Understanding basic blockchain functionalities using development tools or platforms
CO 410.3	APPLYING	Analyze the scalability and sustainability challenges associated with different blockchain implementations
CO 410.4	ANALYSING	Articulate the ethical considerations surrounding blockchain technology and its applications
CO 410.5	EVALUATING	Designing novel business models that leverage blockchain technology for competitive advantage.

Course Contents

Unit	Description	Duration [Hrs]
I	Introduction to Block Chain, Block Chain Applications in management Introduction to Block Chain, Blockchain – fundamentals, evolution-history, uses, application areas, Block Chain: The Indian Imperative (Introduction to Cryptographic Algorithms, Public-Private key, Digital Signature, Digital Certificates, Hashing), Blockchain components and applications, Blocks, transactions, distributed ledger, Mining, Block Chain in E- Governance, Block Chain Currency (Cryptocurrency), Introduction to Blockchain Pillars, Block Chain: The Indian Imperative	(7+2)
II	Bitcoin Blockchain Introduction to Bitcoin, Bitcoin Wallets, Bitcoin Block, Bitcoin Transaction, Bitcoin Scripts, Bitcoin Attacks, Bitcoin Network, Bitcoin Mining	(7+2)
III	Ethereum Blockchain Introduction to Ethereum, Swarm and whisper, Remix IDE, Truffle Framework, Ethereum Networks, Ethereum Wallets, Ethereum Clients, Web3.js, NFT	(7+2)
IV	Enterprises Blockchain Enterprise Blockchain, Hyperledger, Hyperledger Sawtooth, Hyperledger Iroha, Hyperledger Indy, Hyperledger Burrows, Hyperledger Fabric, Hyperledger Fabric Transaction, Fabric Network, Fabric Network Types, Fabric Explorer, Node Js, R3 Corda, Corda Network	(7+2)
V	Multichain Introduction to Multichain, Multichain Installation, Create a Multichain Instance, Multichain Assets, Multichain Streams, Multichain Consensus, Multichain API	(7+2)
	Total	45

Suggested Text Book:

1. Mastering Blockchain: Inner workings of blockchain, from cryptography and decentralized identities, to DeFi, NFTs and Web3, 4th Edition
2. Blockchain and the Supply Chain: Concepts, Strategies and Practical Applications
3. Blockchain Principles and Applications in IoT Rajdeep Chakraborty, Anupam Ghosh, Valentina Emilia Balas and Ahmed A. Elnga
4. Blockchain Technology: Exploring Opportunities, Challenges, and Applications Sonali Vyas, Vinod Kumar Shukla, Shaurya Gupta, Ajay Prasad

Suggested Reference Book

1. Blockchain Basics: A Non-Technical Introduction in 25 Steps by Daniel Drescher, 1st Edition (2017), published by Apress
2. Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World by Don Tapscott & Alex Tapscott, 1st Edition (2016), Portfolio (Penguin)
3. Mastering Bitcoin: Programming the Open Blockchain by Andreas M. Antonopoulos, 2nd Edition (2017), published by O'Reilly Media,

Suggested Online Link

1. https://onlinecourses.nptel.ac.in/noc20_cs01/preview
2. https://onlinecourses.nptel.ac.in/noc24_cs15/preview
3. https://onlinecourses.nptel.ac.in/noc19_cs63/preview
4. <https://www.coursera.org/learn/introduction-blockchain-technologies>

