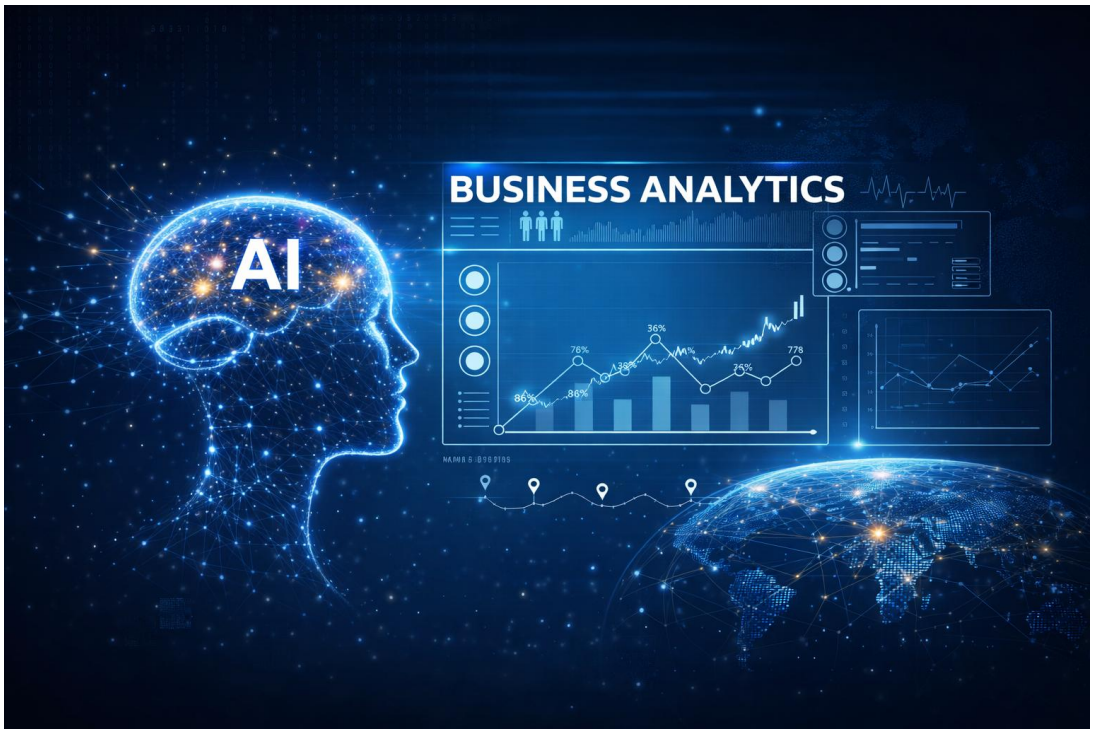
Curriculum & Contents

M.S.

(Artificial Intelligence and Business Analytics)



Department of Management Studies

विश्वजीवनामृतं ज्ञानम्

ABV Indian Institute Of Information Technology And Management

Department Of Management Studies

ABV - Indian Institute of Information Technology & Management, Gwalior

Course Schema

First Year

Semester-I

S.No.	Course code	Title of the course	L-T-P	Credits
1.	MS511	Fundamentals of Economics	3-0-0	3
2.	MS512	Business Statistics using R	2-0-2	3
3.	MS513	Principles and Practices of Management	3-0-0	3
4.	MS514	IoT and Big Data Management	2-0-2	3
5.	MS515	Financial Accounting	3-0-0	3
6.	MS516	Mathematical and Programming Foundations	1-0-2	2
7.	MS517	Organizational Behaviour	3-0-0	3
			Total	**20**

Semester-II

S.No.	Course code	Title of the course	L-T-P	Credits
1.	MS521	Business Research Methods	3-0-0	3
2.	MS522	Artificial Intelligence and Machine Learning	2-0-2	3
3.	MS523	Operations and Business Intelligence	2-0-2	3
4.	MS524	Financial Engineering and Management	3-0-0	3
5.	MS525	Marketing Management	3-0-0	3
6.	MS526	Data Mining and Data Warehousing	2-0-2	3
7.	MS5XX	Elective-I	3-0-0/ 2-0-2	3
8.	MSA03	Seminar on Contemporary Business*	0-0-2	0
			Total	**21**

Compulsory Audit course

****Summer Project/Internship (credits: 4)***

EXIT AFTER YEAR-1: Post Graduate Diploma in Artificial Intelligence and Business Analytics

Second Year

Semester-III

S.No.	Course code	Title of the course	L-T-P	Credits
1.	MS531	Business Process Management	3-0-0	3
2.	MS532	Strategy and Game Theory for Management	2-0-2	3
3.	MS533	Design Thinking and Sustainable Innovation	3-0-0	3
4.	MS534	Applied Deep Learning	2-0-2	3
5.	MS535	Business Ethics and Sustainability	3-0-0	3
5.	MS5XX	Elective-II	3-0-0/ 2-0-2	3
6.	MS5XX	Major Project – I	0-0-6	3
7.	MS5XX	Summer Training Evaluation	0-0-8	4
			Total	**21+4**

Semester-IV

S.No.	Course code	Title of the course	L-T-P	Credits
1.	MS5XX	Elective- III/MOOC*	3-0-0/ 2-0-2	3
2.	MS5XX	Elective- IV/ MOOC*	3-0-0/ 2-0-2	3
3.	MS5XX	Elective-V/ MOOC*	3-0-0/ 2-0-2	3
4.	MS5XX	Major Project - II	0-0-24	12
			Total	**21**

*** Only those students who are proceeding for the internship may take MOOCs in the final semester.**

List of Tentative Elective Courses	
1.	Supply Chain Analytics
2.	Smart Manufacturing
3.	AI for Product and Brand Management
4.	Financial Time Series and Forecasting
5.	Technology Analytics
6.	AI for Public Policy and Smart Governance
7.	Health Analytics
8.	Financial Risk Analytics
9.	Financial Decision Modelling and Optimisation
10.	Quantitative Asset Management and Fixed Income Engineering
11.	Talent Analytics
12.	Performance Management Analytics
13.	Digital Entrepreneurship
14.	Business Intelligence for Decision Modelling
15.	Data Visualization and Storytelling
16.	Consumer Analytics
17.	Human Resource Management

The list of elective courses will be expanded and updated in future as per the needs of the course.

Course Schema for MS Programme (AI and BA)

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS511
4	**Title of the subject**	Fundamentals of Economics
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	To introduce students to fundamental economic concepts relevant to managerial decision-making and understand market structures and macroeconomic environment affecting businesses.
8	**Brief Contents**	Introduction to Economics – Nature and scope of economics, micro vs macroeconomics, role of economics in managerial decision making. Demand and Consumer Behaviour – Law of demand, determinants of demand, elasticity of demand, consumer equilibrium, demand forecasting. Production and Cost Analysis – Production function, law of variable proportions, returns to scale, cost concepts, cost curves. Market Structure and Pricing – Perfect competition, monopoly, monopolistic competition, oligopoly, pricing strategies. Macroeconomic Environment – National income, inflation, business cycles, fiscal and monetary policy and business environment, Emerging topics in Economics.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Dominick Salvatore (2015). Managerial economics in a global economy. OUP Catalogue. 2. Mankiw N. Gregory (2009). Principles of Economics/N. Gregory Mankiw. Mason: South–Western Cengage learning, 2009.–856 p. 3. Paul Samuelson & William Nordhaus (2009). Economics. McGraw Hill. 4. H. Craig Petersen & W. Cris Lewis (1994). Managerial economics. Macmillan Publishing Company.

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS512
4	**Title of the subject**	Business Statistics using R
5	**Any prerequisite**	Basic knowledge of Mathematics and Statistics
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• To understand the role of statistics in the field of business intelligence. • To understand the process associated with statistical decisions, defining and formulating problems, analyzing the data, and using the results in decision making.
8	**Brief Contents**	Introduction to Statistics, Introduction to Statistical Computing (R and RStudio), Data Preparation and Management, Data Visualization, Charts and Graphs, Measures of central tendency, Measures of dispersion, Probability, Discrete probability distribution, Continuous probability distribution Sampling and sampling distributions, Statistical inference: Estimation for single populations, Statistical inference: Hypothesis testing for single population, Statistical inference: Hypothesis testing for two populations, Analysis of variance and Experimental designs, Hypothesis testing for categorical data (chi-square test), Simple linear regression analysis , Multiple regression analysis, Time series and Index numbers, Statistical quality control, Non-parametric statistics, Statistical decision theory, Emerging topics in Business Statistics
9	**Contents for lab**	Application of appropriate statistical software, Application of R and RStudio for data management, statistical analysis, and data visualization.
10	**Books/Suggested Readings**	1. Bajpai, Naval (2021). Business Statistics (3rd ed.). Pearson Education India. 2. Field, A., Miles, J., & Field, Z. (2012). Discovering Statistics Using R. Sage Publications. 3. Schumacker, R. E. (2014). Learning Statistics Using R. SAGE Publications.

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS513
4	**Title of the subject**	Principles and Practices of Management
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To acquaint students with the terms, concepts, and points of view used in management and its historical evolution, ethics, social responsibility and environmental issues. • Provide students with a working knowledge of the skills and functions necessary to be an effective, efficient manager. • Provide an introduction to the theory and practice of managing organizations. • Examine the management functions (planning, organizing, leading or influencing, and controlling) and the impact of those functions on the business organization.
8	**Brief Contents**	Definition, nature, purpose and scope of management, Skills and roles of a Manager, functions, principles; Evolution of Management Thought, Scientific Management, Types of plans, planning process, Characteristics of planning, Traditional objective setting, Strategic Management, premising and forecasting, Process, Simon's model of decision making, creative problem solving, group decision making, Management by exception; Styles of management: (American, Japanese and Indian), McKinsey's 7-S Approach, Self-Management Organizational design and structure, Coordination, differentiation and integration, Span of management, centralization and de-centralization Delegation, Authority & power - concept & distinction, Line and staff organizations, Human Resource Management and Selection, Performance appraisal and Career strategy, Coordination- Concepts, issues and techniques, Resistance to Change, Behavioral Reactions to Change, Approaches or Models to Managing Organizational Change, Human Factors and Motivation, Leadership, Communication, Teams and Team Work, Planning-control relationship, process of control, Types of Control, Control Techniques, Emerging topics in practices of management.
9	**Content for lab**	No
10	**Books/Suggested Readings**	1. Singh, C., & Khatri, A. (2024). Principles and practices of management and organizational behavior. Taylor & Francis. 2. Prasad, L. (2020). Principles and practice of management. Sultan Chand & Sons.

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS514
4	**Title of the subject**	IoT and Big Data Management
5	**Any prerequisite**	Fundamentals of Computer/ Computer organization
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• To understand the deployment of smart applications on different IoT platforms. • Understand the impact of big data for business decisions and strategy. • Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data
8	**Brief Contents**	Introduction to IoT, AI in IoT Applications, Sensing, Actuation, Basics of networking, M2M and IoT technology fundamentals-devices and gateways, Data management, Business processes in IoT, Everything as a Service (XaaS), Role of Cloud in IoT, Security aspects in IoT, Components selection criterion for implementing IoT application, Hardware components computing (Node MCU, Raspberry Pi), Communication, Sensing, Actuation, I/O interfaces, Software components- programming API's (using Python/Node.js/Arduino), Sensors interfacing: Interfacing of temperature, Humidity, Light, Accelerometer, Ultrasonic, IR/PIR, Camera etc, Communication and I/O components, Interfacing: bluetooth, WiFi, GSM, Displays and touch sensor etc., Introduction to Big Data, Big Data Analytics, Relational Databases & SQL, Data Cleansing and Preparation, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, analyzing data with Hadoop, Hadoop Streaming, IBM Big Data Strategy, Infosphere Big Insights and Big Sheets, HDFS (Hadoop Distributed File System): The Design of HDFS, HDFS concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data ingest with Flume and Scoop and Hadoop archives, NoSQL, Types of NoSQL database, Advantages, New SQL, Comparison of SQL, NoSQL and NewSQL., MapReduce, Hadoop YARN, HBase, Apache Spark, Hive, Pig, Emerging topics in Big Data Management.
9	**Contents for lab**	Install, configuration, and run python, numPy and Pandas, Hadoop and HDFS, visualize data using Python, NoSQL Database Operations, and MapReduce
10	**Books/Suggested Readings**	1. Misra, S., Mukherjee, A., Roy, A. (2021). Introduction to IoT. India: Cambridge University Press. 2. Kamal, R., & Saxena, P. (2019). Big data analytics: Introduction to hadoop, spark, and machine-learning. McGraw-Hill Education. 3. Dasgupta, N. (2018). Practical Big Data Analytics: Hands-on Techniques to Implement Enterprise Analytics and Machine Learning Using Hadoop, Spark, NoSQL and R. Germany: Packt Publishing.

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS515
4	**Title of the subject**	Financial Accounting
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Understand the basic principles and concepts of financial accounting. • Explain the role of accounting information in business decision-making. • Record financial transactions using appropriate accounting procedures. • Classify and summarize accounting data through the accounting cycle. • Prepare financial statements such as the income statement and balance sheet. • Interpret financial statements for managerial and stakeholder decision-making.
8	**Brief Contents**	Introduction to financial accounting: nature, scope and importance of accounting in business organizations, accounting principles, concepts and conventions, Generally Accepted Accounting Principles (GAAP), IFRS and accounting environment. Accounting process and recording of transactions, journal, ledger and trial balance. Preparation of financial statements including profit and loss account, balance sheet and cash flow statement. Depreciation accounting and inventory valuation methods. Financial statement analysis including horizontal analysis, vertical analysis, ratio analysis and trend analysis. Introduction to cost accounting concepts, types of costs and preparation of cost sheet. Basic concepts of budgeting and budgetary control including preparation of sales budget, production budget and cash budget, Emerging topics in Financial Accounting.
9	**Contents for Lab**	No
10	**Books/Suggested Readings**	1. Harrison, W., Harrison, W. T., Suwardy, T., Tietz, W. M., Thomas, C. W., Horngren, C. T. (2023). Financial Accounting: International Financial Reporting Standards. United Kingdom: Pearson. 2. Horngren, C. T., Sundem, G., Elliott, J. (2014). Introduction to Financial Accounting. United Kingdom: Pearson. 3. MilleNobles, T. L., Mattison, B., Matsumura, E. M. (2018). Horngren's Accounting: The Financial Chapters. United States: Pearson. 4. Weygandt, J. J., Kieso, D. E., Kimmel, P. D. (2009). Financi al Accounting. United Kingdom: Wiley. 5. Hanif, M., Mukherjee, A.. Financial Accounting. India: McGraw Hill Education (India) Private Limited. 6. Financial Accounting, 8th Edition.: Vikas Publishing House.

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS516
4	**Title of the subject**	Mathematical and Programming Foundations
5	**Any prerequisite**	Fundamentals of mathematics and introductory programming concepts.
6	**L-T-P**	1-0-2
7	**Learning Objectives of the subject**	This course provides the essential mathematical background and programming skills required for Artificial Intelligence and Business Intelligence applications. It introduces fundamental concepts in linear algebra, calculus, and probability along with practical programming skills in Python and R for data analysis, visualization, and basic AI implementation.
8	**Brief Contents**	Linear Algebra Foundations,Calculus and Optimization, Probability Theory and Statistical Distributions, Programming Foundations with Python: Introduction to Python programming, variables and data types, operators and control structures, functions and modules, python libraries such as NumPy, Pandas, Matplotlib and Seaborn, basic data preprocessing and exploratory data analysis.Programming Foundations with R: Introduction to R programming environment, R data structures (vectors, matrices, lists, and data frames), data import and data manipulation, data visualization, statistical analysis in R, basic data analytics workflows for business intelligence.
9	**Contents for lab**	The lab sessions will provide practical exposure to Python and R programming for data analysis, visualization, and basic statistical computation. Students will implement mathematical concepts, perform data preprocessing, and analyze datasets relevant to AI and Business Intelligence applications.
10	**Books/Suggested Readings**	1. Deisenroth, M. P., Faisal, A. A., Ong, C. S. (2020). Mathematics for Machine Learning. India: Cambridge University Press. 2. Pradhan, M., & Dinesh Kumar, U. (2019). Machine learning using Python (1st ed.). Wiley. 3. Nwanganga, F., Chapple, M. (2020). Practical Machine Learning in R. United States: John Wiley & Sons.

1	**Semester**	I
2	**Type of course**	Core
3	**Code of the subject**	MS517
4	**Title of the subject**	Organizational Behavior
5	**Any prerequisite**	General Understanding of Management Functioning
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	To provide a comprehensive analysis of individual and group behaviour in the organizations. To provide an understanding of how organizations can be managed more effectively and at the same time enhancing the quality of employees work life.
8	**Brief Contents**	What is organizational behaviour? OB as an interdisciplinary subject, The Individual: Diversity in the organizations, attitudes and job satisfaction, emotions and moods, personality and values, perception and individual decision making, motivation concepts, motivation: from concepts to applications The Group: Foundations of group behaviour, understanding work teams, communication, leadership, power and politics, conflict and negotiations, foundations of organization structure, The Organization system Organizational culture, human resource policies and practices, organizational change and stress management, Emerging topics in organizational behaviour.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Organizational Behaviour by Pearson 18e. Pearson Education India. 2. Newstrom, J. W., Davis, K. (2002). Organizational Behavior: Human Behavior at Work. United Kingdom: McGraw-Hill/Irwin. 3. Mills, A. J., Helms Mills, J. C., Forshaw, C., Bratton, J. (2006). Organizational Behaviour in a Global Context. United States: University of Toronto Press.

1	**Semester**	II
2	**Type of course**	Core
3	**Code of the subject**	MS521
4	**Title of the subject**	Business Research Methods
5	**Any prerequisite**	Basic knowledge of Business Statistics
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To design and execute a basic survey research project. • To understand the research tools and techniques for executing a business project and decision making.
8	**Brief Contents**	Introduction to business research: Business research methods: An introduction, business research process design, Research design formulation: Measurement and scaling, questionnaire design, sampling and sampling distributions, Sources and collection of data: Secondary data sources, data collection: survey and observations, experimentation, fieldwork and data preparation, Data analysis and presentation: Statistical inference: hypothesis testing for single population, hypothesis testing for two populations, analysis of variance and experimental designs, hypothesis testing for categorical data (chi-square test), non-parametric statistics, Correlation and simple linear regression analysis, Multivariate analyses (Multiple regression analysis, discriminant analysis, conjoint analysis, factor analysis, cluster analysis, multidimensional scaling, correspondence analysis), Result presentation: Presentation of results, report writing, Emerging topics in business research methods.
9	**Contents for lab**	Data analysis and presentation: Statistical inference: hypothesis testing for single population, hypothesis testing for two populations, analysis of variance and experimental designs, hypothesis testing for categorical data (chi-square test), non-parametric statistics, Correlation and simple linear regression analysis, Multivariate analyses (Multiple regression analysis, discriminant analysis, conjoint analysis, factor analysis, cluster analysis, multidimensional scaling, correspondence analysis)
10	**Books/Suggested Readings**	1. Bajpai, Naval (2017). Business Research Methods (2nd ed.). Pearson Education India. 2. Cooper, D. R., & Schindler, P. S. (2014). Business Research Methods (12th ed.). McGraw-Hill Education. 3. Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). Business Research Methods (9th ed.). Cengage Learning. 4. Kothari, C. R., & Garg, G. (2019). Research Methodology: Methods and Techniques (4th ed.). New Age International.

1	**Semester**	II
2	**Type of course**	Core
3	**Code of the subject**	MS522
4	**Title of the subject**	Artificial Intelligence and Machine Learning
5	**Any prerequisite**	Statistics, linear algebra, matrix, probability, programming languages and data modelling.
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	Upon course completion, students will be able to: Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. Implement basic algorithms using basic machine learning libraries mostly in python/R. Gain hands-on experience in applying ML to problems encountered in various domains.
8	**Brief Contents**	Introduction to AI, Definitions, Historical foundations, Basic elements of AI, Characteristics of intelligent algorithm, AI application areas, Neural network representation, Neural networks as a paradigm for parallel processing, Linear discrimination, Gradient descent, Logistic discrimination, Perceptron, Training a perceptron, Multilayer perceptron, Back propagation algorithm, Recurrent networks, Need of machine learning, Types of machine learning, Supervised learning: k-nearest neighbours, Linear regression, Logistic regression, Classification, Support vector machines, Neural networks, Unsupervised learning: clustering (k-means, hierarchical, EM), Auto-encoders, Dimensionality reduction, Association rule mining, RFM analaysis, Learning by agents, Intelligent agent, Online learning, Batch learning, Markov Decision Processes, Temporal difference learning, Dynamic programming, Hyperparameters, Introduction to Deep learning, Applications in various business domains, Emerging topics in AI and machine learning
9	**Contents for lab**	Hands-on implementation of AI and machine learning algorithms using Python, including data preprocessing, model training, evaluation, and visualization using libraries such as NumPy, Pandas, Scikit-learn, and TensorFlow/Keras.
10	**Books/Suggested Readings**	1. Russell, S., & Norvig, P. (2021). Artificial intelligence: A modern approach (4th ed.). Pearson Education. 2. Pradhan, M., & Dinesh Kumar, U. (2019). Machine learning using Python (1st ed.). Wiley. 3. Rose, D. (2020). Artificial Intelligence for Business, 2nd Edition. United States: Pearson FT Press.

1	**Semester**	II
2	**Type of course**	Core
3	**Code of the subject**	MS523
4	**Title of the subject**	Operations and Business Intelligence
5	**Any prerequisite**	-
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• Understand the critical nature of operations management in transforming raw material into products and services valued by end customers. • Understand the critical nature of operations along supply chain and role of facility location related decisions. • Perform process analysis and product and process layout related decisions. • Understand role of inventory and associated inventory models. • Understand materials and manufacturing requirement planning and scheduling. • Understand waiting line models and their role in service delivery. • Understand concepts of quality. • Understand elements of supply chain management
8	**Brief Contents**	Nature, evolution and scope of production and operations management. emerging trends in operations management, linkage with competitive strategy and formulation of operations strategy. Globalization of operations, factors affecting location decisions, location planning methods, linkage with supply chain network design decisions. Design of production process and facility layout, process design and analysis. just-in-time, lean operations and Toyota production system, theory of constraints Design of products and services: Process of product and service design, tools. Deterministic models, probabilistic models: multi-period and single period (News vendor) models, Selective Inventory Models. aggregate production planning, master production schedule, materials and manufacturing requirements planning. Quality management, statistical process control, process capability and six sigma, Emerging topics in operations management
9	**Contents for lab**	Simulation related software
10	**Books/Suggested Readings**	1. Jacobs, F. R., & Chase, R. B. (2018). Operations and supply chain management, 15th ed. Boston, MA: McGraw-Hill Education. 2. Mahadevan, B. (2015), Operations management: theory and practice, 3rd ed. New Delhi: Pearson Education. 3. Krajewski, L.J, Malhotra, M. K. & Ritzman, L. P. (2016). Operations management: processes and supply chains, 11th ed. Essex: Pearson Education. 4. Russel, R.S. & Taylor, B.W. (2015). Operations and supply chain management, 8th ed. New Jersey: John Wiley & Sons

1	**Semester**	II
2	**Type of course**	Core
3	**Code of the subject**	MS524
4	**Title of the subject**	Financial Engineering and Management
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To develop an understanding of financial engineering and financial management concepts. • To explain how corporations make investment and financing decisions under dynamic risk conditions. • To build knowledge of financial engineering tools and techniques to apply risk mitigation strategies in financial decision-making.
8	**Brief Contents**	Changing Financial arena and associated risks, Financial engineering as a response to increased risks, Types of Risks and Risk management, Financial markets, Financial institutions, Financial services, Financial instruments., Financial Management: Nature, Scope, and Objectives of financial management, Time value of money, Risk and return, Capital Structure and Cost of Capital: Capital structure theories and leverage, Optimum capital structure, Measurement of specific costs, Computation of overall cost of capital, Financing Decision: Long-term financing, Short-term financing, Term financing, Venture capital. Capital Budgeting: Principles, Techniques, Measurement, evaluation, and involved risk analysis, Working Capital Management: Planning of working capital, Working capital financing, Cash management, Receivable management and Inventory management. Dividend Policy Decision: Dividend and valuation, Determinants of dividend policy, The Futures Markets, Static and dynamic hedging, Devising a Hedging Strategy Using Futures, Stock Index Futures, Value at Risk (VaR), Short Term and Long Term Interest Rate Futures, Foreign Currency Futures and Commodity Futures, Options Markets; Properties of Stock Option Prices; Option Pricing Models - Binomial Model, Black-Scholes Model; Single Period Options - Calls and Puts, Option Strategies, Multi-Period Options – Caps, Floors, Collars, Captions, Swaptions and Compound options, Cross-currency Futures and Options, Structure of a Swap, Interest Rate Swaps, Currency of Swaps, Commodity Swaps, Other Swaps, Credit Risk and Credit Derivatives, Credit default swaps, Role of a Swap Dealer. Basics of FRAs, Emerging Innovations and recent trends.
9	**Contents for Lab**	No
10	**Books/Suggested Readings**	1. Van Horne, J. C., & Wachowicz, J. M. (2009). Fundamentals of Financial Management (13th ed.). Pearson Education. 2. Gitman, L. J., & Zutter, C. J. (2015). Principles of Managerial Finance (15th ed.). Pearson Education. 3. Pandey, I. M. (2025). Financial Management (13th ed.). Pearson Education India. 4. Chandra, P. (2023). Financial Management: Theory and Practice (11th ed.). McGraw-Hill Education India. 5. Khan, M. Y., & Jain, P. K. (2025). Financial Management: Text, Problems and Cases (8th ed.). McGraw-Hill Education India.

1	**Semester**	II
2	**Type of course**	Core
3	**Code of the subject**	MS525
4	**Title of the subject**	Marketing Management
5	**Any prerequisite**	Basic understanding of microeconomics
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To understand the fundamental marketing concepts and the processes that influences the market orientation of a firm. • To understand the role of marketing within the organization. • To recognize the importance of marketing in the competitive world. • To analyze critically the marketing process and its relationship with the environment within which it operates. • To broadly look at the role of Marketing as a key element within an organization's strategy.
8	**Brief Contents**	Introduction to Marketing- Definition of marketing, Marketing environment, Business models and value chain, Segmentation and targeting- Concept of segmentation, Bases of segmentation (B2C & B2B), Targeting, Application in real life scenario, Positioning and differentiation- Differentiation parameters, POP& POD, Competition, Consumer Behavior- Consumer decision making process, factors influencing consumer behavior, B2B Marketing- Organizational decision making process, buying roles, Marketing strategy (product, service and pricing decisions)- Product strategy, branding, service, pricing strategy, Marketing strategy (place decisions)- Channels of distribution, Distribution strategy, Marketing strategy (promotion decisions)- Integrated marketing communication, Emerging topics in marketing- Predictive, contextual, augmented and agile marketing.
9	**Contents for lab**	Simulation on marketing environment, Case study exercises, Class projects and exercises, Field projects and company visits
10	**Books/Suggested Readings**	1. Kotler, P., & Keller, K. L. (2012). Marketing management. 2. Kotler, P., & Keller, K. L. (2015). Marketing Management, Global Edition.

1	**Semester**	II
2	**Type of Course**	Core
3	**Code of Subject**	MS526
4	**Title of the course**	Data Mining and Data Warehousing
5	**Any Prerequisite**	Data Base Management
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• To introduce the fundamental concepts and architecture of data warehousing systems. • To develop an understanding of data mining techniques and their applications in decision-making. • To enable students to apply various data mining algorithms for classification, clustering, and association analysis. • To familiarize students with data preprocessing, data integration, and data transformation techniques. • To provide hands-on experience with data mining tools and real-world datasets.
8	**Brief Contents**	Introduction to Data Warehousing: Concepts of data warehousing, characteristics, architecture, OLTP vs OLAP, data warehouse schemas (star, snowflake, fact constellation). Data Warehouse Design and Implementation: Data extraction, transformation and loading (ETL), metadata, data marts, data warehouse architecture and implementation issues. Data Preprocessing: Data cleaning, data integration, data transformation, data reduction, and data discretization techniques. Introduction to Data Mining: Concepts, tasks, and applications of data mining; knowledge discovery in databases (KDD) process. Data Mining Techniques: Association rule mining (Apriori algorithm), classification methods (decision trees, naïve Bayes), clustering techniques (k-means, hierarchical clustering). Emerging Topics in Data Mining: Outlier analysis, text and web mining, data mining applications in business, healthcare, and social sciences.
9	**Lab Requirement**	• Data preprocessing using data mining tools (e.g., WEKA / Python / R). • Implementation of association rule mining algorithms. • Classification using decision trees and Naïve Bayes. • Clustering using k-means algorithm. • Case study-based data mining on real-world datasets.
10	**Books/Suggested Readings**	1. Han, J., Kamber, M., Pei, J. (2011). Data Mining: Concepts and Techniques. Netherlands: Elsevier Science. 2. Ponniah, P. (2003). Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals. Germany: Wiley. 3. Tan, P., Steinbach, M., Kumar, V. (2007). Introduction to Data Mining. India: Pearson Education. 4. Kimball, R., Ross, M. (2002). The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling. India: Wiley. 5. Linoff, G. S., Berry, M. J. A. (2011). Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management. Germany: Wiley.

1	**Semester**	III
2	**Type of course**	Core
3	**Code of the subject**	MS531
4	**Title of the subject**	Business Process Management
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Understand and evaluate the development of process management and tasks of process holders in organizations • Analyze and model strategic and operational business processes, • Compare, select and apply modern approaches to good business process management practice, • Design performance indicators and measures; consider soft factors and continuous improvements to the business processes system. • Apply critical thinking skills to evaluate and propose technology-based solutions to business problems • Communicate professionally – individually and/or in a group context to a variety of audiences • Integrate the knowledge of core business disciplines (marketing, operations, finance, accounting, law and human resources) with ICT enablement
8	**Brief Contents**	Understand the concept process and process life cycle, process identification and discovery: Introducing process identification and discovery, explain process architecture, explain process prioritization, review different methods for process discovery, Basic process modeling I, understand basic process modeling notations (BPMN), introducing process model evaluation Basic process modeling, adding information artifacts, pools/lanes, and message flows/message events, applying BPMN to simple business scenarios Modelling complex process modeling concepts (e.g., process decomposition, events), advanced process modeling, applying complex process modeling concepts to business scenarios Process analysis: Concept of value and waste, process analysis, root cause analysis, issue register, applying quantitative process analysis techniques (e.g., flow analysis, queueing theory), process redesign, Emerging topics in business process management.
9	**Contents for lab**	Process analysis using open-source tools. Development of front-end, business logic and backend tiers of ERP system. Development of prototypes of ERP using open-source tools.
10	**Books/Suggested Readings**	1. Weske, M. (2024). Business Process Management: Concepts, Languages, Architectures. Germany: Springer, Imprint: Springer. 2. Jeston, J., Nelis, J. (2006). Business Process Management: Practical Guidelines to Successful Implementations. Netherlands: Butterworth-Heinemann. 3. Garimella, K. K. (2006). The Power of Process: Unleashing the Source of Competitive Advantage. United States: Meghan-Kiffer Press. 4. Hammer, M., Hershman, L. W. (2010). Faster, Cheaper, Better: The 9 Levers for Transforming how Work Gets Done. United States: Crown Business.

1	**Semester**	III
2	**Type of course**	Core
3	**Code of the subject**	MS532
4	**Title of the subject**	Strategy and Game Theory for Management
5	**Any prerequisite**	Knowledge of basic Mathematics.
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• Understand and model strategic behaviour in cooperative and non-cooperative situations. • Know various solution concepts and be able to find such solutions for cooperative and non-cooperative games. • Know the significance of the difference between games with perfect and imperfect information as well as the difference between games with complete information and within complete information. • Demonstrate the understanding of different types of games and their suitability to wide variety of business scenarios or societal phenomena. • Be able to model and apply game theory concepts in business and other real-life applications. • Identify business and real-life situations in which game theory can add value. • Exhibit more profound knowledge and understanding of the topics as part of the project and the report should reflect on critical awareness of the methodological choices with written skills to accepted academic standards.
8	**Brief Contents**	Introduction to Game Theory; Types of Games; Strategic or Normal form Games; Extensive Form Games; Games with various forms of Information; Strategic Behaviour in Markets; Applications of Game Theory in Business; Behavioral Game Theory and their Impact on Strategic Decision-Making, Emerging topics in game theory.
.9	**Contents for Lab**	Use Python/Jupyter notebooks or Google Colab for modelling and simulation of strategic games and decision-making scenarios. Game theory tools and platforms such as GAMBIT and Game Theory Explorer may be used for analysing strategic games. Assignments may include payoff matrix modelling, Nash equilibrium analysis, sequential game simulations and case-based strategic decision exercises. Both theoretical and computational components may be included in assignments to help students understand practical applications of game theory in business strategy.
10	**Books/Suggested Readings**	1. Osborne, M. J., & Rubinstein, A. (1994). A Course in Game Theory. MIT Press. 2. Leyton-Brown, K., & Shoham, Y. (2022). Essentials of Game Theory: A Concise Multidisciplinary Introduction. Springer International Publishing. 3. Narahari, Y. (2014). Game Theory and Mechanism Design. World Scientific Publishing Co. Pte. Ltd. 4. Powell, J. H. (2003). Game Theory in Strategy.

1	**Semester**	III
2	**Type of course**	Core
3	**Code of the subject**	MS533
4	**Title of the subject**	Design Thinking for Sustainable Innovation
5	**Any Prerequisite**	Basic understanding of innovation, entrepreneurship, or product/service development (desirable but not mandatory)
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Understand the key concepts and objectives of Design Thinking and its role in the design and development of sustainable products and services. • Explore how Design Thinking can be applied across the empathy, definition, ideation, and prototyping phases to create user-centered, sustainable solutions. • Gain a comprehensive understanding of sustainability principles and their importance in the development of products and services. • Analyze the conditions and requirements for creating products and services that are both user-oriented and sustainable.
8	**Brief Contents**	Introduction to Human-Centered Design (HCD), Design Thinking and Innovation, Context–Environment–Users, Identifying User Needs, Ideation and Immersion, Artificial Intelligence and Generative AI in Design, Storytelling and Visualisation, Iterative Design and Sustainability, Minimum Viable Product (MVP) and New Product Development (NPD), Agile Design and Data-driven Innovation, Integrating Design Technology and Business, Agentic AI Applications, Innovation Project Lifecycle and Innovation Management Tools, Innovation Strategies and Market Implementation, Designing for Change, Design for Leadership.
9	**Content for lab**	No
10	**Books/Suggested Readings**	1. Brown, T. (2009). Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. United States: HarperCollins. 2. Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic books. 3. Liedtka, J., & Ogilvie, T. (2011). Designing for growth: A design thinking tool kit for managers. Columbia University Press.

1	**Semester**	III
2	**Type of course**	Core
3	**Code of the subject**	MS534
4	**Title of the subject**	Applied Deep Learning
5	**Any prerequisite**	Basic knowledge of linear algebra, probability, and Python programming
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	To understand the fundamental concepts of deep learning and implement neural networks, CNNs, transformers, and GANs to solve real-world AI problems.
8	**Brief Contents**	Overview of artificial intelligence, machine learning, and deep learning; perceptron and multilayer perceptron; fundamentals of neural networks; activation functions; architecture of deep neural networks and applications in real-world Business problems. Training Deep Neural Networks Gradient descent and its variants; loss functions; backpropagation algorithm; optimization techniques; regularization methods; issues in training deep networks such as overfitting and vanishing gradients. Convolutional Neural Networks (CNNs) Convolution operation, pooling layers, CNN architectures, feature extraction, image classification, object detection, and applications of CNNs. Transformer and Attention-Based Models Attention mechanisms, self-attention, transformer architecture, transformer- based models for natural language processing, applications in text analytics, language modeling, and multi-modal learning. Advanced Deep Learning Models Graph Neural Networks (GNNs) for structured data analysis; Generative Adversarial Networks (GANs) and generative models; applications of deep learning in multimodal data processing and intelligent systems, Emerging topics in deep learning.
9	**Contents for lab**	Hands-on implementation of deep learning models using Python, including neural networks, gradient descent and backpropagation, convolutional neural networks for image tasks, transformer-based models for natural language processing, and generative models
10	**Books/Suggested Readings**	1. Bishop, C. M., Bishop, H. (2023). Deep Learning: Foundations and Concepts. Germany: Springer. 2. Liu, Y., Mehta, S. (2019). Hands-On Deep Learning Architectures with Python: Create Deep Neural Networks to Solve Computational Problems Using TensorFlow and Keras. Germany: Packt Publishing.

1	**Semester**	III
2	**Type of course**	Core
3	**Code of the subject**	MS535
4	**Title of the subject**	Business Ethics and Sustainability
5	**Any prerequisite**	No
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To develop skills in recognizing and analysing ethical issues. • To understand sources of organizational ethical culture and to design ethical programs designed to accomplish specific objectives in organizations. • To develop ethical leadership skills and practices
8	**Brief Contents**	Business ethics- an overview, Concepts and theories of business ethics, Emerging business ethics issues, Ethical decision making in business, Creating an ethical organization globalization and business ethics, Stakeholders and business ethics, Social responsibility and ethics, Issues in social responsibility, Implementing stakeholders' perspective, Stakeholder and issue management approaches, Managing corporate responsibility with external stakeholders, Corporate governance and ethical leadership, Kohlberg's six stages of moral development, Levels of ethical analysis, Concept of corporate integrity, Issues in corporate governance, good corporate governance - obligations towards society and stake holders, Ethics in consumer protection, Role of government agencies, SEBI, judiciary in ensuring ethical practices, Ethics and Indian business, Marketing ethics, Ethics in human resource management, financial management, banking and insurance.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Meinhold, R. (2021). Business Ethics and Sustainability. United Kingdom: Taylor & Francis. 2. Business Ethics: An Indian Perspective. (2009). India: Pearson Education India. 3. McDonald, G. (2015). Business Ethics: A Contemporary Approach. Austria: Cambridge University Press.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Supply Chain Analytics
5	**Any prerequisite**	-
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• Understand and evaluate the development of process management and tasks of process holders in organizations • Identify and assess the importance of the strategic perspective of business process management planning, • Analyze and model strategic and operational business processes, • Compare, select and apply modern approaches to good business process management practice, • Design performance indicators and measures; consider soft factors and continuous improvements to the business processes system. • Apply critical thinking skills to evaluate and propose technology-based solutions to business problems • Communicate professionally – individually and/or in a group context to a variety of audiences • Integrate the knowledge of core business disciplines (marketing, operations, finance, accounting, law and human resources) with ICT enablement
8	**Brief Contents**	Data driven analytics basics: events and probability, random variables, functions of random variables, inequalities, limit theorems statistical sampling: distribution estimates, sample mean and variance, confidence intervals, proportion estimates, experimental design Supply chain simulation modelling: discrete event simulation, simulation modelling, simulation applications, discrete event simulation, simulation modelling, simulation applications Demand forecasting techniques with applications: importance of demand forecasting, forecasting methods, forecasting accuracy evaluation optimal forecast and intelligent Supply chain demand planning and management: aggregate planning, aggregate planning strategies, managing demand supply chain inventory models: stochastic inventory models with and without fixed ordering cost, multi-period inventory models, Supply network optimization: network concepts, network shortest path, optimal supply network, integrated supply chain decision modelling
9	**Contents for lab**	Analysis of concepts on course content using various available software. AI, data visualization, and simulation to optimize end-to-end logistics. Software like: Tableau, Power BI, Oracle SCM,
10	**Books/Suggested Readings**	1. Chopra, S., & Meindl, P. (2016). Supply Chain Management– Strategy, Planning, and Operation. 6th Edition. 2. Bertsimas, D., Freund, R. M. (2004). Data, Models, and Decisions: The Fundamentals of Management Science. United States: Dynamic Ideas. 3. Hillier, F. S., Hillier, M. S. (2003). Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets. United Kingdom: McGraw-Hill/Irwin.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Smart Manufacturing
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Appreciate the concept and need of world class manufacturing. • Recognize the need to implement agility and flexibility in manufacturing system in current context. • Develop frameworks of various product and process design structures and systems in AI-driven manufacturing. • Appreciation for computer integrated manufacturing system • AI-driven data analysis and process control. • Develop benchmarks for operational excellence through digitalization in manufacturing.
8	**Brief Contents**	Introduction to operations management and industry 4.0, productivity measurement, and competitive strategy, evolution from automation to AI-driven factories, data, predictive engineering, and sustainability. IIoT (Industrial Internet of Things), AI, Cloud Computing, Cybersecurity, Digital Twins etc. and their role in factory context Smart production planning and control, demand forecasting, manufacturing execution systems, real-time monitoring and scheduling, aggregate planning & scheduling, capacity planning and facility allocation, flexible Manufacturing. Smart factory technologies and processes, machining and robotics, SCARA robots, automated guided vehicles, process modeling and simulation, additive manufacturing and industrial networks. Resilience, agility, and sustainability, inventory management, Just-in-Time, Kanban systems, automated storage and retrieval, logistics planning and blockchain in supply chains. Data-driven quality, statistical process control and six sigma, predictive maintenance: condition-based monitoring to minimize downtime, performance metrics: assessing digital transformation capabilities.
9	**Contents for lab**	Analysis of concepts on course content using various available software.
10	**Books/Suggested Readings**	1. Shingo, S. (1981). A Study of Toyota Production System from Industrial Engineering Viewpoint. Tokyo: Japanese Management Association. 2. Womack, J. P., and Jones, D. T. (2003). Lean Thinking: Banish Waste and Creating Wealth in your Organization. UK: Simon & Schuster. 3. Willmott, P., & McCarthy, D. (2001). TPM; A Route to World Class Performance. Butterworth-Heinmann.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	AI for Product and Brand Management
5	**Any prerequisite**	• Understanding the basics of digital technologies and their influence on various aspects of professional life • Interest in learning about the integration of AI technologies within product development and brand management • An open mindset towards learning new concepts and technological developments
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	This course offers a comprehensive foundation in AI tailored for product and brand management. It begins by demystifying AI, exploring its various branches, and delving into specific AI applications within product management. Students will learn about the evolving role of an AI Product Manager and how this position is critical in bridging the gap between cutting-edge technology and practical, market-driven solutions. It highlights the significance of AI in product development and brand management, detailing the benefits and competitive advantages it brings to the table. By the end of this course, participants will possess a solid understanding of AI fundamentals and their application in enhancing product development and brand management processes.
8	**Brief Contents**	Importance of AI, Fundamentals of Machine Learning, AI Product Development Lifecycle, Methods for Prototyping and Testing AI-driven Products Effectively, AI Ethics and Bias, Ethical Implications of AI Products and brand management and the responsibility of Product Managers, Identify and Address Bias in AI Algorithms and Products, AI Implementation Strategies for product and brand management, Methods for Integrating AI Features Into Existing Products and brands Seamlessly, Communicate AI Initiatives Effectively with Stakeholders and Gain their Support, AI Metrics and Performance Evaluation, Relevant Metrics for Measuring the Success of AI-driven Products and brands, Methods for Evaluating the Performance of AI Models and Products, AI Regulation and Compliance, Current Regulations and Frameworks Relevant to AI Products and brand management, Strategies to Ensure AI Products Comply with Regulatory Requirements, Future Trends in AI and Product and brand Management
9	**Contents for lab**	Simulations and Case studies, Projects
10	**Books/Suggested Readings**	1. Sterne, J. (2017). Artificial intelligence for marketing: Practical Applications. John Wiley & Sons. 2. Thaichon, P., & Quach, S. (2022). Artificial Intelligence for marketing management. Taylor & Francis.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Financial Time Series and Forecasting
5	**Any prerequisite**	Basic knowledge of Mathematics, Statistics, Probability, Regression analysis and spreadsheet tools
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To develop an understanding of statistical and econometric techniques used to analyse financial time-series data. • To study the dynamic behaviour of financial variables such as stock prices, returns, exchange rates, and interest rates. • To equip students with forecasting techniques and time-series modelling tools for financial data analysis. • To enable the use of analytical methods and real financial datasets for financial decision-making, risk management, and investment analysis.
8	**Brief Contents**	Introduction to time series analysis and financial time series data, characteristics and stylized facts of financial data, components of time series (trend, seasonal, cyclical and irregular components). Data visualization and exploratory analysis of financial time series. Stationarity and non-stationarity, transformation of data, autocorrelation and partial autocorrelation functions, white noise and random walk models. Smoothing techniques including moving averages, exponential smoothing, Holt's linear trend method and Holt-Winters seasonal method. Linear time series models including Autoregressive (AR), Moving Average (MA), ARMA and ARIMA models; model identification, parameter estimation and diagnostic checking. Seasonal ARIMA models and forecasting procedures. Multivariate time series analysis including Vector Autoregression (VAR), Granger causality and impulse response analysis. Volatility modelling in financial markets including ARCH and GARCH models and their extensions. Forecast evaluation and model comparison using RMSE, MAE and MAPE. Applications of financial time series forecasting in stock market analysis, exchange rate forecasting, interest rate modelling and financial risk measurement including Value at Risk (VaR).
9	**Contents for lab**	Application of statistical software such as E-views and advanced excel for financial data analysis including data visualization, ARIMA modelling, smoothing techniques, volatility modelling, model diagnostics and forecasting exercises using real financial market datasets.
10	**Books/Suggested Readings**	1. Brooks, C. (2019). Introductory Econometrics for Finance (4th ed.). Cambridge University Press. 2. Hamilton, J. D. (1994). Time Series Analysis. Princeton University Press. 3. Tsay, R. S. (2010). Analysis of Financial Time Series (3rd ed.). Wiley. 4. Enders, W. (2014). Applied Econometric Time Series (4th ed.). John Wiley & Sons.

1	**Semester**	II/III/IV
2	**Type of Course**	Elective
3	**Code of Subject**	MS5XX
4	**Title of the course**	Technology Analytics
5	**Any Prerequisite**	Basic knowledge of Statistics and Data Analysis
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	• To introduce the concept and significance of analytics in technology management and innovation ecosystems. • To develop analytical skills for assessing technological trends, innovation performance, and R&D outcomes. • To enable students to use data-driven approaches for technology forecasting, technology assessment, and decision-making. • To familiarize students with analytical tools and techniques used in technology intelligence and innovation analytics.
8	**Brief Contents**	Introduction to Technology Analytics: Concepts, scope, and role of analytics in technology management and innovation systems; data-driven decision-making in technological environments. Technology Intelligence and Data Sources: Technology databases, patent databases, research publications, innovation indicators, and technology monitoring systems. Technology Trend Analysis: Techniques for identifying emerging technologies, bibliometric analysis, patent analysis, and technology life cycle analysis. Technology Forecasting Methods: Quantitative and qualitative approaches such as trend analysis, Delphi method, scenario analysis, and technology roadmapping. Innovation and R&D Analytics: Measuring innovation performance, R&D productivity, knowledge networks, and technology diffusion.
9	**Contents for lab**	• Data collection and visualization of technology indicators using spreadsheet and analytical tools. • Bibliometric and patent data analysis using open databases (e.g., World Intellectual Property Organization patent data resources). • Technology trend analysis using datasets from OECD and World Bank innovation indicators. • Basic analytics using tools such as Python or R for technology data analysis. • Case study analysis on emerging technologies such as Artificial Intelligence, Internet of Things, and Blockchain.
10	**Books/Suggested Readings**	1. De Weck, O., Roos, D., & Magee, C. L. (2011). Engineering systems: Meeting human needs in a complex technological world. Cambridge, MA: MIT Press. 2. Jaggia, S., & Kelly, A. (2013). Business analytics: Communicating with numbers (1st ed.). New York, NY: McGraw-Hill Education. 3. Sharda, R., Delen, D., & Turban, E. (2020). Business intelligence, analytics, and data science: A managerial perspective (4th ed.). Pearson Education. 4. Porter, A. L., Cunningham, S. W., Banks, J., Roper, A. T., Mason, T. W., & Rossini, F. A. (2004). Technology futures analysis: Toward integration of the field and new methods. Oxford, UK: Elsevier.

1	**Semester**	II/III/IV
2	**Type of Course**	Elective
3	**Code of Subject**	MS5XX
4	**Title of the course**	AI for Public Policy and Smart Governance
5	**Any Prerequisite**	Basic understanding of public administration, governance systems, and introductory knowledge of data analytics or information technology.
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• To introduce the role of Artificial Intelligence in transforming governance and public policy processes. • To understand how AI-driven data analytics can support evidence-based policymaking and decision-making. • To familiarize students with AI applications in public service delivery, urban governance, and digital government platforms. • To examine ethical, legal, and social implications of AI adoption in governance systems. • To develop analytical perspectives on the use of AI for smart governance and sustainable public administration.
8	**Brief Contents**	Introduction to Artificial Intelligence in Governance: Concept of AI, evolution of digital governance, role of AI in public administration and policymaking. AI and Data-Driven Public Policy: Big data analytics, predictive analytics, and evidence-based policy formulation; data-driven governance models. Smart Governance and Digital Government: Smart cities, intelligent public service systems, digital platforms for citizen engagement, and AI-enabled governance models. AI Applications in Public Sector: AI in healthcare management, education systems, transportation planning, urban management, and environmental monitoring. Ethical and Regulatory Issues: Data privacy, algorithmic bias, accountability, transparency, and governance frameworks for responsible AI. Global and National Case Studies: Applications of AI in public policy initiatives and smart governance projects in different countries.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Russell, S., & Norvig, P. (2021). Artificial intelligence: A modern approach (4th ed.). Pearson Education. 2. Sharda, R., Delen, D., & Turban, E. (2020). Business intelligence, analytics, and data science: A managerial perspective (4th ed.). Pearson. 3. Eggers, W. D., Schatsky, D., & Viechnicki, P. (2017). AI-augmented government: Using cognitive technologies to redesign public sector work. Deloitte University Press. 4. Sun, T. Q., & Medaglia, R. (2019). Mapping the challenges of artificial intelligence in the public sector: Evidence from public healthcare. Government Information Quarterly, 36(2), 368–383. 5. Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2019). Artificial intelligence and the public sector—Applications and challenges. International Journal of Public Administration, 42(7), 596–615.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Health Analytics
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	To understand healthcare data systems and apply analytical techniques to evaluate healthcare quality, performance, and decision-making.
8	**Brief Contents**	Introduction to Healthcare Analytics: The changing healthcare system; technology-enabled clinical care; introduction to healthcare analytics; healthcare value and outcomes; healthcare information flow; electronic health records (EHR); projects and value-based healthcare. Healthcare Data Sources and Transmission: Data sources in healthcare; types of healthcare data and constraints; healthcare data transmission standards; transmitting and storing healthcare data; interoperability in healthcare systems. Databases in Healthcare: Introduction to database structures and relational databases; querying healthcare databases; tables, keys, and normalization; entity relationships and joins; database applications in healthcare systems. Healthcare Financial Data and Performance Management: Financial reporting in healthcare; billing and revenue cycle management; basic managerial cost accounting; budgeting and variance analysis; time value of money; financial evaluation of healthcare projects and return on investment. Healthcare Delivery, Reporting, and Analytics Applications: Measuring quality of care; healthcare coding systems; reporting and data visualization; data dimensionalisation and dynamic reporting; introduction to bioinformatics and bioinformatics resources; digital image analysis including segmentation and feature extraction; IoT and sensor data in healthcare; ethical and legal issues in healthcare data analytics; analytics-driven healthcare process improvement projects.
9	**Contents for lab**	Basic data exploration with Python and R
10	**Books/Suggested Readings**	1. Boland, M. R. (2024). Health Analytics with R: Learning Data Science Using Examples from Healthcare and Direct-to-Consumer Genetics. Switzerland: Springer Nature Switzerland. 2. Burke, J. (2013). Health Analytics: Gaining the Insights to Transform Health Care. United States: Wiley. 3. Gapenski, L. C., Pink, G. H. (2015). Understanding Healthcare Financial Management. United States: Health Administration Press.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Financial Risk Analytics
5	**Any prerequisite**	Understanding of Basic Financial Mathematics and Basic Finance
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	Construct Hedge Strategies: Design effective hedging programs using Forwards and Futures to lock in prices and mitigate exchange rate volatility. Valuate Complex Swaps: Calculate the fair value of interest rate and currency swaps and understand their impact on a firm's debt profile. Option Pricing and Sensitivity: Utilize pricing and its sensitivity to monitor and adjust the risk exposure of an options portfolio. Assess Counterparty Exposure: Evaluate the risk of default in private derivative contracts and implement mitigation techniques like collateralization. Optimize Risk-Reward: Synthesize derivative market data to make executive recommendations on whether to hedge, increase exposure, or remain passive.
8	**Brief Contents**	Forwards & Futures Markets: Contract specifications, mark-to-market mechanics, backwardation vs. contango, and optimal hedge ratio calculation. Currency Swaps: Comparative advantage theory, swap valuation, "plain vanilla" IRS structures, and cross-currency basis swaps. Interest Rate & Fixed Income Risk: Yield curve modeling, term structure of interest rates, and immunization techniques. Option Pricing & Strategy: Put-Call Parity, intrinsic vs. time value, and volatility surfaces. Strategy modeling including Straddles, Strangles, and Spreads. Greek letters Credit Derivatives: Mechanics of Credit Default Swaps (CDS), counterparty risk in over-the-counter (OTC) markets, and Credit Value Adjustment (CVA). Exotic Options & Structured Products: Brief overview of Path-dependent options (Asian, Barrier, Binary) and their use in corporate risk management. Risk Metrics for Derivatives: Delta-Normal VaR, Monte Carlo VaR for non-linear portfolios, and Expected Shortfall (ES). Regulatory Frameworks: Basel I-IV Accords, Dodd-Frank Act, and the role of Stress Testing
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1.Hull, J. C. (2021). Options, Futures, and Other Derivatives (11th ed.). Pearson. 2.McDonald, R. L. (2013). Derivatives Markets. Pearson. 3.Flavell, R. (2010). Swaps and Other Derivatives. Wiley.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Financial Decision Modelling and Optimisation
5	**Any prerequisite**	Understanding of Basic Accounting, Finance, and Quantitative Methods
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	Design & Audit Logic: Construct robust, non-circular financial models that adhere to global spreadsheet standards. Solve Constrained Problems: Formulate mathematical models to optimize resource allocation and capital structure under regulatory or liquidity constraints. Evaluate Uncertainty: Apply probabilistic techniques to assess the likelihood of financial outcomes and mitigate downside risks. Synthesize Strategic Insights: Convert complex quantitative outputs into data-driven narratives for board-level decision-making.
8	**Brief Contents**	Integrated Financial Architecture: 3-Statement linkages, revenue drivers, fixed and variable cost schedules, and depreciation/tax modeling. Corporate Valuation & Strategy: DCF and WACC estimation, terminal value logic, enterprise value to equity value bridges, and transaction multiples. Capital Budgeting & Project Finance: Multi-period project appraisal, capital rationing, leverage effects, and lease vs. buy decision models. Mathematical Optimization: Linear Programming (LP), Non-linear Programming (NLP), and Goal Programming for cost minimization and profit maximization. Modern Portfolio Theory: The Efficient Frontier, Beta estimation, Security Market Line (SML), and Sharpe/Treynor ratio optimization. Risk & Simulation: Probability distributions, Monte Carlo simulation, Latin Hypercube sampling, and Tornado/Spider charts for sensitivity. Advanced Analytics: Logistic regression for credit scoring, Altman Z-score for bankruptcy prediction, and time-series analysis for asset price movements. Strategic Decision Tools: Decision trees, Bayesian inference in finance, and Real Options analysis (ROA).
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Rees, M. (2018). Principles of Financial Modelling: Model Design and Best Practices Using Excel and VBA. Wiley. 2. Day, A. (2024). Mastering Financial Modelling in Microsoft Excel. Pearson. 3. Hillier, F. S., & Lieberman, G. J. (2021). Introduction to Operations Research. McGraw-Hill.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Quantitative Asset Management and Fixed Income Engineering
5	**Any prerequisite**	Basic Mathematics and Foundational Finance
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Engineer solutions for fixed income portfolios using duration-matching and convexity hedging. • Solve mean-variance optimization problems to determine the "Efficient Frontier" for a multi-asset fund. • Valuate path-dependent debt instruments and structured finance products using binomial trees. • Back-test quantitative investment strategies using historical time-series data. • Attribute portfolio performance to specific allocation and selection decisions using the Brinson Model.
8	**Brief Contents**	Debt Pricing & Yield Analytics: Bootstrapping spot/forward curves, YTM vs. Total Return, and day-count arbitrage. Interest Rate Engineering: Numerical derivation of Modified and Effective Duration; Convexity hedging, Term Structure Modeling (Vasicek, CIR, Hull-White), and Credit Spread Analysis Stochastic Interest Rate Modeling: Valuing callable/puttable bonds using Binomial Trees and the Black-Derman-Toy (BDT) framework, Securitisation Mechanics. Portfolio Optimization Logic: Quadratic programming problem for the Efficient Frontier and Global Minimum Variance. Factor Investing: Multi-factor attribution (Size, Value, Momentum, Quality, and Low Volatility)., Beta estimation, and calculating "idiosyncratic risk." Advanced Asset Allocation: Implementing the Kelly Criterion, Risk Budgeting, and Bayesian view integration (Black-Litterman). Back-testing & Performance: Tracking error optimization, Information Ratio calculation, and Brinson-Fachler attribution. Risk-Adjusted Metrics, Algorithmic Rebalancing.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Fabozzi, F. J. (2023). The Handbook of Fixed Income Securities. McGraw-Hill. (The industry standard for debt). 2. Ang, A. (2014/Revised 2024). Asset Management: A Systematic Approach to Factor Investing. Oxford Press. 3. Tuckman, B., & Serrat, A. (2022). Fixed Income Securities: Tools for Today's Markets. Wiley.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Talent Analytics
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Learn to identify, attract, and onboard top talent efficiently. • Develop strategies for employee engagement, training, coaching, and long-term retention. • Implement systems to measure performance and build a pipeline for future leadership roles. • Connect talent management practices to overall business goals and organizational culture. • Utilize HR analytics to measure the effectiveness of talent initiatives.
8	**Brief Contents**	History of Different HRM Perspectives, HR Analytics and Changing Role of HR Professionals. Importance and Scope of HR Analytics. Significance of HR Analytics, Benefits of HR Analytics. Levels of Analysis and Conducting analytics. Key Influencers of HR Analytics Process. Big Data Era in HR Analytics, HR Analytics – Linkage to Business Outcomes. Conducting HR/Workforce Analytics: Models of HR Analytics, How to Conduct HR Analytics. Understanding HR Data: Importance of Data, Types and Scales of Data; Methods of Capturing Data, Data Examination & Purification. Understanding various HR Metrics from the perspective of HR Analytics. HR Analytics for Recruitment & Selection, Training & Development, Performance Appraisal, Talent Management, Employee Engagement, Compensation Management. Overview of Select Tools for Conduction HR Analytics: MS Excel, R, Tableau, Power BI, Python, SPSS & PSPP. Descriptive Analytics in HR: HR Dashboards using MS Excel, Slicing and Dicing of HR Data using MS Excel Pivot Table Applications, Data Visualization for Key HR processes. Predictive HR Analytics: Correlation, Linear and Multiple Regression, Factor Analysis and Cluster Analysis, Comparison of Means and Analysis of Variance for Manpower Demographics, Employee Satisfaction, Training Effectiveness etc. Prescriptive HR Analytics, Predictive vs Prescriptive HR Analytics, Future of HR Analytics.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Yadav, R. S., & Maheshwari, S. (2020). HR analytics: Connecting data and theory. Wiley 2. Banerjee, P., Pandey, J., Gupta, M. (2019). Practical Applications of HR Analytics: A Step-by-Step Guide. India: SAGE Publications. 3. Bhattacharyya, D. K. (2017). HR Analytics: Understanding Theories and Applications. India: SAGE Publications.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Performance Management Analytics
5	**Any prerequisite**	No
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Significance, evolution, and key components. • Utilizing data for talent management, including AI for HR. • Planning, monitoring, reviewing, and rewarding performance. • Connecting individual performance to organizational goals. • Using data to improve performance management systems and conducting performance audits.
8	**Brief Contents**	Foundations of Performance Management: Evolution of performance management, Performance management vs performance appraisal, Strategic performance management, Performance management cycle, Role of leadership in performance culture Goal Setting & Performance Frameworks: SMART goals and cascading objectives KRAs and OKRs, Balanced Scorecard framework, Strategy maps and performance alignment, Designing measurable performance indicators Data & Metrics in Performance Management: Types of performance data (quantitative & qualitative), HR metrics (turnover rate, absenteeism, productivity ratios), Data collection methods, Reliability and validity in performance measurement, Ethical issues in performance data. Performance Appraisal Methods: Traditional and modern appraisal systems, 360-degree feedback, Behaviourally Anchored Rating Scales (BARS), Continuous performance management, Bias and errors in evaluation Analytics for Performance Decision-Making: Introduction to HR analytics, Descriptive, diagnostic, predictive analytics, Regression basics for performance prediction, Correlation analysis, identifying high performers using analytics,
9	**Contents for lab**	Performance dashboards using Excel / Power BI / Tableau, AI in performance management.
10	**Books/Suggested Readings**	1. Aguinis, H. (2018). Performance Management. United States: SAGE Publications. 2. Fitz-enz, J. (2010). The New HR Analytics: Predicting the Economic Value of Your Company's Human Capital Investments. United Kingdom: AMACOM. 3. Armstrong, M. (2017). Armstrong's Handbook of Performance Management: An Evidence-Based Guide to Delivering High Performance. India: Kogan Page.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Digital Entrepreneurship
5	**Prerequisite**	Basic understanding of entrepreneurship, business management, and digital technologies (desirable but not mandatory)
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Introduce students to key theories and models in the area of e-Business and digital entrepreneurship. • Understand the emergence of digital technologies and their role in creating new entrepreneurial opportunities. • Analyze digital business models and innovative venture creation processes. • Identify and exploit opportunities for digital entrepreneurship. • Apply Lean Startup methodology and design thinking for developing digital products and services. • Understand digital marketing, data analytics, and customer engagement strategies. • Examine legal, ethical, and financial aspects related to digital entrepreneurship. • Explore digital strategy, digital transformation, and platform ecosystems.
8	**Brief Contents**	Entrepreneurship Framework and Digital Entrepreneurship; Entrepreneurship Framework; Digital Business Models; Venture Design and Business Model Innovation; Identifying and exploiting Opportunities for Digital Entrepreneurship; Strategies for creating Competitive Advantage in Digital Entrepreneurship, Growth Strategy and Venture Financing; Digital Marketing for Entrepreneurs; Crowdfunding for Entrepreneurs; Design Thinking, Lean Startup, Platform ecosystems and online communities, Digital Strategy and Digital Transformation for Agile Organisations; Online Fraud & Cybersecurity
9	**Content for lab**	No
10	**Books/Suggested Readings**	1. Chaffey, D. (2015). Digital Business and E-commerce Management: Strategy, Implementation and Practice. United Kingdom: Pearson Education Limited. 2. Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. United Kingdom: Crown. 3. Osterwalder, A., Pigneur, Y., Clark, T. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. Germany: Wiley. 4. Blank, S., Dorf, B. (2013). The Startup Owner's Manual: The Step-by-step Guide for Building a Great Company. Pescadero, CA, USA: K & S Ranch.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Business Intelligence for Decision Modelling
5	**Any prerequisite**	Basic knowledge of Statistics and Data Analytics
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	To provide understanding of business intelligence concepts and analytical tools for decision modelling and strategic business analysis.
8	**Brief Contents**	Introduction to Business Intelligence – Evolution of BI, data and decision support systems, BI architecture. Data Management and Warehousing – Data sources, ETL process, data warehousing, OLTP and OLAP. Data Analytics for Decision Modelling – Descriptive, predictive and prescriptive analytics, statistical models, forecasting. BI Tools and Applications – Dashboard design, KPI development, Tableau and Power BI applications. Advanced BI and Strategic Decision Making – Big data analytics, AI integration in BI, ethical issues, case studies.
9	**Contents for lab**	Use of BI tools such as Tableau or Power BI for dashboard creation and analytics exercises.
10	**Books/Suggested Readings**	1. Ramesh Sharda, Dursun Delen, Efraim Turban, Janine Aronson, & Ting-Peng Liang (2014). Business intelligence and analytics. System for Decision Support, 398, 2014. 2. Larissa Terpeluk Moss & Shaku Atre (2003). Business intelligence roadmap: the complete project lifecycle for decision-support applications. Addison-Wesley Professional. 3. Fernando Berzal & N. Matín (2002). Data mining: concepts and techniques by Jiawei Han and Micheline Kamber. ACM Sigmod Record, 31(2), 66-68. 4. Cindi Howson (2013). Successful business intelligence: Unlock the value of BI & big data. McGraw-Hill Education Group.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Data Visualization and Storytelling
5	**Any prerequisite**	Basic knowledge of Statistics and Data Analysis
6	**L-T-P**	2-0-2
7	**Learning Objectives of the subject**	To develop the ability to communicate analytical insights effectively through visual representations and storytelling techniques.
8	**Brief Contents**	Foundations of Data Visualization, Importance of visualization, visual perception principles, chart types. Visualization Tools and Techniques, Data preparation, visualization tools, dashboard design, interactive visualization. Visual Analytics, Exploratory data analysis, identifying trends and patterns, visualization of large datasets Data Storytelling, Narrative techniques, communicating insights, storytelling frameworks. Applications and Case Studies Visualization applications in marketing, finance and operations; ethical issues.
9	**Contents for lab**	Hands-on exercises using Tableau, Power BI or Python visualization libraries.
10	**Books/Suggested Readings**	1. Cole Nussabaumer Knaflic (2025). Storytelling with data: A data visualization guide for business professionals. John Wiley & Sons. 2. Stephen Few (2006). Information dashboard design. 3. Albert Cairo (2016). The truthful art: Data, charts, and maps for communication. New Riders. 4. Andy Kirk (2019). Data visualisation: A handbook for data driven design.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Consumer Analytics
5	**Any prerequisite**	Basics of statistics and working knowledge of MS Excel
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	The course emphasis will be on applications and interpretation of the results for making business/policy decisions. Students should go through a four-stage problem-solving process: analyzing the business problem, selecting and estimating relevant models, interpreting and estimating results, and making decision recommendations.
8	**Brief Contents**	Consumer Behavior, Concept, Scope, and their applications, Information search Process, Evaluative Criteria and Decision Rules, Building Customer satisfaction, Consumer Decision Making Process, Four views of Consumer decision rules: Economic man, Passive man, Emotional man, Cognitive man. Models of Consumer Decision making, Nicosia Model, Consumer Motivation, needs and goals, Positive and Negative Motivation, Dynamic nature of Motivation, Consumer Perception, Conceptual Framework, Cultural Influence, Dynamism of culture, consumer attitude and change. Influence of personality and self- concept on buying behavior, Diffusion of innovations, Diffusion Process, the Adoption Process, Introduction to Consumer Analytics, Summary Statistics, Data visualization, Exploring Analytics: STP and Clustering Analysis, Association Rules and Text Mining, Market Response Model: Regression and Inference, Nonlinearities and transformations, Time Series: Forecast accuracy, Moving averages and exponential smoothing, Regression analysis and Serial correlation, Predictive Data Mining, Consumer behavior models and applications.
9	**Contents for lab**	Simulation , Case study exercises, Secondary Data Analysis , Group projects
10.	**Reference Books**	1. Smith, A. (2023). Consumer Behaviour and Analytics. United Kingdom: Taylor & Francis. 2. Business and Consumer Analytics: New Ideas. (2019). Germany: Springer International Publishing.

1	**Semester**	II/III/IV
2	**Type of course**	Elective
3	**Code of the subject**	MS5XX
4	**Title of the subject**	Human Resource Management
5	**Any prerequisite**	-
6	**L-T-P**	3-0-0
7	**Learning Objectives of the subject**	• Applying techniques for recruitment, selection, induction, and placement. • Designing performance appraisal systems and compensation/benefits plans. • Developing training and development strategies to enhance performance. • Understanding labour laws, safety regulations, and ethical standards.
8	**Brief Contents**	Human Resource Management: Describe the Nature, Feature and Scope of HRM., Describe the major activities of HRM, Explain the skills and roles of Human Resource manager, ask that why HRM is important to All Managers, List the challenges and opportunities of HR manager. Job Analysis and HR planning: Define Job Analysis, explain types of Job analysis, Understand Job Analysis Process, Describe the basic methods of collecting the Job analysis information, Define HR planning, Describe the need and objectives of HR planning, Understand the HR planning model, Explain the factors affecting HR planning. Recruitment and Selection: Define Recruitment, explain essential steps for Recruitment Planning, Understand Recruitment Model, Describe Sources of Recruitment, Explain the Pros and Cons of Recruitment, Define selection, Steps / process of selection. Employee Training: Define Employee Training, explain need and objectives of training, differentiate between training and Development, Describe the principles, areas and benefits of training, Understand the Training Methods, Describe Training System Model, Understand levels of Training Evaluation. Career Planning: Define Career and its related terms, understand stages of growth and career, Describe Career-planning process and its responsibility, Understand the benefits of Career development system, Know the career program for special target groups, Explain the Model or Designing Organizational career development. Performance Appraisal: Define Performance Appraisal, explain why it is important to effectively appraise performance, understand features, purposes and objectives of Performance appraisal, Describe the methods of Performance appraisal, List the criticism of Performance Appraisal.
9	**Contents for lab**	No
10	**Books/Suggested Readings**	1. Dessler, Gary (2011). Human Resource Management. India: Pearson 2. Ivancevich, J. M., Konopaske, R. (2013). Human Resource Management. United Kingdom: McGraw-Hill. 3. Rao, V. S. P. (2007). Human Resources Management: Text and Cases. India: Excel Books.