

Materials Management

Semester-V

<u>DSC</u>	Technology in Supply Chain Management
	Firms in the Globalising World
	Business Analytics in SCM
<u>DSE</u>	Port Management
	Global Supply Chain Management
	Revenue Management and Financial Essentials
	Public Policy and Governance
	Productivity Management
<u>GE Pool For BA(VS) Materials Management Students</u>	
1.	Tourism: An Introduction
2.	Tourism Business Environment
3.	Modern Office Management
4.	Sustainable Development
5.	Essentials of Management and Retail Essentials
6.	Basics of Retail Management
7.	Launching a New Venture
8.	Management of Small Business Enterprises
9.	Stress Management
10.	Team Building and Development
11.	Risk Management and Insurance
12.	Introduction to Insurance
13.	Cultural Diversity: Tangible & Intangible Heritage
14.	Polity and Governance in India
<u>GE Pool for students other than that of BA(VS) Materials Management</u>	
1	Introduction to Materials Management
2	Basics of Purchase Management

B.A. (VS) MATERIALS MANAGEMENT

DSC 5.1: Technology in Supply Chain Management

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Technology in Supply Chain Management DSC 5.1	4	3	0	1	Pass in Class XII	NIL

Learning objectives

It is designed to provide students with a comprehensive understanding of how technology is transforming and improving supply chain operations. Students will learn about the latest technological advancements and their applications in various aspects of the supply chain, including procurement, logistics, inventory management, demand forecasting, and customer relationship management. It will cover both theoretical concepts and practical case studies to help students develop a strategic and practical approach to leveraging technology for supply chain optimization.

Learning outcomes

After completion of the course, learners will be able to:

1. recognize the role of technology in enhancing supply chain management practices and also analyse the case studies to explore successful implementations of e-procurement and SRM systems.
2. analyse route optimization and fleet management solutions for effective transportation planning.
3. examine the integration of Customer Relationship Management (CRM) systems with the supply chain and analyse customer segmentation and personalization strategies in CRM.
4. evaluate the applications of Internet of Things (IoT) in supply chain management and analyse case studies on successful implementation of blockchain in supply chain management.
5. analyse big data analytics and predictive modelling techniques for supply chain optimization.

Unit 1: Introduction to Supply Chain Management and Technology

9 hours

Overview of supply chain management and its importance, Role of technology in supply chain management, Key technological trends shaping the industry, E-Procurement and Supplier Relationship Management, E-procurement systems and their benefits, Supplier relationship

management (SRM) and its significance, Case studies on successful implementation of e-procurement and SRM systems

Unit 2: Warehouse and Inventory Management Technologies

9 hours

Automated warehouse systems and robotics, Inventory management software and tool Just-in-Time (JIT) and Lean principles in inventory management, Transportation and Logistics Technologies, Transportation management systems (TMS), Route optimization and fleet management solutions, Tracking and tracing technologies for real-time visibility

Unit 3: Demand Forecasting and Analytics

9 hours

Statistical forecasting methods, Demand sensing and demand-driven planning, Predictive analytics and machine learning in demand forecasting, Customer Relationship Management (CRM) in the Supply Chain, CRM systems and their integration with the supply chain, Customer segmentation and personalization, Omni-channel customer experience management

Unit 4 Internet of Things (IoT) and Supply Chain Visibility

9 hours

IoT applications in supply chain management, Sensor technologies for real-time monitoring Achieving end-to-end supply chain visibility, Blockchain and Supply Chain Transparency, Introduction to blockchain technology, Blockchain applications in supply chain industry, Case studies on blockchain implementation in supply chain

Unit 5: Artificial Intelligence (AI) and Machine Learning (ML) in Supply Chain

9 hours

Role of technology in global supply chain operations, Internet of Things (IoT), blockchain, and artificial intelligence (AI) in supply chains. Big data analytics and predictive modelling for supply chain optimization, Supply chain visibility and collaboration platforms, AI and ML applications in supply chain optimization, Predictive maintenance and quality control using AI, Autonomous vehicles and drones in logistics. Case studies on autonomous delivery systems including Drones.

Exercises

The learners are required to:

1. discuss the case studies on successful implementation of e-procurement and SRM systems.
2. prepare a project on Route optimization and fleet management solutions for any company.
3. discuss the case on machine learning in demand forecasting.
4. be given case on Blockchain applications in supply chain industry.
5. dents will be able to prepare a case on use of Autonomous vehicles and drones in logistics.

Suggested readings

- Chopra, S., & Meindl, P. (2016). Supply chain management: Strategy, planning, and operation (6th ed.). Pearson.

- Chen, I. J., & Paulraj, A. (2004). Towards a theory of supply chain management: The constructs and measurements. *Journal of Operations Management*, 22(2), 119-150.
- Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2019). *Designing and managing the supply chain: Concepts, strategies, and case studies* (4th ed.). McGraw-Hill Education.
- Ferdows, K., Lewis, M. A., & Machuca, J. A. D. (2003). Rapid-fire fulfilment. *Harvard Business Review*, 81(11), 104-110.
- Gunasekaran, A., Patel, C., & McGaughey, R. E. (2004). A framework for supply chain performance measurement. *International Journal of Production Economics*, 87(3), 333-347.
- Narasimhan, R., & Das, A. (2001). An empirical investigation of the antecedents and impact of e-business technology usage on small firms in the USA. *European Journal of Information Systems*, 10(2), 80-93.
- Sheffi, Y. (2018). *The resilient enterprise: Overcoming vulnerability for competitive advantage*. The MIT Press.
- Handfield, R. B., & Nichols, E. L. (2002). *Introduction to supply chain management*. Prentice Hall.
- Simatupang, T. M., & Sridharan, R. (2008). Design for supply chain collaboration. *Business Process Management Journal*, 14(3), 401-418.
- Lummus, R. R., Krumwiede, D. W., & Vokurka, R. J. (2001). The relationship of logistics to supply chain management: Developing a common industry definition. *Industrial Management & Data Systems*, 101(8), 426-431.
- Jacobs, F. R., Chase, R. B., & Lummus, R. R. (2013). *Operations and supply chain management* (14th ed.). McGraw-Hill Education.
- Hoek, R. I. V., & Harrison, A. (2008). Measuring the unmeasurable: The measurement of performance in the supply chain. *International Journal of Operations & Production Management*, 28(11), 1030-1054.
- Sodhi, M. S., & Tang, C. S. (2012). *Managing supply chain risk*. Springer.

Notes:

- **Suggested readings shall be updated and uploaded on the college website from time to time. Teachers may use free softwares available for SCM.**
- **Examination scheme and mode shall be prescribed by the Examination branch, University of Delhi from time to time.**

B.A. (VS) MATERIALS MANAGEMENT

DSC 5.2: FIRMS IN THE GLOBALISING WORLD DISCIPLINE SPECIFIC CORE - (DSC, 5th Semester)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title and Code	Total Credits	Lectures	Tutorial	Practical	Eligibility criteria	Pre-requisites of the course
Firms in the Globalizing World (DSC 5.2)	4	3	1	0	Class XII	Nil

Learning Objectives: Globalization since the early 1990s has created a connected world and many firms participate in cross-border activities assisted by acceleration in the access to information and communication technology and the internet. This paper covers topics in contemporary international business comprising trade theory, trans-national corporations and their choice of the host country and entry modes. It covers the theoretical and empirical issues in trade and investment and risks of international business. The students will conceptually understand these topics and will also follow case studies. The course also brings out the consequences of globalization and internationalization of value chains for firms and the functioning of the international monetary and financial system including the determination of exchange rates, currency risks and financial crises.

Learning Outcomes: After the completion of the course the learners will be able to:

- Understand how and why firms internationalize in a globalized world. They will be able to appreciate the differences in the business environments in the domestic economy and in the foreign location.
- Understand the basis of trade and why firms locate production activity abroad either in full or in a segmented manner through value chains and learn about trade barriers and trade costs faced by firms when they enter the international market.
- Appreciate the pros and cons of economic integration in the context of international monetary and trade institutions. The students will also understand the basics of exchange rate determination, the international capital market and global financial crises.

Unit I. Globalization: Phases and dimensions of globalization and consequences of participation in the international economy, globalization of markets and firms, internationalization of value chains and cultural and ethical challenges in international business. Risks in international business. Causes and Types of country risks. Managing country risks. Opportunities and challenges of doing business in emerging markets. Role of the WTO, IMF and WB. **(10 hours)**

Unit II. International Trade and Investment, Comparative and competitive advantage, The strategies of

internationalizing firms to gain and sustain competitive advantage. Economies of scale and new trade theories. Gains from trade. Difference between inter and intra-industry trade.

Building a global firm and market entry strategies of a Transnational Firm - FDI and GVCs. Outsourcing, global sourcing, offshoring, re-shoring and supply chain management. Benefits and Risks. Types of FDI (Greenfield /brownfield (M&A)), choice of the host country and modes of entry. Risks, challenges and successful strategies of FDI into and from emerging markets.

(15 hours)

Unit III. Government intervention in international trade and investment: Causes, types and effects - tariffs, quotas, VRS, Subsidies, LCRs, etc. Firm-response to intervention - FDI - (horizontal and vertical), GVCs. Reasons for and benefits of Economic Integration - customs unions, FTAs/RTAs - trade creation and diversion. Examples - EU, NAFTA, RECP.

(10 hours)

Unit IV. International Monetary and Financial system: Foreign exchange market and Exchange rate determination - Asset market approach and the purchasing power parity approach, currency risks, capital flight and speculation. Exchange rate pass through and the J-curve effect of currency depreciation/appreciation. Modern Exchange rate regimes. Global financial system and monetary institutions and global financial crises.

(10 hours)

Practical Exercises:

The learners are required to:

1. Discussion - The role of cultural differences in the MNCs' decision to enter a host country market? The students can study different multinationals in the fast-food sector, in the automobile sector and in the consumer goods sector and see how they have altered their strategy in host countries and comment on its success/failure in doing so. (Unit 1).
2. Discussion - Highlight the role of various factors in the success of IT exports from India. (Unit 2).
3. Group Presentation - The class can be divided into groups and asked to make a presentation of various FTAs and the European Union to discuss the benefits and costs of economic integration. (Unit 3).
4. Fieldwork-based exercises - Use the examples of smart phones and automobiles/auto-components to understand the meaning of value chains. (Unit 1 & 3).
5. Group projects based on data collection from the internet - Study India's export-import structure and compare it with the structure of the BRICS. Is India's export structure in line with the trade theories studied? (Unit 1).
6. Project - Compare and contrast the causes of the various currency crises since the 1990s across Asia and Latin America. Use the data on current account balance and the exchange rates from the internet to see whether phases of rupee depreciation in India coincide with phases of an improvement in India's current account balance. Do you see a lagged effect? (Unit 4).

7. Group projects based on data collection from the internet - Collect data on the ease of doing business from the World Bank website and compare India with China and other emerging markets. (Unit 1).

Suggested Readings:

1. Cavusgil, S. T., Knight, G. and Riesenberger, J. (2020). *International Business: The New Realities*. Fifth edition (Global edition). London: Pearson.
2. Salvatore, D. (2013). *International Economics*. Eleventh Edition. USA: Wiley.

Additional Reading:

Krugman P. R., Obstfeld, M. and Melitz, M. J. (2018) *International Economics: Theory and Policy*. (11th edition). Pearson.

Notes:

1. Suggested readings shall be updated and uploaded on the college website from time to time.
2. Examination scheme and mode shall be prescribed by the Examination Branch, University of Delhi from time to time.

B.A. (VS) MATERIALS MANAGEMENT

DSC: 5.3 BUSINESS ANALYTICS IN SCM

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
BUSINESS ANALYTICS IN SCM (DSC: 5.3)	4	2	-	2	Pass in Class XII	Basics of Statistics

Learning Objective: To make students to learn data-driven decision making and learn the basics of the business analytics in logistics and supply management. To familiarise students with basics of predictive and prescriptive analytics in order to solve some business problems using different types of data. Students should be able to solve business problems, analyse data sets using various relevant statistical software packages, and interpret and effectively communicate the result

Learning outcomes:

After completion of the course, learners will be able to:

1. analyze data practices within the organization to identify opportunities for improvement.
2. recognize cultural barriers to data-driven decision making and propose solutions to overcome them. Apply the six steps of the data-driven decision-making model to solve business problems.
3. interact with MongoDB as a document store and understand the concept of graph stores and comprehend the key functions and utility of big data technologies, including Hadoop and MapReduce.
4. recognize the different ways data enters an organization and the forms it takes as it is stored and used.
5. differentiate and explain the three Vs of data (volume, velocity, variety) and their impact on analysis.

Unit 1: Disruptions in Business

9 hours

Challenges: Identify hurdles to becoming a data-driven organization - Opportunities: Analyze data practices in the organization - Identify how data can benefit the organization - Distinguish how to be a proactive data practitioner, Introduction to Business Analytics: Role of Analytics for Data Driven Decision Making; Types: Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics. Introduction to the concepts of Big Data Analytics, Web and Social Media Analytics. Overview of Machine Learning Algorithms. Introduction to relevant statistical

software packages and carrying out descriptive analysis through it.

Unit 2: Business analytics Pre- Requisites and Predictive analytics

9 hours

Business Analysis Principles: Identify the categories of analytical people - Distinguish and define roles and responsibilities of professionals in data analysis - Data Driven Decision Making: Identify cultural barriers - Distinguish solutions to cultural and cross-functional barriers - Identify six steps of the data-driven decision-making model.

Simple Linear Regression: Estimation of Parameters, validation of simple linear regression model, Coefficient of determination, Significance tests, Residual analysis, Confidence and Prediction intervals. Multiple Linear Regression: Interpretation of Partial regression coefficients, working with categorical variables, Multi-collinearity and VIF, Outlier Analysis, Auto-correlation, transformation of variables, variable selection in regression model building.

Unit 3: Business analytics Ecosystems

9 hours

Relational Databases: Nature of relational databases - Purpose of the SQL language – Key aspects of ACID - Meaning of ETL - Not Only SQL: Big data and other data storage tools - Interacting with MongoDB - Document stores and graph stores, Utility of Hadoop - Purpose of MapReduce - Statistical Tool, Machine Learning, and Data Visualization: Tools for statistical analysis – Python/ R - Purpose of machine learning - Visualization tools.

Logistic and Multinomial Regression: Logistic function, Estimation of probability using logistic regression, Omnibus Test, Wald Test, Hosmer Lemshow Test, Pseudo R Square.

Unit 4: Data life cycle management and Decision Trees

10 hours

Data Life Cycle: Identify the stages in the data life cycle - Data in the organization: Distinguish between ways that data enters the organization - Identify the forms data takes as it is stored and used within the organization.

Decision Trees: Introduction, Chi-Square Automatic Interaction Detection, Bonferroni Correction, Classification and Regression Tree, Gini Impurity Index, Entropy, Cost based splitting Criteria, Ensemble Methods, Random Forest.

Unit 5: Clustering and Requirement gathering

8 hours

Clustering: Introduction, Distance and Dissimilarity measures used in clustering, Quality and Optimal Number of clusters, Clustering Algorithms, K-Means clustering, Hierarchical Clustering Requirements gathering process: Analyze why requirement gathering process is critical to proper analysis - 3 V's of data: Distinguish between the ways data is consumed (the three V's of data) - Customer journey map: Understand how requirement gathering fits with the development of a customer journey map - Distinguish between the stages of the customer journey map

Practical Exercises

1. You are a data analyst working for a mid-sized retail company. The company has recognized the importance of becoming a data-driven organization to stay competitive in the market. However, they are facing several challenges in this transformation. As part of the analytics team, you are tasked with addressing these challenges and identifying opportunities for leveraging data practices to benefit the organization. Prepare and import data (financial data of companies, macroeconomic data, primary data collected through questionnaires). Calculate and interpret descriptive statistics on R/Python
2. You have recently been hired as a business analyst for a large multinational company. Your role involves working with different teams and departments to analyze data and provide insights to support data-driven decision-making. However, you have noticed that there are cultural and cross-functional barriers within the organization that hinder the effective use of data and analytics. As a business analyst, it is crucial for you to understand the categories of analytical people, define the roles and responsibilities of professionals in data analysis, and identify solutions to overcome cultural barriers and promote data-driven decision-making.
3. Perform simple OLS regression on R/Python and interpret the results obtained. Test the assumptions of OLS (multicollinearity, autocorrelation, normality etc.) on R/Python.
4. You are working as a data analyst in a technology startup that collects and analyzes large amounts of data from various sources. Your role involves managing and analyzing data using relational databases, exploring alternative data storage tools, and utilizing statistical and machine learning techniques for data analysis and visualization. You are also responsible for selecting appropriate tools for statistical analysis and data visualization to effectively communicate insights to stakeholders.
5. You have recently joined a data management team in a large corporation. Your role involves understanding and managing the data life cycle within the organization. You need to have a clear understanding of the stages in the data life cycle, how data enters the organization, and the various forms data takes as it is stored and used within the organization. Apply and interpret the results of decision trees and clustering models on R and Python.
6. You have been assigned as a business analyst for a software development project that aims to create a new e-commerce platform. Your role involves gathering requirements from various stakeholders, understanding the characteristics of data consumption (the 3 V's of data), and aligning the requirement gathering process with the development of a customer journey map. Additionally, you need to have a clear understanding of the different stages of the customer journey map.

7. You are also required to perform regression analysis with categorical/dummy/qualitative variables on R/Python. Perform probabilistic regression models (logit and probit) along with validation tests and classification table on R/Python

SUGGESTED READINGS:

- Chen, H., Chiang, R. H., & Storey, V. C. (Eds.). (2012). *Business Intelligence and Analytics: From Big Data to Big Impact*. Springer.
- Davenport, T. H., & Harris, J. G. (2017). *Competing on Analytics: The New Science of Winning*. Harvard Business Review Press.
- Evans, J. R., & Patton, R. J. (2020). *Business Analytics: Methods, Models, and Decisions*. Cengage Learning.
- Gupta, R. (2019). *Business Analytics: Principles, Concepts, and Applications*. Pearson.
- Kumar, U. D. (2017). *Business Analytics: The Science of Data Driven Decision Making (1st ed.)*. Wiley India.
- Larose, D. T., & Larose, C. D. (Eds.). (2021). *Data Science and Business Analytics with R*. CRC Press.
- Mitra, S., & Singh, M. (2018). *Big Data Analytics in Business*. In S. Banerjee & C. Paul (Eds.), *Handbook of Research on Big Data Analytics for Business* (pp. 45-68). IGI Global.
- Shmueli, G., Bruce, P. C., Gedeck, P., & Patel, N. R. (2019). *Data Mining or Business Analytics – Concepts, Techniques, and Applications in Python*. Wiley.
- Mueller, A. C., & Guido, S. (2016). *Introduction to Machine Learning with Python*. O'Reilly Media, Inc.
- Provost, F., & Fawcett, T. (2019). *Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking*. O'Reilly Media.
- Winston, W. L., & Albright, S. C. (2017). *Practical Management Science: Spreadsheet Modeling and Applications (6th ed.)*. Cengage Learning.
- Provost, F., & Kohavi, R. (Eds.). (2018). *The Cambridge Handbook of Data Science*. Cambridge University Press.
- Liu, J., & Motwani, R. (2019). *Business Intelligence and Analytics*. In A. Tucker (Ed.), *Wiley StatsRef: Statistics Reference Online*. Wiley.

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advantages and disadvantages of leasing as a special purchase system for XYZ Company. Compare the financial implications of leasing versus outright purchase and discuss the factors that should be considered when deciding between the two options.

4. XYZ Corporation is considering implementing online purchasing as part of their procurement strategy. Discuss the concept of online purchasing and its advantages for XYZ Corporation. Provide examples of specific situations where online purchasing can offer significant benefits over traditional purchasing methods. Prepare the step-by-step procedure that XYZ Corporation should follow to successfully conduct online purchasing.

Suggested Readings

- Bailky, P., & Farmer, D. (Year). Purchasing Principles and Techniques. Pitman.
- Chunawalla, S.A. (Year). Materials and Purchase Management. Himalaya Publishing House.
- Dutta, A.K. (Year). Materials Management: Procedures, Text and Cases. Prentice Hall of India Pvt. Ltd.
- Gopalakrishnan, P., & Sundareson, M. (Year). Materials Management: An Integrated Approach. Prentice Hall of India Pvt. Ltd.
- Shah, N.M. (Year). An Integrated Concept of Materials Management. Indian Institute of Materials Management, Baroda Branch, Baroda.
- Sharma, S.C. (Year). Material Management and Materials Handling. Khanna Publishers.
- Pooler, V.H. (Year). Purchasing and Supply Management: Creating the Vision. Chapman & Hall.
- Lee, L., & Dobler, D.W. (Year). Purchasing and Materials Management. McGraw Hill.
- Zenz, G.J. (Year). Purchasing and the Management of Materials. John Wiley
- <https://www.india.gov.in/spotlight/government-e-marketplace-procurement-made-smart#tab=tab-1>

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