GUJARAT TECHNOLOGICAL UNIVERSITY

Programme: Master of Business Administration, 3rd Semester
Branch: Logistic & Supply Chain Management
Subject Name: Supply Chain Analytics
Subject Code: 1539708

Learning Outcome:

Learning Outcome Component	Learning Outcome (Learner will be able to)
Business Environment and Domain Knowledge (BEDK)	Develop the understanding & Examine the application of analytics in supply chain.
Critical thinking , Business Analysis ,Problem solving & Innovative solutions (CBPI)	Analyze & evaluate the utility of analytical tools, techniques & technology in creating efficiency & effectiveness, in demand forecasting, operations, logistics & distribution management.
Global Exposure & Cross Cultural Understanding (GECCU)	Analyze the current global Supply chain Analytics practices & deduce the applicability of these practices in providing solutions to organization problems /decision making requirements.
Social Responsive & Ethics (SRE)	Judge the critical managerial & ethical issues in using supply chain logistics.
Effective Communication (EC)	Evaluate and communicate results of analysis and technical information to both technical and non-technical audiences through verbal, written and graphical reporting.
Leadership & Teamwork (LT)	Collaborate with team members to design a framework for a given business problem using Supply chain analytics solutions.

LO - PO Mapping: Correlation Levels:
1 = Slight (Low); 2 = Moderate (Medium); 3 = Substantial (High), "- "= no correlation

Sub. Code:	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
Develop the understanding & Examine the application of analytics in supply chain.	3	3	1	-	2	2	1	2	-
Analyze & evaluate the utility of analytical tools, techniques & technology in creating efficiency & effectiveness, in demand forecasting, operations, logistics & distribution management.	2	3	3	-	2	2	1	2	1
Analyze the current global Supply chain Analytics practices & deduce the applicability of these practices in providing solutions to organization problems /decision making requirements.	1	3	3	-	3	2	1	2	1
Judge the critical managerial & ethical issues in using supply chain logistics.	2	2	2	1	2	1	3	1	1
Evaluate and communicate results of analysis and technical information to both technical and non-technical audiences through verbal, written and graphical reporting.	1	-	1	3	1	3	-	2	-

Collaborate with team members to design a framework for a given business problem using Supply chain analytics solutions.	1	-	1	3	1	3	-	2	-

1. **Course Duration:** The course duration is of **40 sessions of 60 minutes each.**

2. **Course Contents:**

Module No:	Contents	No. of Sessions	70 Marks (External Evaluation)
I	**Introduction of SCA:** Internet Era and Shift in Supply Chain, Challenges of Modern Supply Chains, Supply Chain Management Framework, Definition and Meaning of Supply Chain Analytics, Core Components & Types of Supply Chain Analytics, Working of Supply Chain Analytics, Importance of SCA, Big Data in Supply Chain, Benefits of Analytics, B2B Intergradation **Basics of Matrices and KPIs** Strategic Goals (Increase Profitability, Forecast Accuracy, Working Capital Management, Risk Management), Strategic Considerations (Top Down V/s Bottom Up and Positive V/s Negative Variance), Models (Maturity, Reference, Benchmarking)	10	17
II	**Analytical Foundations:** Predictive Analytics Bias-Variance Trade Off, Linear Models, Matrix Formation, Generalized Least Squares (GLS), Dealing with Endogeneity Problems, Regularization, Classification and Time Series Methods **Prescriptive Analytics** Taylor's Expansion, Convexity, Newton's Method, Gradient Descent Method, Lagrange Optimization Method. **Steps/Stages of Supply Chain Analytics** Identify the Business Problem, Find Your Data, Choose the Right Team, Select the Right Tools, Start Small – Think Big, Measure Success, Six Things to Avoid	10	18
III	**Modelling in Supply Chain Analytics** Uncertainty Modelling V/s Demand Forecasting, Evolutionary Dynamics of Uncertainty (Additive & Multiplicative Demand Models), Integration of Uncertain Elements in a Unified Model, Demand Regularization **Supply Chain Responsiveness:**	10	18

	Lead Time Reduction, Multiple Sourcing, Quantity Flexibility Contracts, Multiple and Sequential Ordering Problems, Multiple Ordering in a Multi-echelon Model **Managing Product Variety:** Mean-Variance Analytics for Product Selection, Resource Allocation and Capacity Management, Mutiple Ordering Model with Multiple Products, Product Proliferation Model, Operational Excellence		
IV	**Managing Supply Risk** Type-1 Disruption Risk, Type-2 Disruption Risk, Type-3 Delivery Shortfalls, Implications of the Shipment Ownership for Global Trade **Contemporary Issues in Supply Chain Analytics** Growing Pace and Variety of Data (Social Data, IoT, Mobile Data), Integrated and Embedded in SCA, Cognitive Analytics, Artificial Intelligence in SCA, Activation Functions, Model Training, ANNs in Inventory Management, etc.	10	17
V	**Practical:** ○ Select a recent case study or article on supply chain analytics, focusing on its context, importance, framework, and tools. Analyze key issues, such as descriptive analytics, the bullwhip effect, and decision domains, and discuss the use of spreadsheet and visualization tools. Evaluate modelling, simulation, predictive modelling, and prescriptive analytics methods discussed. Provide recommendations for leveraging analytics in supply chain decision-making. Present findings in a structured report format, citing relevant sources. Uses of Spreadsheet / Tableau/POWER BI in Supply chain Analytics	---	(30 marks CEC)

3. **Pedagogy:**
   - ICT enabled Classroom teaching
   - Case study
   - Practical / live assignment
   - Interactive class room discussions
4. **Evaluation:**

Students shall be evaluated on the following components:

A	**Internal Evaluation**	**(Internal Assessment- 50 Marks)**
	• Continuous Evaluation Component	30 marks
	• Class Presence & Participation	10 marks
	• Quiz	10 marks
B	**Mid-Semester examination**	**(Internal Assessment-30 Marks)**
C	**End –Semester Examination**	**(External Assessment-70 Marks)**

5. Reference Books:

No.	Author	Name of the Book	Publisher	Year of Publication / Edition
1	Isik Bicer	Supply Chain Analytics: An Uncertainty Modeling Approach	Springer	Latest
2	Mark Morley	Supply Chain Analytics for Dummies	John Wiley & Sons, Ltd	Latest
3	Rabindranath Bhattacharya & Anindita Maitra Bhattacharya	Supply Chain Analytics: Strategies, Models and Solutions	SAGE	Latest
4	Sunil Chopra and Peter Meindle	Supply Chain Management	Pearson	Latest Edition
5	Jeremy F. Shapiro	Modeling the Supply Chain	Duxbury Thomson Learning	Latest Edition
6	D. Simchi-Levi, P. Kaminsky, E. Simchi-Levi, and Ravi Shankar	Designing andManaging the Supply Chain concepts, Strategies and Case studies	TataMcGraw Hill, New Delhi	3rd Edition
7	Rahul Saxena & Anand Srinivasan	Business Analytics	Springer	Latest Edition
8	Lora M. Cecere	Supply Chain Metrics that Matter	Wiley	Latest Edition

Note: Wherever the standard books are not available for the topic appropriate print and online resources, journals and books published by different authors may be prescribed

6. List of Journals / Periodicals / Magazines / Newspapers / Web resources, etc.

1. Journal of Operations Management: Covers topics related to supply chain analytics, including frameworks, tools, and key issues in SCM.
2. Supply Chain Management Review: Provides insights into the importance of analytics in supply chain management and the use of analytics in various SCM flows.
3. Harvard Business Review: Offers articles on supply chain analytics concepts, such as descriptive analytics, the bullwhip effect, and decision domains.
4. International Journal of Production Economics: Publishes research on modelling and simulations for supply chain analytics, predictive modelling techniques, and prescriptive analytics foundations.
5. MIT Sloan Management Review: Provides articles on the role of analytics in SCM, including network planning, logistics network design, and performance optimization.