Syllabus for the PG Elective Courses Offered by the Centre of Excellence in Logistics and Supply Chain Management, NIT Calicut focusing on Capacity Building to Promote PM Gati Shakti Scheme

(Applicable from 2023 Admission onwards)

Centre of Excellence in
Logistics and Supply Chain Management
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
NIT Campus PO, Kozhikode 673601, Kerala

LIST OF COURSES

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1	GS6001E	Air Cargo Logistics Management	3	0	0	6	3
2	GS6002E	Digital Innovations and Technology in Supply Chain Management	3	0	0	6	3
3	GS6003E	Agri-Food Supply Chain Management	3	0	0	6	3
4	GS6004E	Sustainable Supply Chain	3	0	0	6	3

GS6001E AIR CARGO LOGISTICS MANAGEMENT

Pre-requisites: Nil

Total Lecture Sessions: 39

L	T	P	O	C
3	0	0	6	3

Course Outcomes:

CO1: Demonstrate the concept of air cargo operations.
CO2: Apply data analytics tools and techniques for air cargo handling and management.
CO3: Discover best practices across the industry.
CO4: Illustrate how technology is transforming traditional ways of doing business.

Basics of Air Cargo Operations - Understanding basics of air cargo operations; Activity/operation of key players in air cargo service such as Shipper, Forwarder, Airline, Airports, Consignee, Coordination and contract in air cargo supply chain; Complexity in air cargo operations

Role of Analytics & Digitization in Air Cargo Management - Demand analytics, Capacity planning, Revenue management, Terminal operations & Cargo Handling, Fleet routing and flight scheduling, Decision making under risk and uncertainty, Applications of various AI/ML and optimization models in air cargo operations, Information technology and GIS for managing air cargo operations

Case Studies/ Real life applications - Cold Logistics – food, flower and medicines, Heavy-lift air transportation, Humanitarian operations using Air Transport, Applications of Geospatial Technologies in Air Cargo Handling and Management, Sustainable Intermodal Freight Transportation, Optimizing Periodic Maintenance Operations

References

[1] Sales, M., 2016, *Air cargo management: Air freight and the global supply chain,* Routledge.
[2] Sales, M., 2016, *Aviation logistics: the dynamic partnership of air freight and supply chain,* Kogan Page Publishers.
[3] Thompson, J. F., Brecht, P. E., and Hinsch, T., 2002, *Refrigerated trailer transport of perishable products* (Vol. 21615), UCANR Publications.

GS6002E DIGITAL INNOVATIONS AND TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT

L	T	P	O	C
3	0	0	6	3

Pre-requisites: Nil

Total Lecture Sessions: 39

Course Outcomes:

CO1: Understanding of existing supply chain and its challenges.
CO2: Illustrate the opportunities for supply chain transformation.
CO3: Application of innovation and IT frameworks in the supply chain context of their domain.
CO4: Designing appropriate strategies to mitigate the cyber risk towards efficient modern supply chain.

Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) Environment & Business Needs; Understanding IT challenges and integrated business processes in supply chain and logistics; Opportunity Identification for Digital Transformation; Business models and Innovation frameworks for supply chain; Enterprise Systems for Supply chain, Data Lake and Data Integration.

Emerging technologies for Digital Transformation of supply chain; Application of AI, ML, IOT, Blockchain, Robotics & Automation, and Drone technologies; Platform Economy and Eco Systems. Product life cycle management for supply chain; Technology life cycle for supply chain management.

Web technologies & e-SCM applications, Understanding Risk & Cyber-attacks in supply chain; Security Controls and Information Security Posture; Cryptographic Algorithms and hashing systems, Analyzing and assessing the risks; Strategies for successful implementation and use-cases.

References

[1] Carnovale, S., and Yeniyurt, S., 2021, *Cyber Security and Supply Chain Management: Risks, Challenges, and Solutions* (Vol. 1). World Scientific.
[2] Chopra, S., and Kalra, D. V., 2019, *Supply Chain Management: Strategy, Planning and Operations*. Pearson Education, Singapore.
[3] Delfs, H., and Knebl, H., 2007, *Introduction to Cryptography: Principles and Application*s, Springer.
[4] Pagano, A. M., and Liotine, M., 2019, *Technology in supply chain management and logistics: Current practice and future applications*, Elsevier.
[5] Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E., and Shankar, R., 2019, *Designing and Managing the Supply Chain: Concepts, Strategies and Case studies*, McGraw-Hill.
[6] Vyas, N., Beije, A., and Krishnamachari, B., 2019, *Blockchain and the supply chain: concepts, strategies and practical applications*, Kogan Page Publishers.

GS6003E AGRI-FOOD SUPPLY CHAIN MANAGEMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

CO1: Understand the fundamentals and cross-functional perspectives of agri-food supply chain.
CO2: Apply the best practices in agri-food supply chain management for performance improvement.
CO3: Demonstrate Geospatial technology in an agri-food supply chain.

Concept of agricultural food supply chain - Introduction to agri-food supply chain management, Food production - Entities in the agriculture supply chain, Agriculture and poverty alleviation, The barriers to the development of the agri-industry. Operations Management in an agri-food supply chain - agri-food silos, storage of agri-food, interdepartmental linkage, public procurement and distribution system, Railway Vs Airways, issues in interface complexities of vegetable supply chain, cold supply chain management. Food manufacturing - The importance of food processing, Changing market conditions, Food processing, Application of Geospatial Technologies for agriculture.

Resource Utilization - Essentials of farm business management and sustainability, Efficient, effective, and sustainable use of resources. Human resource management in an agri-food supply chain management. Food safety and quality - Food laws and regulation, Food innovation - Classification of innovation methods, Product development in food supply chains, Innovations within food supply chains.

Infrastructure development for the food sector - Food hubs, Food Logistics - Movement of food, Applications of logistics in agri-food supply chain. Digital supply chain management in the era of circular and sustainable economy - ICT future trends in agri-food logistics, Application of Geospatial Technologies to map and track Food Supply Chains, Circular economy in agri-food supply chain. Packaging in logistics, Temperature-controlled supply chains. International food supply chains, Food security and future challenges - challenges in international food supply chains, Factors affecting the future of international food systems, Managing challenges in international food supply chains.

References

[1] Pullman, M., and Wu, Z., 2011, *Food supply chain management: Economic, Social and Environmental Perspectives*, Routledge.
[2] Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E., and Shankar, R., 2019, *Designing and Managing the Supply Chain: Concepts, Strategies and Case studies*, McGraw-Hill.
[3] Schönsleben, P., 2016, *Integral Logistics Management: Operations and Supply Chain Management within and Across Companies,* CRC Press.
[4] Govil, M., and Proth, J-M., 2002, *Supply Chain Design and Management: Strategic and Tactical Perspectives*, Academic Press, San Diego.
[5] Wisner, J. D., Tan, K-C., and Leong, G. K., 2016, *Principles of Supply Chain Management: A Balanced Approach*, Cengage.

GS6004E SUSTAINABLE SUPPLY CHAIN

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

CO1: Understand the aspects in sustainable supply chains.
CO2: Analyse performance measures to achieve sustainability in supply chain operations.
CO3: Evaluate environmental, social, and governance risks in end-to-end supply chains.
CO4: Develop a diagnostic analysis of sustainability in supply chain operations using relevant policies and standards.

Sustainable development frameworks - Sustainable Development Goals, other frameworks, inclusiveness and resilience in supply chain.

Sustainability strategies - Cases, examples, best practices, Statement on sustainable development strategy, Policy commitments Embedding policy commitments, Processes to remediate negative impacts, Mechanisms for seeking advice and raising concerns, Compliance with laws and regulations 28 Membership associations.

Sustainable logistics - Cases, examples, best practices, Activities, stakeholders, Types and Environmental Management, Concept of Green Logistics, Green Transportation, Carbon Foot print Analysis, Vehicle Routing, Tools For modelling environmental Impacts LCA.

Environmental dimension - Materials, Energy, Water and Effluents, Biodiversity Emissions, Waste, Supplier Environmental Assessment. Emerging energy technologies in supply chain operations.

Social (including safety) dimension - Employment, Labor/Management Relations, Occupational Health and Safety, Training and Education, Diversity and Equal Opportunity, Non-discrimination, Freedom of Association and Collective Bargaining, Child Labor, Forced or Compulsory Labor, Security Practices, Rights of Indigenous Peoples, Local Communities, Supplier Social Assessment.

Governance - Governance structure and composition, Nomination and selection of the highest governance body, Chair of the highest governance body, Role of the highest governance body in overseeing the management of impacts, Delegation of responsibility for managing impacts, Role of the highest governance body in sustainability reporting, Conflicts of interest, Communication of critical concerns, Collective knowledge of the highest governance body, Evaluation of the performance of the highest governance body, Remuneration policies, Process to determine remuneration, Annual total compensation ratio.

Value creation - Financial, manufactured, intellectual, human, social and relationship, natural capitals and value creation from these with the business model.

References

[1] McKinnon, A., Browne, M., Poecyk, M., and Whiteing, A., 2015, *Green Logistics: Improving the Environmental Sustainability of Logistics*, Kogan Page Publishers.
[2] Modak, P., 2021, *Practicing Circular Economy*, CRC Press.
[3] Grant, D. B., Trautrims, A., and Wong, C. Y., 2017, *Sustainable Logistics and Supply Chain Management: Principles and Practices for Sustainable Operations and Management*, Kogan Page Publishers.