Dept. of Industrial and Systems Engineering, IIT Kharagpur

Course Name # Logistics Systems and Management

Course Objectives

The five primary objectives of this course are:

1. Introduce the analytic model based approach for solving logistics problems,
2. Reinforce the importance of using total supply chain costs in all analyses,
3. Provide students with techniques for measuring and managing movement of materials/products throughout the supply chain,
4. Provide students with the idea of using big data for logistics problem solution, and
5. Introduce the idea of using segmentation and a portfolio of solutions, rather than a single approach, for real-world logistics problems.

Course outline

. The course material is designed from an engineering management perspective, with an emphasis on where and how specific tools can be used to improve the overall performance and improve the efficiency of a Logistics system. There is a strong emphasis on the development and use of fundamental models to illustrate the underlying concepts involved in both intra- and inter-company logistics operations. The following topics are covered: Introduction to Logistics, Value and Logistics costs, Capacity and demand management, Warehousing, Advanced Network analysis, Transportation Operations and Management, Optimization of Transportation Carrier Operations, Sourcing, Location- Allocation problems, Facility location algorithms, Reverse logistics, Shipping logistics and Global logistics. In addition to model development, the course uses research papers and examples from multinational organizations to provide illustrations of the concepts of logistics in practice across the globe.

Course Schedule

Sessions	Topic	Lect. Hours
1&2	Introduction to Logistics- Definition, Logistics: a System concept, Strategy and factors, Customer value chain, various functions of logistics, Logistics for business excellence	2
3&4	Value and logistics costs, Logistics performance indicator and its interpretation	2
5&6	Capacity and Demand Management, Order Management	2
7,8,9 &10	Warehouse Location and product allocation- Discreet space location problems- Qualitative, Quantitative and Hybrid methods; Continuous Space location problem- Median, Contour line, Weiszfeld methods; Set Covering Models	4
11,12,13&14	Warehouse Management and Material handling, Packaging: packaging as unitization, Design consideration, packaging material and cost	4
15 and 16	Warehousing and Risk pulling- Single and multiple warehousing: Inbound and outbound real life distribution problems; Cross docking; Extension to multi - echelon problems, solutions and comparison; Regression analyses for rate calculations;	2
17, 18, 19 and 20	Strategic sourcing- Sourcing systems, processes and World class fit; Supply Network; TCO; ROI; Supply positioning model; Supplier Selection Models like AHP, TOPSIS and combination;	4
21,22,23,24,25&26	Logistics network design: Application of different OR techniques (such as mathematical modeling, linear programming, integer programming, network optimization (shortest paths, minimum spanning trees, minimum cost network flows, maximum flows) to problems arising in transportation. Vehicle routing problem, Route Planning	6
27,28	Concept and Advantages of Multimodal Transport; Dimensions of Multimodal	2

	Transport; Multi-Modal Operations: Ro-Ro, Piggy back, Land bridge, Marshalling, Pallets, Containers and ULDs, and other forms of Operations, Context & Regulation of Multi-Modalism in India; Challenges in development of Multi-modalism In India	
29, 30,31,32	Closed loop operation/Reverse Logistics-Product acquisition, grading and disposition decisions, Reverse logistic Network Configuration and Modeling, Multi objective facility location of CLSC network	2
33&34	Shipping Logistics: Port and terminal Management, Stockyard Management, Crane Scheduling Cargo handling and storage etc.	4
35&36	Managing Global Logistics- Getting goods shipped; Freight inbound and outbound: Cross border problems; Exchange/credit risk; Getting paid; Regulatory hurdles; Inco terms. Concept of E logistics	2
37,38,39 &40	Logistics game and Simulation, Case studies	4
	Total	40

N.B: Computer package is to be used to assist solution. The techniques will be demonstrated with a range of case studies drawn from the field of logistics including transportation, supply chain configuration, ware house design and layout, container port layout and vehicle routing.

Text Books

1. Supply Chain Network Design- Applying Optimization and Analytics to the Global Supply Chain by Michael Watson, Sara Lewis, Peter Cacioppi, and Jay Jayaraman (FT Press Operations Management).2013, Pearson Education.
2. Business Logistics/Supply Chain Management (Fifth Edition) by Ballou with CD-ROM Paperback – 2007, Pearson Education

3. Contemporary Logistics: Global Edition by Paul R. Murphy, Donald Wood, 11th Edition 2015, Pearson Education

References

4. Sudalaimuthu , S. Raj, S. Anthony. Logistics Management for International Business: Text and Cases. Prentice-Hall of India Pvt. Ltd.
5. Research papers, Handouts and Power Point presentations

Credit

It is a **40 hours** course with and worth **Three** units of credits

Assessment

Case studies Presentations: 10%

Project 10%

Mid Term 30%

End Term 50%

TOTAL; 100%

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