

INDU 498
Logistics Network Models

Instructor: Dr. Ali Akgunduz, Office: EV 4.217, Tel: 514-848-2424 ext 3179

Text Book:

1. Introduction to Logistics Systems Planning and Control, G. Ghiani, G. Laporte, R. Musmanno, Wiley, 2003, ISBN : 0-470-84917-7
2. Airline Operations and Scheduling, M. Bazargan, Ashgate, 2009, ISBN: 978-0-7546-3616-8

Calendar Description

Overview of transportation systems: airlines, railways, ocean liners, cargo, energy transportation and pipelines; supply chain characterization; site location; distribution planning; vehicle routing; fleet scheduling; crew scheduling; demand management; replenishment management; revenue management; geographic information systems; and real-time control issues; term project.

Rational

Globalism has become an unavoidable nature of both manufacturing and service enterprises. Transportation of goods and services rapidly and effectively around the world is crucial for companies in order to survive in the highly competitive marketplace. Industrial engineers are trained to help their organizations to manage their supply-chains. The course will target transportation system which is an important topic in supply-chain management. Students will be equipped with tools to address challenges of the global economy.

Soft skills

Application of math and operations research in business systems

Prerequisites

INDU 324: Industrial Operational Research II

COURSE OUTLINE

- 1 INTRODUCTION:
 - Overview of transportation systems
 - Airlines
 - Railways-Freight systems
 - Ocean liners
 - Energy transportation-Pipelines
 - Telecommunication networks
 - Ground carriers
 - Logistic issues for companies
- 2 SUPPLY CHAIN MODELS
 - Demand chains
 - Demand optimization

Distribution resource planning

- 3 **TRANSPORTATION NETWORK DESIGN**
 - Classification of location selection models
 - Single level, single product, location selection models
 - Two level, multi product, location selection models
 - Locations selection models for government agencies

- 4 **LONG DISTANCE LOGISTIC NETWORK DESIGN**
 - Classification of logistic problems
 - Network design for cargo carriers
 - Constant cost network designs
 - Time-space network designs

- 5 **SHORT DISTANCE LOGIC TIC NETWORKS**
 - Travelling salesmen problems
 - Vehicle routing problems
 - Operator routing problems
 - Solution techniques for network models

- 6 **SCHEDULING IN NETWORKS**
 - Vehicle Scheduling
 - People scheduling: Crew, operator, Equipment

- 7 **REVENUE OPTIMIZATION IN NETWORK SYSTEMS**
 - Airlines, Freight, Ocean liners and Cargo carriers
 - Energy networks-pipelines and Telecommunication

Evaluation:

Midterm	30 %
Assignments	5 %
Term Project	25 %
Final exam	40%

Project:

Groups may consist up to 4 students. Each group will design one of the following networks

- 1. A startup airline company flying up to 10 destinations using 4 different aircraft types. Total budget of the startup company is \$10 million. The startup funds will be used for leasing aircrafts and operating expenses.**
- 2. A network design for blood collection and distribution. This will be a non-profit organization has 2 million budget to design a blood collection and distribution network in Canada.**
- 3. A network design to sell olive products, which are imported from Europe, in North American. Products are available only in internet. Total budget of the company is \$100K.**
- 4. Design a network model for snow removal work during winter in the island of Montreal. Total budget of the organization is \$2 million/year.**