+++ Course Description

This course introduces quantitative techniques and state-of-the-art practices of Operations Research relevant to the strategic and tactical design and management of logistical and transportation systems.

We discuss a wide variety of passenger and freight systems, including air, motor and rail systems. For airlines, we cover the practice of revenue management, fleet assignment and crew scheduling. We examine modern distribution networks, their connection to transportation decisions, and their role in integrated supply chains. We will study models for transportation, transshipment, stocking and supply-chain design. We also focus our attention on urban and highway traffic networks, where we cover models for traffic flow and traffic forecasting. Finally, we investigate the role of Intelligent Transportation Systems (ITS) in alleviating traffic congestion.

Through case studies, we study successes and failures in third-party logistics, distribution, traffic management, and air, truck and rail pickup and delivery systems. We explore how large-scale integrated logistics and transportation systems interact directly with the social, political, and economic agents of society, and study the underlying principles governing transportation planning, investment, operations, and maintenance.

This course should appeal to Masters (EMS, IE, OR and FE) and undergraduate students (EMS, IE and OR) in the IEOR department, and students with some quantitative background from the Civil Engineering & Engineering Mechanics department and the Architecture, Planning and Preservation department.

+++ Course outline

* What is logistics
* Airlines
* Revenue management
* Fleet assignment problems
* Crew scheduling problems
* Railroads
* Costing and pricing for transportation
* Distribution systems
* Motor carriers
* Traffic flow models and traffic flow parameters
* Travel demand and traffic forecasting
* Intelligent transport systems

+++ Case studies

* Deere and company worldwide logistics
* Holt Renfrew
* Grocery gateway: customer delivery operations
* Benetton A
* The future of same-day delivery: same as the past?
* Frito-Lay: the backhaul decision
* Transland shipping: dealing with cross-border logistics barrier
* Road building or road pricing?
* Burlington Northern A
* Building Sustainable Distribution at Walmart Canada
* Amazon.com’s European Distribution Strategy
* DR Corporation
* Totaline Transport
* DHL Worldwide Express

+++ Required textbooks

* Transportation- a supply chain perspective, 7th edition (978-0324789195)
* Principles of highway engineering and traffic analysis, 5th edition (978-1118120149)

+++ Evaluation

Participation (5%)
Assignments (25%)
Case presentation (20%)
Midterm (15%)
Exam (35%)

Midterm and exam are closed text and closed notes. You can use two (2) one-sided 8.5" by 11" sheets with formulas.

All examinations and written homework are subject to the usual standards of academic honesty as described in the University's Student Handbook