Transportation and Logistics represent vital activities for our societies. Logistics covers the set of planning, management, and control activities that have to do with the procurement of direct and indirect materials and supplies, the production of goods and services, the flow of materials (supplies, products, …), information (plans, reports, orders, …), and funds, and the distribution and delivery of goods and services for the utmost satisfaction of customers and the profitability of the firm. Freight transportation is part of these activities. In fact, transportation enables most - all? - economic and social human activities.

The contemporaneous paradigms of political, economic, and technological developments - e.g., larger political/economic economic spaces, globalization of economic and social activities, continuous increase in computing and communication power, the Internet, increased environmental concerns, to name but a few - augment the pressure for efficient logistics and transportation operations. Decision Technologies and Operations Research in particular offer the means to design powerful models and methods to assist addressing these issues and challenges by enhancing the planning and management of operations.

The scope of this intensive five days course is to examine some of these issues and challenges and present fundamental Operations Research-based methodologies proposed to address them. We will focus on modelling issues, but will also aim to enhance the understanding of the corresponding solution methods. Standard software will be used to experiment with models, methods, and strategies.

A “reference” text:

Plan

1. Monday
   a. Introduction. Logistics and Transportation. Planning levels
   b. Modelling and Operations Research
   c. Review Linear Programming modelling and resolution

2. Tuesday
   a. Design of the logistics chain. Consolidation and fixed costs
   b. Vendor selection
   c. Location-allocation
   d. Hub location and location of vehicle terminals with balancing requirements
   e. Perspectives: multi-level location and planning, p-median, etc.

3. Wednesday
   a. Consolidation carriers: railways, less-than-truckload, shipping, ...
   b. Service network design: selecting services, frequencies, cargo itineraries, terminal workloads, ...
   c. Frequencies and schedules
   d. Static versus time-dependent approaches

4. Thursday
   a. Fleet (empty vehicle) management, resource allocation
   b. Issues and models for consolidation carriers
   c. Customized, door-to-door transportation (motor carriers)
   d. The need for dynamic and stochastic approaches

5. Friday
   a. Electronic business, E-logistics, transportation
   b. Procurement, Smart markets, Market design
   c. Bundle (combinatorial) trading
   d. Participating to e-markets
   e. Intelligent Transportation Systems (ITS)
   f. General conclusions