Transportation Center Seminar Series presents.....

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Inventory Routing Problems

Thursday, April 21, 2009
4:00 – 5:00 pm

Refreshments available at 3:30 pm

Location:
Transportation Center –Lower level
Northwestern University
Chambers Hall - 600 Foster
Evanston, IL

Abstract: In this talk the class of inventory routing problems (IRPs) will be introduced. After a review of the literature, with motivations to study this class of problems, the focus will be on the class of discrete time IRPs that include in the objective function transportation and inventory costs. The case of a general distribution network will be considered. A product is distributed from a central facility to several customers and a maximum level of the inventory is given for each customer. The central facility monitors the inventory of each customer and decides when to serve each customer and how much to deliver, guaranteeing that no stock-out occurs. The problem is to determine for each discrete time instant of a given time period which customers to serve, the quantity to deliver to each customer and the route of the vehicles. The objective is the minimization of the sum of the cost of the inventory and of the cost of the routing. A mixed integer linear programming model will be presented together with valid inequalities used to strengthen the continuous relaxation of the model. A branch-and-cut algorithm to optimally solve the model and a hybrid heuristic will be described. Computational results will be presented for a set of randomly generated problem instances. An extension of the model to the case where production is also included will be discussed. Different inventory management policies will be compared.

Bio: M. Grazia Speranza is professor of operations research at the University of Brescia. She has served as Dean of the Faculty of Economics and Business at University of Brescia, and has been a visiting professor at the London School of Economics this past year. Her teaching has included courses in Operations Research, Mathematical Programming, Operations Management, and Supply Chain Management. Recent research has focused on research activity is focused on optimization in logistics; mixed integer programming models and solution algorithms for the joint minimization of transportation and inventory costs; vehicle routing models and algorithms; combinatorial optimization models and algorithms, worst-case analysis; competitive analysis of on-line algorithms for scheduling problems; optimization models for portfolio optimization.