IE 430 Logistics Systems Planning and Design - Fall 2020

Instructor	Lectures	Office Hours	Zoom ID
Bülent Çatay	M 11:40 - 13:30 T 10:40 - 11:30	T 16:00 - 17:00	342 586 8236
TA		**Office Hours**	**Online Link**
Amin Ahmadi Digehsara Nozir Shokirov		F 10:00 - 11:00 W 11:00 - 12:00	efe-akre-vnu asx-kbev-zct

Objectives:

The objective of the course is to give the students a solid understanding of the analytical modeling and solution approaches in logistics planning problems and design issues in logistics systems. We will use mathematical programming approaches to model and solve the planning and control problems arising in transportation and distribution logistics, including (but not limited to) single and multiple facility location/allocation problems, logistics networks design for long-haul freight transportation, transportation modes and multi-modal transport, and vehicle routing and scheduling. We will develop and employ both exact and approximate methods to solve optimization problems and implement computerized applications. Proficiency in operations research and capability of using CPLEX or GUROBI solvers and coding with computer programming are required. **You are strongly recommended to have completed IE 312 with a passing grade**.

Textbook:

Introduction to Logistics Systems Management. G. Ghiani, G. Laporte and R. Musmanno. John Wiley & Sons, 2013. (eBook available online)

Additional References:

Introduction to Logistics Systems Planning and Control. G. Ghiani, G. Laporte and R. Musmanno. John Wiley & Sons, 2004. [TS161 .G45 2004]

Facilities Design, 3rd edition. S. Heragu. CRC Press, 2008. [TS177 .H47 2008]

Supply Chain Engineering. M. Goetschalckx. Springer, 2011. [HD38.5 .G586 2011] (eBook available online)

Grading Policy:

AvgGrade = 25% Pop-up Quizzes + 50% Exams + 25% Term Project

All grades are out of 100. In order to receive a passing letter grade you must maintain an *AvgGrade* of "50". Otherwise, your letter grade will be "F".

- *Pop-up Quizzes*: Students should be prepared for in-class pop-up (unannounced) quizzes during the lectures at random times. You are expected to work on the quizzes individually. You may be randomly requested to take an oral exam online following the quiz. There is no limit on the number of quizzes to be given during the semester. There is no make-up for missed quizzes.

- *Exams*: Two mid-term exams will be given individually in the form of separate (3-4) quizzes. No make-up will be offered for any particular quiz. **Two make-up quizzes** (comprehensive, i.e. including all the topics) will be offered at the end of the semester to those who have missed any quiz. So, you are allowed to miss **at most two (2)** quizzes. If you miss more than two, the grades for the remaining quizzes will be "0" regardless of your excuse.
- *Term Project*: A term project will be assigned in mid-semester. The project involves the development and implementation of a methodological/algorithmic approach to solve a logistics planning problem using an optimization solver (CPLEX/GUROBI) and/or a programming language (C/C++/Python). Students are expected to form groups of two or three (depending on the class size). The instructor will determine a set of possible projects and randomly assign them to each group. More details about the project options and execution will be announced in the second half of the semester.
- *Homework*: The purpose of the homework assignments is to encourage you to study in an organized method and to facilitate your learning process. Regular homework assignments will be given throughout the semester, which usually require mathematical modeling of logistics planning problems and solving them using an optimization package and/or a solver (CPLEX/GUROBI) and/or an algorithm coded in C/C++/Python. The homework may be done in groups of two or three students. They will be collected but not graded.

Tentative Course Outline

Week 1	Continuous space facility location (FL)	Sections 3.1-3.3.1
Week 2	Single echelon discrete space FL	Sections 3.3.2
Week 3-4	Lagrangean relaxation for capacitated FL problem	Section 3.3.2.1
Week 4-5	Two echelon discrete space FL	Sections 3.3.3 & 3.3.4
Week 6	Location covering problems (LCP)	Sections 3.3.5 & 3.3.6
Week 7	**EXAM 1**	
Week 8	Long Haul Freight Transportation	Sections 6.1-6.5
Week 9	Traveling salesman problem (TSP)	Sections 6.8.1
Week 10	Vehicle routing problems (VRP)	Sections 6.8.2-6.8.5
Week 11	Heuristics for VRP	Sections 6.8.2.2 & 6.8.3.1
Week 12	Meta-heuristics for VRP	Section 6.8.3.2
Week 13	**EXAM 2**	
Week 13-14	Sustainable logistics	Lecture notes

Disclaimer:

The instructor reserves the right, when necessary, to alter the grading policy, change exam dates, and modify the syllabus and course content. Modifications will be announced in class and at the SUCourse website. Students are responsible for the announced changes.

Academic Integrity:

Student in this course are expected to honor the academic integrity principles according to the SU rules and procedures. Non-compliance to academic integrity principles through plagiarism, using or accomplishing another person's work, and/or submitting previously used work will be penalized severely.