Description.
Many practical problems arising in logistics, transportation, energy, health, finance and supply-chain can be modeled as linear optimization problems where some of the variables are required to take integral values. For example, a variable used to represent the logical decision to build, or not, a certain power plant, could be modeled using a variable required to take either value 0 or value 1. Problems of this sort are called (mixed) integer programs, and its solution has become a key operational problem in modern industrial settings. In this course we will learn how to model, formulate, and solve integer programs, using a combination of mathematical techniques and state-of-the-art commercial software.


Organization and Grading
The final grade is based on assignments, class participation and the final project. Extra effort in the assignments will be rewarded.
Class Participation. The participation grade is based on the instructor's evaluation of the quality of each student's progress and contribution in class during the semester. Attendance is required and failure to attend the class will affect the final grade.

The grade will be assigned using the following weights.
(i)-Homeworks: 40%
(ii)-Class Participation: 20%
(iii)-Final Project: 40%

Tentative list of topics
Introduction to integer programming
Review of Linear Programming
Introduction to solving linear and integer programs using AMPL
Relaxations, bounds, duality
Easy integer programs: Network Flow Problems
Branch and Bound Algorithm
Cutting Plane Algorithms
Lagrangian relaxation
Column generation and constraint generation
Dynamic Programming
Heuristics