Instructor: Vineet Goyal, vgoyal@ieor.columbia.edu
Teaching Assistant: Itai Feigenbaum, iif2103@columbia.edu

Schedule: MW, 5:40pm-6:55pm, 535 Mudd
Office Hours: Monday 4-5pm, 304 Mudd or by appointment.
TA Office Hours: TBA

Course Website: https://courseworks.columbia.edu/

Description. This class is an introduction to the fundamental methods in Operations Research. Topics covered will include linear programming, network flows, dynamic programming, and nonlinear programming. We will discuss both the underlying theory as well as the applications for all these fundamental topics. A special emphasis will be on learning how to model real-world problems as an optimization problem in one of these frameworks.

Students will learn modeling skills, and develop the ability to build, analyze, and reason logically with models. They will also learn to design and analyze algorithms, and to distinguish good algorithms from not-so-good ones. They will also appreciate the capabilities and limitations of deterministic models in operations research.


Organization and Grading

Homeworks. There will be approximately 8 – 10 homeworks that must be individual work and submitted at the start of the session it is due. Students may discuss homework exercises with others but no person should rely on a written solution of a homework exercise, even if one is available.

Midterm and Final. The course will have a midterm and a final exam. Midterm will be held in class on March 8th. The date for the Final will be determined by the Registrar. The grade will be assigned using the following weights.

- Homeworks: 30%
- Midterm: 30%
- Final: 40%

Tentative list of topics

1. Linear Programming: Modeling, Simplex Method, Duality Theory, Sensitivity Analysis
2. Network Flows
3. Integer Programming: Formulations and Algorithms
4. Dynamic Programming
5. Non-linear Programming