IEOR 151 – Service Operations Design and Analysis Fall 2020

Instructor: Anil Aswani
Office hours – M 1-2P, W 11-12P
aaswani [at] berkeley [dot] edu

GSI: Ilgin Dogan
ilgindogan [at] berkeley [dot] edu

Yoon Lee
yllee [at] berkeley [dot] edu

Lectures: MW 12-1P, on Zoom

Labs: F 12-1P, on Zoom

Website: http://courses.ieor.berkeley.edu/ieor151

Optional Textbook: *Service Science*, by Mark Daskin
http://onlinelibrary.wiley.com/book/10.1002/9780470877876

Prerequisites: IEOR 161, IEOR 162, and a course in statistics

Grading: Homeworks (30%); midterm (30%); final exam (40%)

Grades will be determined using a fixed scale. A raw percentage will be computed using the above breakdown, and the raw percentage will be rounded down. The letter grade will be determined using the rounded down percentage and the below given scale.

Grade Scale: A 94-100, A- 90-93, B+ 87-89, B 83-86, B- 80-82, C+ 77-79, C 73-76, C- 70-72, F 0-69

Midterm: Wednesday, October 28, 2020, using Gradescope

Final Exam: Friday, December 18, 2020, using Gradescope

Description: This course is concerned with improving processes and designing facilities for service businesses such as banks, health care organizations, telephone call centers, restaurants, and transportation providers. Major topics in the course include design of service processes, layout and location of service facilities, demand forecasting, demand management, employee scheduling, service quality management, and capacity planning.

Outline: Specific topics that will be covered include:

Lecture Notes:

- Service Quality Management – Review of probability; hypothesis testing; risk in hypothesis testing; newsvendor model; data-driven newsvendor (about 3 weeks)
- Resource Allocation and Game Theory – Review of optimization; matching markets (e.g., kidney exchanges); adverse selection models; moral hazard models (about 3 weeks)
- Location Planning and Routing – *p*-median problem; *p*-center problem; set covering location model; traveling salesman problem; vehicle routing (about 3 weeks)
- Workforce Scheduling – Service queueing models; Little's law; square-root staffing law; long-term planning (about 3 weeks)

Aug 26	Service Systems, Probability Review, Course Syllabus
Aug 31	Risk in Decision Making
Sep 02	Composite Minimax
Sep 09	Newsvendor Model
Sep 14	Data-Driven Newsvendor
Sep 16	Data-Driven Newsvendor
Sep 21	Matching Markets
Sep 23	Kidney Exchanges
Sep 28	Residency Matching
Sep 30	Nonlinear Programming
Oct 05	Adverse Selection
Oct 07	Adverse Selection
Oct 12	P-Median Problem
Oct 14	Vertex P-Center Problem
Oct 19	Set Covering Problem
Oct 21	Capacitated Location Planning
Oct 26	Vehicle Routing Problem
Nov 04	Savings Algorithm
Nov 09	Markov Processes
Nov 16	Queues
Nov 18	Little's Law
Nov 30	Square Root Rule
Dec 02	Longterm Staffing