

Midterm Exam Review Guide

IEOR 4615: Service Engineering

Professor Whitt and Teaching Assistant Ma, March 24, 2015

The IEOR 4615 midterm exam is scheduled for Tuesday, March 31, in class, with an extra hour to reduce the time pressure. Formula sheets on exponential, Poisson and CTMC's from IEOR 3106 will be handed out.

The exam will emphasize understanding and application. There will be no questions asking for proofs of theorems. There will be no questions asking about software.

Below is a list of the principal topics covered on the midterm exam:

1. Lecture 2: Service systems viewed as queueing systems
2. Lecture 3 and Homework 2: Little's law ($L = \lambda W$)
3. Lecture 4: Basic statistics: How to construct confidence intervals with known and unknown variance, the method of batch means for dependent data
4. Lecture 5: Birth-and-death (BD) processes: review of CTMC's, BD processes, the truncation theorem, the Erlang models
5. Lecture 6: Offered load analysis with constant and time-varying arrival rates
6. Lecture 7: Precedence constraints: PERT and CPM, stochastic PERT, dynamic stochastic PERT
7. Lecture 8: Queueing Networks: the classic open Markov queueing network model (a CTMC) with its product-form steady-state distribution, the QNA approximation for non-Markov models, the squared coefficient of variation,
8. Lecture 9: Deterministic Fluid Models: basic rate models
9. Lectures 12 and 14: The classic probability limit theorems: LLN and CLT
10. Lecture 13: Heavy traffic approximations: many-server and conventional heavy-traffic limits and associated approximations

Topics not to be covered on the exam:

1. Homework: Techniques on using Excel and other software
2. Lecture 10: stochastic models of group play on a golf course
3. Lecture 11: the general $G_t/GI/s_t + GI$ many-server fluid model
4. Lecture 15: applying heavy-traffic limits and approximations to design simulation experiments