Course No.	Course Title	Theory	Practice	Credit	Prerequisite(s)
Stat 463	Queuing Theory	3	-	3	Stat 362

Objectives

This course aims to gain the ability of studying and analyzing real life service systems. This leads to increase and optimize the performance of these systems.

Course Description:

0. **Background:** differential and difference equations, Laplace transforms, probability generating functions, moment generating functions.
1. **Introduction:** Description of queuing problem, characteristics of queuing processes, notations, measures of effectiveness, common areas of applications, deterministic queuing models, Poisson process and the exponential distribution, Markovian property of the exponential distribution, stochastic processes and Markov chains.
2. **Simple Markovian birth-death queuing models:** birth-death processes, steady- state solution for the M|M|1 model, queues with parallel channels M|M|c , queues with parallel channels and truncation M|M|c|k , Erlang's formula M|M|c|c, queues with unlimited service M|M|∞, finite source queues, state-dependent service, queues with impatience, transient behavior, busy period analysis for M|M|1 and M|M|c.
3. **Advanced Markovian models:** Bulk input $M^{[x]}$ |M|1, bulk service M|$M^{[y]}$ |1, Eralangian models M|E_k|1, E_l|E_k|c, priority queue disciplines.
4. **Models with general arrival or service patterns:** Single server queues with Poisson input and general service M|G|1), multi-server queues with Poisson input and general service, general input and exponential service G|M|c.

Main text books:

Taha, H.A. Operations Research: An Introduction. Macmillan Publishing Co., New York, 1997.

Subsidiary books:

Gross D., Harris C.M. Fundamentals of Queuing Theory. 4th edition, John Wiley, 2008.