



IT611: Network Algorithms and Simulation Techniques

Spring 2016

Course Staff

Lecture Time: Sunday 4:00 – 7:00 PM, Lab 3

Course Instructor: Dr. Haitham S. Hamza

Email: courses@ansr.cu.edu.eg

Office Hours: Sunday and Monday 3:00 – 4:00 PM.

Course Objective

This course covers concepts necessary for the study of networking performance and algorithms. It focuses on algorithms, and optimization techniques that are most commonly used to solve complex problems in networking. Major topics include, introduction to algorithms and graph theory, algorithms for solving common problems in networks such as, switch scheduling, multicast tree construction, routing, and packet matching, fundamentals of simulation and analytical modeling techniques, simulator design and model calibration.

Suggested References

1. J.A. Bondy and U.S.R Murty. Graph Theory. Springer, 2008.
 2. Piet Van Mieghem (2006), Performance Analysis of Communications Networks and Systems.
 3. Mohsen Guizani, Ammar Rayes, Bilal Khan, Ala Al-Fuqaha (2010), Network Modeling and Simulation: A Practical Perspective.
 4. Research papers (to be handed in class)
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Grade Distribution

The overall course grade is distributed as follows:

Homework/Assignments	10 %
Midterm Exam 1	15 %
Midterm Exam 2	15 %
Final Exam	60 %

Ground Rules

The following rules are strict in order to ensure quality learning and fairness to all students:

- Homework assignments must be submitted on the due date in lecture. A **25 % per day** will be deducted for late homework. Under no circumstances a homework assignment shall be accepted after Thursday of the due week.
 - Homework assignments must be submitted in a neat and clean format. The instructor reserves the right to reject any homework assignment that is not deemed appropriate.
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Course Outline

The following is a **tentative** course outline and is subject to change.

- Introduction to algorithms
 - Introduction to Graph Theory
 - NP-Complete theory and key problems
 - Application of graph theory and algorithms in solving key problems in computing
 - Overview of network optimization techniques
 - Overview of network simulation
 - Design and implementation of discrete event simulators
 - Introduction to queuing theory fundamentals
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