

## **COURSE SYLLABUS**

**Course Number: COMP6340/6346**

**Course Title: NETWORK QUALITY ASSURANCE AND SIMULATION**

**Credit Hours: 3**

**Prerequisites: COMP4320 or ELEC 6220**

**Corequisite: none**

### **I. Course Content/Objectives:**

1. Objectives: At the conclusion of this course the student will have an understanding of theoretical and practical aspects of network simulation and quality assurance

### **2. Tentative Schedule and Outline of Course Content.**

#### **Fundamentals of Simulation**

Lesson 1 Systems analysis

Lesson 2 Types of data

Lesson 3 Probability and statistics

Lesson 4 Random variable distributions

#### **Random Variable Distributions**

Lesson 5 Continuous distributions

Lesson 6 Discrete distributions

#### **Statistical Inference**

Lesson 7 Random sampling

Lesson 8 Higher-order moments and moment generating functions

Lesson 9 The distribution of random variables

Lesson 10 Confidence intervals

Lesson 11 Hypothesis testing

Lesson 12 Distribution suitability

Lesson 13 Exam Review

Lesson 14 Exam 1

#### **System Modeling**

Lesson 15 Planning

Lesson 14 Modeling

Lesson 15 Validation and verification

Lesson 16 Evaluation of random number generation

Lesson 17 Experimentation

#### **Distributed Systems**

Lesson 18 Overview of parallel and distributed systems  
Lesson 19 Models for distributed systems and services  
Lesson 20 Distributed databases  
Lesson 21 Fault tolerance in distributed systems  
Lesson 22 Implementing distributed systems

Wireless Network Performance (from Raj Jain)  
Lesson 23 An Overview of Performance Evaluation  
Lesson 24 Common Mistakes and How to Avoid Them  
Lesson 25 Selection of Techniques and Metrics  
Lesson 26 Measurement Techniques and Tools  
Lesson 27 Types of Workloads  
Lesson 28 Workload Characterization Techniques.  
Lesson 29 Monitors.

Lesson 30 Exam 2 Review  
Lesson 31 Exam 2

Resolution in Simulation  
Lesson 32 Resolution, fidelity, and model simplification  
Lesson 33 Decomposition  
Lesson 34 Adjusting resolution dynamically

Modeling and Abstraction in Multilevel Simulation  
Lesson 35 Multilevel abstraction  
Lesson 36 Aggregation and deaggregation  
Lesson 37 Architectural considerations  
Lesson 38 & Lesson 39 Experimental Design (again from Raj Jain)

Distributed Simulation Considerations  
Lesson 40 Decomposition of a simulation  
Lesson 41 & Lesson 42 Time, clocks, and synchronization  
Lesson 42 Logical process simulation  
Lesson 43 Verification and validation revisited  
Lesson 45 Final Exam Review

### 3. Textbook or assigned readings

Hamilton, Nash and Pooch, *Distributed Simulation*, CRC Press 1997.

R.K. Jain, *The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling*, John Wiley 1991.

### Grading and Evaluation Procedures:

1000 points can be earned: 900+ = A, 800+ = B, 700+ = C, 600+ =D, < 600 = F

Exam 1 = 150 points

Exam 2 = 200 points

Final Exam = 250 points

3 projects = 100 points apiece

10 homeworks = 10 points each

III. Statement related to policies on unannounced quizzes and class attendance and participation.

There will be no unannounced quizzes and attendance will not affect the grade.

**Accommodation Statement:** Students who need special accommodations should make an appointment to discuss the Accommodation Memo during my office hours as soon as possible. If scheduled office hours conflict with classes, please arrange an alternate appointment time. If you do not have an Accommodation Memo, but need special accommodations, contact the Program for Students with Disabilities in 1244 Haley Center (844-2096 V/TTY).

**Justification for Graduate Credit:** This course requires knowledge of data networks, which are not covered until the senior year of undergraduate studies in the required course COMP4320 or ELEC6220.

11/6/01