		COE	755
	Lebanese American University		
School of Engineering		Queuing Theory (Elective)	3 credits
Department of Electrical and Computer Engineering		T 04:00PM-07:00PM	Frem 504
Course syllabus		Dr. Wissam F. Fawaz	Spring 2013

1.	**Course Description and Course Prerequisite**

This course introduces simulation and queueing modelling techniques. The following topics relating to simulation and queueing theory are covered: random variables, probability distribution of functions, single queue Markovian systems, semi-Markovian queueing systems, pseudo-random number generation, estimation techniques for analyzing endogenously created data, and validation of a simulation design.

The course prerequisite is GNE 331 Probability and Statistics.

2.	**Course Objectives**

Upon successful completion of this course, students are expected to be able to:
- Gain a mastery of Markovian queuing systems.
- Construct queuing models for engineering problems and solve queuing problems.
- Become familiar with the derivation techniques used to measure system performance.
- Write simulation programs enabling them to solve real life engineering problems.

3.	**Contribution of course to meeting the professional component**

Professional Component	**Credits**
Mathematics and Basic Sciences	2
Engineering Topic	1
General Education	0

4.	**Relationship of course to program outcomes**

PO (a) *an ability to apply knowledge of mathematics in the following area:*
- Probability and Statistics

PO (c) *an ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.*
- Uses numerical and/or experimental simulation to verify a design or solution.
- Analyzes results and draws conclusions.

PO (k) *an ability to use the techniques, skills and modern engineering tools necessary for engineering practice*
- Uses computer programs necessary for engineering practice

5.	**Course Outline**

Topics to be covered include:
- Preliminaries (Week 1)
- Discrete random variables (Week 2)
- Continuous random variables (Week 3)
- Birth and death process (Weeks 4 & 5)
- Introduction to queueing systems (Weeks 6 & 7)
- Machine interference problem (Week 8)
- Hypo and Hyper-exponential distributions (Week 9)
- Coxian and Erlang distributions (Weeks 10 & 11)
- Markov chains (Weeks 12 & 13)
- Queueing Networks (Week 14)

6.	**Required tools / software / skills**

Good programming skills (Matlab, C, C++, or Java)

7.	**Textbook[s]**

Chee Hock Ng, *Queuing Modelling Fundamentals*, second edition, John Wiley & Sons, 2008.

8.	Additional References

L. Kleinrock, *Queuing Systems, Volume 1: Theory*, Wiley publishers, 1st edition, 1975.
Robert Cooper, *Introduction to Queuing theory,* North Holland, 2nd edition, 1977.
Donald Gross and Carl M. Harris, *Fundamentals of Queuing Theory*, Wiley series, third edition, 1998.

9.	Schedule of Exams & Grading Percentage

Topic Presentation/Homeworks:	15%
Simulation Projects:	15%
Exam I:	20%
Exam II:	20%
Final:	30%

10.	Course Policies

Cheating is considered to be a very serious breach of the cheating policy of the faculty and will not be tolerated. Students are expected to submit their own solutions to all homework assignments and programming projects. Solutions must be handed in at the beginning of the class in which they are due. Late assignments will not be accepted.

11.	General Comments

Instructor:	Dr. Wissam FAWAZ	email: wissam.fawaz@lau.edu.lb
Office:	103, Bassil Bldg, ext: 2414	
Office Hours:	Tuesday and Thursday	from 12:45 p.m. – 3:45 p.m.
Course webpage:	http://www.wissamfawaz.com/queueing_theory.htm	

12.	General Rules & Regulations

- A student can miss no more than the equivalent of 5 weeks of instruction. Students who exceed the allowed number of absences must withdraw from the course; otherwise, the course grade will be recorded as "F".
- Plagiarism: students caught cheating on an exam receive a grade of Zero on the exam in the first cheating attempt and a warning. Students caught cheating for the second time in the same course receive an F grade in the course and a second warning. A grade of zero on an exam resulting from cheating must be counted in the student's course grade. The zero cannot be dropped in computing the final grade in case the instructor has a policy of allowing students to drop their worst exam grade.
- Any student who receives 3 warnings will be suspended.