AMERICAN UNIVERSITY OF BEIRUT
FACULTY OF ENGINEERING AND ARCHITECTURE
ENGINEERING MANAGEMENT PROGRAM

ENMG 623: Stochastic Processes

COURSE SYLLABUS

I. Meeting Time, Location, and Website:

Lecture: MW: 5:30 p.m-6:45 p.m.
Location: FS1
Website: Moodle

II. Instructor:

Dr. Walid Nasr
Office: Bechtel Building – 5th floor
E-Mail: wn12@aub.edu.lb

GA: TBA in class E-Mail: TBA in class

III. Description:

This course begins as an introduction to probability and random variables, then we will extend the focus to stochastic processes, which are collections of random variables, usually indexed by time. (In stochastic process models, time can be regarded as either discrete or continuous.) For example, we might use stochastic processes to model the evolution of a stock price over time, the damage claims received by an insurance company over time, the work-in-process inventory in a factory over time or the number of calls waiting in a telephone call center over time, all of which evolve with considerable uncertainty. Among the stochastic processes that might to be considered are discrete-time Markov chains, random walks, continuous-time Markov chains, Poisson processes, birth-and-death processes, renewal processes, renewal-reward processes, Brownian motion and geometric Brownian motion. Among the engineering applications to be considered are queueing, inventory and finance.

IV. Course Objectives:

1. Develop probabilistic models for real problems.
2. Enhance the understanding of probability theory through real applications.
3. Understand the probability theory in Markov chains, queueing and inventory models.
4. Identify and understand the applications of Markov chains and queueing theory.
5. Master the fundamental techniques for analyzing basic Markov chains and queues

V. Instructional Methodology:

Lecture, class discussion, assignments, quizzes

VI. Textbooks:

Sheldon M. Ross. Introduction to probability models. Academic Press, New York, 2003
The course is based on this book. The book also contains most of the homework problems

VII. Performance Evaluation and Grading:

Quiz I,II	55%
Final Exam (Quiz III)	40 %
Assignments/ Attendance/Cases	5 %

Summary of Topic Coverage:

- **Random Variables and Conditional Probability (A review of probability theory- Chapters 1 and 3)**
- **Discrete Time Markov Chains (DTMC)**
- **Continuous Time Markov Chains (CTMC)**
- **Queueing Theory**
- **Introduction to Renewal Theory**
- **Introduction to Brownian motion**

VIII. Other Course Policies:

Homework

Homework problems will be posted on Moodle. All students are encouraged to solve the homework problems and discuss their solutions with the instructor and their colleagues.
However, *every student must write his own homework assignments*.

Attendance Policy and Class Management

Students are personally responsible and accountable for learning the content of any class they miss. Students missing more than 20% of sessions before the last day for withdrawal may be dropped from

the course without notice. No student will be admitted to class after 5 minutes from the beginning of the lecture***. Cells phones, laptops and other gadgets are not allowed in class.***

Due Dates
Due dates will be strictly enforced.

Email
Information concerning the course may be sent by the instructor to students by email or through Moodle. Students are responsible for keeping AUB email accounts functioning properly.

IX. Academic Honesty:

Students are expected to complete all work with the highest standard of integrity in line with AUB's Student Code of Conduct and FEA's Honor Code. Plagiarism, forgery, cheating or any form of academic misconduct will not be tolerated. Any of the above may cause a student's final course grade to be lowered significantly or the student may receive a failing grade, depending on the severity of the offence. Plagiarism is the presentation of the work of another as one's own work.