Course program and reading list

Semester 2 Year 2024

School: Efi Arazi School of Computer Science M.Sc.

Practical Probability Models for Computer Science Seminar

Lecturer:

Dr. Gail Gilboa Freedman gail.gilboa@runi.ac.il

Course No.:	Course Type :	Weekly Hours :	Credit:
3614	Seminar	3	3

Course Requirements :	Group Code :	Language:
Final Paper	241361401	English

Prerequisites

Prerequisite:

52 - Calculus I
53 - Calculus II
54 - Linear Algebra I
55 - Linear Algebra II
56 - Discrete Mathematics
59 - Data Structures
69 - Logic And Set Theory
109 - Introduction to Probability
417 - Introduction To Computer Science

Course Description

Many kinds of industrial problems can be viewed as probability models, for example in the area of finance, communication, reliability, and so forth. This seminar serves as an introduction to probability modeling and applications for computer scientists.

The general concepts covered in this seminar include:

- Stochastic process
- Markov chains
- Renewal
- Queueing
- Reliability
- Brownian motion
- Simulations

Prerequisites: Sufficient proficiency in English, Elementary kn*owledge* of probability, Algebra, and coding.

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Course Goals

To exposes the participants to a variety of techniques that are useful for thinking probabilistically:

A. better understanding stochastic systems

B. development of stochastic algorithms that are key to many applications in engineering

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Grading

Each team (of 2 or 3 students) is referred to a specific chapter in the seminar textbook.

The grade is based on a presentation accompanied by a submission on the topic that is covered in your chapter. It should include:

- Part A: proof of a theorem/ solution of a challenging exercise.
- Part B: Coding of a method or a process.

Learning Outcomes

At the end of the seminar, the student is:

- Able to identify problems that require a probabilistic approach.
- Familiar with a wide range of common probabilistic models, along with programming techniques for simulating these models.

Lecturer Office Hours

By appointment.

Reading List

Introduction to *Probability models,* Ross, S.M., 2010 (*10th edition).*