



# Course program and reading list

Semester 1 Year 2023

**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](mailto:gail.gilboa@runi.ac.il)

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<b>Course No.:</b>	<b>Course Type :</b>	<b>Weekly Hours :</b>	<b>Credit:</b>
3614	Seminar	3	3

<b>Course Requirements :</b>	<b>Group Code :</b>	<b>Language:</b>
Final Paper	231361401	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
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### 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 *knowledge* of probability, Algebra, and coding.

The lecturer: Dr. Gail Gilboa Freedman [gail.gilboa@runi.ac.il](mailto:gail.gilboa@runi.ac.il)

[Gail's LinkedIn;](#)

[Gail's homepage](#)

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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 memo, summarizing selected subjects that are covered in this chapter.

It should include:

- PartA: At least 3 key terms definitions
- PartB: At least 1 challenging exercise/technical-example, solved.
- PartC: Coding or referring to implementation of method or process.

The three parts of the assignment will be weighted equally.

The grade is conditional on attending at least 7 student presentations including your own.

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## 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.
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### Lecturer Office Hours

By appointment.

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### Reading List

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