
Probability and Statistic (for CS Students)

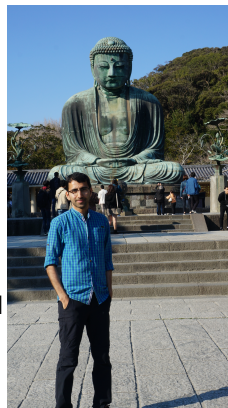
Lecture 1: Introduction

University of Mazandaran

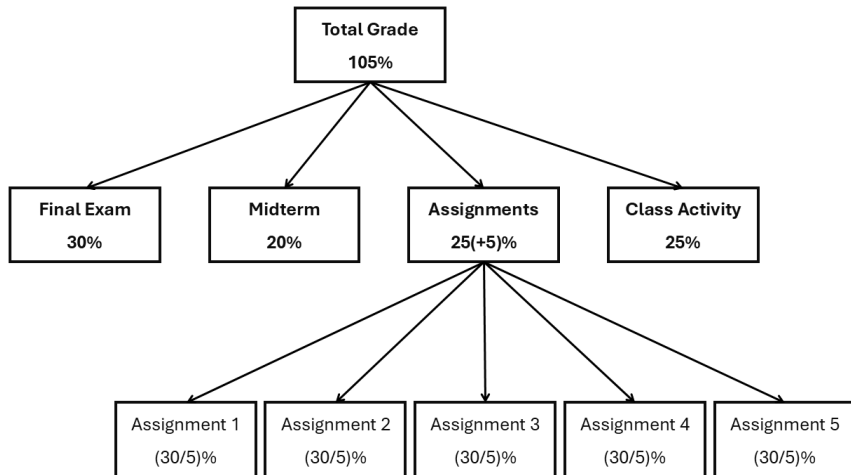
Fall 1405

Hi, I'm Homayun Afrabandpey

- ▶ Assistant Professor with CS group at UM
 - ▶ communication efficient distributed learning/inference
 - ▶ human-in-the-loop machine learning
 - ▶ interpretable machine learning
- ▶ Prior to this
 - ▶ senior ML researcher at Nokia, Finland
 - ▶ visiting researcher at Sony AI, Tokyo
 - ▶ postdoctoral researcher at University of Helsinki, Finland
 - ▶ PhD at PML in Aalto University, Finland
 - ▶ M.Sc. and B.Sc. from IUT
- ▶ Reach me via email:
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 - ▶ h.afrabandpey@umz.ac.ir



- ▶ Help you gain experience in the following areas:
 - ▶ understanding the combinatorial nature of problems
 - ▶ working knowledge of probability theory
 - ▶ an introduction to machine learning



More on Assignments

- ▶ Each assignment has one question with extra grade
 - ▶ The extra question is not mandatory.
 - ▶ In total the extra questions worth of 5% of the total score of the course, i.e. 20

- ▶ Assignments are **individual**
 - ▶ theoretical questions and programming assignments
 - ▶ programming assignments are in Python **only**
- ▶ Submit in time!
- ▶ Use chatbots for homework problems? Have fun on the exams
- ...

1. Presentation

- ▶ After teaching each concept, e.g., combinatorics, we will start the next class with a ~ 10 min recap
 - ▶ Recaps will be presented by you! Assume you are the teacher of the course
 - ▶ Form teams of two and prepare slides
 - ▶ You will be evaluated by your prepared content, slides quality, presentation quality, etc.

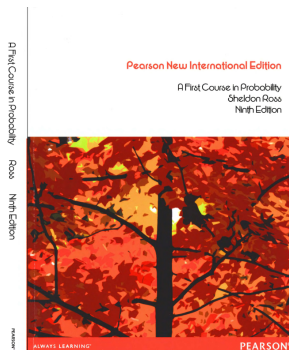
2. Being active in the class

- ▶ Prior to each lecture, lecture slides will be provided, and you are expected to go through them,
- ▶ During class time, we will go over the slides and spend more time working on practice problems. We will have tons of questions in this class
 - ▶ Be active in responding the questions

Lectures

Week	Title	Week	Title
Week 27 (06.28-07.03)	Lecture 1. Introduction	Week 35 (08.23-08.29)	Lecture 17. Normal Distributions II
	Lecture 2. Counting and Combinatorics I		Lecture 18. Joint Distribution
Week 28 (07.04-07.10)	Lecture 3. Counting and Combinatorics II	Week 36 (08.30-09.06)	Lecture 19. Recap
	Lecture 4. Probability		Lecture 20. Inference I
Week 29 (07.11-07.17)	Lecture 5. Conditional Probability and Bayes I	Week 37 (09.07-09.13)	Lecture 21. Inference II
	Lecture 6. Conditional Probability and Bayes II		Lecture 22. Modelling
	Lecture 7. Independence		Lecture 23. General Inference
Week 30 (07.18-07.24)	Lecture 8. Random Variables, Expectation	Week 38 (09.14-09.20)	Lecture 24. Beta and Gamma Distributions
	Lecture 9. Bernoulli and Binomial		Lecture 25. Adding Random Variables
Week 31 (07.25-08.01)	Lecture 10. Poisson	Week 39 (09.21-09.27)	Lecture 26. Central Limit Theorem
	Lecture 11. Other Discrete Distributions		Lecture 27. Bootstrapping and p-values I
Week 32 (08.02-08.08)	Lecture 12. Recap	Week 40 (09.28-10.04)	Lecture 28. Bootstrapping and p-values II
	Lecture 13. Continuous Distributions I		Lecture 29. Recap
Week 33 (08.09-08.15)	Lecture 14. Continuous Distributions II	Week 41 (10.05-10.11)	No Session
	Lecture 15. Midterm (?)		
Week 34 (08.16-08.22)	Lecture 16. Normal Distributions I		

- ▶ Textbook (optional):
 - ▶ A First Course in Probability, 9th edition by Sheldon Ross, 2014



- ▶ Plagiarism **will not be** tolerated
- ▶ **What is plagiarism?** Copying from each other is plagiarism. Sharing solutions is plagiarism. Seeing someone else's solutions and retyping is plagiarism.
- ▶ Please please don't!



Probability for CS Students Feedback Form

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This form is intended to collect your feedback on how to improve the teaching, contents, students participation, etc. for the 'Probability for CS Students' course.

What part of the course is your feedback about? (examples are teaching style, contents, teacher's behavior, etc.) *

Short-answer text

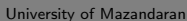
What is your feedback or suggestion to improve the course? *

Long-answer text

(optional) How can we reach you for follow-up question?

Short-answer text

Why should we learn this course?



Generative Models



(a) A dog wearing a superhero outfit with red cape flying through the sky.



(b) There is a table by a window with sunlight streaming through illuminating a pile of books.



(c) Robot dancing in Times square.



(d) Unicorns running along a beach, highly detailed.



Email Filtering



Intent Modelling and Search Engines



[link to the paper](#)

And Many More ...

- ▶ Self-driving cars
- ▶ Face recognition
- ▶ A/B testing and online experiments
- ▶ Financial market predictions

Statistics and probability are among the main building blocks of CS and ML