

Lecture 0: Introduction

Yi, Yung (이용)

EE210: Probability and Introductory Random Processes
KAIST EE

August 27, 2022

- Course logistics
- Why this course?

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Instructor

- Yi, Yung (이용)
- Office: N1, 810
- Homepage: <https://yung-web.github.io/home/>
- E-mail: yiyung@kaist.edu
- Computer Division
- In KAIST EE since 2008

- All lecture videos have already been pre-recorded. Available in [YouTube](#).
- [non-real-time online \(\$\leq 50\%\$ \)](#) + [real-time offline/online \(\$\geq 50\%\$ \)](#)
- [non-real-time online](#): Watch and study anytime and anywhere you like.
- [realtime offline/online](#): Watch lecture videos in the classroom or in the zoom, with asking and answering questions.
- No attendance check!

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- Method 1:
<https://yung-web.github.io/home/courses/probability.html>
- Method 2: (a) Type **Yung Yi** in the google, (b) visit his [GitHub homepage](#), (c) find the links on [Course](#).

The screenshot shows a Google search result for 'yung yi'. The top result is a GitHub profile for Yung Yi, which includes a photo, a brief bio, and sections for 'Education', 'Students advised (PhD)', 'Position', and 'Courses'. Below this are other links to his academic profiles at KAIST and Seoul National University.

This is a detailed view of Yung Yi's GitHub profile. It features a large photo, a bio, and sections for 'Education', 'Students advised (PhD)', 'Position', and 'Courses'. The 'Courses' section lists various probability-related courses he has taught or is teaching, such as 'Probability and Random Processes (Video included, Undergraduate)', 'Markov Chains and Discrete-Time Martingales (Undergraduate)', 'Computer Network, Undergraduate', and 'Gaussian Random Variables, Stochastic and Random Video included, Graduate'.

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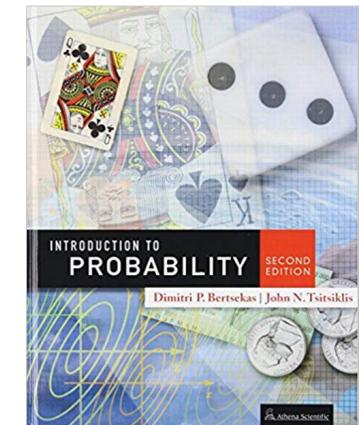
- KLMS:** All notifications and announcements (also sent to you via email)
- KLMS:** Homework upload
- KLMS:** Score upload and all the grade-related things
- Campuswire:** All Questions (course contents, logistics, etc). Should be in English.
- NOT individual emails to the instructor or the TAs
- Emails to the instructor, Prof. Yung Yi, are allowed for handling private situations.

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Campuswire Demonstration

Textbook

- Introduction to Probability (2nd edition)
 - MIT course textbook
 - Dimitri P. Bertsekas and John N. Tsitsiklis
- You can order it from Yes24, Aladin, Kyobo
 - Yes24: <http://www.yes24.com/Product/Goods/3995311>
 - Aladin: <https://www.aladin.co.kr/shop/wproduct.aspx?ItemId=12945615>
 - Kyobo: <http://www.kyobobook.co.kr/product/detailViewEng.laf?ejkGb=ENG&mallGb=ENG&barcode=9781886529380&orderClick=LAG&Kc=>



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- <http://athenasc.com/probbook.html>
- **Solutions for all problems** (so you have all solutions for your homework)
- Links to the old MIT courses
- You can find the urls (2006, 2010, 2013) for the MIT lectures based on the same textbook, where there are many useful resources (recitation problems, homework problems, old exam problems, etc)
- Some of my lecture slides are based on theirs, but my slides are largely modified/reorganized/edited in many places for our purpose.

1. Probabilistic model (0.5 week)
2. Conditioning and Independence (0.5 week)
3. Random Variable, Part I (Discrete Random Variable) (1.5 week)
4. Random Variable, Part II (Continuous Random Variable) (1.5 week)
5. Random Variable, Part III (Advanced Topic on Random Variable) (1.5 week)
6. Limit of Scaled Sum of Random Variables: Central Limit Theorem and Weak Law of Large Numbers (1.5 week)
7. Random Process: Bernoulli and Poisson Processes (2 week)
8. Random Process: Markov Chain (2 week)
9. Introduction to Statistical Inference (2 week)

- 2 Exams (mid-term and final)
- Homeworks
 - All problems are from exercise problems in the textbook.
 - We do NOT check whether you copy your solution from the problem solutions or not.
- 9 Homeworks for each of 9 chapters.

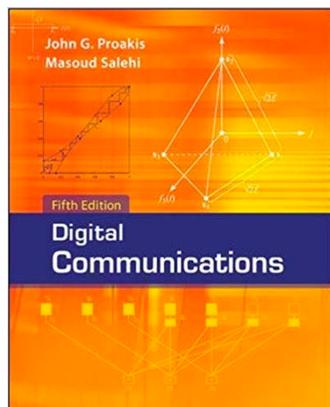
- Read **ALL** the emails.
- Need to buy the textbook?
 - Strongly recommend it. Taking a course is NOT just solving mid-term and final exam problems and getting a good grade.
- OK not to be present in the classroom? Yes.
- OK that my homework solutions is same as those in the solutions book? Yes.
- Can I ask for a personal meeting to ask questions or get other general advices? Sure. Send me an email.

Questions?

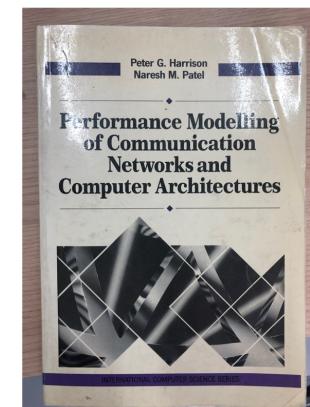
- Many things are "probabilistic"
- Assume that you are a designer of the following engineering systems. Good design?
 - a web server
 - a communication device like mobile phones
 - an AI-based image classifier
- From an engineering point of view,
 - System input
 - Algorithms in systems
 - Analysis of systems

Textbook: Digital Communication

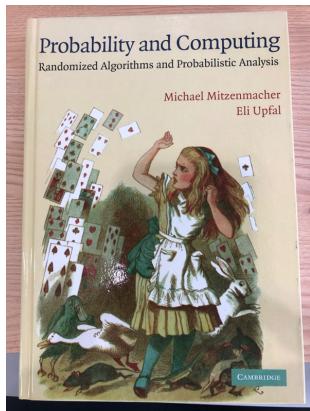
Textbook: Computer Networking



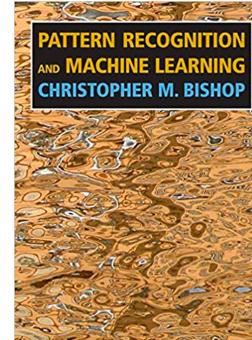
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3.3 Asymptotic properties	
Exercises	



<i>Preface</i>	1 Events and Probability
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	1.2 Axioms of Probability
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These days, every area in CS and EE is directly or indirectly related to machine learning!

How to take this course? A designer's perspective

- Designer's perspective?
- In the year of 2022, suppose that unfortunately there is no theory of mathematically studying the *uncertainty* of some phenomena, events, etc.
- You have to design such a theory called "probability". How are you going to do it? Where are you going to start?
- You just have other basic mathematical theories such as set theory.
- You need to get used to the *English terms* on probability (e.g., sample space = 표본공간, probability density function = 확률밀도함수).
- We will take this exciting journey from the next lecture!

Questions?

