Lecture 0: Introduction

Yi, Yung (이융)

EE210: Probability and Introductory Random Processes
KAIST EE

August 31, 2021

Outline

- Course logistics
- Why this course?

Instructor

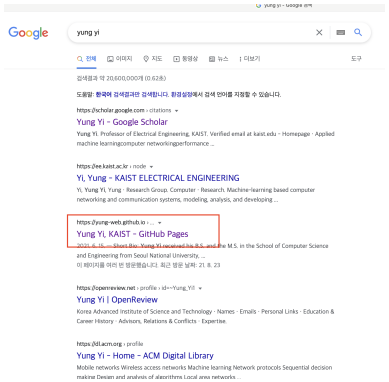
- Yi, Yung (이융)
- Office: N1, 810
- Homepage: `https://yung-web.github.io/home/`
- E-mail: `yiyung@kaist.edu`
- Computer Division
- In KAIST EE since 2008

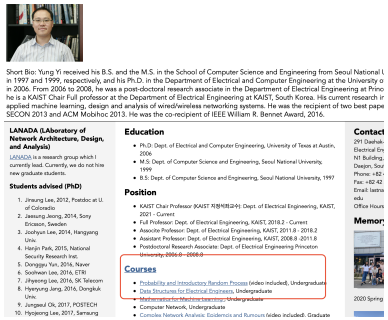
How to Run This Course

- Basically, Non-real-time online class, but with a little bit of real-time zoom classes (if necessary)
- All lecture videos have already been pre-recorded. Now available in YouTube.
  - No class attendance check
  - You can watch the videos anytime and anywhere.
  - You can adjust the speed of studying the materials according to your schedule, as long as you submit the homworks until the announced deadlines and you show up at the right time for the exams.
- Sometimes, we will open real-time zoom classes (maybe biweekly)
  - To answer students' questions
  - To give important announcements
  - etc

Watching Lecture Videos

- 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.





Questions, Real-time Zoom Session, and Office Hours

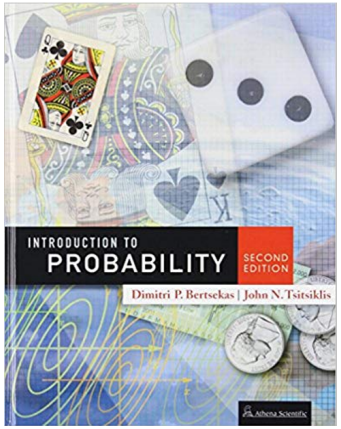
- Questions on the course contents
  - Upload them in the Q&A board in KLMS.
  - Your question will also be very helpful to other classmates
  - Answers to your questions will be given at the board (if simple), or via separate lecture videos or a real-time zoom session.
- Real-time Zoom Session
  - Open when necessary and it will be recorded so as to be accessible throughout this semester.
  - The zoom link information will be given in advance at the corresponding week.
- Personal Office Hours
  - Will arrange by an individual request.
  - Send an email to `yiyung@kaist.edu` for appointment.
  - Questions on the course and other any types of advices that may help you

Most Course-related Contents and Announcements

- Lecture videos and slides: `https://yung-web.github.io/home/courses/probability.html`
- All other contents: KLMS, `http://klms.kaist.ac.kr/`
  - To ask questions about everything
  - To check your score on each homework/exam
  - To see all the announcements about the class
  - ...
- Important: Please regularly check!
  - Emails
  - SMS
  - KLMS announcements

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=`



Course Contents (Guided Schedule for Your Study)

1. Probabilistic model (1/2 week) (08/31)
2. Conditioning and Independence (1/2 week) (09/02)
3. Random Variable, Part I (Discrete Random Variable) (1.5 week) (09/07, 09/09, 09/14)
   Exam 1 (09/23)
4. Random Variable, Part II (Continuous Random Variable) (1.5 week) (09/16, 09/28, 09/30)
5. Random Variable, Part III (Advanced Topic on Random Variable) (1.5 week) (10/05, 10/07, 10/12)
   Exam 2 (10/14)
6. Limit of Scaled Sum of Random Variables: Central Limit Theorem and Weak Law of Large Numbers (1.5 week) (10/19, 10/21, 10/26)
7. Random Process: Bernoulli and Poisson Processes (2 week) (10/28, 11/2, 11/4, 11/9)
   Exam 3 (11/11)
8. Random Process: Markov Chain (2 week) (11/16, 11/18, 11/23, 11/25)
9. Introduction to Statistic Inference (2 week) (11/30, 12/2, 12/7, 12/9)
   Exam 4 (12/16)

Other Contents

- On-line lectures at MIT and EdX
  - MIT: `http://bit.ly/2PkvYdr`
  - EdX: `http://bit.ly/3pHmZRd`
  - 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.

More about Exams and Homeworks

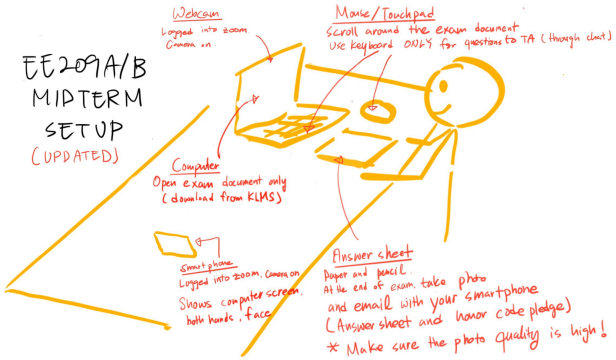
- 4 Exams
- Schedule Again
  - Exam 1: 09/23, 7:00PM - 10:00PM
  - Exam 2: 10/14, 7:00PM - 10:00PM
  - Exam 3: 11/11, 7:00PM - 10:00PM
  - Exam 4: 12/16, 9:00AM - 12:00PM
  - Check your calendar and empty your schedule at these times.
- 9 Homeworks for each of 9 chapters.
  - Will take just about 2-3 hours if you understand the course contents very well.
  - Try to finish as soon as possible soon after you watch the lecture videos.

Grading, Cheating

- Homeworks: total 37%, 4 points for each of the first 8 homeworks and 5 points for the last homework
- Exams: total 63%, $63/3 = 21$ points for each exam
  - You can exclude one exam that you don't want to be graded
- Letter or Pass/Fail
  - You can decide until the date of Exam 2, no extension
  - Minimum requirement for Pass: C+ or higher
  - Minimum requirement for C+ or higher
    - Take all the exams, and the homework score ≥ 18
- Cheating
  - **Zero tolerance** (very serious)
  - Honor code from EE department

How to Take Exam

- Will announce more details when you take exams
- Earlier experience from the EE209 class

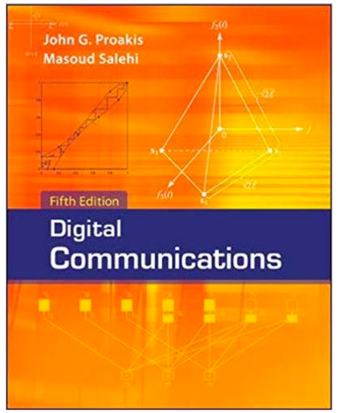


Questions?

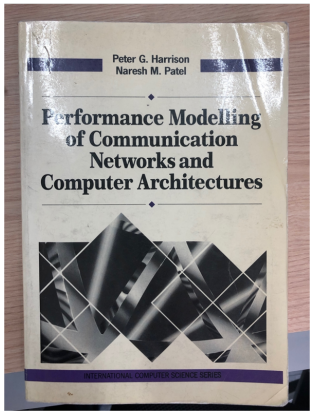
Why Probability?

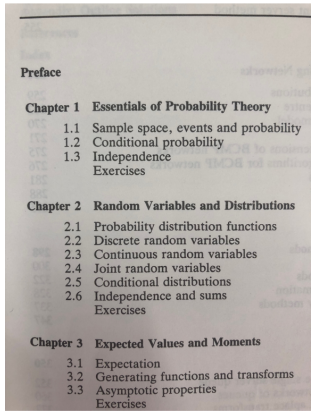
- Many things are "probabilistic"
- Assume that you are a designer of the following engineering systems. Good design?
  - a web server
  - a communication device like mobile phones
  - an AI-based image classifier
- From an engineering point of view,
  - System input
  - Algorithms in systems
  - Analysis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

Textbook: Digital Communication



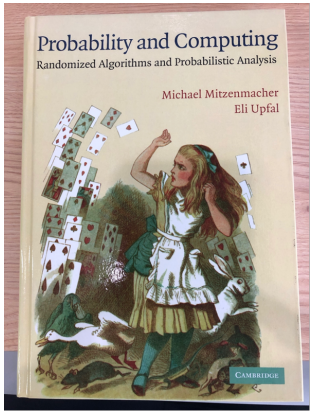
Textbook: Computer Networking

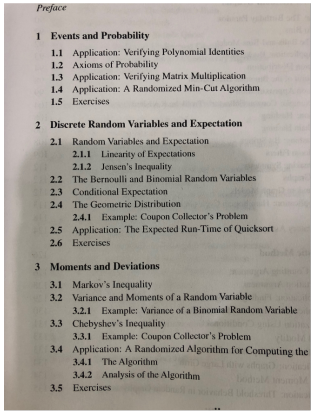




Preface

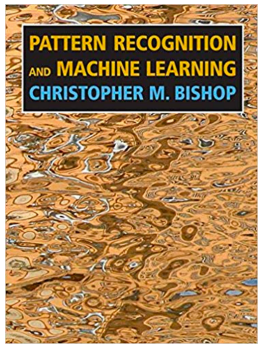
Textbook: Algorithm and Computing

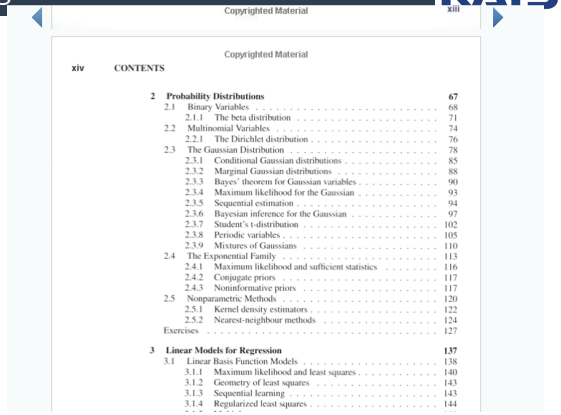




Preface

Textbook: Machine Learning





Copyrighted Material xiii

Copyrighted Material

xiv CONTENTS

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 2021, 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?