COM 5110 Random Processes for Communications
(通訊之隨機程序)
Spring Semester 2018

Instructor: 祁忠勇 (Chong-Yung Chi), Office: Room 966, Delta Building
Tel: 5731156 or 5715131 X31156,
E-mail: cychi@ee.nthu.edu.tw
http://www.ee.nthu.edu.tw/cychi/

This is a fundamental course of random processes including discrete-time random sequences and continuous-time random processes and applications in *Communications,* and S*ignal Processing* which are **<u>essential</u>** to analyze and design communications systems and signal processing algorithms. This course is suitable for senior undergraduate and first-year graduate students who would like to *pursue communications, signal processing and machine learning related researches.*

Units: 3
Lectures: M3, M4, R3, R4,
Classroom: Delta 202
Prerequisites**:** Probability Theory, Signals and Systems

Outline:

1. *Review on probability, random variables and statistics:* Probability; Discrete random variables; Continuous random variables; Functions of random variables and their distributions; Distributions derived from the normal distribution

2. *Transform methods, bounds, and limits:* Moment-generating function and characteristic function; Generating functions and Laplace transform; Inequalities, bounds, and large deviation approximation; Convergence of a sequence of random variables and the limit theorems.

3. *Random processes:* Random processes; Spectral representation of random processes and time series.

4. *Statistical inference:* Estimation and decision theory; Estimation algorithms.

5. *Advanced topics in random processes:* Probability models in machine learning.

Textbook:

[1] Hisashi Kobayashi, Brian L. Mark, and William Turin, *Probability, Random Processes, and Statistical Analysis*, Cambridge University Press, 2012. (科大文化事業股份有限公司 (02) 2697-1353)

References:

[1] Scott Miller and Donald Childers, *Probability and Random Processes: With Applications to Signal Processing and Communications,* 2/e, Academic Press, 2012. (新月圖書 (02) 2311-4027 分機 308)

[2] Henry Stark and John W. Woods, *Probability, Statistics, and Random Processes for Engineers*, Pearson, 2012. (高立圖書 02-2290-0318 分機 222)

Grading:

Homework: 20%, Midterm Examination: 40% and Final Examination: 40%

Midterm Examination: **to be determined**

Final Examination: **to be determined**

Office Hours: Monday: 13:30-15:30, Thursday: 13:30-15:30

Teaching Assistants:

Name: 楊駿騰 (Jun-Teng Yang)

Office: Room 706, EECS Building

e-mail: az345705@gmail.com

Tel: 0978639762

Office hours: to be determined