Sirindhorn International Institute of Technology

Thammasat University

School of Information, Computer and Communication Technology

ECS315: Course Syllabus

Semester/Year: 1/2018

Course Title: Probability and Random Processes
Instructor: Asst. Prof. Dr.Prapun Suksompong (prapun@siit.tu.ac.th)
***Course Website*:** http://www2.siit.tu.ac.th/prapun/ecs315/
Line Group: http://line.me/ti/g/vsNuRq-8ZP

Lectures

- Tuesday 10:40-12:00 BKD 2506
- Thursday 13:00-14:20 BKD 3214
- Thursday 14:40-16:00 BKD 3214
  (Tutorial/Make-up; Shared with ECS332)

Office Hours

See the Calendar section on the course website.

Course Information

Prerequisite: MAS117 (Mathematics II: Multivariable Calculus)

Course Description: This course introduces the principles of probability and random processes to undergraduate students in electronics and communication. The topics to be covered include random experiments, events, probability, discrete and continuous random variables, probability density function, cumulative distribution function, functions of random variables, expectations, law of large numbers, central limit theorem, introduction to random processes, Gaussian random process, autocorrelation and power spectral density.

Grading Policy: Coursework will be weighted as follows:

Assignments (HWs)	5%
Class Discussion	5%
In-Class Exercises	10%
Midterm Examination	35%
Final Examination (comprehensive)	45%

- Late assignments will be heavily penalized or rejected.
- Cheating will not be tolerated

Textbook: [Y&G] R. D. Yates and D. J. Goodman, Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers, 2nd ed., Wiley, 2004. Call No. QA273 Y384 2005.

Additional References:

1. John A. Gubner. Probability and Random Processes for Electrical and Computer Engineers. Cambridge University Press, 2006.
2. Terrence L. Fine. Probability and Probabilistic Reasoning for Electrical Engineering. Prentice Hall, 2005. Call No. QA273 F477 2006
3. Henk Tijms. Understanding Probability: Chance Rules in Everyday Life. Cambridge University Press, 3rd edition, 2012. Call No. QA273 T48 2012
4. William Feller. An Introduction to Probability Theory and Its Applications, Volume 1. Wiley, 3 edition, 1968.
5. Probability and random processes for electrical engineering / Alberto Leon-Garcia. Call No. TK153 L425 1994
6. A first course in probability / Sheldon Ross. Call No. QA273 R83 2002
7. Probability models, introduction to / Sheldon M. Ross. Call No. QA273 R84 1997
8. Leonard Mlodinow. The Drunkard's Walk: How Randomness Rules Our Lives. Pantheon; 8th Printing edition, 2008.

Assignments: Homework will be assigned throughout the semester. Most assignments will be graded on completeness, not correctness: if an honest attempt was made on an assigned problem, it will be considered complete. Occasionally, part(s) of a selected problem will be graded. Of course, you do not know which problem of which assignment will be selected; so you should work on all of them. The lowest assignment score will be dropped. The complete solutions to all problems (not just answers) will be posted on the course web site.

Class Discussion: The score for this part is judged by the amount of active participation in the class discussion (with the instructor) either inside or outside of the classroom. There will be (self-evaluation) forms for collecting information about this twice (one right after the midterm exam and another one right after the final exam).

In-Class Exercises: In-class exercises will focus on current or recently-discussed topics. An exercise may be given at any time during any class period. Students are expected to work in groups of at most three persons. In-class exercises will be given only to those students who are present. There will be no make-up exercise.

Two lowest in-class exercise scores will be dropped. Additionally, one who has legitimate excuse (such as participating in competition, or university-approved curricular and extracurricular activity, career-related interview, broken bone(s), being admitted to the hospital) may request that the corresponding missing score will not be counted. For such request, supporting document should be submitted to the instructor and the student must explicitly provide the missing exercise number and date in the (self-evaluation) forms.

Exams: A handwritten A4 study sheet is allowed. One side for the midterm exam. Another side for the final exam.

Students should notify the instructor before missing any exam if at all possible and immediately thereafter when not possible. The instructor (and/or the fact-finding committee) will determine if the absence from an exam is legitimate. Simply not feeling well is not a reason to miss an exam. In the case of legitimate absence, an oral and/or written make-up exam could be arranged.

Expectations: You should expect to spend extra 5-8 hours per week studying outside of class. However, the instructor do expect you to come to class and *participate actively* in class discussions. If you must miss a class, you must find out and catch up with what happened in lecture, either from the instructor or one of your classmates. You are responsible for all materials that are discussed in class.

Academic Integrity

The work submitted in this class is expected to be the result of your individual effort. You are free to discuss course material, approaches to problems with your colleagues or the instructor but you should never misrepresent someone else's work as your own.

It is your responsibility to protect your work from unauthorized access. For example, do not discard copies of your codes/assignments in public places.

Course Outline

The following is a tentative list of topics with their corresponding chapters from the textbook by Yates and Goodman. Each topic spans approximately one week.

1.	Introduction, Set Theory, Classical Probability	[1]
2.	Combinatorics: Four Principles and Four Kinds of Counting Problems	[1]
3.	Probability Foundations	[1]
4.	Event-based Conditional Probability	[1]
5.	Event-based Independence	[1]
6.	Random variables, Support, Probability Distribution	[2]
7.	**MIDTERM: 4 Oct 2018 TIME 09:00 - 11:00**	
8.	Discrete Random Variables	[2]
9.	Families of Discrete Random Variables and Introduction to Poisson Processes	[2,10]
10.	Real-Valued Functions of a Random Variable	[2]
11.	Expectation, Moment, Variance, Standard Deviation	[2]
12.	Continuous Random Variables	[3]
13.	Families of Continuous Random Variables and Introduction to Poisson Processes	[3,10]
14.	Multiple Random Variables	[4-6]
15.	Correlation, Covariance, Limiting Theorems	[4, 6, 7]
16.	Mixed Random Variables, Introduction to Random Vectors and Random processes	[3, 5, 10]
17.	**FINAL: 11 Dec 2018 TIME 09:00 - 12:00**	

Additional Remarks

1) Calculator: Casio FX-991 is permitted in exams and for in-class exercises
2) MATLAB: Computer simulation will be used to enhance learning. MATLAB is available in SIIT computer labs.

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