

<b>COURSE</b>	Name	: Random Processes in Telematics
	Code	: EE185568
	Credit(s)	: 2
	Semester	: (Elective Course)

### Description of Course

Various signals and phenomena in communication systems and networks can be modeled as a random process, which can then be used to analyze the performance of a system or design a particular technique. In this course, students will study probabilities, random variables, random vectors, random processes, and calculation methods. In addition, the main statistical signal processing techniques for telematics will also be studied.

### Learning Outcomes

#### Knowledge

(P01) Mastering the concepts and principles of science in a comprehensive manner, and to develop procedures and strategies needed for the analysis and design of systems related to the field of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics as a preparation for further education or professional career.

#### Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

#### General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

#### Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.  
(S12) Working together to be able to make the most of his/her potential.

### Course Learning Outcomes

#### Knowledge

Mastering the concepts of probability and random processes, as well as the calculation methods to be applied to various problems in the field of telematics.

#### Special Skill

Able to model various kinds of random signals, transform them on systems and phenomena that exist in telematics, and be able to calculate probabilities and other statistical quantities.

#### General Skills

Able to use software and tools to implement statistical signal processing on various problems in telematics, eg Matlab.

#### Attitude

Demonstrating attitude of being responsible for the work in his area of expertise independently.

### Main Subjects

1. Probability theory
2. Random Variables
3. Functions of random variables
4. Random vector, random sequence and matrix computation
5. Moment of random variable
6. Random processes
7. System, noise and power spectral
8. Parameter estimation
9. Hypothesis and detection
10. Applications of statistical signal processing

### Reference(s)

- [1] Henry Starks & Hohn W. Woods, "Probability, Statistics and Random Processes for Engineers," 4th ed., Pearson, 2012.
- [2] John J. Shynk, "Probability, Random Variables, and Random Processes: Theory and Signal Processing Applications," John Wiley & Sons, 2013.
- [3] Umberto Spagnolini, "Statistical Signal Processing in Engineering," John Wiley & Sons, 2018.

### Prerequisite(s)

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