Course Syllabus

STOCHASTIC PROCESSES

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Program: Telecommunications Engineering

1. Course number and name

ESTG1003 - STOCHASTIC PROCESSES

2. Credits and contact hours

3 credits and 4 contact hours

3. Instructor's course or coordinator's name

JOHN ALEX RAMIREZ FIGUEROA

4. Text book, tittle, author, and year

• Gubner, J. Probability and Random Processes for Electrical and Computer Engineers (2006)

a.Other supplemental materials

• Ross, Sheldon M.. Introduction to probability models ((hardcover : alk. paper))

• Wackerly, Dennis D. & Mendenhall, William & Scheaffer, Richard L.. Mathematical statistics with applications (Second)

• Taylor, Howard Francis & Karlin, Samuel. An introduction to stochastic modeling ((alk. paper))

• Karatzas, Ioannis & Shreve, Steven E.. Brownian motion and stochastic calculus ((New York Berlin Heidelberg) :$46.54)

5. Specific course information

a. Brief description of the content of the course (catalog description)

Stochastic Processes contributes with the consolidation of the skills and knowledge of the future engineer, to model phenomena with a strong random component, in order to make inferences about their behavior and evolution. These course includes the study of the basic fundamentals, properties and applications of stochastic process theory, counting processes, conditional expected value and martingales.

b. Prerequisites

STATISTICS - ESTG1005

c. This course is: Required

6. Specific goals for the course

a. Specific outcomes of instruction

1.- To distinguish when a stochastic process is stationary in the strict (strong) or broad (weak) sense, in order to make inferences about the future behavior of the process.

2.- Apply Markov's chain theory to real life problems to contribute to solutions where a

proper model definition is required, determination of server occupancy time, or assignment of operators to waiting systems.

3.- To differentiate the processes of counting, Poisson, renewal, Wiener and birth-death in order to establish a mathematical model that allows the correct understanding of the evolution and future development of a given problem.

4.- Use the mathematical models provided by stochastic process theory to address and solve the different problems of random modeling.

b. Explicity indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

• An ability to function on multidisciplinary teams

7. Brief list of topics to be covered

1.- Preliminaries
2.- Stochastic Processes
3.- Random walks
4.- Markov Chains
5.- Poisson Processes
6.- Renewal Processes
7.- Wiener Processes
8.- Spectral analysis