



Course Specification

(Bachelor)

Course Title: **Introduction to Random Processes**

Course Code: **CENX 402**

Program: **B.S. in Computer Engineering**

Department: **Department of Computer Engineering**

College: **College of Computer and Information Sciences**

Institution: **King Saud University**

Version: *Course Specification Version Number*

Last Revision Date: *Pick Revision Date.*

Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	5
E. Learning Resources and Facilities	5
F. Assessment of Course Quality	6
G. Specification Approval	6





A. General information about the course:

1. Course Identification

1. Credit hours: (3 (3,1,0) hours)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: (Level 7)

4. Course general Description:

Introduction to random variables, parameter estimation, stochastic processes, random signal processing and applications to systems.

5. Pre-requirements for this course (if any):

Linear Algebra, MATH 240

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

This goal of this course is to teach students about the different statistical models that can help them in their future studies and research in networking and signal processing.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	6 hours per week	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
----	----------	---------------



1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define the concepts of probability, random variable and their representations and operations.	1	Lectures and Tutorials	Exams and Homework
1.2	Explain statistics, sampling, confidence intervals, and hypothesis testing.	1	Lectures and Tutorials	Exams and Homework
1.3	Recognize random processes and their classifications.	1	Lectures and Tutorials	Exams and Homework
2.0	Skills			
2.1	Explain joint probability, conditional probability, independence, and Bay's rule.	2	Lectures and Tutorials	Exams and Homework
2.2	Analyze data statistics, relative frequency, percentiles and outliers.	2	Lectures and Tutorials	Exams and Homework
3.0	Values, autonomy, and responsibility			
3.1	Calculate the mean, variance, and joint moment of two random variables such as the correlation and covariance	6	Lectures and Tutorials	Exams and Homework



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2	Estimate parameters using maximum likelihood.	6	Lectures and Tutorials	Exams and Homework

C. Course Content

No	List of Topics	Contact Hours
1.	Experiments, Models, and Probabilities	8
2.	Discrete and Continuous Random Variables	8
3.	Pairs of Random Variables	8
4.	Random Vectors	4
5.	Parameter Estimation using the Sample Mean	8
6.	Stochastic Processes	8
7.	Random Signal Processing	12
8.		4
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Examination (1)	7	15%
2.	Midterm Examination (2)	12	15%
3.	Homework Assignments	Bi-weekly	15%
4.	Term project	Team	15%
5.	Final Exam	End	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers, Yates, R. D. and Goodman, D. J., John Wiley and Sons, 2nd Ed., 2005.
Supportive References	Random Variables and Random Signal Processing, Peebles, P., Probability, McGraw Hill, 4th Ed., 2001. Statistic Informed Decisions Using Data, Sullivan III, M., Pearson, 3rd Edition, 2010.





Electronic Materials	https://lms.ksu.edu.sa
Other Learning Materials	Tutorial book and Lab book are available in the college print shop.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with number of seats enough to accommodate enrolled students.
Technology equipment (projector, smart board, software)	Overhead projector with required software to facilitate presentations on smart board.
Other equipment (depending on the nature of the specialty)	Matlab software

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Department Council	Course reports are evaluated by the Department Council.
Effectiveness of Students assessment	Faculty-Peer Review	Final examination is moderated.
Quality of learning resources	Students	Indirect – Edu-gate survey.
The extent to which CLOs have been achieved	Students	Attainment level of every CLO is measured directly.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

