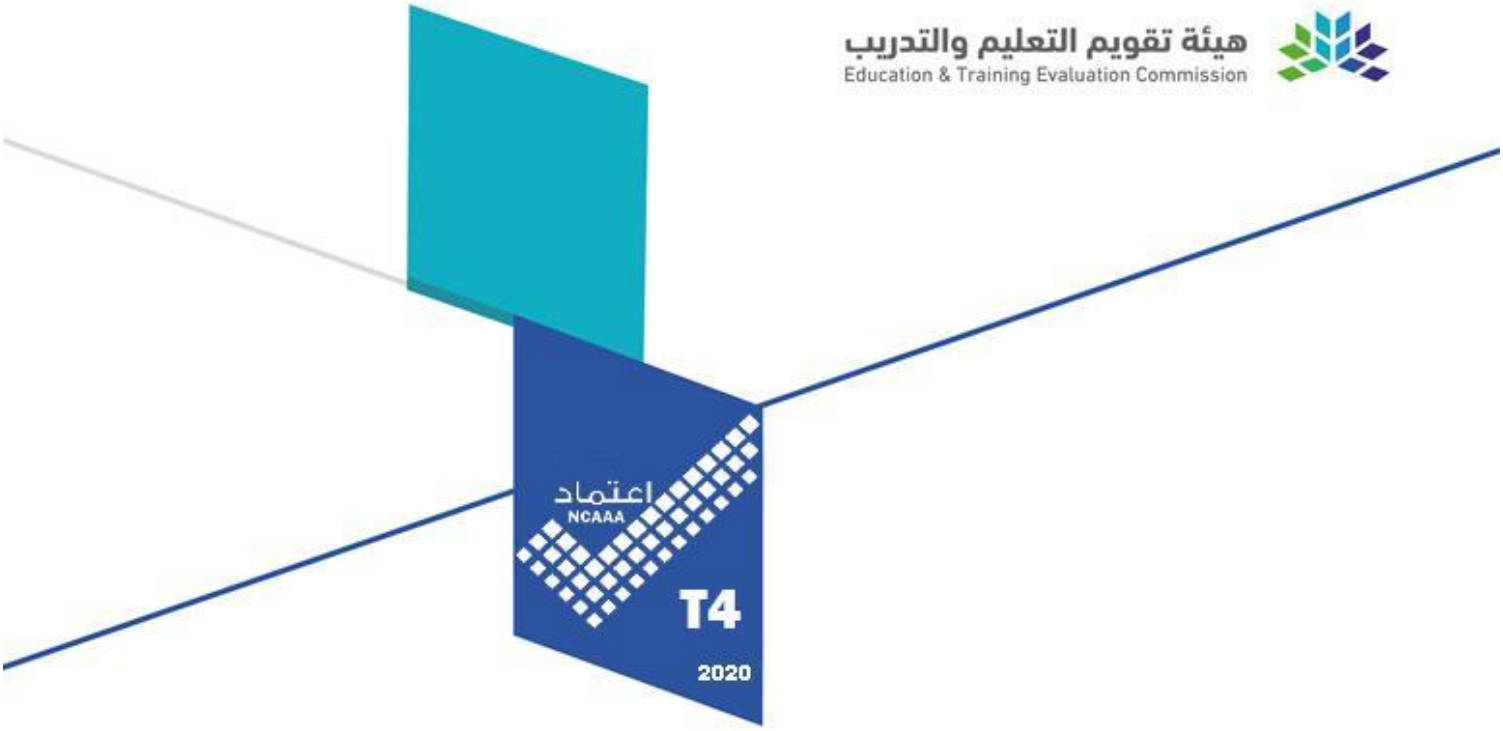
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Signals and Systems
Course Code:	503371-3
Program:	Bachelor in Computer Engineering
Department:	Department of Computer Engineering
College:	College of Computers and Information Technology
Institution:	Taif University

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 6/3
4. Pre-requisites for this course (if any)**: Calculus (2)** (202263-3)
5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	3	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	45
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

This course focuses on classification and properties of signals and systems, Fourier series representation of periodic signals, Fourier transform and it properties, convolution, correlation and spectral density, Laplace transform, representation and analysis of linear time-invariant (LTI) systems, LTI systems characteristics, impulse response and transfer function of LTI systems, frequency response of LTI systems, Introduction to analog filters.

2. Course Main Objective

1. To present and describe different types of systems and signals.
2. To describe Fourier representation for signals and systems and use it to analyze linear systems.
3. To introduce the student to Laplace transform and its applications on signals and systems.
4. To describe linear time invariant systems, its properties, analysis and design using time and transform domains.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Identify engineering problems by applying principles of signals and systems based on their characteristics and properties.	K1
1.2	Formulate engineering problems by performing frequency representation for different types of signals and systems using Fourier series and Fourier transform	K1
1.3	Solve engineering problems by using Laplace transform on continuous-time signals and systems.	K1
1...		
2	**Skills**	
2.1	Apply engineering design to produce solutions that meet specific needs with consideration of LTI systems in time and transform domains.	S1
2.2	Apply engineering design to produce solutions that meet specific needs with consideration of analog filters of type LPF, BPF, HPF.	S1
2.3		
2...		
3	**Values**	
3.1		
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Course overview + Introduction to signals and systems + Types and classification of signals and systems	2
2	Convolution	5
3	Trigonometric Fourier Series + Complex Fourier Series	6
4	Fourier Transform Theory + Fourier Transform Properties + Fourier Transform of Periodic Signals	6
5	Inverse Fourier Transform of Periodic Signals	5
6	Correlation and Spectral Density	2
7	Laplace Transform	6
8	Inverse Laplace Transform	5
9	LTI Systems-System Characteristics, System impulse response and transfer function	5
10	Filters LPF, BPF, HPF	3
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Identify engineering problems by applying principles of signals and systems based on their characteristics and properties.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.2	Formulate engineering problems by performing frequency representation for different types of signals and systems using Fourier series and Fourier transform	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.3	Solve engineering problems by using Laplace transform on continuous-time signals and systems.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.0	**Skills**		
2.1	Apply engineering design to produce solutions that meet specific needs with consideration of LTI systems in time and transform domains.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.2	Apply engineering design to produce solutions that meet specific needs with consideration of analog filters of type LPF, BPF, HPF.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments Projects
…			
3.0	**Values**		
3.1			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	Continues	5%
2	Midterm Exam	7	30%
3	Quizzes	Continues	10%
4	Projects	10	5%
5	Final Exam	16	50%
6			
7			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

• Teaching staff provide at least 6 office hours for students to help them in the course as well as in any other academic issues.

• Consultation can also be done 24 hours/ 7days through university Edugate (Tawasol)

• Consultation can also be done through email which is available at blackboard system.
• academic advice can be done through blackboard system facilities.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	M. Mandal and A. Asif, Continuous and Discrete Time Signals and Systems, Cambridge University Press, 2007 Signals and Systems (with Matlab Programs), Sanjay Sharma, S.K. Kataria & Sons Publisher, ISBN: 9350142295, 9th edition, 2017.
Essential References Materials	Simon Haykin & Barry Van Veen, Signals & Systems, John Wiley & Sons, 2002
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Traditional Classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Students	Indirect (Survey)
Effectiveness of teaching and assessment	Students	Indirect (Survey)
Extent of achievement of course learning outcomes	Faculty	Course Report

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Computer Engineering Council / Curriculum Committee
Reference No.	16
Date	4/3/2022