

Signals and Systems

Course Name	Course type (credit/hours)	Required course(3/3)		Course code	C057
	Target students Division/major/grade	Electrical and Computer Engineering/Sophomore		Opening semester	2019 2ND SEMESTER
	Class time and classroom	Tue D(WH340)Thu C(WH340)		English Grade	A(100%English)
Reference to this course	Prerequisite courses	Circuit Analysis			
	Related basic courses	Mathematics I, II, Engineering Mathematics			
	Recommended concurrent courses				
	Related advanced courses	Commun. Syst., Digital Sig. Proc., Linear Syst.			
Instructor	Name (title/division)		Sangsin Na(Professor, Electrical and Computer Engineering)		
	Office Room Number	원천관 406	Office phone Number	2366	e-mail
	Office hours		Homepage address		
Teaching Assistant	Name (title/division)				
	Office Room Number		Office phone Number		e-mail

1. Introduction

<Course Overview>

As a sophomore-level course on signals and systems, this course is to introduce signals and analysis tools such as the Fourier and Laplace transforms, to develop basic understanding of time-domain signals and their spectra, and to foster understanding their applications. Topics include signals, spectra, the Fourier series, the Fourier transform, and the Laplace transform. Some software experiments using Matlab will be part of the course.

Also studied will be the z-transform, which is used to deal with analysis and description of discrete-time signals and systems.

This course is a prerequisite for system areas such as analog/digital communication systems and automatic control, and signal processing.

2. Course Objectives

<Course Objectives>

- (1) understand signals and its spectra
- (2) understand systems and their operations
- (3) design analog filters
- (4) implement systems through simulation with MATLAB

A student who finishes the course successfully will be able to analyze signals and many linear systems and design a basic type of analog filters.

3. Class types and activities

1. <Lecture>

The lecture will be given in a combination of the computer-based classnotes and blackboard writing.

2. <Worksheets>

Worksheets will be assigned regularly and are recommended to go over in detail. Solutions or their drafts will be web-posted.

3. <Exams>

All the exams are closed-book. But one sheet of A4-sized summary note is allowed in each exam. And the note(s) for the previous exam(s) can be brought in for the subsequent exams. (So, you are allowed to bring in the total of three sheets for the final exam, two of which are from the midterms.) Additional information and/or solutions will be web-posted.

4. Teaching Method

lecture

discussion and debate

team project(presentation and case studies)

experiments(role-playing,etc)

designing and production

on-site learning(on-site training)

others

5. Support Systems in Use

AjouBb

automatic recording system

web-based assignment

cyber lecture

online content

class behavior analyzing system

others

6. Teaching Tools

PBL(Problem Based Learning)

CBL(Case Based Learning)

TBL(Team Based Learning)

UR(Undergraduate Research)

FL(Flipped Learning)

DSAL(Data Science Active Learning)

others

7. Knowledge and ability required for taking this course

You will be expected to have skill to deal with complex numbers, knowledge on differentiation, integration of ordinary functions and transcendental functions such as exponential and trigonometric functions.

Also required is knowledge on simple circuit analysis, which you would have acquired in circuit (analysis) theory.

Basic MATLAB programming skill is useful.

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam	1	25%	Midterm on school schedule
final exam	1	25%	Final on Tues, Dec. 10, 2019, 7:00--9:00 pm
quiz	6~10	50%	Quizzes and Assignments account for 50% and will be given in class or in evenings
presentation			
discussion			
homework		*	
etc			
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Ref.	Signals and Systems: Continuous and Discrete, 4th Ed.	Ziemer, Tranter, and Fannin	Pearson Education	2014
Main	Signals and Systems: Download from http://ss2.eecs.umich.edu/	Ulaby and Yagle		2018

10. Class system and Class shedule

Signals and Systems are introduced.

Signals and spectra are considered and analyzed with the Fourier series/transform.

The Laplace tranform is introduced.

System analysis is discussed with the Laplace transform.

Discrete-time signals and systems are introduced.

The z-tranform is introduced as a tool for discrete-time signals and systems.

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction to Signals and Systems		Sangsin Na			
2	Signal Properties		Sangsin Na			
3	Convolution Integral		Sangsin Na			
4	Fourier Series of Periodic Signals		Sangsin Na			
5	Fourier Transform		Sangsin Na			
6	Fourier Transform		Sangsin Na			
7	Applications of Fourier Transforms		Sangsin Na			
8	Midterm Review		Sangsin Na		Midterm Exam	
9	Laplace Transforms		Sangsin Na			
10	Laplace Transforms		Sangsin Na			
11	Discrete-Time Signals and Systems		Sangsin Na			
12	z Transforms		Sangsin Na			
13	z Transforms		Sangsin Na			
14	Digital Filters		Sangsin Na			
15	Digital Filters		Sangsin Na			
16	Final Exam		Sangsin Na		Final Exam	

11. Other items of notification