

## Digital Signal Processing

Course Name	Course type (credit/hours)	Elective course(3/3)			Course code	C093
	Target students Division/major/grade	Electrical and Computer Engineering/Junior			Opening semester	2021 2ND SEMESTER
	Class time and classroom	Tue D(Pal107)Thu C(Pal107)			English Grade	A(100%English)
Reference to this course	Prerequisite courses					
	Related basic courses					
	Recommended concurrent courses					
	Related advanced courses					
Instructor	Name (title/division)		Ran Rong(Assistant Professor, Electrical and Computer Engineering)			
	Office Room Number	종합관 603호	Office phone Number	2375	e-mail	
	Office hours				Homepage address	
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

### 1. Introduction

This course is for an upper-level undergraduate students and try to provide a simple and intuitive understanding of essential DSP concepts with a sufficiently detailed mathematical treatment. The course is organized into five parts:

- 1) Review of continuous-time signal and systems;
- 2) Sampling and reconstruction;
- 3) Introduction to discrete-time signals and systems;
- 4) Introduction to the time-domain analysis of discrete-time systems;
- 4) Frequency-domain analysis of discrete-time systems using the discrete-time FT and Z-transform.

### 2. Course Objectives

- 1) Let students understand the essential DSP concepts;
- 2) Encourage students learning with exercises and being able to solve DSP problems;
- 3) Develop students Matlab coding capability through mini-projects.

### 3. Class types and activities

- 1) Lecture: Introduction to the fundamental concepts+ Learning with a lot of examples
- 2) Midterm (prefer to offline);
- 3) Final Exams (prefer to offline) ;
- 3) Homework (4 times, online report submission);
- 3) Projects (1–2 times, online)

### 4. Teaching Method

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> lecture                          | <input checked="" type="checkbox"/> discussion and debate   |
| <input type="checkbox"/> team project(presentation and case studies) | <input type="checkbox"/> experiments(role–playing,etc)      |
| <input type="checkbox"/> designing and production                    | <input type="checkbox"/> on–site learning(on–site training) |
| <input type="checkbox"/> others                                      |   |

### 5. Support Systems in Use

- |  |   |   |
|--|---|---|
| <input checked="" type="checkbox"/> AjouBb               | <input type="checkbox"/> automatic recording system | <input type="checkbox"/> web–based assignment |
| <input type="checkbox"/> cyber lecture                   | <input type="checkbox"/> online content             |   |
| <input type="checkbox"/> class behavior analyzing system | <input type="checkbox"/> others                     |   |

### 6. Teaching Tools

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> PBL(Problem Based Learning) | <input checked="" type="checkbox"/> CBL(Case Based Learning) | <input type="checkbox"/> TBL(Team Based Learning)           |
| <input type="checkbox"/> UR(Undergraduate Research)             | <input type="checkbox"/> FL(Flipped Learning)                | <input type="checkbox"/> DSAL(Data Science Active Learning) |
| <input type="checkbox"/> others                                 |  |   |

### 7. Knowledge and ability required for taking this course

The course requires some background on SIGNALS and SYSTEMS & Matlab programming.

## 8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance	30	10%	
midterm exam	1	25%	
final exam	1	25%	
quiz	1-2	15%	
presentation			
discussion			
homework	1-2	15%	
etc	4	10%	Homework
study hours			

## 9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Sub	Discrete-Time Signal Processing	Oppenheim and Schafer	Prentice Hall	
Main	Essentials of Digital Signal Processing	B.P. Lathi and R. A. Green	Cambridge	

## 10. Class system and Class shedule

<ol style="list-style-type: none"> <li>1. Review of Continuous-time signals and systems;</li> <li>2. Sampling of continuous-time signals;</li> <li>3. Discrete-time signals and systems;</li> <li>4. Time-domain analysis of Discrete-time systems;</li> <li>5. Discrete-time Fourier Analysis</li> <li>6. Discrete-time Analysis using Z-Transform</li> </ol>
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### < Class Schedule >

\* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Review of Continuous-time signal and systems	E	Ran Rong			
2	Continuous-time analog filters	E	Ran Rong			
3	Sampling and the sampling theorem	E	Ran Rong			
4	A/D and D/A conversion	E	Ran Rong			

< Class Schedule >

\* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
5	Discrete-time systems	E	Ran Rong			
6	Discrete-time systems	E	Ran Rong			
7	Time-domain Analysis of Discrete-time systems	E	Ran Rong			
8	Midterm Exam	E	Ran Rong			
9	Time-domain Analysis of Discrete-time systems	E	Ran Rong			
10	The Discrete-time Fourier Transform	E	Ran Rong			
11	System analysis by the DTFT	E	Ran Rong			
12	Digital processing of analog signals	E	Ran Rong			
13	The z-Transformation	E	Ran Rong			
14	Discrete-time systems analysis by the z-transform	E	Ran Rong			
15	Discussion of digital filter design techniques	E	Ran Rong			
16	Final Exam	E	Ran Rong			

11. Other items of notification