

Digital Circuit

Course Name	Course type (credit/hours)	Required course(3/3)	Course code	F068
	Target students Division/major/grade	Software and Computer Engineering/Freshman	Opening semester	2021 2ND SEMESTER
	Class time and classroom	Mon B(Pa11025)Thu B(Pa11025)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses			
	Recommended concurrent courses			
	Related advanced courses	Computer structure		

Instructor	Name (title/division)		PAUL RAJIB(Assistant Professor, Software and Computer Engineering)		
	Office Room Number	Palda1 1011	Office phone Number		e-mail
	Office hours	Tue A/C/E, Thu B/D/F		Homepage address	
Teaching Assistant	Name (title/division)				
	Office Room Number		Office phone Number		e-mail

1. Introduction

This course deals with principles and applications of digital systems.

The topics covered are Logic Gates and Boolean Algebra, Combinational Logic Circuits, Flip-Flops and Related Devices, Digital Arithmetic: Operations and Circuits, Counters and Registers, Integrated-Circuit Logic Families, MSI Logic Circuits, Interfacing with the Analog World, and Memory Devices. There is a project assignment in this course to enhance the practical skill of digital systems.

2. Course Objectives

◇ Educational goals

Empower students to understand the fundamental principles and concepts of digital circuits and apply knowledge, process design, through the learning of problem-solving methods, etc.,
Information and computer engineers accurately recognize information and communication-related problems to be solved.
Develop creative problem-solving and digital circuit design capabilities and generate interest in digital circuit design.

◇ Learning outcomes for subjects

- ① Use the knowledge of mathematics, basic science, engineering and information technology to solve everything that happens within the digital circuit.
- ② Understand the various phenomena that occur between logical elements and IC chips and by defining and modeling the problems that can be occur during the development of digital logical circuit or systems, can solve it effectively,
- ③ Depending on realistic constraints, the structure of the digital system as a whole, the components that make it, and the relationships between the components can be creatively designed cost-effectively.

3. Class types and activities

4. Teaching Method

<input checked="" type="checkbox"/> lecture	<input checked="" type="checkbox"/> discussion and debate
<input checked="" type="checkbox"/> team project(presentation and case studies)	<input checked="" 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 type="checkbox"/> PBL(Problem Based Learning)	<input 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

To take this course, you must understand the binary system.

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam	1회	20%	
final exam	1회	30%	
quiz			
presentation			
discussion			
homework	4회	30%	
etc	14회	20%	
study hours	주당 12시간		

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Digital Systems: Principles and Applications, 11th ed.	Ronald J. Tocci etc.	Pearson	2011
Main	bCube-DLC를 활용한 논리회로 실험실습	CNDI 기술연구소	CNDI	2015

10. Class system and Class shedule

Logic Gates and Boolean Algebra => Combinational Logic Circuits => Flip-Flops and Related

Devices => Digital Arithmetic: Operations and Circuits => Counters and Registers =>

Integrated-Circuit Logic Families => MSI Logic Circuits => Memory Devices

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Logic Gates and Boolean Algebra, Basic Practice		PAUL RAJIB	Lecture, Practice	Task Evaluation	
2	Combinational Logic Circuits, 디지털 논리회로 실습장비 소개		PAUL RAJIB	Lecture, Practice	Task Evaluation	
3	- Flip-Flops and Related Devices 1 -Latches, Flip-Flops, Timing Considerations, Applications, Synchronization, 논리 게이트 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
4	- Flip-Flops and Related Devices 2 -Shift Registers, Schmitt-Trigger Devices, One-Shot, Clock Generator Circuits, 가산기/감산기 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
5	- Digital Arithmetic: Operations and Circuits -Addition, Subtraction, Multiplication, Division, BCD Addition, Arithmetic Circuits, Parallel Binary Adders, IC Parallel Adder, 2's-Complement System, BCD Adder, ALU ICs, 비교기 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
6	- Counters and Registers 1 -Asynchronous Counters, Synchronous Counters, Presettable Counters, BCD Counters, 인코더/디코더 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
7	- Counters and Registers 2 - IC Registers, 멀티플렉서/디멀티플렉서 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
8	- Mid term Exam		PAUL RAJIB	Exam		
9	- MSI Logic Circuits 1 -Decoders, BCD-to-7-Segment Decoder/Drivers, Encoders, MUX/DEMUX, 7-세그먼트 디코더 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
10	- MSI Logic Circuits 2 -Magnitude Comparator, Code Converters, Data Busing, Data Bus Operation, 코드 변환기 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
11	- Memory Devices 1 -Memory Technology, General Memory Operations, ROMs, SRAM, 병렬 가산기 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
12	- Memory Devices 2 -DRAM, Expanding Word Size and Capacity, Troubleshooting Memory Systems, Latch&FF 실습		PAUL RAJIB	Lecture, Practice	Task Evaluation	
13	- Case Studies I, 레지스터 실습		PAUL RAJIB	Lecture, Practice	Presentation Evaluation	
14	- Case Studies II, 동기식 카운터 실습		PAUL RAJIB	Lecture, Practice	Presentation Evaluation	
15	- Case Studies III, 비동기식 카운터 실습		PAUL RAJIB	Lecture, Practice	Presentation Evaluation	
16	- Final Exam		PAUL RAJIB	Exam		

11. Other items of notification

Students who do not carry out design projects are rated as F.