

강 의 계 획 서(Syllabus)

[1] 기본 정보(Basic Information)

■ 강의 정보(Course Information)

교과목명 (Course Title)	초고속저전력회로설계특론	강의유형 (Course Type)	이론
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[2] 학습 목표/성과(Learning Objectives/Outcomes)

■ 과목 설명(Course Description)

This coursework starts with an introductory classes in VLSI CMOS integrated circuit design where you will go from the low level physical transistor and mask design of your own cell library, all the way to the design, implementation, and fabrication of a significant CMOS digital integrated circuit.

Many aspects of Digital VLSI design will be introduced in order to take this significant and enjoyable design journey. Plus, although this is not a course in digital system design or computer architecture, some basic knowledge such as boolean logic and how to design and implement combinational and sequential digital circuits (such as adders and other data-path logic, and esp. finite state machines) will be covered during the classes.

The final goal of this coursework is to understand the VLSI design philosophies and corresponding methodologies of high performance and low power.

■ 학습 목표(Learning Objectives)

The final goal of this coursework is to understand the philosophies of VLSI design and corresponding methodologies of high performance and low power.

■ 학습 성과(Learning Outcomes)

Students will learn about the basic knowledge of CMOS VLSI design that covers:

- Basic transistor theory
- CMOS processing
- Mask layout and design rules
- VLSI CAD tools
- Circuit simulation and characterization
- Custom data-path circuit design
- Standard cell design and use
- Library-based circuit synthesis
- Full chip assembly

Then students will study:

- Low power VLSI design
- High performance circuit design
- Optimization algorithms

[3] 강의 진행 정보(Course Methods)

■ 강의 진행 방식(Teaching and Learning Methods)

강의 진행 방식	추가 설명
오프라인 강의	자체 개발한 강의 노트를 통해 진행. 영어 강의

■ 수업 자료(Textbooks, Reading, and other Materials)

수업 자료	제목	저자	출판일/게재일	출판사/학회지
참고 교재	Principles of CMOS VLSI Design: A Circuit and Systems Perspective	Neil Weste, David Harris		Addison-Wesley

[4] 수업 일정(Course Schedule)

차시	강사명	수업주제 및 내용	제출 과제	추가 설명
1	이우주	We will learn about Performance vs power in VLSI circuits.		
2	이우주	We will study on energy and power analysis (theoretical and numerical analysis)		
3	이우주	Let's study on how to calculate the speed of circuit. Then, let us learn about the logical effort. Then we will study on the interconnect delay.		
4	이우주	Let us study on the new low power design beyond the conventional low power VLSI design techniques.		
5	이우주	What is the temperature effect inversion (TEI) ?		
6	이우주	We will learn about the cutting edge ULP techniques: TEI-aware ULP techniques.		
7	이우주	We will learn about the pros and cons of the TEI ULP techniques, then discuss about the on-going research on this technique.	Report of summarizing the TEI-aware ULP method papers.	
8	이우주	This chapter is dedicated to review what we have learned by using a couple of sample problems.	Solutions of the sample problems	
9	이우주	Exam		
10	이우주	In this chapter, we will learn the power conversion efficiency and the ways to improve it.		
11	이우주	This chapter is to learn about the reconfigurable architecture for high speed/low power design.		
12	이우주	Final project		
13	이우주	Final project		
14	이우주	Final project		

[5] 수강생 학습 안내 사항

Students are encouraged to proactively and positively participate in the classes, aiming to understand the philosophy of circuit design and smoothly keep their eyes in VLSI design.

출결(Attendance)

10

attendance

중간시험(Mid-term Exam)

35

Midterm

기말프로젝트(Final Project)

35

Final

과제(Assignment)

20