2015학년도 1학기 [반도체] 강의계획서

◆ 수업정보 ◆

[수업정보]

시간/강의실	월(5-6) 9-211B 화(3) 9-211B		
학점	3학점	학수번호(분반)	DISP381(00)
이수구분	기본전공선택		

[강의담당자]

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[조교정보]

성명		소속	
E-mail			
연구실		연락처	

◆ 수업운영 ◆

[수업방법]

활동유형	강의, 토론, QnA

[평가방법]

항목	점수	항목	점수
과제	15 점	중간시험	30 점
기말시험	30 점	토론 및 Q&A	10 점
실습	15 점		
총점	100 점		
평가점수공개여부	공개		

◆ 학습계획 ◆

▶ 과목개요

This class is an introduction to the physical principles of semiconductor devices and their fabrication technology. It is intended to incorporate the basics of semiconductor materials and conduction processes in solids, which arise repeatedly in the class when new devices are explained. One of the keys to success in understanding the semiconductor physics is to work problems that exercise the concepts. Therefore, three or four problems at the end of each chapter are assigned to the homework every week. In addition, we apply the knowledge learned in class directly to electronic devices such as pn junction and light-emitting diodes, through AMPS-1D Simulation. The class includes both silicon and compound semiconductors, to reflect the continuing growth in importance for compounds in optoelectronic and high-speed device applications.

▶ 학습목표

This lecture has two basic purposes: (1) to provide students with a sound understanding in semiconductor devices, from semiconductor physics to its application, so that their studies of electronic circuits and systems will be meaningful; and (2) to develop the basic tools with which they can later learn about newly developed devices and applications. In the end, we will learn as to how semiconductors work and are to be applied.

▶ 추천 선수과목 및 수강요건

1. General Physics 1 and 2, Modern Physics
2. Basic Computer Programming
3. Attendence > 1/2
4. Homework > 1/2
5. Discussion> 1/2
6. Projects: Computer Simulation >6/6
7. Midterm, Final Test
8. Cell Phones: Students will turn their cell phones off. They will not answer their phones in class. Students whose phones disrupt the course and do not stop when requested by the instructor will be referred to the Judicial Affairs Officer of the University.

▶ 수업자료(교재)

Textbook: Robert F. Pierret, “Semiconductor Device Fundamentals”, Addison-Wesley Publishing Company, Inc.
ISBN 0-201-54393-1

▶ 지정도서 및 참고문헌

지정도서	참고도서명	저자명	출판사	출판년도	ISBN
N	Semiconductor Devices, Physics and Technology	S. M. Sze	John Wiley & sons	1985	0-471-87424-8
N	Solid State Electronic Devices	Ben G. Streetman and Sanjay banerjee	Prentice Hall, Inc.	2000	0-13-026101-7

▶ 과제물

(1) Homeworks: Three or four problems at the end of each chapter are assigned to the homework every week.
(2) Q&A: About 5 questions every week.
(3) Computer Simulation: About 6 projects this semester.

▶ 주별학습내용

주	기간	회차	학습내용	교재	활동 및 설계내용
1	03.02 - 03.08	1	Semiconductors: A general introduction	Ch 1 Semiconductors: A general introduction	
2	03.09 - 03.15	1	Crystal Structure	Ch 1 Semiconductors: A general introduction	The method of semiconductor simulation
3	03.16 - 03.22	1	Semiconductor Models	Ch 2 Carrier Modeling	
4	03.23 - 03.29	1	Equilibrium carrier concentrations	Ch 2 Carrier Modeling	Computation of Fermi statistics
5	03.30 - 04.05	1	Drift and diffution	Ch 3 Carrier Action	
6	04.06 - 04.12	1	Recombination-generation	Ch 3 Carrier Action	
7	04.13 - 04.19	1	Fabrication processes	Ch 4 Basics of device fabrication	Report of semiconductor processes
8	04.20 - 04.26	1	Review and midterm exam	Ch 1 - Ch 4	중간고사
9	04.27 - 05.03	1	Introduction to pn junction	Ch 5 pn junction electrostatics	Simulation of semiconductor diodes
10	05.04 - 05.10	1	pn junction electrostatics	Ch 5 pn junction electrostatics	Simulation of semiconductor diodes
11	05.11 - 05.17	1	Ideal diode equation	Ch 6 pn Junction Diode: I-V Characteristics	Simulation of semiconductor diodes
12	05.18 - 05.24	1	Reverse-bias breakdown	Ch 6 pn Junction Diode: I-V Characteristics	
13	05.25 - 05.31	1	pn Junction diode: Capacitance	Ch 7 pn Junction Diode: Small-Signal Admittance	
14	06.01 - 06.07	1	Optics and photodiodes	Ch 9 Optoelectronics	
15	06.08 - 06.14	1	Solar cells	Ch 9 Optoelectronics	Simulation of solar cells
16	06.15 - 06.21	1	Review and final exam		기말고사

▶ 기타 (설계관련사항 포함)

Projects:

(1) Simulation: We use AMPS-1D Simulation Program to understand semiconductor physics and in designing electronic devices.
(2) Report: Write an one-page paper in each Simulation Project.
(3) Computation: Calculating carrier concentrations based on Fermi-statistics.