

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	课程名称 Course Title	半导体器件导论 Introduction to Semiconductor Devices
2.	授课院系 Originating Department	电子电气工程系 Department of Electrical and Electronic Engineering
3.	课程编号 Course Code	EE204
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业基础课 Major Foundational Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	中英双语 English & Chinese
8.	授课教师、所属学系、联系方式 (如属团队授课, 请列明其他授课教师) Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	于洪宇 Hongyu Yu Department of Electrical and Electronic Engineering 755-88018508 yuh@ustech.edu.cn Aung Ko Ko Kyaw Department of Electrical and Electronic Engineering 755-8801-8531 aung@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	蒋苓利 Lingli Jiang Department of Electrical and Electronic Engineering Jiangll@sustech.edu.cn
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	

11. 授课方式 Delivery Method	讲授	习题/辅导/讨论	实验/实习	其它(请具体注明)	总学时
	Lectures	Tutorials	Lab/Practical	Other (Please specify)	Total
学时数 Credit Hours	32		32		64
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	EE203 固体电子学 Solid State Electronics				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	EE304 集成电路设计 Integrated Circuit Design				
	EE320-15 集成电路工艺实践 Integrated Circuit Fabrication Laboratory				
	EE322 光电器件工艺实践 Optoelectronic Devices Fabrication Laboratory				
	EE336 光伏基础 Fundamental of Photovoltaics				
	EE337 模拟集成电路设计 Analog Integrated Circuit Design				
	EE338 专用集成电路设计技术 Application Specific IC (ASIC) Designs Methodology and Practice				
	EE343 光电仪器设计 Optoelectronic Instrumentation				
	EE345 第三代半导体基础导论 Introduction of Wide Bandgap Semiconductors				
14. 其它要求修读本课程的学系 Cross-listing Dept.	EE347 功率半导体器件与应用 Power Semiconductor Devices and Application				
	EE403 显示与照明技术 Introduction to Display and Lighting Technologies				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

The course objectives are:

- To give the overview of semiconductor industry and device trend
- To understand the fundamental of semiconductors
- To understand the device physics and operation principle of various semiconductor devices

16. 预达学习成果 Learning Outcomes

Upon completion of the course, the students will be able to demonstrate:

- An understanding of semiconductor fundamentals and operation principles of semiconductor devices
- An ability to apply the knowledge of semiconductor fundamentals and device physics in device engineering
- An ability to design the semiconductor devices

- An ability to analyse the characteristics and performance of semiconductor devices
- An ability to apply simulation tools to modulate the output of semiconductor devices

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Section 1: Overview of semiconductor industry and trend (Week 1)

Section 2: Fundamentals of semiconductors I (crystal structure, energy band, intrinsic semiconductor) (Week 1)

Fundamentals of semiconductors II (doping, Fermi-Dirac Function, semiconductor in equilibrium) (Week 2)

Section 3: Charge Carrier Transport (Week 3)

Section 4: Non-equilibrium excess carriers (Week 4)

Section 5: P-N Junction (Week 5)

P-N Junction Diode (Week 6)

P-N Junction Capacitance (Week 7)

Section 6: Metal-Semiconductor Contact (Week 8)

Section 7: Solar cell devices (Week 9-10)

Section 8: Mos Capacitor characteristics (Week 11-12)

Section 9: MOSFET devices (Week 13-14)

Section 10: GaN device structure and characteristics (Week 15-16)

18. 教材及其它参考资料 **Textbook and Supplementary Readings**

Semiconductor Physics and Devices Basic Principles, 4th Edition, Donald A. Neamen

Semiconductor Device Fundamentals, Robert F. Pierret

Physics of Semiconductor Devices, 3rd Edition, S. M. Sze, Kwok K. Ng

Gallium Nitride Power Devices, Hongyu Yu and Tianli Duan

课程评估 ASSESSMENT

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验				

Quiz				
课程项目 Projects		10		
平时作业 Assignments	Every two weeks	20		
期中考试 Mid-Term Test	Middle of the course	30		
期末考试 Final Exam	End of the course	40		
期末报告 Final Presentation				
其它（可根据需要 改写以上评估方 式） Others (The above may be modified as necessary)				

20. 记分方式 **GRADING SYSTEM**

- A. 十三级等级制 **Letter Grading**
 B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 **REVIEW AND APPROVAL**

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority



SUSTech

Southern University
of Science
and Technology