

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	微电子及集成电路基础 Fundamentals of Microelectronics and Integrated Circuit
2.	授课院系 Originating Department	深港微电子学院 School of Microelectronics
3.	课程编号 Course Code	SME102
4.	课程学分 Credit Value	2
5.	课程类别 Course Type	专业基础课 Major Foundational Courses
6.	授课学期 Semester	春季 Spring / 秋季 Spring
7.	授课语言 Teaching Language	英文 English / 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)	安丰伟, 副教授, 深港微电子学院 Fengwei An, Associate Professor, School of Microelectronics,, Email: anfw@sustech.edu.cn 李毅达, 助理教授, 深港微电子学院 Yida Li, Assistant Professor, School of Microelectronics, Email: liyd3@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	待公布 To be announced
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
学时数 Credit Hours	32				32
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	本课程为基础课，是微电子专业的先修课。主要后续课程包括集成电路基础 I&II、微电子基础 I&II、集成电路设计等。 This is an elective General Education course. It serves as a prerequisite course for students who will major in Microelectronics Engineering. The subsequent courses in Microelectronics include fundamentals of analog electronics, fundamentals of digital electronics, and integrated circuits design, etc.				
14. 其它要求修读本课程的学系 Cross-listing Dept.	无				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

介绍集成电路的基础和芯片制作过程，如模拟电路中放大器电路和数字电路中的与或非等逻辑门电路；另外包括 CMOS 集成电路的工艺流程。

To introduce the basic concepts, basic laws, theorems and analysis methods of electric circuits and the basic physics of semiconductor devices. Applications of devices in building amplifier, logic gates, basic circuits and CMOS Process will also be taught.

16. 预达学习成果 Learning Outcomes

通过本课程的学习，学生将系统地理解电路的概念和规律。学生将具备初步的器件理论知识和应用知识，能够将理论与实际相结合，具备一定的分析能力。

After completing this course, students will comprehensively understand the basic concepts and principles related to electric circuits. They will also master the fundamental physics behind the taught semiconductor devices and their applications. Finally, students will also understand and appreciate a set of basic fabrication process flow used by the microelectronics industry to fabricate silicon chips.

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.)

- 1: 课程介绍, 半导体基础知识 (4 学时)
Course introduction and basic knowledge of the semiconductor (4Hours)
- 2: 基本放大电路 (2 学时)
Basic amplifier (2Hours)
- 3: 信号运算和处理 (4 学时)
Signal operation and processing (4Hours)
- 4: 功率放大电路 (2 学时)
Power amplifier circuit (2Hours)
- 5: 逻辑代数基础 (2 学时)
Basics of logical algebra (2Hours)
- 6: 组合逻辑门电路 (2 学时)
Combinational circuit (2Hours)
- 7: 时序逻辑门电路 (2 学时)
Sequential circuit (2Hours)
- 8: 存储器 (2 学时)
Memory(2Hours)
- 9: PN 节, PN 二极管, 晶体管 (8 学时)
PN junction, PN diode, BJT, MOSFET (8Hours)
- 10: CMOS 制作 (4 学时)
CMOS fabrication (4Hours)

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

教材 Textbooks:

1. Microelectronic Circuits, 8th Edition, Adel S Sedra & Kenneth C Smith & Tony Chan Carusone & Vincent Gaudet, Oxford University Press, 2019.2.

参考书 References:

1. CMOS VLSI Design, 4th Edition, Neil H. E. Weste and David M. Harris, Pearson Education Asia Limited, 2010.
2. Semiconductor Physics and Devices, D.A. Neamen, McGraw-Hill, 2003.
3. Fabrication Engineering at the Micro- and Nanoscale, Stephen A. Campbell, Oxford University Press, 2008, Chapter 15.

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		5		
课堂表现 Class Performance		5		
小测验 Quiz				

课程项目 Projects				
平时作业 Assignments		20		
期中考试 Mid-Term Test		30		
期末考试 Final Exam		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