

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	微电子技术、产业与博弈 Microelectronics Technology, Industry and Policy Strategy
2.	授课院系 Originating Department	深港微电子学院 School of Microelectronics
3.	课程编号 Course Code	SMES207
4.	课程学分 Credit Value	1 学分 / 1 credit
5.	课程类别 Course Type	专业选修课程 Major Elective Courses
6.	授课学期 Semester	夏季 Summer
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)	陈凯 深港微电子学院 手机 18917520665 邮件: chenk6@sustech.edu.cn Kai Chen School of Microelectronics mobile 18917520665 email: chenk6@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	无 NA (请保留相应选项 Please only keep the relevant information)
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	12	4			16
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	N/A				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	N/A				
14. 其它要求修读本课程的学系 Cross-listing Dept.	不限				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

系统化地分析介绍人类迄今为止最伟大的战略性科技产业之一 - 微电子领域的科技创新、产业化、产业链、前沿趋势、创业与区域经济、政府政策和战略，乃至反复和正在发生的国际博弈，使学生对微电子领域的政产学研互动及其战略性，初步建立起较为全面完整的观察与思考框架。

Systematically introduce major milestones and outstanding examples of foundational innovation, commercialization, industry R&D trend, start-up and impact to local economies, and government policy as well as international confrontations in Microelectronics so that how government, industry, labs and universities can collaborately and nurture.

16. 预达学习成果 Learning Outcomes

建立对整个微电子技术产业的创新、产业化与产业链、创业、区域经济影响、政策制定和区域国家博弈等各个维度的系统完整的了解，激发学生在后续各个专业进一步学习热情，和后续工作的视野与工作基础。课程要求每位学生提交一份所感兴趣领域的学习总结性文章，帮助寻找确定学生对细分领域的学习钻研热情和本期的学习效果。

Establish a whole and systematic picture about the innovations, industry chains, start-up, economic impact to local society, regional and national hi-tech strategy as well as international competition and confrontations in science & tech.

The course requires each student to submit a summary paper on interested niche areas at the end and present in front of whole class. The attendance, on class performance, summary paper quality and presentation will be graded to assure class outcome.

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.)

对微电子七十余年的从创新到创业的发展历程、当前热点、未来趋势、产业链和产学研、创业及“硅谷”现象、政府扶持的成功案例、对区域经济的影响及区域国家博弈等相关方面加以介绍。

时间内容分布暂定如下：

第一周（ $2 \times 2 = 4$ 学时）：4 个小时介绍课程及要求，明确每人选题、学习总结与口头 presentation 作为评分要求。内容覆盖 1947 年晶体管的发明，“硅谷之母”Fairchild 如何引爆缔造“硅谷”，1959 年集成电路发明引爆“摩尔定律”直至 1970 年代前期。此外涉及“硅谷”大学在其中的角色，“硅谷”与“曼哈顿工程”两者的有趣对比。

第二周（ $1 \times 2 = 2$ 学时）：1980 年代，奠定 40 年后今天格局的重大事件接连发生，“美日半导体大战”，以及三个政府不约而同地投资创建了 SEMATECH, IMEC 和台湾工研院，政府在微电子产业的重要角色，思考其赋能产学研的成功之处，如何借鉴应用于今天的中国。

第三周（ $2 \times 2 = 4$ 学时）：1990-2010 年代，半导体产业所面临的“摩尔定律”可能到头的瓶颈是如何被大学与产业共同突破的；2010 年以来市场如何驱动产业而在半导体技术领域产生“三代拳王”更替；2020 年现状及未来前沿趋势。

第四周（ $1 \times 2 = 2$ 学时）：总结政府在发展历程中的重要角色，着重介绍反复/正在发生的区域/国家博弈的策略与方法。

第五周（ $2 \times 2 = 4$ 学时）：前两个小时总结梳理，着重探讨此其四周学生兴趣浓厚或结合今天国内外微电子产业现实，值得深入思考的部分；后两个小时为学生 present 分享他们的总结文章，全班逐一共同讨论。

Systematically introduce major milestones and outstanding examples of foundational innovation, commercialization, industry R&D trend, start-up and impact to local economies, and government policy as well as international confrontations in Microelectronics so that how government, industry, labs and universities can collaborately and nurture.

The 5 week/ 16 hours curricular set up is planned as follows:

1st week (2 hours/lecture * 2 lectures/week): introduce the course overall and requirement of summary paper by each student by the end of semester with personal presentation in class, as well as grading system. Start from the invention of transistor in 1947 and start-up of Fairchild, the “mother of Silicon Valley” and the shaping of the “Valley” in 1970s. Also introduce Bay Area and Universities. May compare echo systems/legends left over from “Manhattan Project” and “Silicon Valley”.

2nd week (2 hours/lecture * 1 lecture/week): Through 1980s, 1st technology confrontation in semiconductor specifically between US and Japan in history. Meanwhile, governments in 3 nations/regions simultaneously established three semiconductor endeavors, namely, SEMATECH, IMEC and Taiwan Industrial Research Institute. Nearly 40 years later, we now clearly see the successful consequences of each. That sets the high standard for how government to support microelectronics.

3rd week (2 lecture hours * 2 lectures = 4 lecture hours): Through 1990 - 2010s, universities and industry work together, with government support, to overcome the formidable; From current status to future frontiers in foundational research and emerging technology will be covered.

4th week (2 lecture hours * 1 lecture = 2 lecture hours):

5th week (2 lecture hours * 2 lectures = 4 lecture hours):

1st 2 lecture hours will emphasize and focus on some interested areas arised from first 4 weeks lectures, particularly those directly correlate or apply to current situation. 2nd 2 hours mainly leave for student’s paper presentation one by one.

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

自编，适当选用专业会议和期刊的最新论文材料及政府公开政策文件，以反映相关动态及进展动向。

Compile by lecturer, partially select from published conference and journal papers and government documents, including most recent materials to reflect dynamics and progresses.

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		60%		
课堂表现 Class Performance		10%		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation	学习书写质量	15%		
其它（可根据需要 改写以上评估方式） Others (The above may be modified as necessary)	Presentation skill, 沟通有效性	15%		

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