课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	**微电子前沿创新与技术领导力** **Innovations & Technology Leadership on Microelectronics**
2.	**课程性质** **Compulsory/Elective**	专业选修课 Major Elective Courses
3.	**课程学分/学时** **Course Credit/Hours**	3/48
4.	**授课语言** **Teaching Language**	中英 Chinese & English
5.	**授课教师** **Instructor(s)**	陈凯 Kai CHEN
6.	**是否面向本科生开放** **Open to undergraduates or not**	是 Yes
7.	**先修要求** **Pre-requisites**	（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.） 选修过任何一门大学物理，如“大学物理（上）B”（PHY103B)或“大学物理（下）B” （PHY105B)，或类似水平的物理课程即可。 For undergraduate students, any one course in physics such as “General Physics B (I)”(PHY103B) or “General Physics B (II)” (PHY105B) or similar level.

8. 教学目标
Course Objectives

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）
以教师亲身经历，多角度探讨业界数十年来屈指可数的几个里程碑意义的技术创新、著名机构与产业变迁和国际博弈等“大事件”，教育和培养学生在微电子领域的前沿创新能力与技术领导力，并通过“小课堂与大世界”的实时结合和分组角色扮演与讨论互动模式，启发学生对当前国际学科前沿现状脉动、历史发展脉络及未来演变趋势的深刻理解与洞见，既助力其当前基础学习和细分专业方向的选择，也为其未来职业生涯的选择与发展打下良好基础。
Through sharing and analyzing the technical milestones, well-known institution evolution and international semiconductor “big events” in semiconductor industry that the teacher himself has participated and contributed, educate innovation and technology leadership, especially combine the “small classroom with big world” in real time, as well as group discussion with possible role playing to develop deep understanding and insights on the technical advancements, associated driving forces and future trends of microelectronics.

9. 教学方法
Teaching Methods

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）
讲授，文献阅读，书面报告，分组讨论与角色互动，和个人 PPT 口头报告相结合的方式。
Lectures, material reading, word summary, group discussion and role playing, PPT oral presentation combined.

10. 教学内容
Course Contents
（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

Section 1	约 6 学时：从晶体管的发明与建模理论的奠基到未来一二十年硅基器件继续驱动“摩尔定律”这“百年”跨度（1940s-2030s)的硅基 CMOS 技术。

	Approximately 6 academic hours: from Transistor and Its Modeling to future 20 years CMOS device scaling as the driver of “Moore’s Law” and Si-based CMOS (compatible) technology spanning decades.
Section 2	约 6 学时：从“硅谷之母”的创建到“硅谷”因创业诞生到今天的创业及未来走向，并探讨支撑“硅谷”层出不穷创业浪潮的社会底层基础 Approximately 6 academic hours: discuss topics on startups, entrepreneurship, its social supporting foundations and semiconductor industrial echo systems
Section 3	约 6 学时：从半导体发展历史及国际成功案例入手，探讨政府角色与政产学研融合之着力点（“器”之打造） Approximately 6 academic hours: introduce & discuss government’s role in developing semiconductor industry with several successful examples to start.
Section 4	约 6 学时：微电子国际产业链的演变及分析 Approximately 6 academic hours: introduce the evolution of semiconductor echo systems distributed to global scale
Section 5	约 6 学时：国际产业博弈与”自主可控“ （外部环境与产业链的制约与创新突破） Approximately 6 academic hours: facing current “self reliance” trend, introduce the background and history of international side on semiconductor industry for the past and foreseeable future.
Section 6	约 6 学时：”前沿+前瞻“之”double challenges”(微电子科技产业之 nature） Approximately 6 academic hours: Discuss the nature of Semiconductor industry labeled by “Moore’s Law” which has been progressing in power law in its economic and technology scales.
Section 7	约 4 学时：技术领导力的方方面面 - 顶层设计与实践 （探索前沿创新突破的技术领导力之源） Approximately 6 academic hours: Discuss and explore various perspectives of “technology leadership” driving semiconductor frontier innovations.
Section 8	约 2 学时：个人领导力- 个人与前沿技术领导力视角看个人职业生涯规划与成长 Approximately 6 academic hours: “Think Different”characterized by Steve Jobs and discuss personal mentality and character for young professionals’ career choice and growth.
Section 9	约 2 学时：“百年树人”，如何培养陶冶个人品格与职业素养，成为最优秀的前沿技术探索者与领导者。 Approximately 6 academic hours: Character and leadership shaping.
Section 10	约 4 学时：PPT 口头 presentations, 课堂讨论等
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11. 课程考核
Course Assessment

（①考核形式 Form of examination；②.分数构成 grading policy；③如面向本科生开放，请注明区分内容。If the course is open to undergraduates, please indicate the difference.）
出勤（60%）+课堂表现（5%）+(课程 word 总结+PPT 口头 presentation)（两者合计 35%）
Attendance (60%) + Class performance (5%) + (Term paper in word+ PPT Presentation) (both together 35%)

12.	**教材及其它参考资料** **Textbook and Supplementary Readings**
	半导体与量子计算专业参考书，国际顶级咨询机构统计与报告，国内外公开发表的政府文件，专业媒体报道，和正在召开的及一两年内的国际会议前沿研究案例..... Semiconductor and Quantum Computing technical references, research reports from top international firms, publicly available government documents and statistics, professional news coverage, as well as example papers from current and recent top international technical conferences.....