课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	**硅基量子计算超低温 CMOS/Si-based Quantum Computing Cryogenic CMOS**
2.	**课程性质** **Compulsory/Elective**	理论课/Lecture
3.	**开课单位** **Offering Dept.**	深港微电子学院
4.	**课程学分/学时** **Course Credit/Hours**	2/32 小时 2 credits/32 academic hours
5.	**授课语言** **Teaching Language**	中文/Chinese
6.	**授课教师** **Instructor(s)**	陈凯/Kai CHEN
7.	**开课学期** **Semester**	秋季/Fall
8.	**是否面向本科生开放** **Open to undergraduates or not**	是/Yes
9.	**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.） 暂无(并于第一节课与所有学生当面沟通确认）。 No now （will confirmation with all students in 1st class in-person）.

10. 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.）
弥补现有课程体系在量子计算结合低温微电子这一跨学科跨领域的前沿新兴领域知识短板，以进入微电子或量子计算相关领域的研究，培养研究生的前沿创新能力。
对本科生的要求没有区别。

To make up the missing course and training in the uprising niche field which is interdisciplinary between quantum computing and cryogenic CMOS, this course aims to train graduate level students knowledge, vision, and latest research progresses so that they can be prepared for conducting research or engineering tasks in either mainstream microelectronics or uprising quantum computing fields.
No difference for undergraduates.

11. 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.）
课堂理论授课结合国际前沿最新研究成果研读。
对本科生无不同要求。

Lectures combined with the latest international research papers in the field.
For undergraduates: no difference for this.

12. 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.）
教学内容对本科生无区别。
No difference for undergraduates.

Section 1	课程简介 General Introduction
Section 2	量子计算简介 Quantum Computing Introduction
Section 3	“摩尔定律”与颠覆性计算 “Moore’s Law”& “Beyond Moore”
Section 4	量子计算 Quantum Computing
Section 5	量子物理简介 Quantum Physics Introduction
Section 6	模拟量子计算机及淬火 Analog Quantum & Annealers
Section 7	量子力学简介 Quantum Mechanics Introduction
Section 8	Qubits 的实现 Qubits Implementations
Section 9	硅基量子计算 Si-based Quantum Computers
Section 10	通用量子计算机 General Purpose Quantum Computers
Section 11	低温 Cryogenic CMOS 回顾 Cryogenic CMOS Review
Section 12	低温 Cryogenic CMOS 当前状态 Cryogenic CMOS Current Status
Section 13	Quiz
Section 14	当前论文研读及 PPT Presentations Latest Conf & Journal Research Paper Review through individual PPT Presentations
Section 15	当前论文研读及 PPT Presentations Presentations Latest Conf & Journal Research Paper Review through individual PPT Presentations
Section 16	当前论文研读及 PPT Presentations Presentations Latest Conf & Journal Research Paper Review through individual PPT Presentations
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13. 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.）
随堂测试 Quiz

分数构成：
48%考勤 + 12%作业 + 15%随堂小测验成绩 + 15%论文 PPT 总结互评 + 10%课程总结(word)及课程总体行为评估
对本科生：与研究生分开单独按本科生自己序列进行评分。

Grading policy:
48% attendance + 12% Problem Set + 15% Quiz scores + 15% paper review PPT presentations + 10% term paper & overall behavior
For undergraduates: separately grades among themselves from postgraduates.

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

"Quantum Computing: Progress and Prospects" by Horowitz, "Quantum Computing Explained" by McMahon, 自编教材，以及国际顶级峰会 IEDM，ISSCC, VLSI and ESSDERC 的最新研究论文。
Reference books as shown above and top conference papers from above named.