课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	**前沿物理选讲 C** **Selected Topics in Frontier Physics C**
2.	**课程性质** **Compulsory/Elective**	专业核心课
3.	**课程学分/学时** **Course Credit/Hours**	3/48
4.	**授课语言** **Teaching Language**	英文
5.	**授课教师** **Instructor(s)**	王恺
6.	**是否面向本科生开放** **Open to undergraduates or not**	否
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.） 无

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.）

修完本门课程后能够掌握的知识：晶体物理性质的基础知识和方法论，包括晶体的结构、晶体的结合、晶格振动和晶体热力学理论、能带论、半导体电子论；及其在场效应晶体管、光电子器件等半导体器件中的应用。
修完本门课程后能够具备的能力：从晶体结构的角度出发，理解晶体的力、热、光、电等性能及其相互作用机理；从半导体/光电子产业的实际应用出发，依据晶体及半导体器件的结构与性能分析，探究与构造新材料与新器件等。
Knowledge that can be mastered after finishing this course: basic knowledge and methodology of crystal physical properties, including crystal structure, crystal binding, lattice vibration and crystal thermodynamics theory, energy band theory, semiconductor electron theory; and the application of these theories in semiconductor devices such as field effect transistor and optoelectronic devices.
Ability that can be mastered after finishing this course: understanding the mechanical, thermal, optical and electrical properties of crystals and their interaction mechanism from the perspective of crystal structure; exploring and constructing new materials and new devices based on crystal and semiconductor device structure and performance analysis, for the practical application of semiconductor/optoelectronics industry.

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.）

课程主要采用的教学方式和教学方法：常规板书与多媒体 PPT 文档演示相结合的讲授方式，并适当增加一些与本专业课程相关的当下科学技术新方向的课堂讨论。
combining traditional blackboard writing with multimedia PowerPoint document presentation. In addition, some classroom discussions related to the current new directions of science and technology related to the courses are appropriately added

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	晶体的结构
Section 2	晶体的结合
Section 3	晶格振动和晶体热力学理论
Section 4	能带论
Section 5	半导体电子论
Section 6	场效应晶体管
Section 7	光电子器件
Section 8	
Section 9	
Section 10	
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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.）

本课程为考察课，考核方式为平时作业、课堂考察、期末课题。

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

1. 阎守胜， 固体物理基础, 北京大学出版社
2. 冯端,金国钧， 凝聚态物理学新论, 上海科学技术出版社
3. 美国物理学评述委员会, 90 年代物理学---凝聚态物理学, 科学出版社
4. 张礼, 近代物理学进展, 清华大学出版社
5. P.W.Anderson, Basic notions of condensed matter physics, Benjamin-Cummings, Menlo Park (1984)
6. P.M.Chaikin & T.C. Lubensky, Principles of condensed matter physics, Cambridge (1995).
7. 李正中， 固体理论， 高等教育出版社