课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	**Two-dimensional materials for electronic device applications**
2.	**课程性质** **Compulsory/Elective**	Elective
3.	**开课单位** **Offering Dept.**	MSE
4.	**课程学分/学时** **Course Credit/Hours**	3/48
5.	**授课语言** **Teaching Language**	English
6.	**授课教师** **Instructor(s)**	Associate Professor Yury Illarionov
7.	**开课学期** **Semester**	Spring 2024
8.	**是否面向本科生开放** **Open to undergraduates or not**	No
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.） No

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.）

Two-dimensional (2D) materials offer excellent opportunities for next-generation electronics that can potentially extend the life of Moore's law. In this course students are expected to learn the basics about 2D materials, their synthesis methods and applications of 2D materials in electronic devices. The lecture materials will include the review of the main achievements in the field of 2D electronics, the ongoing trends and most recent research and industry advances. This will help the students to understand the main challenges which arise during the lab-to-fab transition of the device technologies based on 2D materials, and possibly come up with fresh ideas on how to address these challenges. The knowledge gained during this course will be very beneficial for the future career of students in all areas of academy and industry related to electrical engineering, material science and physics. It is also worth mentioning that research on 2D materials is very capable for publications in high-impact journals and patents, thereby being a very good choice for those students who target at top-level positions and prestigious talent programs in future.

11. 教学方法
Teaching Methods

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The course will be given in the series of lectures followed by seminars organized after every 2-3 lectures (i.e. after a certain section is completed). During lectures the most important information about the corresponding topic will be discussed and followed by the references to the research papers for more detailed reading. During seminars students will be requested to make a brief report and initiate discussion of the selected research paper by the class. Also there will be the final report in the end of the semester.

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.）

	Section 1	Introduction to 2D materials
	Section 2	Synthesis methods used for different 2D materials
	Section 3	Overview of electronic devices based on 2D materials
	Section 4	FETs with 2D channels: main challenges and limitations
	Section 5	FETs with 2D channels: research trends and key milestones
	Section 6	Industry integration of 2D FETs
	Section 7	Possible future trends in 2D electronics

13.	**课程考核** **Course Assessment**
	（❶考核形式 Form of examination；❷.分数构成 grading policy；❸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.） Attendance (10%), Performance in seminars (40%), Mid-semester project (20%), Final report (30%) In addition, oral quiz may be arranged for those students whose performance during seminars was not sufficient for evaluation.
14.	**教材及其它参考资料** **Textbook and Supplementary Readings**
	- 2D Materials: Properties and Devices (edited by Phaedon Avouris, Tony F. Heinz, Tony Low), Cambridge Press, 2017 - Research papers cited in lecture slides