课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	**忆阻器导论及神经形态计算应用** **Introduction to RRAM and neuromorphic computing**
2.	**课程性质** **Compulsory/Elective**	专业选修/Major elective courses
3.	**课程学分/学时** **Course Credit/Hours**	2/32
4.	**授课语言** **Teaching Language**	英 English
5.	**授课教师** **Instructor(s)**	周菲迟 Feichi Zhou
6.	**是否面向本科生开放** **Open to undergraduates or not**	否 Not open
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 Not open

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.）

通过课程学习让研究生了解忆阻器相关理论，及其在神经形态计算的应用；了解基于忆阻器的神经形态计算的优势；了解当前在人工智能硬件方面的前沿研究方向。

Through this course students can easily understand the basics of the RRAM and the applications in neuromorphic computing. Students can know the advantages of RRAM based neuromorphic computing compared with conventional Von Neumann architecture based computing, as well as the other cutting-edge research directions in artificial intelligence hardware.

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 Lectures, 文献阅读 Research paper review, 口头报告/展示 selected topics presentation by students

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	忆阻器基础 Basics of RRAM
Section 2	忆阻器材料与物理机理 Materials and physical mechanisms of RRAMs
Section 3	忆阻器制备与集成 RRAM fabrication and integration

Section 4	忆阻器在逻辑运算及模拟电路的应用 RRAM for logic operations and analogue circuits
Section 5	忆阻器在神经形态计算的应用 RRAM for neuromorphic computing
Section 6	新兴光控忆阻器介绍 Introduction of emerging optoelectronic RRAM
Section 7	
Section 8	
Section 9	
Section 10	
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11. 课程考核
Course Assessment

（考核形式 Form of examination；.分数构成 grading policy；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.）

1) 出勤 attendance(10%), 2) 出勤及课堂表现 class participation (20%), 3)中期报告 Mid-Term Report （20%），口头报告 final presentation based on related topics towards the end of the course (50%)

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

1. 忆阻器导论，缪向水，2018
2. Pedretti, G.; Ielmini, D. In-Memory Computing with Resistive Memory Circuits: Status and Outlook. Electronics 2021, 10, 1063. https://doi.org/10.3390/electronics10091063
3. Zhou, F., Zhou, Z., Chen, J. et al. Optoelectronic resistive random access memory for neuromorphic vision sensors. Nat. Nanotechnol. 14, 776–782 (2019). https://doi.org/10.1038/s41565-019-0501-3
4. Zhou, F., Chai, Y. Near-sensor and in-sensor computing. Nat Electron 3, 664–671 (2020). https://doi.org/10.1038/s41928-020-00501-9