

# MRES MATERIALS SCIENCE AND ENGINEERING

## 材料科学与工程硕士

### 概览

本专业旨在把学生培养成材料科学与工程领域的研究人员和终身学习者。通过在理论、实践、计算等方面的学习,让学生能全面了解材料性能与材料合成、加工、结构、性质之间的复杂相互关系。本专业的毕业生有望对涉及材料科学与性能的工程和技术进步做出贡献,并将他们所学的知识应用于现代工业的新材料分析、开发和测试。

本专业各阶段都包括研究导向型教学和技术支持教学。本专业旨在培养开发可用于能源生产的先进材料、适用于极端环境的材料、高级复合材料和纳米材料等的研究型人才。

本专业的课程涉及工程学、材料化学及分子建模等学科及其有机整合,致力于培养学生在材料合成、微观表征及宏观物理力学性能分析等方面的能力,聚焦在纳米新材料及金属与合金领域。本专业的学生可通过选修分子动力学模拟(科学)或计算固体力学(工程学)领域的课程,来确定其专业方向。本专业的学生将有机会与先进材料研究与开发的领先机构——江苏省产业技术研究院(JITRI),进行项目合作。学生将进行聚合物和陶瓷等材料领域的为期三学期的项目制学习,同时也将有机会参与相关工业领域的定制化培养和项目实践。此外,对从事学术研究和行业资深研究职位感兴趣的学生,将有机会通过申请奖学金,或者自费的方式,来攻读博士学位。

### 知识与技能

毕业生将获得:

- 对材料属性、结构、物理力学性能有深入的理论理解,理解材料科学对工程和其他技术应用的重要性
- 理解材料表征技术和物理力学性能技术,在材料化学和工程领域具备扎实的研究和分析技能
- 在材料科学与工程领域的理论研究和实践中,拥有解决问题的能力
- 运用熟练的英语写作能力和表达能力,阐述复杂观点、研究方法、关键结果和结论

 **开始时间**  
2022年09月

 **学习地点**  
苏州

 **教学形式**  
全日制

 **学院**  
设计学院

 **学制**  
两年

### 课程

#### 核心课程

第一学期

- 纳米技术与先进材料
- 材料与力学实验方法
- 材料表征

第二学期

- 研究课题规划与安排

第三与第四学期

- 研究课题

#### 可选课程

第一学期

- 计算材料科学
- 计算固体力学

西交利物浦大学为硕士生提供一系列的活动来丰富其理论学习、体验学习以及专业发展。学校、学院与系部通常会开设涵盖各种主题和专题的培训、工作坊及研讨会。此类活动不仅包括通用类主题,也包括与特定学科相关的各项专题。学生还将有机会在西交利物浦大学担任助教、研究助理或实习生。根据各专业的具体安排,学院和系部或有机会带领学生到企业或组织进行实地考察或访问,以及邀请学者和专业人士来开展讲座和研讨会。这些课程或活动不仅可以支持学生在硕士项目中的学习,而且还可以培养学生在未来就业和专业发展等方面的重要技能和能力。



# MRES MATERIALS SCIENCE AND ENGINEERING

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### OVERVIEW

The MRes Materials Science and Engineering programme aims to train students as active researchers and lifelong learners in materials science and engineering. This programme provides students with a comprehensive understanding of the complex interrelation between material synthesis, processing, structure, properties and performance through theoretical, practical and computational work. Graduates of this programme will significantly contribute to the technological advancements involved in materials science and engineering performance and apply the knowledge gained in the analysis, development and testing of new materials in the modern industry.

The programme encompasses a research-led teaching and technology-enhanced learning approach at all levels of study. It aims to train researchers to resolve the current and future challenges associated with developing advanced materials in science and engineering for energy production, materials for challenging environments, structural material applications, advanced composites and nanomaterials.

The content of the degree programme integrates the engineering discipline and materials chemistry and modelling. The focus is on materials synthesis, characterisation and mechanical testing on nanomaterials and metal alloys. Students of this programme can select their specialisation field by selecting optional modules in either molecular modelling (science) or computational solid mechanics (engineering). Students attending this programme will also be able to work on collaborative projects with the Jiangsu Industrial Technology Research Institute (JITRI), a leading institution in research and development of advanced materials. This provides students with the opportunity to investigate diverse materials (e.g. polymers, ceramics, etc.) during the three semesters of project work which can be linked to industrial placement. In addition, after completing this masters programme, students with an interest in academia and advanced research positions in the industry will also be provided with opportunities to pursue a PhD degree through collaborative research scholarships or self-funded study.

### KNOWLEDGE AND SKILLS

By the time you graduate from the MRes Materials Science and Engineering programme, you will have developed:

- an in-depth theoretical understanding of material properties, structure and mechanical behaviour, as well as the importance of materials science to engineering and other technical applications;
- knowledge and understanding of a wide range of material characterisation and mechanical behaviour techniques, as well as strong research and analytical skills in materials chemistry and engineering;
- practical and problem-solving skills in materials science and engineering, applied in a wide range of theoretical and practical situations; and
- skills to present complex ideas, research methodology and key results and conclusions in written and oral formats



#### START DATE

September 2022



#### ATTENDANCE

Full time



#### DURATION

Two years



#### LOCATION

Suzhou



#### SCHOOL

DESIGN SCHOOL

### MODULES

#### CORE MODULES

Semester 1

- CHE40 3 Nanotechnology and Advanced Materials
- CEN425 Experimental Methods in Materials and Mechanics
- CEN412 Characterisation of Materials

Semesters 3 & 4

- CEN415 Research Project

#### OPTIONAL MODULES

Semester 1

- CHE421 Computational Materials Science

Semester 2

- CEN414 Research Project – Planning and Scheduling

- CEN413 Computational Solid Mechanics

The university offers a broad range of activities aiming to enrich master students' theoretical and experiential learning and professional development. Trainings, workshops and seminars, covering varieties of themes and topics, both generic and subject-specific, are often offered at both university and school/department levels. You may also be provided with opportunities to work as a teaching assistant, research assistant, or intern at XJTLU. Depending on the programme, field trips and company visits may be organized, and invited talks may be given by the industrial experts and professionals. Such activities will not only support you in your programme study, but also develop your personal and professional skills and enhance your overall employability.

