

BEng

MATERIALS SCIENCE

AND ENGINEERING

(UMSE)

材料科学

与工程

June 22,2026
具体信息以官方网站为主
Please refer to the official website for specific
programme information

XJTLU | ACADEMY OF LIFE AND
NATURAL SCIENCES
生命与自然科学学院

PROGRAMME FEATURES

The field of materials science and engineering is playing a critical and growing role in the development of modern technology. The **BEng Materials Science and Engineering** programme aims to equip students with the foundational knowledge, practical skills, and professional competencies required to excel as innovative engineers in the dynamic field of materials science. It fosters a deep understanding of the relationships between material synthesis, processing, structure, properties, and performance, grounded in core engineering principles and jobs in high demand in today’s rapidly evolving world. Graduates will be prepared to address global engineering challenges, contribute to sustainable technological advancements, and meet the increased demands of modern and exciting industries such as aerospace, renewable energy, AI-driven intelligent manufacturing, and health care.

MODULES

YEAR ONE

In the UK, undergraduate programmes typically last three years, whereas in China, they normally span four years. Accordingly, at Xi’an Jiaotong-Liverpool University (XJTLU), students who have already obtained the required credits and qualifications may be admitted directly into Year 2 of their chosen programme. The majority of students, however, enter Year 1, where they take foundation courses that include language training, basic mathematics, and subject-specific preparatory modules.

YEAR THREE

Core Modules

- FRACTURE MECHANICS
- NUMERICAL METHODS
- MEASUREMENTS IN CHEMISTRY
- SURFACE CHEMISTRY AND FUNCTIONAL MATERIALS
- SEMICONDUCTOR MATERIALS
- MATERIALS FOR ENGINEERING 1
- MATERIALS PROCESSING
- ADVANCED AI IN MATERIALS SCIENCE
- INTRODUCTION TO SOLID STATE PHYSICS



START DATE
Every September



DURATION
Four years



2+2 STUDY
Available



LOCATION
Suzhou



ATTENDANCE
Full time



SCHOOL
Academy of Life and
Natural Sciences



QUALIFICATION
XJTLU
BEng Materials Science
and Engineering

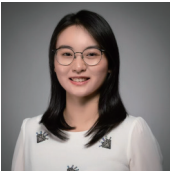
University of Liverpool
BEng Materials Science
and Engineering
(Hons,4+0)

BEng Materials Science
and Engineering
(Hons,2+2)

CAREERS

Graduates of the BEng Materials Science and Engineering programme are equipped to drive innovation in cutting-edge fields such as advanced manufacturing, renewable energy, and biomaterials development. They pursue roles as Materials Engineers designing high-performance alloys for aerospace, Computational Scientists using AI to accelerate materials discovery, or Sustainability Specialists optimising eco-friendly manufacturing processes. Opportunities span industries like energy (battery technology, solar cells), healthcare (biocompatible implants), and high-tech (semiconductors, additive manufacturing). With interdisciplinary training in chemistry, physics, and AI, graduates address global challenges in sustainability, resource efficiency, and next-generation technologies, shaping careers in academia, industry, and policy.

“As of today, almost all high-tech development and innovation are inseparable from new materials, so that Materials Science and Engineering has become one of the most popular disciplines in the world, and is an interdisciplinary field that studies, designs, and develops new materials, drawing on the fundamental principles of chemistry, physics and engineering to solve problems that would benefit our society. UMSE programme provides the basis for developing highly competent, well-trained undergraduates and the key skills developed in numeracy, communication, analysis and in solving a wide array of problems.”



Dr. Tianhong Gu
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Programme Director
BEng Materials Science and Engineering

KNOWLEDGE AND SKILLS

By graduation, BEng Materials Science and Engineering students will have the following knowledge and skills:

- Core principles of materials science, including synthesis, structure, properties, and performance relationships;
- Understanding of mechanical, thermal, and electrical behaviour of materials and degradation mechanisms;
- Skills in sustainable materials design and eco-friendly manufacturing principles;
- Proficiency in AI-driven materials discovery and computational modelling;
- Expertise in advanced materials for aerospace, energy, health care, and emerging technologies;
- Hands-on experimentation, material characterisation, and data analysis capabilities;
- Critical thinking to balance cost, performance, and sustainability in engineering solutions; and
- Teamwork, leadership, and adaptability to technological advancements.

WHY STUDY BENG MATERIALS SCIENCE AND ENGINEERING AT XJTLU?

- Solve Global Challenges:** Develop sustainable materials and clean energy technologies to tackle resource scarcity, carbon neutrality, and advanced manufacturing needs.
- Interdisciplinary Skills:** Master materials synthesis, characterisation, AI-driven design, and advanced manufacturing through chemistry, physics, and engineering.
- Expertise & Facilities:** Learn from world-class faculty and use cutting-edge labs (e.g., AI design tools, advanced materials testing).
- Industry Connections:** Access internships and careers in semiconductors, energy, and aerospace via Suzhou Industrial Park (3,000+ tech firms) and partnerships like JITRI.
- Career Success:** Over 80% of graduates join top global companies (e.g., Huawei, Tesla) or pursue postgraduate studies at leading universities.
- Dual Degrees:** Earn a Chinese Ministry of Education-accredited degree and a globally recognized University of Liverpool qualification.



材料科学与工程

材料科学与工程在现代技术发展中发挥着日益关键的作用。材料科学与工程学士（UMSE）专业旨在培养掌握坚实理论基础、具备丰富实践技能和专业素养的创新型工程人才。本专业基于核心工程原理，深入探讨材料合成、加工、结构、性能与应用之间的内在关联，并紧密结合当今快速发展的行业需求。毕业生将具备应对全球性工程挑战、推动可持续技术发展的能力，并能满足航空航天、可再生能源、人工智能智能制造、医疗健康等前沿产业对高层次人才的需求。

知识与技能

毕业时，你将具备以下几方面的知识与能力：

- 材料科学核心原理：理解材料合成、结构、性能与应用间的关系。
- 材料机械、热学、电学行为及失效机理。
- 可持续材料设计与环保制造原理。
- AI驱动材料发现与计算建模技术。
- 航空航天、能源、医疗及新兴科技领域先进材料的开发能力。
- 材料表征实验与数据分析技能。
- 工程决策中平衡成本、性能与可持续性的批判性思维。
- 团队协作、领导力及对技术变革的适应能力。

在当今科技高度发达的时代，几乎所有重大高科技发展创新皆与新材料研发应用密不可分。材料科学与工程因此成为全球最热门的学科领域之一——其交叉学科属性融合化学、物理、数学和工程学基本原理，通过研究设计新型材料解决现实社会问题，同时提供就业前景广阔且回报丰厚的职业路径。本材料科学与工程（UMSE）专业旨在培养学生掌握数值分析、工程沟通与复杂问题解决等核心能力，培养能力全面、专业过硬的复合型人才，广受国内外制造业领军企业青睐。



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材料科学与工程本科专业负责人



June 8, 2026
具体信息以官方网站为主
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就业

材料科学与工程工学学士毕业生具备在先进制造、可再生能源和生物材料研发等前沿领域推动创新的能力。他们可选择在材料工程领域就业，设计航空航天用高性能合金；在计算材料科学领域发展，运用人工智能加速材料发现；或在可持续制造领域优化环保工艺。职业选择覆盖能源行业（如电池技术与太阳能电池研发）、医疗领域（如生物相容性植入材料应用）、科技产业（如半导体制造与增材制造技术）等。凭借跨学科的化学、物理与人工智能知识体系，毕业生可投身学术界深化研究，加入工业界推动技术革新，或参与政策制定促进可持续发展，在资源效率、清洁能源与新兴技术等全球性挑战中开拓多元职业道路。

课程

第一年

在英国，本科阶段学习学制三年，而中国本科阶段学制为四年。因此，对于已获得相应学分、证书的学生，在我校可以直接升入二年级进行专业学习；大多数学生则是进入一年级进行基础课学习，主要课程包括语言课程、基础数学课程和专业相关的预备课程。

第二年

核心课程

固体和结构力学
材料概论
工程编程技能
非化学专业有机化学入门
初级无机化学（非化学专业）
人工智能材料科学入门
化学与材料科学关键技能
非化学专业物理化学导论
工程数学 1
物理学（化学专业）
面向科学的人工智能导论
科学领域的创业教育：面向未来的创新

第三学年

核心课程

断裂力学
数值方法
化学测量
表面化学与功能材料
半导体材料
工程材料 1
材料加工
高级人工智能材料科学
固体物理导论

第四学年

核心课程

工程材料 2
毕业设计
科学研究中的批判思维和应用技术

可选课程

高分子材料
计算化学
能源材料
生物材料

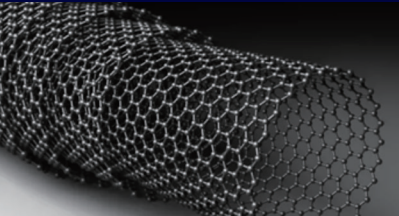
UNDERGRADUATE

BEng
Materials Science and Engineering (UMSE)
材料科学与工程工学学士

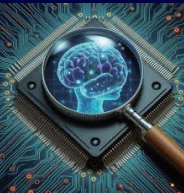
Innovation of Technology Will Start From You!
科技创新从你开始!



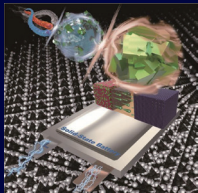
Aerospace
航空航天



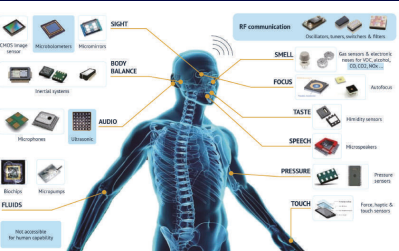
Multifunctional materials
多功能材料



Semiconductor
半导体



Energy Material
能源材料



Robotic Materials
机器人材料



*具体信息以官方网站为主