（085800）动力工程及工程热物理学科 2021 级全日制硕士研究生培养方案

2021 Full-time Master Program for Power Engineering and Engineering Thermophysics

一、基本信息 Basic Information

院系名称 School	中英国际低碳学院 China-UK Low Carbon College			**适用年级** Grade	2021 级 Class
适用专业 Major	能源动力（低碳能源方向） Energy and Power (Low Carbon Energy)			**标准学制** Duration	2.5 年 Years
学习形式 Study Mode	全日制 Full time				
项目类型 Program Type	专业型 Professional				
培养层次 Program Level	硕士生 Master Student				
最低学分 Min Credit	30	**最低 GPA 学分** Min GPA Credit	19	**最低 GPA** Min GPA	2.7

二、专业领域简介 Introduction

为了积极应对气候变化、能源更新以及未来以绿色低碳为主的产业变革所带来的挑战，学院面向国家重大战略需求，着眼未来，开设了以推动低碳能源与可持续发展为目标的能源动力（低碳能源方向）专业。该专业融合了上海交通大学在新工科、新能源、新材料、新系统等领域的优势，旨在培养低碳能源领域的高端人才，开展并推进高水平的学术研究。

In order to cope with the challenges brought by climate change, energy reform, and the industrial transformation towards a low-carbon future, the China-UK Low Carbon College (LCC) has launched a master programme in Low Carbon Energy focusing on energy and sustainability. This programme integrates the advantages of Shanghai Jiao Tong University in engineering, energy, materials, systems and other fields, aiming to cultivate high-level talents and promote cutting-edge academic research.

学院师资力量雄厚，围绕新能源与储能，低碳燃烧与动力系统、智慧能源与大数据、碳捕集利用与贮存等主要方向开展科学研究和人才培养，拥有一流的科研平台和优秀的教学科研队伍。能源动力专业在全英文授课、国际化办学和产学研合作培养上独具特色，注重学生知识、能力和素质的全面协调发展。

LCC has rich academic staff resources, first-class research teams and research platforms. The college carries out scientific research and graduate education in the fields of renewables and energy storage, low carbon combustion and engine system, smart energy and big data, carbon capture, utilization and

storage. The Low Carbon Energy programme is conducted in English and features in international educational cooperation and industrial cooperation and pays attention to the all-round development of students.

学院一直致力于培养富有社会责任感、创新精神、实践能力和国际视野，并且具备低碳能源开发与利用、能量系统优化以及环境保护等能力的复合型工程技术人才。经过研究生阶段的培养，毕业生将能继续在能源与环保等相关领域的研究所、高校以及企事业单位从事科学研究、人才培养、技术开发、工程设计和管理等方面的工作。学院紧密结合国家的绿色发展战略，为低碳和可持续发展提供人才、技术和产业支撑。

The Low Carbon College has been committed to cultivating talents in the fields of low carbon energy development and utilization, energy system optimization and environmental protection. LCC provides graduates with a range of professional skills that enable them to pursue careers related to energy and environment in research institutes, universities, enterprises, governments and NGOs. The college follows the national green development strategy and provides talents, technology and industrial support for low carbon and sustainable development.

三、培养目标 Program Objective

学生应在掌握动力工程及工程热物理学科专业知识的基础上，进一步系统学习低碳能源、碳金融以及碳管理等方面的专业知识，了解低碳能源领域国内外的发展现状、发展动态和国际学术研究的前沿，能够运用先进的低碳能源技术和方法解决工程实际问题。

毕业生应具备良好的科研素养、创新思维、前瞻意识和国际化视野，能够主动适应低碳产业的发展需求，力争成为面向世界、面向未来的高端工程复合型人才。

On the basis of mastering the professional knowledge of Power Engineering and Engineering Thermophysics, students should further learn the professional knowledge of low-carbon energy, carbon finance and carbon management etc., understand domestic and foreign development status, trends and the leading edge of international academic research as regards low-carbon energy field, and being able to use advanced technologies and methods of low-carbon energy to solve practical engineering problems.

The graduates should have sound scientific attainments, creative thinking, forward-looking awareness and international vision, adapt to the developing needs of low-carbon industries actively, strive to become high-end engineering inter-disciplinary talents that facing the world and future.

四、培养方式及学习年限 Training Mode and Study Duration

本项目采用全日制学习、导师制培养模式；新生入学后两周内经师生互选确定导师。

学制为二年半。其中，所有学生第一年在上海交通大学按规定修读课程。第二年经选拔被英国爱丁堡大学录取的学生，将前往爱丁堡大学进行为期一年的课程修读；未通过的学生，则在交大完成第二年规定的相应课程和论文工作。最后半年，所有学生在交大继续完成论文工作。

This programme will adopt Full-time cultivation mode and the Tutorial System. The tutors of LCC studnets will be determined within two weeks from the entrance through the mutual elections between tutors and students.

Students are supposed to finish their study within 2.5 years. In the first year, students study at LCC of SJTU and can apply to study at the UoE during the second year if they meet its entry requirements. In the final half year, students are required to finish their thesis in SJTU.

五、课程学习要求 Course Requirement

1. 须修读完成不少于 30 学分，其中 GPA 学分不少于 19，GPA 不低于 2.7 方能进入论文开题阶段等后续过程，课程原则上要求在第一学年完成。

Students are required to acquire at least 30 credits, including 19 credits in GPA courses. If final GPA points are no less than 2.7, students are allowed to start writing their research proposal. Courses are required to finish in the first year in principle.

2. 赴爱丁堡大学学习的学生须完成爱丁堡大学相应专业规定的学分课程。

Students who are admitted to study at the UoE in the second year should finish relevant courses as required.

3. 各类课程具体要求如下：

The specific requirements are as follows:

课程类别 Course Type	学分要求 Min Credits	门数要求 Min Courses	GPA 学分要求 Min GPA Credit	备注 Note
公共基础课 General Courses	6	/	/	/
专业基础课 Program Core Courses	11	/	/	/
专业前沿课 Program Frontier Courses	7	/	/	/
专业选修课 Program Elective Courses	4	/	/	/

六、培养过程要求 Training Requirement

	普博生 Doctoral Student after Master's	直博生 Doctoral Student after Bachelor's	硕博连读生 Combined Master-Doctoral Student	学术型硕士 Academic Master	**全日制专业型硕士 Full-time Professional Degree Master**
资格（综合）考试 Qualifying (comprehensive) Examination	有 Yes	有 Yes	有 Yes	无 No	**无 No**
开题报告 Thesis Proposal	有 Yes	有 Yes	有 Yes	有 Yes	**有 Yes**
年度报告（论文中期考核） Annual Report (Thesis Mid-term Examination)	有 Yes	有 Yes	有 Yes	无 No	**无 No**
预答辩 Pre-Defense	有 Yes	有 Yes	有 Yes	无 No	**无 No**
答辩 Thesis Defense	有 Yes	有 Yes	有 Yes	有 Yes	**有 Yes**
实践实习环节 Practice / Internship	无 No	无 No	无 No	无 No	**有 Yes**

七、学术成果要求 Requirement on Academic Achievements

须以第一作者发表至少 1 篇 SCI 或 1 篇中文核心期刊论文，第二年前往爱丁堡大学的学生须另交 1 篇英文项目报告。

It is required to publish at least 1 SCI paper or 1 Chinese Core Journals paper as the first author. Students that study in the University of Edinburgh during the second academic year should submit 1 piece of English Project Report in addition.

* 关于学术成果的规定，以相应学科学位委员会当年的具体要求为准。

* The regulations on academic achievements are subject to the specific requirements of corresponding Academic Degree Committee in that year.

八、学位论文 Thesis/dissertation work

1. 上海交通大学能源动力专业学位论文强调应用性研究，课题应来源于企业或生产实际；硕士学位论文需按照《上海交通大学博士、硕士学位论文撰写指南》撰写，学位论文答辩与学位申请按照《上海交通大学关于申请授予硕士专业学位的规定》执行。论文通过答辩获上海交通大学工学学位；

1. The school of Environmental Science and Engineering in SJTU emphasizes applicability and practicability of the dissertation, as a result, students' dissertation directions are supposed to stem from the practical experience or enterprises. If students pass the dissertation defence, they can get a master degree from SJTU.

2. 爱丁堡大学按照碳金融、碳管理、地理能源、可持续能源系统、能源-社会与可持续发展等专业要求。论文通过答辩获爱丁堡大学理学学位。

2. Students who study in the UoE in the second year need to meet the requirements UoE makes.

九、课程设置 Courses

详见下页 Please refer to the next page.

撰稿人签字：　　日 期：

校稿人签字：　　日 期：

审核人签字：　　日 期：

主管院长签字：　　院系公章　　日期：

说明：

1. 培养方案制定完成并经院系学位委员会审核通过后，全日制请将本表格电子版(word)发送至 SherryLi327@sjtu.edu.cn，非全日制请将本表格电子版(word)发送至 jshen@sjtu.edu.cn；
2. 请在新研究生教育管理信息系统完成新培养方案的申请，并在审核通过后将本表格的纸质版（签字盖章）送交研究生院存档。

课程类别 Category	课程代码 Course Code	课程名称 Course Name		学分 Credit	授课语言 Language*	开课学期 Semester	可以计算 GPA	必须计算 GPA	备注 Note
		中文 Chinese	English 英文						
公共基础课 General Courses	FL6001	学术英语	English for Academic Purposes	2	英文 in English	春季 Spring	是 Yes	是 Yes	必修 Compulsory 6 学分 at least 8 credits
	MARX6001	中国特色社会主义理论与实践研究	The Theory and Practice of Socialism in China	2	中文 in Chinese	秋季 Autumn	是 Yes	是 Yes	
	MARX6003	自然辩证法概论	Dialectic of Nature	1	中文 in Chinese	春季 Spring	是 Yes	是 Yes	
	GE6001	学术写作、规范与伦理	Academic Writing, Standards and Ethics	1	英文 in English	春季 Spring	是 Yes	是 Yes	
专业基础课 Program Core Courses	MATH6015	最优化方法	Fundamentals and Theory for Optimization Methods	3	英文 in English	春季 Spring	是 Yes	是 Yes	必修 Compulsory 数学类课程，五选二，学分≥5 Mathematics Courses, Select 2 out of 5, at least 5 credits
	MATH6004	计算方法	Numerical Analysis	3	英文 in English	秋季 Autumn	是 Yes	是 Yes	
	STAT6001	基础数理统计	Fundamental Mathematical Statistics	3	英文 in English	秋季 Autumn / 春季 Spring	是 Yes	是 Yes	
	MATH6014	最优估计及系统建模	Matrix Theory	3	英文 in English	秋季 Autumn / 春季 Spring	是 Yes	是 Yes	
	MATH6008	偏微分方程数值方法	Mathematical-Physical Equation	3	英文 in English	秋季 Autumn / 春季 Spring	是 Yes	是 Yes	
	PE6220	高等工程热力学	Advance Engineering Thermodynamics	3	英文 in English	秋季 Autumn	是 Yes	是 Yes	必修 Compulsory 学分≥6 at least 6 credits
	PE6201	高等传热学	Advanced Heat Transfer	3	英文 in English	春季 Spring	是 Yes	是 Yes	
	PE6120	高等工程流体力学	Advanced Fluid Dynamics in Engineering	3	英文 in English	秋季 Autumn	是 Yes	是 Yes	
	PE6100	高等燃烧学	Advanced Combustion Theory	3	英文 in English	春季 Spring	是 Yes	是 Yes	
	PE6441	新能源系统	New Energy Systems	3	英文 in English	秋季 Autumn / 春季 Spring	是 Yes	是 Yes	

	ME6522	测试原理、传感器与系统	Basic Principle of Sensors and Systems for Mechanical Measurement	3	英文 in English	春季 Spring	是 Yes	是 Yes		
	PE6603	低碳能源多相流输运理论	Multiphase Transport Fundamentals of Low Carbon Energy	3	英文 in English	秋季 Autumn	是 Yes	是 Yes		
	PE6605	能源系统智能控制技术	Intelligent Control Technology in Energy System	3	英文 in English	春季 Spring	是 Yes	是 Yes		
	PE6601	低碳能源过程中的数值方法	Numerical Methods in Low Carbon Energy Processing	2	英文 in English	春季 Spring	是 Yes	是 Yes		
	PE6607	碳中和	Carbon Neutrality	2	英文 in English	秋季 Autumn	是 Yes	是 Yes		
专业前沿课 Program Frontier Courses	GE6011	学术报告	Seminar	1	英文 in English	秋季 Autumn / 春季 Spring	否 No	否 No	必修 Compulsory	学分≥7，《碳经济学》需预先修读《环境经济学》 At least 7 credits. In order to choose Carbon Economics you need to study Environmental Economics in advance.
	ENVR8150	碳核算	Carbon Accounting	2	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	ENVR8151	碳经济学	Carbon Economics	2	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	ENVR8153	商业与气候变化	Business and Climate Change	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	
	ENVR8155	低碳能源与气候变化	Low Carbon Energy and Climate Change	2	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	ENVR7012	碳资源循环科学与技术前沿	Advanced Carbon Cycle Science and Technology	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	
	ENVR8152	低碳管理决策	Low Carbon Management Decision	2	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	PE8607	生物质能利用技术	Biorenewable Resources and Conversion Technologies	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	
	ENVR8163	联合国可持续发展目标	Sustainable Development Goals of the United Nations	2	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
专业选修课	GE8001	专业实践	Practice in Specialty	1	英文 in English	夏季 Summer	否 No	否 No	必修 Compulsory	学分≥4 At least 4 credits
	ENVR8154	碳资源循环学	Carbon Resources Cycle	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	

Program Elective Courses	PE6420	能源清洁与梯级利用	Energy Clean and Cascade Utilization	3	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	PE6422	热力系统建模与仿真	Analysis of Energy Utilization Systems	3	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	ENVR7104	环境经济学	Environmental Economics	2	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	PE6442	建筑节能与太阳能利用	Building Energy Saving and Solar Energy Utilization	3	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	PE6502	内燃机燃烧与排放控制	Combustion and Emission Control in Internal Combustion Engine	3	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	PE8601	燃气轮机燃烧原理	Gas Turbine Combustion Theory	3	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	ENVR8159	城市与可持续发展:城市作为低碳过渡的载体	Cities and Sustainability The urban as a vehicle for low	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	
	ENVR8157	地球资源地质学	Geology for Earth Resources	1	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	ENVR8158	地质能源的石油地质学	Petroleum Geology for GeoEnergy	1	英文 in English	秋季 Autumn	否 No	否 No	选修 Elective	
	PE8603	能源互联网与智慧能源	Energy Internet and Smart Energy	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	
	PE8605	新能源与储能技术	New Energy and Energy Storage Technology	2	英文 in English	春季 Spring	否 No	否 No	选修 Elective	