

建筑环境与能源应用工程专业培养方案

Undergraduate Program of Building Environment and Energy Engineering

I.专业介绍 Introduction

建筑环境与能源应用工程是一个综合性专业，涵盖了健康、能源、环境等人们广泛关注的內容。本专业致力于解决民用、医疗、交通、航天等领域的能源环境问题，为人们创造健康、舒适的热湿环境、空气质量环境、声光环境等，同时最大限度地减少建筑的能源与资源消耗，保证国家建设和自然环境的协调发展。结合我校交通运输工程一流学科建设和“交通领域特色鲜明的综合性研究型一流大学”的办学定位，专业定位为建设“具有交通领域特色的建筑环境与能源应用工程专业”，培养复合型高级工程技术人才。

Building Environment and Energy Engineering is a comprehensive specialty, which covers public hot concerns including health, energy and environment. This specialty is committed to solve the energy and environment problems in civil, medical, transportation and aerospace, create healthy and comfortable thermal and humid environment, air quality environment and sound and light environment, minimize the energy and resource consumption of buildings and ensure the coordinated development of national construction and natural environment. Combining with the construction of the first-class discipline of transportation engineering and the orientation of the first-class comprehensive research university with distinct characteristics in transportation field, the orientation of the specialty is to build the specialty of building environment and energy application engineering with characteristics in transportation field and to train senior engineers of transportation artificial environment.

专业代码：081002

Program Code: 081002

专业名称：建筑环境与能源应用工程

Program Name: Building Environment and Energy Engineering

II.培养目标 Objectives

培养德、智、体、美全面发展，知识、能力、素质协调，具备良好职业道德、社会责任、国际视野和创新意识，掌握扎实的从事建筑环境与能源应用工程专业技术工作所需的基础理论知识及专业技术能力，在设计研究、工程建设、设备制造、营运等企事业单位从事采暖、通风、空调、净化、冷热源、供热、燃气等方面的规划设计、研发制造、施工安装、运行管理及系统保障等技术或管理岗位工作的复合型高级工程技术人才。

To cultivate all-round development of morality, intelligence, physique and beauty, coordinate knowledge, ability and quality, possess good professional ethics, social responsibility, international vision and innovation consciousness, grasp the basic theoretical knowledge and professional technical ability needed to engage in technical work of Building Environment and Energy Engineering, and design, research and engineering construction. Establishment, equipment manufacturing, operation and other enterprises and institutions engaged in heating, ventilation, air conditioning, purification, cold and heat sources, heating, gas and other aspects of planning and

design, research and development, manufacturing, construction and installation, operation management and system support and other technical or management posts of senior engineering and technical personnel.

III.专业毕业要求 Graduation Requirements

1. 工程知识：能够将自然科学、工程基础和专业知用于解决建筑环境与能源应用工程领域复杂工程问题。

1. Engineering knowledge: The graduates can apply natural science, engineering foundation and professional knowledge to solve complex engineering problems in the field of Building Environment and Energy Engineering.

2. 问题分析能力：能够应用自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析建筑环境与能源应用工程领域复杂工程问题，以获得有效结论。

2. Problem Analysis ability: The graduates can apply the basic principles of natural science and engineering science to identify, express and analyze complex engineering problems in the field of Building Environment and Energy Engineering through literature research in order to obtain effective conclusions.

3. 设计/开发解决方案：能够设计针对建筑环境与能源应用工程领域复杂工程问题的解决方案，设计满足建筑环境与能源应用工程领域需求的系统、单元（部件）或工艺流程，并能够在设计环节中体现创新意识，考虑社会、节能、健康、安全、法律、文化以及环保等因素。

3. Ability to design/develop solutions: The graduates can design solutions to complex engineering problems in the field of Building Environment and Energy Engineering, design systems, units (components) or process flow to meet the needs of the field of Building Environment and Energy Engineering, and embody innovative consciousness in the design process, considering society, energy conservation, health, safety, legal, cultural and environmental factors.

4. 研究能力：掌握基本的研究方法。能够基于科学原理并采用科学方法对建筑环境与能源应用工程领域复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

4. Research ability: The graduates can master basic research method and adopt scientific principles and scientific methods to study complex engineering problems in the field of Building Environment and Energy Engineering, including designing experiments, analyzing and interpreting data, and obtain reasonable and effective conclusions through information synthesis.

5. 使用现代工具能力：能够针对建筑环境与能源应用工程领域复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对建筑环境与能源应用工程领域复杂工程问题的预测与模拟，并能够理解其局限性。

5. Ability to use modern tools: The graduates can develop, select and use appropriate technology, resources, modern engineering tools and information technology tools for complex engineering problems in the field of Building Environment and Energy Engineering, including prediction and simulation of complex engineering problems in the field of Building Environment and Energy Engineering, and understand their limitations.

6. 处理社会、环境与可持续发展问题的能力：能够基于工程相关背景知识进行合理分

析，评价方案对环境、社会、健康、安全、法律、文化、环境以及可持续发展的影响，理解并明确应承担的责任，维护社会的可持续发展。

6. Ability to deal with social, environmental and sustainable development issues: The graduates can make reasonable analysis based on relevant engineering background knowledge, evaluate the impact of the solution on environment, society, health, safety, law, culture, environment and sustainable development, understand and clarify their responsibilities, and maintain the sustainable development of society.

7. 合作与组织能力: 具有良好的团队合作意识和组织协调能力，能够在多学科背景下的技术团队中承担个体、团队成员以及负责人的角色。

7. Cooperation and organizational ability: The graduates can have good teamwork spirit and organizational coordination ability and be able to assume the role of individual, team members and leaders in a multi-disciplinary technical team.

8. 沟通交流能力: 具备良好的沟通表达、人际交往能力，能够就具体问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令，并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

8. Communication ability: The graduates have good communication and interpersonal ability, can effectively communicate with peers in the industry and the public on specific issues, including writing reports and designing manuscripts, presenting speeches, clearly expressing or responding to instructions, and have a certain international vision, and can communicate and respond to cross-cultural background.

9. 项目管理能力: 理解并掌握工程管理原理、经济学原理与决策方法，并能在具体项目中承担并完成项目管理任务。

9. Project management ability: The graduates can understand and master engineering management principles, economic principles and decision-making methods, and can undertake and complete project management tasks in specific projects.

10. 学习能力: 具有自主学习与终身学习的意识，具备独立学习，适应社会和技术发展的能力。

10. Learning ability: The graduates have the consciousness of autonomous learning and lifelong learning, and the ability to learn independently and adapt to the development of society and technology.

11. 思想素质: 具有良好的思想政治素质和科学的世界观、人生观、价值观，践行社会主义核心价值观。

11. Ideological quality: The graduates have good ideological and political quality, scientific world outlook, outlook on life and values, and can practice socialist core values.

12. 创新意识: 具有创新意识、创业精神和批判性思维，并能在解决工程实际问题的所有环节中体现。

12. Innovation consciousness: The graduates have innovative consciousness, entrepreneurship and critical thinking, which can be reflected in all aspects of solving practical engineering problems.

13. 职业规范: 具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

13. Professional norms: The graduates have humanities and social sciences literacy and sense of social responsibility. They can understand and abide by engineering professional ethics and norms in engineering practice and fulfill their responsibilities.

IV.学制与学位 Duration and Degree

学制：4 年

Duration: 4 Years

学位：工学学士

Degree: Bachelor of Engineering

V.主干学科与主干课程 Main Subject and Main Course

主干学科：土木工程、机械工程

Main Subject: Civil Engineering, Mechanical Engineering

主干课程: 理论力学、材料力学、工程热力学、传热学、流体力学、机械设计基础、电工技术、电子技术、建筑环境学、流体输配管网、热质交换原理与设备、自动控制原理、冷热源工程、供热工程、通风工程、空气调节、建筑环境测试技术、建筑设备自动化

Main Course: Theoretical Mechanics, Material Mechanic, Engineering Thermodynamics, Heat Transfer, Fluid Mechanics, Fundamentals of Mechanical, Electrical Technology, Electronic Techniques, Built Environment, Fluid Network for Transportation and Distribution, Fundamentals & Equipment of Heat & Mass Transfer, Automatic Control Principle, Cooling and Heating Source Engineering, Heating Engineering, Ventilation Engineering, Air Conditioning, Testing Technology for Building Environment, Building Automation

VI.毕业学分基本要求 Basic Requirements of Credits for Graduation

课程体系 Curriculum System		学分要求 Credits Requirements						
		必修 Compulsory		限修 Distributional Electives		选修 Free Electives		小计 Subtotal
		理论 Theory	实践 Practice	理论 Theory	实践 Practice	理论 Theory	实践 Practice	
公共基础 课程 Public Basic Courses	思想政治类 Ideological Politics Courses	15	2					17
	军事类 Military Courses	2	2					4
	外语类 Foreign Language Courses	6		2				8
	体育类 Physical Education Courses		4					4
通识教育 课程 General Education Courses	核心通识课 Core General Education Courses			4				4
	新生研讨课 Freshman Seminar			2-1.5	0-0.5			2

学科与专业基础课程（含实验） Discipline and Specialty Foundational Courses(Including Experiments)	数学与自然科学基础课 Foundational Courses on Mathematics and Natural Science	23.5	2.5					26
	专业基础课 Professional Foundational Courses	47.5	6.5					54
专业课程（含实验） Specialized Courses(Including Experiments)	专业核心课程 Specialized Core Course	17	1					18
	专业限修课程 Specialized Restricted Courses			3	1			4
实习实践教学 Practice Courses	基本技能训练、实习实训、综合课程设计、社会与文化素质实践、毕业实习与毕业设计 Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design		14					14
多元化课程 Diversified Courses	跨学科课程、美育专业类课程、学科竞赛类课程、其它个性化选修课程等 Interdisciplinary Courses, Aesthetic Education Courses, Subject Competition Courses, other Personalized Elective Courses, etc			4				4
创新创业实践 Innovation and Entrepreneurship Practice	创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等 Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc				2			2
必修环节 A Compulsory Part	大学生综合素质提升、学生体质达标测评 Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness							0
总 计 Total								161

VII.课程设置细化表 Course Programs Table

公共基础课程 Public Basic Courses 共 33 学分，其中必修 31 学分，限修 2 学分，选修 0 学分 A total credits of 33, including 31 for compulsory courses, 2 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class Practice Credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
思想政治类 Ideological Politics Courses	思想道德与法治 Ideological and Moral Education and the Rule of Law	必修 Compulsory	3	0.4	第 2 学期 2Nd Semester	马克思主义学院 School of Marxism	6、11、12	
	中国近现代史纲要 Conspectus of Chinese Modern History	必修 Compulsory	3	0.4	第 1 学期 1St Semester	马克思主义学院 School of Marxism	11、12	
	马克思主义基本原理 The Basic Principles of Marxism	必修 Compulsory	3	0.4	第 4 学期 4Th Semester	马克思主义学院 School of Marxism	11、12	
	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics	必修 Compulsory	3	0.4	第 5 学期 5Th Semester	马克思主义学院 School of Marxism	11、12	
	习近平新时代中国特色社会主义思想概论 Outline of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	必修 Compulsory	3	0.4	第 6 学期 6Th Semester	马克思主义学院 School of Marxism	11、12	
	形势与政策 I Situation and Policy I	必修 Compulsory	0	0	第 1 学期 1St Semester	马克思主义学院 School of Marxism	6、11	
	形势与政策 II Situation and Policy II	必修 Compulsory	0	0	第 2 学期 2Nd Semester	马克思主义学院 School of Marxism	6、11	
	形势与政策 III Situation and Policy III	必修 Compulsory	0	0	第 3 学期 3Rd Semester	马克思主义学院 School of Marxism	6、11	
	形势与政策 IV Situation and Policy IV	必修 Compulsory	0	0	第 4 学期 4Th Semester	马克思主义学院 School of Marxism	6、11	
	形势与政策 V Situation and Policy V	必修 Compulsory	0	0	第 5 学期 5Th Semester	马克思主义学院 School of Marxism	6、11	
	形势与政策 VI Situation and Policy VI	必修 Compulsory	0	0	第 6 学期 6Th Semester	马克思主义学院 School of Marxism	6、11	
	形势与政策 VII Situation and Policy VII	必修 Compulsory	0	0	第 7 学期 7Th Semester	马克思主义学院 School of Marxism	6、11	

	形势与政策Ⅷ Situation and Policy Ⅷ	必修 Compulsory	2	0	第 8 学期 8Th Semester	马克思主义学院 School of Marxism	6、11	
军事类 Military Courses	军事理论 Military Theories	必修 Compulsory	2	0	第 1 学期 1St Semester	武装部 Security Office	11、12	
	军事技能 Military Skills	必修 Compulsory	2	2	短 1 学期 Short Semester 1	武装部 Security Office	7、12	
外语类 Foreign Language Courses	英语 I College English I	必修 Compulsory	2	0	第 1 学期 1St Semester	外国语学院 School of Foreign languages	8、10	
	英语 II College English II	必修 Compulsory	2	0	第 2 学期 2Nd Semester	外国语学院 School of Foreign languages	8、10	
	通用学术英语 English for General Academic Purposes	必修 Compulsory	2	0	第 3 学期 3Rd Semester	外国语学院 School of Foreign languages	8、10	
	职场英语 Workplace English	限修 Distributional Elective	2	0	第 4 学期 4Th Semester	外国语学院 School of Foreign languages	8	限选 1 门，2 学分 Limited to 1 course, 2 credits.
	交际与文化视听说 Viewing, Listening & Speaking in English --Communication & Culture							
	语言、文化与翻译 Language, Culture and Translation							
	英语公共演讲 Public Speaking in English							
体育类 Physical Education Courses	体育 I Physical Education I	必修 Compulsory	1	1	第 1 学期 1St Semester	体育部 Dept. of Physical Education	12	
	体育 II Physical Education II	必修 Compulsory	1	1	第 2 学期 2Nd Semester	体育部 Dept. of Physical Education	12	
	体育 III Physical Education III	必修 Compulsory	0.5	0.5	第 3 学期 3Rd Semester	体育部 Dept. of Physical Education	12	
	体育 IV Physical Education IV	必修 Compulsory	0.5	0.5	第 4 学期 4Th Semester	体育部 Dept. of Physical Education	12	
	体育健康课程 I Diversified Physical Education Courses I	必修 Compulsory	0.5	0.5	第 5 学期 5Th Semester	体育部 Dept. of Physical Education	12	
	体育健康课程 II Diversified Physical Education Courses II	必修 Compulsory	0.5	0.5	第 6 学期 6Th Semester	体育部 Dept. of Physical Education	12	
通识教育课程 General Education Courses 共 6 学分，其中必修 0 学分，限修 6 学分，选修 0 学分 A total credits of 6, including 0 for compulsory courses, 6 for distributional electives and 0 for free electives								

课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
核心通识课 Core General Education	“交通天下”通识课程 General Studies on Transportation	限修 Distributional Elective	4		第 2-7 学期 2-7 Semester	全校 The whole school	3、6、7、8、12	
新生研讨课 Freshman Seminar	建筑环境与能源技术 Building Environment and Energy Technology	限修 Distributional Elective	2	0.5	第 2 学期 2Nd Semester	机械工程学院 School of Mechanical Engineering	6、9、10、13	限选 1 门，2 学分 Limited to 1 course, 2 credits.
	暖通空调节能技术 Efficient Technology of HVAC		2	0.5				
	发动机的前世今生 The Past and Present of The Engine		2					
	从化石能源到新能源 From Fossil Energy to New Energy		2					
学科与专业基础课程（含实验） Discipline and Specialty foundational Courses(Including Experiments) 共 80 学分，其中必修 80 学分，限修 0 学分，选修 0 学分 A total credits of 80, including 80 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
数学与自然科学 基础课 Foundational Courses on Mathematics and Natural Science	高等数学I Advanced Mathematics I	必修 Compulsory	5		第 1 学期 1St Semester	数学 School of Mathematics	1、2	
	高等数学II Advanced Mathematics II	必修 Compulsory	5		第 2 学期 2Nd Semester	数学 School of Mathematics	1、2	
	线性代数 B linear Algebra	必修 Compulsory	3		第 2 学期 2Nd Semester	数学 School of Mathematics	1、2	
	概率论与数理统计 Probability Theory and Mathematical Statistics	必修 Compulsory	3		第 3 学期 3Rd Semester	数学 School of Mathematics	2、4	
	大学物理 BI University Physics BI	必修 Compulsory	3		第 2 学期 2Nd Semester	物理科学与技术学院 School of Physical Science and Technology	1	
	大学物理 BII University Physics BII	必修 Compulsory	3		第 3 学期 3Rd Semester	物理科学与技术学院 School of Physical Science and Technology	1	
	大学物理实验I Experiment of University PhysicsI	必修 Compulsory	1	1	第 2 学期 2Nd Semester	物理科学与技术学院 School of Physical Science and Technology	1、4	
	大学物理实验II Experiment of University Physics II	必修 Compulsory	1	1	第 3 学期 3Rd Semester	物理科学与技术学院 School of Physical Science and Technology	1、4	

	工程化学 C Engineering Chemistry C	必修 Compulsory	2	0.5	第 1 学期 1St Semester	生命科学与 工程学院 School of Life Science and Engineering	1、6	
专业基础课 Professional Foundational Courses	机械工程概论 An Introduction to Mechanical Engineering	必修 Compulsory	1	0.5	第 1 学期 1St Semester	机械工程学 院 School of Mechanical Engineering	2、3、6、 12、13	前 8 周 The First 8 weeks
	轨道交通概论 An Introduction to Rail Transit	必修 Compulsory	1	0.5	第 1 学期 1St Semester	机械工程学 院 School of Mechanical Engineering	2、3、6、 12、13	后 8 周 Later 8 weeks
	计算机程序设计基础 Fundamentals of computer programming	必修 Compulsory	3	1	第 1 学期 1St Semester	计算机与人 工智能学院 School of Computing and Artificial Intelligence	2、5	
	机械工程制图I Mechanical engineering drawing I	必修 Compulsory	2		第 1 学期 1St Semester	机械工程学 院 School of Mechanical Engineering	1、3	
	机械工程制图II Mechanical engineering drawing II	必修 Compulsory	3	1	第 2 学期 2Nd Semester	机械工程学 院 School of Mechanical Engineering	1、3	
	计算机绘图 Computer Drawing	必修 Compulsory	2	1	第 3 学期 3Rd Semester	机械工程学 院 School of Mechanical Engineering	1、3、5	
	电工技术 B Electrical Technology B	必修 Compulsory	3	0.5	第 3 学期 3Rd Semester	电气工程学 院 School of Electrical Engineering	1、4	
	电子技术 B Electronic technology B	必修 Compulsory	3	0.5	第 4 学期 4Th Semester	电气工程学 院 School of Electrical Engineering	1、4	
	理论力学 C Theoretical Mechanics C	必修 Compulsory	3		第 3 学期 3Rd Semester	力学与工程 学院 School of Mechanics and Engineering	1、2、4	
	材料力学 C Material Mechanics C	必修 Compulsory	3		第 4 学期 4Th Semester	力学与工程 学院 School of Mechanics and Engineering	1、2、4	
	流体力学 A Fluid Mechanics A	必修 Compulsory	4	0.5	第 4 学期 4Th Semester	机械工程学 院 School of Mechanical Engineering	1、2、4	

专业基础课 Professional Foundational Courses	工程热力学 A Engineering Thermodynamics A	必修 Compulsory	4		第 3 学期 3Rd Semester	机械工程学院 School of Mechanical Engineering	1、2、4	
	传热学 A Heat transfer A	必修 Compulsory	4	0.5	第 4 学期 4Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4	
	机械设计基础 B Fundamentals of Mechanical Design B	必修 Compulsory	4	0.5	第 4 学期 4Th Semester	机械工程学院 School of Mechanical Engineering	1、3、4	
	自动控制原理 B Automatic Control Principle B	必修 Compulsory	3		第 5 学期 5Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3	
	建筑概论 An Introduction to Architecture	必修 Compulsory	2		第 5 学期 5Th Semester	建筑与设计学院 School of Architecture and Design	1、3、6、12、13	
	建筑环境学 Built Environment	必修 Compulsory	3		第 5 学期 5Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4	
	热质交换原理与设备 Fundamentals & Equipment of Heat & Mass Transfer	必修 Compulsory	3		第 5 学期 5Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	
	流体输配管网 Fluid Network for Transportation and Distribution	必修 Compulsory	3		第 5 学期 5Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	
专业课程（含实验） Specialized Courses(Including Experiments) 共 22 学分，其中必修 18 学分，限修 4 学分，选修 0 学分 A total credits of 22, including 18 for compulsory courses, 4 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
专业核心课程 Specialized Core Course	冷热源工程 Cooling and Heating Source Engineering	必修 Compulsory	3	0.5	第 6 学期 6Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	
	供热工程 Heating Engineering	必修 Compulsory	2		第 6 学期 6Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	
	通风工程 Ventilation Engineering	必修 Compulsory	2	0.5	第 6 学期 6Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	

专业核心课程 Specialized Core Course	空气调节 Air Conditioning	必修 Compulsory	3		第 6 学期 6Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	
	建筑环境测试技术 Testing Technology for Building Environment	必修 Compulsory	2		第 6 学期 6Th Semester	机械工程学院 School of Mechanical Engineering	2、3、4	
	建筑设备自动化 Building Automation	必修 Compulsory	2		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	2、3、4	
	工程项目管理 Project Management	必修 Compulsory	2		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	3、7、9	
	暖通空调综合实验 Comprehensive Experiments of HVAC	必修 Compulsory	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4、10、12	
	轨道交通暖通空调 Application of HVAC in Rail Transit	必修 Compulsory	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4	
专业限修课程 Specialized Restricted Courses	建筑给排水 Building Water Supply and Sewerage	限修 Distributional Electives	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4	限修 4 学分 Limited to 4 Credits
	燃气应用 Gas Application	限修 Distributional Electives	2		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4、6	
	城市能源系统 Urban Energy Systems	限修 Distributional Electives	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4、6	
	空气洁净技术 Air Cleaning Technology	限修 Distributional Electives	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4	
	建筑节能技术 Building Energy Efficient Technology	限修 Distributional Electives	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4、13	
	工程设计方法 Engineering Design Method	限修 Distributional Electives	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4	

	建筑电气 Building Electric	限修 Distributional Electives	1		第 7 学期 7Th Semester	机械工程学院 School of Mechanical Engineering	1、2、4	
实习实践教学 Practice Course 共 14 学分，其中必修 14 学分，限修 0 学分，选修 0 学分 A total credits of 14, including 14 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实 践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要 求指标点 Indicators which Support Graduation Requirements	备注 Notes
基本技能训练、 实习实训、综合 课程设计、社会 与文化素质实 践、毕业实习与 毕业设计 Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design	工程训练 A Engineering Training A	必修 Compulsory	2	2	第 2 学期 2Nd Semester	工程中心 Engineering Center	6、12	
	机械课程设计 Mechanical Course Exercise	必修 Compulsory	1	1	短 2 学期 Short Semester 2	机械工程学院 School of Mechanical Engineering	2、3、6、8	
	专业认识实习 Professional Cognition Practice	必修 Compulsory	1	1	短 2 学期 Short Semester 2	机械工程学院 School of Mechanical Engineering	6、7、10	
	生产实践与综合课程设计 Productive Practice and Curriculum Design	必修 Compulsory	2	2	短 3 学期 Short Semester 3	机械工程学院 School of Mechanical Engineering	1、2、3、4、 5、6、10、13	
	毕业实习与毕业设计 Graduation Internship and Graduation Design	必修 Compulsory	8	8	第 8 学期 8Th Semester	机械工程学院 School of Mechanical Engineering	1、2、3、4、 5、6、10、13	
多元化课程 Diversified course 共 4 学分，其中必修 0 学分，限修 4 学分，选修 0 学分 A total credits of 4, including 0 for compulsory courses, 4 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实 践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要 求指标点 Indicators which Support Graduation Requirements	备注 Notes
跨学科课程 Interdisciplinary Courses	全校跨学科课程 Interdisciplinary Courses of University	限修 4 学分 Distributional Elective 4 Credits	2		第 2-8 学期 2-8 Semester	全校 The whole school	1、9	按照《西南 交通大学多 元化课程修 读指导手 册》 Follow the 《Instruction manual of diversified courses of Southwest Jiaotong University》
美育专业类课程 Aesthetic Education Courses	全校美育专业类课程 Aesthetic Education Courses of University		2				1、13	
学科竞赛类课程 Subject Competition Courses	全校学科竞赛类课程 Subject Competition Courses of University		2				1、3	
创新创业实践 Innovation and Entrepreneurship Practice 共 2 学分，其中必修 0 学分，限修 2 学分，选修 0 学分 A total credits of 2, including 0 for compulsory courses, 2 for distributional electives and 0 for free electives								

课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等 Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc	创新创业训练计划项目 Innovative Entrepreneurship Training Program	限修 2 学分 Distributional Elective 2 Credits	2	2	第 2-7 学期 2-7 Semester	机械工程学院 School of Mechanical Engineering	4、6、7、8、9、13	主持或参与结题至少 1 项 Leading or participation at least one project conclusion
	个性化实验项目 Individualized Experiment Project		2	2				主持或参与结题至少 1 项 Leading or participation at least one project conclusion
	学科竞赛 Discipline Competition		2	2				获校级一等奖或省部级及以上竞赛三等奖及以上 Winning the first prize at this university or the third prize at the provincial level or above
	工程实践 Engineering Practice		2	2				主持或参与结题至少 1 项 Leading or participation at least one project conclusion
	大学生科研训练计划 SRTP		2	2				主持或参与结题至少 1 项 Leading or participation at least one project conclusion
	必修环节 A compulsory part 共 0 学分，其中必修 0 学分，限修 0 学分，选修 0 学分 A total credits of 0, including 0 for compulsory courses, 0 for distributional electives and 0 for free electives							
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes

大学生综合素质提升、学生体质达标测评 Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness	大学生综合素质提升 (第二、第三课堂) Comprehensive Quality Improvement Courses for College Students (The Second and Third Classroom)	必修 Compulsory	0	0	第 1-8 学期 1-8 Semester	校团委 Communist Youth League Committee	7、8、9、13	
	学生体质达标测评 Assessment of Students' Physical Fitness	必修 Compulsory	0	0	秋季学期 fall Semester	体育部 Dept. of Physical Education	12	
学分总计 Total Credits			161					

注:

1.课程明细中未列出核心通识课程名称,共 4 学分,本专业学生应按学校要求,在“交通天下”通识教育类课程中选择,不能以其他选修课代替。

2.创新创业实践 2 学分只能选择表中所列 5 类项目,其中:个性化实验、学科竞赛、工程实践、SRTP 项目必须是机械学院教师指导完成的项目。学生参加完项目后,提供证明材料,由学院认定通过后给予学分。

Note: 1. The name of the core general education curriculum is not listed in the curriculum details, totaling 4 credits. Students of this major should choose the general education curriculum of "traffic world" according to the requirements of the school, and cannot replace them with other elective courses.

2. The course of Innovation and entrepreneurship practice with 2 credits can only be chosen from the five types of projects listed in the table. The personalized experiment, subject competition, engineering practice, SRTP project must be completed under the guidance of teachers in school of mechanical engineering. The students participating in the project should provide proof materials and can grant the credits after the acceptance by the college.

西南交通大学培养方案变更申请表

申请单位		专业（方向）		涉及年级		涉及学生人数
机械工程学院		建筑环境与能源应用工程专业		2022 级		64
课程名称	课程编码	课程学分	选修性质	开课学期	变更内容	变更原因
建筑概论	SoAD001612	2	必修	3	开课学院更改为机械学院，学分修改为 1 学分，开课学期调整至第 5 学期	优化课程内容与学分
机械设计基础 B	MECE013912	4	必修	4	更改为机械设计基础 C（MECE011512、3 学分）	优化理论课程学分
电工技术 B	ELEC015912	3	必修	3	删除	优化理论课程学分
电子技术 B	ELEC016012	3	必修	4	删除	优化理论课程学分
电子技术基础	ELEC002712	4	必修	3	新增	优化理论课程学分
理论力学 C	MECH000812	3	必修	3	删除	优化理论课程学分
材料力学 C	MECH000812	3	必修	4	删除	优化理论课程学分
工程力学 C	MECH000612	3	必修	3	新增	优化理论课程学分
自动控制原理 B	MECE011612	3	必修	5	删除	优化课程内容与学分
建筑设备自动化	MECE007412	2	必修	7	删除	优化课程内容与学分
建筑环境与能源系统控制		3	必修	6	新增	优化课程内容与学分
工程热力学 A	MECE011312	4	必修	3	学分更改为 3 学分	优化理论课程学分

传热学 A	MECE011412	4	必修	4	学分更改为 3.5 学分	优化理论课程学分
建筑环境学	MECE023112	3	必修	5	学分更改为 2.5 学分	优化理论课程学分
热质交换原理与设备	MECE011712	3	必修	5	学分更改为 2.5 学分	优化理论课程学分
流体输配管网	MECE011812	3	必修	5	学分更改为 2.5 学分	优化理论课程学分
机械课程设计	MECE013413	1	必修	短 1	删除	优化实践环节学分
计算机绘图	MECE011112	2	必修	3	删除	优化理论课程学分
建筑环境测试技术	MECE007312	2	必修	6	学分更改为 1 学分，开课学期调至第 5 学期	优化理论课程学分
建筑环境测试技术实验		1	必修	5	新增	增加实践学分
生产实践与综合课程设计	MECE013513	2	必修	短 3	删除	优化实践环节内容
生产实习		1	必修	短 3	新增	优化实践环节内容
工程设计方法	MECE013112	1	限修	7	删除	优化理论课程学分
轨道交通暖通空调	MECE013012	1	必修	7	课程性质修改为限修	优化理论课程学分
建筑节能技术	MECE012912	1	限修	7	修改为建筑节能与绿色建筑	优化课程内容
城市能源系统	MECE012712	1	限修	7	开课学期调整至第 6 学期	平衡各学期间学分
建筑给排水	MECE012412	1	限修	7	开课学期调整至第 6 学期	平衡各学期间学分
建筑电气	MECE013212	1	限修	7	开课学期调整至第 5 学期	平衡各学期间学分
暖通空调综合实验	MECE013312	1	必修	7	课程名称修改为专业创新实验，学分增加至 2 学分	增加实践学分

[illegible]

专业负责人意见: 专业负责人签名: 孙亮亮 年 月 日 2023 5 8	教授委员会意见: 经 2022 年 12 月 12 日教授委员会讨论, 与会委员表决情况如下: 教授委员会主任签名: 钱振 2023 年 5 月 9 日	学院/中心 意见: 院长/主任 签名: 2023 年 5 月 9 日 院/中心 (盖章): 机械工程学院
开课学院/中心 意见: (如变更课程非本单位需要填写本栏) 开课单位教学负责人 签名: 2023 年 5 月 9 日 建筑学院 力学与航空航天学院 电气工程学院		
教务处意见: 年 月 日		

注: 此表一式三份, 一份存学院, 一份存教学研究科, 一份存排课考试中心。