

建筑环境与能源应用工程专业 2021 版本本科培养方案

Undergraduate Education Plan for Specialty in Building Environment and Energy Application Engineering (2021)

专业名称	建筑环境与能源应用工程 Building Environment and Energy Application Engineering	主干学科	土木工程、热学 Civil Engineering, Thermal Science
Major		Major Disciplines	
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering
所属大类	土木工程类	大类培养年限	1 年
Disciplinary	Civil Engineering	Duration	1 year

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	公共基础课程 Public Basic Courses	通识教育 课程 Public Courses	大类课程 Basic Courses in General Discipline	专业教育 课程 Specialized Courses	个性课程 Personalized Course	集中性实践 教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	31	\	35	26	\	27	10	180
选修课 Elective Courses	\	9	\	26	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

(一) 培养目标

本专业通过人文素养、职业规范、专业知识、实践能力和职业发展能力的专业教育和综合训练，培养适应我国社会主义现代化建设需要，德、智、体、美、劳全面发展，适应能力强、实干精神强、创新意识强，和具有卓越追求、卓越能力的卓越人才，能够在建筑环境等相关行业从事暖通空调系统设计、研发制造、施工安装、运行管理及建筑节能设计、评估、管理等工作。

本专业学生毕业后经过 5 年左右的学习、深造或工作，能达到以下目标：

- (1) 具有良好的人文素养、工程职业道德和可持续发展意识，具备严谨求实和吃苦耐劳的工程师品质，能主动承担社会责任并积极服务于社会；
- (2) 能够综合运用建筑环境与能源应用工程专业知识与工程技术，独立发现、研究和解决实际工程中的复杂工程问题；
- (3) 具有团队协作意识和交流与合作能力，能够在跨职能团队中发挥骨干作用并具备承担领导角色的能力；
- (4) 具有创新思维，能够从事研发制造、技术创新或科学研究等工作，成为单位的业务骨干，具备获得中级技术职称的能力；
- (5) 具有国际视野，能够通过自主学习提升专业持续发展能力，适应建筑环境与能源应用工程

行业科学技术的发展需求，具备获得注册执业资格的能力。

Through the professional education and comprehensive training of humanistic quality, professional norms and knowledge, practical and professional development ability, this major cultivates excellent talents who can adapt to the needs of China's socialist modernization construction. With all-round development of morality, intelligence, physical education, beauty, and labor, students have strong adaptability, practical spirit, innovative sense, excellent pursuit, and excellent ability. These professionals can be engaged in HVAC system design, R & D and manufacturing, construction and installation, operation and management, building energy-saving design, evaluation and management, and related industries. Students of this major will achieve the following goals in about five years after graduation:

- (1) Have good humanistic quality, engineering professional ethics and sustainable development consciousness, have rigorous and realistic and hard-working engineer quality, can actively undertake social responsibility and actively serve the society;
- (2) Be able to comprehensively use professional knowledge and engineering technology of building environment and energy application engineering to independently discover, research and solve complex engineering problems in practical engineering;
- (3) Have the sense of teamwork and the ability of communication and cooperation, be able to play a backbone role in the cross-functional team, and have the ability to assume the leading role;
- (4) Be able to do innovative thinking, be able to engage in R & D and manufacturing, technological innovation or scientific research, be able to become the business backbone of the company, and have the ability to obtain intermediate technical titles;
- (5) Have a global vision, be able to improve the ability of sustainable professional development through independent learning, adapt to the development needs of science and technology in the industry practice, and have the ability to obtain the licensed professional qualification.

(二) 毕业要求

- (1) 工程知识。具有扎实的数学、物理、化学的知识基础，掌握现代物理、信息科学、环境科学、能源科学的基本知识，了解当代科学技术发展的主要方向和应用前景。
- (2) 问题分析。能够综合应用数学、自然科学、工程科学、人文社会科学、经济管理学、法学和专业规范，对复杂建筑环境与能源应用工程问题进行调查分析，提出解决工程问题的技术方案。
- (3) 设计/开发解决方案。掌握建筑环境与能源应用工程的设计方法，熟悉工程设计规范、标准、设计手册的使用，能够进行方案论证选定，并绘出施工图，具有进行专业工程的施工、安装、调试与运行管理，提出解决方案等基本能力。
- (4) 研究。能够运用工程热力学、流体力学、传热学、建筑环境学、热质交换原理与设备、空调工程等课程的基础理论与科学方法对复杂工程问题进行研究，并通过实验、分析得到合理有效的结论，初步具备研究与开发的能力。
- (5) 使用现代工具。能够恰当选择和使用建筑环境控制技术、建筑节能及能耗模拟技术、流体流动与传热模拟技术，并基于上述相应的技术开发、选择与使用恰当的现代工程工具和信息技术工具，对建筑环境与能源应用工程问题进行模拟、分析和研究，并能够理解相应结果的局限性。

- (6) 工程与社会。能够了解建筑环境与能源应用工程及相关行业的政策和法律法规，了解国内外行业标准、规范和技术发展趋势；能够了解工程相关背景知识，正确评价工程项目方案的优缺点，以及对环境、安全等方面的影响；能够采用适当的方法正确评价工程实践和相关复杂工程问题的解决方案对于社会、健康、安全、法律以及文化的影响，并理解应承担的责任。
- (7) 环境和可持续发展。能够了解国家政策对专业领域发展的引导，具备环境保护和可持续发展的相关知识；能够了解环境保护的法律法规；能够正确评价建筑环境与能源应用工程行业与环境保护的关系，理解建筑环境与能源应用工程专业复杂工程问题的工程实践对环境、社会可持续发展的影响。
- (8) 职业规范。能够树立正确的世界观、人生观、价值观，拥有健康的体质、良好的心理素质、良好的人文社会科学和工业美学素养；能够了解基本国情和相关的形势政策，拥有良好的社会责任感；能够了解设备工程师的职业性质和责任，在工程实践中能自觉遵守职业道德和规范，具有法律意识。
- (9) 个人和团队。能够理解在多学科背景下理解团队的意义，团队中每个角色的含义及其对于整体团队的意义；能够在多学科背景下主动与其他成员沟通、合作，具有良好的执行力和与他人合作承担具体任务的能力；能够在团队中承担个体、团队成员以及负责人的角色，具有任务分解、计划安排和组织实施的能力。
- (10) 沟通。能够针对建筑环境与能源应用工程专业的复杂工程问题，通过撰写报告、陈述发言等形式运用恰当工具阐述工作成果，与业界同行和社会公众进行有效沟通与交流，并做出合理反应；能够具备一定的国际视野，能够了解和跟踪建筑环境与能源应用工程专业的最新发展趋势；能够掌握一门外语，并能在跨文化背景下进行有效沟通和交流，初步具备参加国际工程项目合作与竞争的能力。
- (11) 项目管理。能够理解和掌握工程项目管理原理和经济决策方法；能够了解工程项目经济分析与评价方法，在多学科环境中根据工程项目特征选择恰当的项目管理方法和经济决策方法；能够具备对工程项目进行项目管理的能力并进行实践。
- (12) 终身学习。能够认识到自我探索和学习的必要性，具有自主学习和终身学习的意识；能够养成主动学习习惯并表现出不断探索的精神，能够自我评价；具有职业发展的愿望和职业规划的意识。

(二) Requirements

- (1) Graduation requirements #1: Engineering knowledge. Have a solid knowledge base of mathematics, physics, and chemistry; master the basic knowledge of modern physics, information science, environmental science, and energy science; understand the main development direction and application prospect of contemporary science and technology.
- (2) Graduation requirement #2: Problem analysis. Be able to comprehensively apply mathematics, natural science, engineering science, humanities and social sciences, economic management, law and professional norms to investigate and analyze complex engineering problems in the field of building environment and energy application; be able to put forward technical solutions to solve engineering problems.
- (3) Graduation requirement #3: Proposing solutions. Master the design method of building

environment and energy application engineering; be familiar with the use of engineering design specifications, standards, and design manuals; be able to demonstrate and select schemes, and draw construction drawings; have the basic ability of professional engineering construction, installation, commissioning, and operation management; be able to put forward solutions for engineering problems.

- (4) Graduation requirement #4: Research. Be able to use the fundamental theories and scientific methods of engineering thermodynamics, fluid mechanics, heat transfer, building environment, heat and mass exchange principles and equipment, air conditioning engineering and other courses to study complex engineering problems; be able to get reasonable and effective conclusions through experiments and analysis; have the preliminary ability to do research and development.
- (5) Graduation requirement #5: Application of modern tools. Be able to properly select and use building environment control technology, building energy-saving and energy consumption simulation technology, fluid and heat transfer simulation technology; be able to select, use, and develop appropriate modern engineering tools and information technology tools based on the above corresponding technologies; be able to simulate, analyze and study building environment and energy application engineering problems, and to understand the limitations of the corresponding results.
- (6) Graduation requirement #6: Engineering & society. Understand the policies, laws, and regulations of building environment and energy application engineering and related industries; know the industry standards, specifications and technology development trends at home and abroad; understand the relevant background knowledge of the project, be able to correctly evaluate the advantages and disadvantages of the project scheme, as well as the impact on the environment and safety; be able to correctly evaluate the impact of engineering practice and solutions to complex engineering problems on society, residents' health, safety, law and culture with appropriate methods; understand the responsibilities of engineers.
- (7) Graduation requirement #7: Environment & sustainable development. Be able to understand the guidance of national policies on the professional fields; have relevant knowledge of environmental protection and sustainable development; understand the laws and regulations of environmental protection; be able to correctly evaluate the relationship between building environment and energy application engineering industry and environmental protection; understand the impact of complex engineering practice of building environment and energy application engineering on environmental and social sustainable development.
- (8) Graduation requirement #8: Professional standard. Be able to establish a correct outlook on the world, life and values; have a healthy physique, good psychological quality, good humanities and social sciences and industrial aesthetics; be able to understand the basic national conditions and relevant policies; have a good sense of social responsibility; understand the professional nature and responsibilities of equipment engineer; consciously abide by professional ethics and norms in engineering practice; have legal awareness.
- (9) Graduation requirement #9: Individual & team. Understand the meaning of the team in a

multidisciplinary context; understand the meaning of each role in the team and its significance to the whole team; be able to communicate and cooperate with other members in the multidisciplinary background; and have good ability to cooperate with others to undertake specific tasks; be able to take on the role of the individual, team member or leader in the team; have the ability of task decomposition, planning, and implementation.

(10) Graduation requirement #10: Communication. Be able to demonstrate results and achievements in the form of reports and statements; be able to communicate with the industry peers and the public effectively and make reasonable response to the complex engineering problems of building environment and energy application; have a certain global vision, understand and be able to track the latest development trend of building environment and energy application engineering specialty; master a foreign language, can communicate effectively under the cross-cultural background, and have the ability to participate in international project cooperation and competition.

(11) Graduation requirement #11: Project management. Understand and master project management principles and economic decision-making methods; understand the financial analysis and evaluation methods of engineering projects; can select appropriate project management methods and economic decision-making methods according to the characteristics of engineering projects in a multidisciplinary environment; have the ability of project management and practice.

(12) Graduation requirement #12: Lifelong learning. Be able to do self-exploration and learning, and have the consciousness of autonomous learning and lifelong learning; develop the habit of active learning and show the spirit of continuous exploration, and be able to self-evaluation; have the desire of career development and the consciousness of career planning.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
毕业要求 1	√	√		√	
毕业要求 2	√	√		√	
毕业要求 3		√		√	√
毕业要求 4	√	√		√	
毕业要求 5		√			√
毕业要求 6	√		√		√
毕业要求 7	√			√	√
毕业要求 8	√		√		
毕业要求 9			√	√	√
毕业要求 10			√	√	√
毕业要求 11		√	√		√
毕业要求 12	√	√			√

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

流体输配管网、建筑环境学、热质交换原理与设备、冷热源工程、空调工程。

Fluid Transmission Network, Built Environment, Fundamentals & Equipment of Heat & Mass Transfer, Cold and Heat Source Engineering, Air Conditioning Engineering.

(二) 专业特色课程:

建筑节能, 新能源技术, 节能建筑计算与仿真。

Building Energy Efficiency, New Energy Technologies, Building Energy Efficiency Simulation.

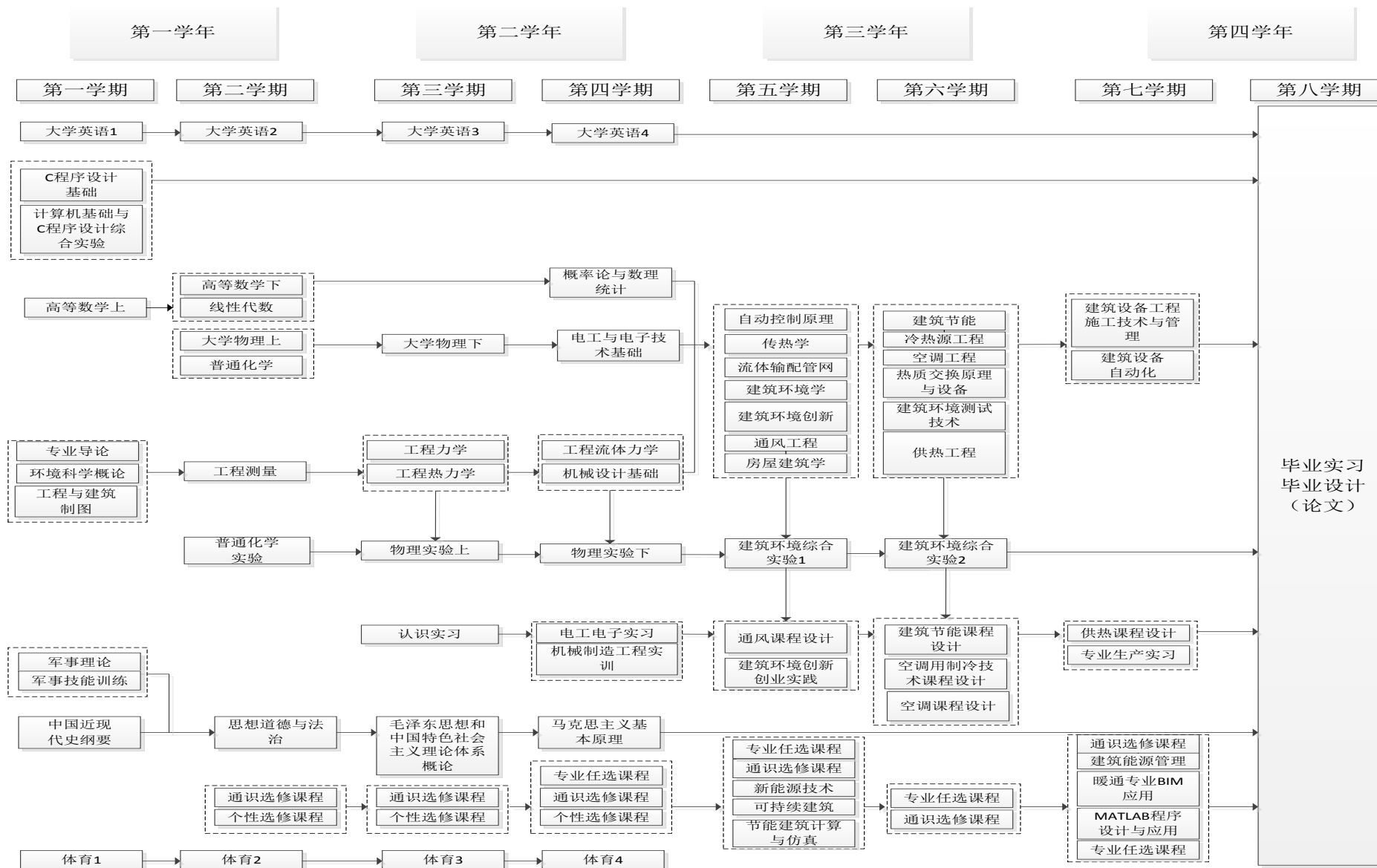
附: 毕业要求实现矩阵:

专业 核心 课程	专业 特色 课程	课程名称	建筑环境与能源应用工程专业毕业要求												
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
		思想道德与法治						M	L	H					H
		中国近现代史纲要		H				L	H						H
		毛泽东思想和中国特色社会主义理论体系概论		H				M	L						H
		马克思主义基本原理		H				M	L	H					H
		军事理论							H						
		军事技能训练							H						
		体育							H						
		大学英语	M	M			H								
		C 程序设计基础 B	M	M			H								
		计算机基础与 C 程序设计综合实验 B	M	M			H								
		专业导论						H			M	L			M
		环境科学概率	H					H			M	L			L
		工程与建筑制图	M	H											
		高等数学	H	M	H	H									
		线性代数	H	M	H	H									
		普通化学 C	H	M					L						
		普通化学实验 C	H	M					L						
		工程测量	H	H	H	M									
		大学物理	H	M											
		物理实验	H	M											
		概率论与数理统计	H	M	H	H									
		工程热力学	H	H		H									
		工程流体力学	H	H		H									
		传热学	H	H		H									
√		建筑环境学		H	M	M		H	H						
√		流体输配管网		H	H	M		H	M	L					
		建筑环境综合实验 1		H		H					M	H			
		建筑环境创新			H			L	M		H	H			H

专业 核心 课程	专业 特色 课程	课程名称	建筑环境与能源应用工程专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
√		空调工程		H	H	M		H	M	L				
	√	建筑节能		H	H	M		H	M	L				
√		热质交换原理与设备		H	H	M		H	M	L				
√		冷热源工程		H	H	M		H	M	L				
		建筑环境综合实验 2		H		H					M	H		
		工程力学 A	H	H		H								
		机械设计基础 B	H	H		H								
		电工与电子技术基础 D	H	H		H								
		自动控制原理 E	H	H		H	L							
		房屋建筑学	H	H		H		M	H					
		通风工程		H	H	M		H	M	L				
		建筑环境测试技术		H	H	M	L	H	M	L				
		建筑设备工程施工技术与管理		H	H	M	L	H	M	L				
		供热工程		H	H	M		H	M	L				
		结构力学	H	H		H								
		计算机辅助设计基础		H			H							
		工程经济学 B		H			L	H		L			H	
		工程项目管理 C		H			L	H		L			H	
		建筑给排水工程		H	H	M		H	M	L				
		燃气供应		H	H	M		H	M	L				
		专业英语		H			L					H		M
		建筑设备自动化		H	H	M	M	H		L				
	√	节能建筑计算与仿真		H	H	M	H	M	H			M		
		可持续建筑		H	H	M		H	H					M
		MATLAB 程序设计与应用		H			H							M
		建筑能源管理		H	H		H	M	M	L				
	√	新能源技术	H				M	H						
		建筑环境 MEP			H	H	H	M	M		L			M
		认识实习						M		H	H	H	L	L
		机械制造工程实训 D1			M						M	H		M
		电工电子实习 B					H					H		M
		建筑环境创新创业实践			H			L	M		H	H		H
		通风课程设计			H			H	M	M		H		L
		建筑节能课程设计			H			H	H	M		H		L
		空调课程设计			H			H	M	M		H		L
		空调用制冷技术课程设计			H			H	M	M		H		L
		供热课程设计			H			H	M	M		H		L
		专业生产实习						M		H	H	H	L	M
		毕业实习						M		H	H	H	L	M
		毕业设计（论文）			H	H	M	H	M	M		H	L	L

三、课程教学进程图

III Teaching Process Map



四、教学建议进程表

IV Course Schedule

(一) 公共基础必修课程											
1 Public Basic Compulsory Courses											
开课单位 Course college	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including						建议 修读学期 Suggested Term	先修课程 Prerequisite Course
				总学时 Tot hrs.	理论 Theory	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese	2.5	42	42					1	
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
马克思主义学院	4220003180	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 Socialism with Chinese Characteristics	4.5	66	66					4	
学工部	1050002210	军事理论 Military Theory	2	32	32					2	
体育部	4210001170	体育1 Physical Education 1	1	32	32					1	
体育部	4210002170	体育2 Physical Education 2	1	32	32					2	体育1
体育部	4210003170	体育3 Physical Education 3	1	32	32					3	体育2
体育部	4210004170	体育4 Physical Education 4	1	32	32					4	体育3
外语学院	4030001210	大学英语1 College English I	2	48	32				16	1	
外语学院	4030002210	大学英语2 College English II	2	48	32				16	2	大学英语1
外语学院	4030003210	大学英语3 College English III	2	48	32				16	3	大学英语2
外语学院	4030004210	大学英语4 College English IV	2	48	32				16	4	大学英语3
计算机智能学院	4120002210	C程序设计基础B Foundations of C Language Programming B	2	32	32					2	
计算机智能学院	4120008210	计算机基础与C程序设计综合实验B Comprehensive Experiments of Foundation of Computer and C Language Programming B	1	32		32				2	
学工部	1050001210	军事技能训练 Military Skills Training	2	136				136		1	
小 计 Subtotal			31	744	512	32	0	136	64		
(二) 通识教育选修课程											
2 General Education Elective Courses											
核心选修 Core elective courses	文明与传统类 Civilization and Tradition Courses		通识课程应修满至少9学分。核心选修不少于2学分；自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Core elective courses ≥ 2 credits. Self-selected courses, at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.								
	社会与发展类 Society and Development Courses										
	艺术与人文类 Art and Humanities Courses										
	自然与方法类 Nature and methods Courses										
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Law and Social Science, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship										

开课单位 Course college	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读学期 Suggested Term	先修课程 Prerequisite Course	
				总学时 Tot hrs.	理论 Theory	实验 Exp.	上机 Ope- ration	实践 Prac- tice			课外 Extra- cur
(三) 大类必修课程 3 Basic Discipline Required Courses											
土建学院	4130369130	专业导论 Introduction to Specialty	1.5	24	24					1	
土建学院	4130568170	环境科学概论 Introduction to Environmental Science	1	16	16					1	
土建学院	4050063110	工程与建筑制图 Engineering and Building Cartography	3	48	48					1	
理学院	4050001210	高等数学A上 Advanced Mathematics A I	4.5	72	72					1	
理学院	4050002210	高等数学A下 Advanced Mathematics A II	5.5	88	88					2	
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					2	
化生学院	4200362170	普通化学B General Chemistry B	2.5	40	40					2	
化生学院	4200363170	普通化学实验C General Chemistry Experiment C	0.5	16		16				2	
土建学院	4130047110	工程测量C Engineering Survey C	2	32	24	8				2	
理学院	4050021110	大学物理A上 Physics A I	3.5	56	56					2	
理学院	4050022110	大学物理A下 Physics A II	3.5	56	56					3	
理学院	4050466130	物理实验A上 Physics Experiment I	1	32		32				3	
理学院	4050467130	物理实验A下 Physics Experiment II	1	32		32				4	
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics B	3	48	48					4	
小 计 Subtotal			35	600	512	88	0	0	0		
(四) 专业必修课程 4 Specialized Required Courses											
土建学院	4130022210	工程热力学 Engineering Thermodynamics	4	64	60	4				3	
土建学院	4130625170	工程流体力学 Engineering Fluid Mechanics	4	64	64					4	
土建学院	4130713170	传热学 Heat Transfer	4	64	64					5	工程热力学
土建学院	4130487130	建筑环境学 Built Environment	2.5	40	40					5	
土建学院	4130417130	流体输配管网 Fluid Transmission Network	2	32	32					5	工程流体力学
土建学院	4130714170	建筑环境综合实验1 Building Environment Comprehensive Experiment I	1	32		32				5	
土建学院	4130486140	空调工程 Air Conditioning Engineering	2	40	32				8	6	建筑环境学
土建学院	4130717170	建筑节能 Building Energy Efficiency	2	32	32					6	
土建学院	4130423130	热质交换原理与设备 Fundamentals & Equipment of Heat & Mass	2	32	32					6	
土建学院	4130213110	冷热源工程 Cold and Heat Source Engineering	2	32	32					6	

开课单位 Course college	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including						建议 修读学期 Suggested Term	先修课程 Prerequisite Course
				总学时 Tot hrs.	理论 Theory	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
土建学院	4130715170	建筑环境综合实验2 Building Environment Comprehensive Experiment II	0.5	16		16				6	
小 计 Subtotal			26	448	388	52	0	0	8		
(五) 专业选修课程 5 Specialized Elective Courses											
专业限选课程 Specialized limited Courses (22.5学分, 建环学生必选)											
理学院	4140076110	工程力学A Engineering Mechanics A	4	64	60	4				3	
机电学院	4080457170	机械设计基础B Fundamental of Machine Design B	2.5	40	40					4	
自动化学院	4100214170	电工与电子技术基础D Fundamentals of Electrical and Electronic Technology D	3	48	40	8				4	
自动化学院	4100136130	自动控制原理E Automatic Control Principle	2	32	32					5	
土建学院	4130630170	房屋建筑学D Building Architecture	2	32	32					5	
土建学院	4130429130	通风工程 Ventilation Engineering	1.5	24	24					5	
土建学院	4130003210	建筑环境创新 Innovation of Building Environment	1	16	16					5	
土建学院	4130631170	建筑环境测试技术 Testing Technology of Building Environment	2	32	32					6	
土建学院	4130004210	建筑设备工程施工技术与管 Construction technology and management of building equipment engineering	1.5	24	24					7	
土建学院	4130552140	供热工程 Building Heating Engineering	1.5	24	24					6	
土建学院	4130414130	建筑设备自动化 Automation in Buildings	1.5	24	24					7	自动控制原 理
其他任选课程 Specialized Optional Courses (12学分, 至少选修3.5学分)											
土建学院	4130635170	结构力学 A1 Structural mechanics I	4	64	64					4	
土建学院	4130083110	计算机辅助设计基础 Basic of Computer Aided Design	1.5	24	12		12			4	
土建学院	4130602170	工程经济学B Engineering Economics B	1.5	24	24					4	
土建学院	4130718170	工程项目管理C Engineering Project Management C	1	16	16					5	
土建学院	4130005210	建筑给排水工程B Building Water Supply and Sewerage Engineering	1.5	24	24					6	
土建学院	4130421130	燃气供应 Gas Supply	1.5	24	24					5或7	
土建学院	4130446130	专业英语 Professional English	1	16	16					5或7	
小计 Subtotal			34.5	192	180	0	12	0	0		
修读说明: 以上专业任选课程中至少选修3.5学分, 再加上专业限选22.5学分, 总共至少选修26学分。 NOTE: Minimum subtotal credits 3.5 for specialized limited courses, and 22.5 credits for specialized optional courses. In total, minimum subtotal 26 credits for specialized elective courses.											
(六) 个性课程 6 Personalized Elective Courses											
土建学院	4130451130	可持续建筑 Sustainable Architecture	1.5	24	24					5或7	

开课单位 Course college	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读学期 Suggested Term	先修课程 Prerequisite Course	
				总学时 Tot hrs.	理论 Theory	实验 Exp.	上机 Ope- ration	实践 Prac- tice			课外 Extra- cur
土建学院	413003210	MATLAB程序设计与应用 MATLAB programming and application	1	16	8		8			5或7	
土建学院	4130452130	建筑能源管理 Building Energy Management	1	16	16					5或7	
土建学院	4130719170	新能源技术 New Energy Technologies	1.5	24	24					5或7	
土建学院	4130503150	节能建筑计算与仿真 Building Energy Efficiency Simulation	1.5	24	12		12			5或7	
土建学院	4130034210	暖通专业BIM应用 BIM for HVAC	1.5	24	12		12			5或7	
小 计 Subtotal			8	128	96	0	32	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修6学分。 NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.											

(七) 专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crts	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	先修课程 Prerequisite Course
土建学院	4130426130	认识实习 Cognition Practice	1	16	1	3	
机电学院	4080152110	机械制造工程实训D1 Training on Mechanical Manufacturing Engineering D1	2	32	2	4	
自动化学院	4100069110	电工电子实习B Practice of Electrical Engineering & Electronics B	1	16	1	4	
土建学院	4130634170	建筑环境创新创业实践 Practice for Innovation & Entrepreneurship	1	16	1	5	
土建学院	4130430130	通风课程设计 Ventilation Design Exercise	1.5	24	1.5	5	
土建学院	4130274110	建筑节能课程设计 Building Energy Efficiency Design Practice	2	32	2	6	
土建学院	4130415130	空调课程设计 Building Air Conditioning Design Exercise	2	32	2	6	
土建学院	4130038210	空调制冷技术课程设计 Refrigeration Design Exercise for Air Conditioning	1	16	1	6	
土建学院	4130448130	供热课程设计 Building Heating Design Exercise	2	32	2	7	
土建学院	4130553140	专业生产实习 Specialty Practice	3	48	3	7	
土建学院	4130231110	毕业实习 Graduation Practice	2	32	2	8	
土建学院	4130049210	毕业设计(论文) Graduation Design (Thesis)	8.5	272	17	8	
小 计 Subtotal			27	568	35.5		

五、 修读指导

V Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个课外学分。

Please refer to the cultivation plan of the Second-Class Implementation Measures for Extracurricular Credits of Wuhan University of Technology.

Situation & Policy (2 credits) and Mental Health Education (2 credits) are the required extracurricular courses.

学院教学责任人：范小春

专业培养方案责任人：明廷臻