

# 工程管理专业辅修培养方案

## Minor Training Program for Engineering management

### 一、培养目标 Objectives

本专业培养德、智、体、美、劳全面发展，适应 21 世纪新时代社会经济发展和社会主义现代化建设需要，具备坚实的经济、管理、工程、法律、信息与数据等知识与技能，具有良好的职业操守、创新精神、国际视野，满足行业、社会对本专业人才素质结构、能力结构、知识结构要求，能够在国内外工程建设领域从事工程项目建设、管理、咨询、研究等工作的复合型、创新型人才。

Students should be comprehensive and innovative talents with all-round development of virtue, intelligence, physical fitness, beauty and labor, adapt to the requirements of social and economic development and socialist modernization in the new era of the 21st century, and have solid knowledge and skills in the fields of economy, management, engineering and law. With proficient computer and foreign language application skills, good professional ethics, international vision, they can engage in engineering project construction, management, research, etc. in the field of engineering construction.

预期学生在毕业后 5 年左右，在社会与专业领域能够达成以下目标：

1. 具有良好的人文素养和工程职业道德，熟悉并能综合考虑与工程建设和管理有关的政策及法律法规，具有较强的社会责任感和服务社会能力；
2. 具备良好的团队协作精神和一定的领导能力，具有较强的工程实践能力，能在土木工程或其他工程建设领域从事项目分析与决策、项目管理等方面的工作；
3. 具备良好的专业素养和对知识前沿的敏锐洞察力；具备良好的国际视野，具有较好的交流、沟通、竞争与合作能力，具有强健体魄和稳定心理素质、能够适应岗位要求；
4. 具备良好的终身学习意识，通过自学、继续教育、在职培训等多种途径更新知识，实现工作能力和专业技术水平的持续提升。

### 二、培养要求 Requirement

1. 工程知识 (Engineering knowledge) :

能够将数学、自然科学、工程基础和专业知用于解决建设工程管理中的复杂问题。

1.1 具有数学、自然科学的基础知识，能够应用相关数学、自然科学知识与原理表述建设工程管理中的复杂问题。

1.2 能够应用工程基础知识、计算机知识、专业知识并结合数学、自然科学知识，分析、评价建设工程管理中的复杂问题。

1.3 能够应用工程基础知识、计算机知识、专业知识并结合数学、自然科学知识，针对建设工程管理中的复杂问题，提出备选方案，并进行分析、建模与仿真，选择合理的方案。

Able to use mathematics, natural science, engineering foundation and professional knowledge to solve complex problems in construction project management.

1.1 Have the basic knowledge of mathematics and natural science, and be able to apply mathematics and natural science knowledge and principles to express complex problems in construction project management.

1.2 Able to apply basic knowledge of engineering, computer knowledge and professional knowledge, combined with mathematical and natural science knowledge, to analyse and evaluate complex problems in construction project management.

1.3 Be able to apply basic engineering knowledge, computer knowledge, professional knowledge and combine mathematical and natural science knowledge to propose alternative solutions to complex problems in construction project management, and analyse, model and simulate, and choose reasonable solutions.

## 2 问题分析 (Problem analysis)

能够综合应用数学、自然科学和工程科学的基本原理，对建设工程管理中的复杂问题进行识别、表达，并通过文献研究，分析复杂工程问题，以获得有效结论。

2.1 通过文献研究分析，结合本专业相关的手册或标准，能够识别和判断建设工程管理过程中复杂问题的关键环节与因素，能够提出多个备选方案。

2.2 能够综合运用本专业知识结合文献研究，对建设工程管理过程中的复杂问题的设计方案进行分析、推演或仿真，能够确定最合理的方案并对其进行表达。

Be able to comprehensively apply the basic principles of mathematics, natural science and engineering science, identify and express complex problems in

construction engineering management, and analyse complex engineering problems through literature research to obtain effective conclusions.

2.1 Be able to identify and judge the key links and factors of the complex problem in the construction project management process, and can propose multiple alternatives through literature research and analysis, combined with the relevant manuals or standards of this major.

2.2 Be able to comprehensively use this professional knowledge and combine literature research to analyze, deduce or simulate the design scheme of complex problems in the process of construction project management, and be able to determine the most reasonable scheme and express it.

### 3 设计/开发解决方案 (Design/Develop solutions)

能够设计针对建设工程管理中的复杂问题的解决方案，设计满足特定需求的系统、单元或流程，并能够在设计、施工组织、运营维护等环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

3.1 根据利益相关方要求，对建设工程项目进行总体策划和设计，具有设计、计算、绘图、阅读相关技术资料、手册、标准的能力，并在总体管理设计方案环节体现创新意识。

3.2 根据利益相关方要求，对建设工程项目进行工程计价并优化方案，具有根据项目阶段和资料进行工程计价，编写造价书，对造价构成进行分析，为项目优化提供建议的综合能力。

3.3 通过调研、数据处理、研判等过程，合理分析利益相关方的需求，提出建设项目投标报价的优化方案以及合同谈判中的多个备选方案。

3.4 从项目需求出发，依据建设工程项目的建设程序和相关法规，查找并加工信息，为委托人提出技术管理方案的初步实践，具有识别和理解需求、技术选择与方案设计、拟定和执行管理方案的综合能力。

3.5 综合运用专业知识，针对项目实施过程中的复杂问题，提出有效解决方案，设计能够满足特定需求的项目管理方案、项目实施程序、操作安全规程、项目协调计划等，并能领导团队实现拟定的方案。

3.6 能够通过文献综述、调研、方案论证、性能分析等过程，解决工程项目开发与项目策划、施工管理或新时代运维等复杂问题，充分考虑社会、健康、安全、法律、文化及环境等因素的影响，并具有方案撰写、工作交流的能力。

Be able to design solutions to complex problems in construction project management. Design systems, units or processes that meet specific needs, and reflect innovation in design, construction organization, operation and maintenance, taking into account social, health, safety, legal, cultural and environmental factors.

3.1 According to the requirements of stakeholders, carry out overall planning and design of construction projects, have the ability to design, calculate, draw, read relevant technical materials, manuals and standards, and reflect the sense of innovation in the overall management design scheme.

3.2 According to the requirements of stakeholders, evaluate and optimize the construction project, with the comprehensive ability to calculate the project according to the project stage and data, prepare cost books, analyse the cost composition, and provide suggestions for project optimization.

3.3 Through research, data processing, research and judgment and other processes, reasonably analyse the needs of stakeholders, and put forward optimization plans for bidding quotations for construction projects and multiple options in contract negotiations.

3.4 Starting from the requirements of the project, according to the construction procedures and relevant regulations of the construction project, find and process the information, and put forward the preliminary practice of the technical management plan for the client. It has the comprehensive ability to identify and understand the requirements, technology selection and scheme design, formulate and implement the management plan.

3.5 Comprehensively use professional knowledge to propose effective solutions to complex problems in the process of project implementation, design project management plans, project implementation procedures, operational safety procedures, project coordination plans, etc. that can meet specific needs, and lead the team to realize the proposed plan.

3.6 Be able to solve complex problems such as project planning, construction management or operation and maintenance through literature review, research, scheme demonstration, performance analysis and other processes, fully consider the

influence of social, health, safety, legal, cultural and environmental factors, and have the abilities of program writing and communicating.

#### 4 研究 (Research)

能够基于科学原理并采用科学方法对建设工程管理中的复杂问题进行研究, 包括调研设计、分析与解释数据、并通过信息综合得到合理有效的结论。

4.1 能够针对建设工程管理中所涉及的利益相关者冲突、工程安全与环境保护、智慧建造效果预测等复杂问题提出调研或实验方法。

4.2 能够基于工程原理设计调研方案或实验、制定实施方案、开展调研或实验、分析与解释调研或实验数据, 并通过信息综合得到合理有效结论。

Be able to study complex problems in construction project management based on scientific principles and scientific methods, including research design, analysis and interpretation of data, and obtain reasonable and effective conclusions through information synthesis.

4.1 Be able to propose research or experimental methods for complex issues such as stakeholder conflicts, engineering safety and environmental protection, and intelligent construction effect prediction involved in construction project management.

4.2 Be able to design research plans or experiments based on engineering principles, formulate implementation plans, carry out research or experiments, analyze and interpret research or experimental data, and obtain reasonable and effective conclusions through information synthesis.

#### 5 使用现代工具 (Use modern tools)

能够针对建设工程管理中的复杂问题, 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进行预测与模拟, 并理解其局限性。

5.1 学习本专业所涉及的计算机、土木工程、建筑学等方面的软硬件工具的使用方法、工作原理, 并能够认识现代工具在使用时的不足之处。

5.2 针对建设工程管理过程中的复杂问题, 能够运用仿真计算机软件等现代工具对设计过程进行预测与模拟, 并理解其局限性。

5.3 在一定的指导下, 能够开发、选择与使用恰当的技术、资源、现代工具, 用于解决建设工程管理过程的复杂问题。

Be able to develop, select and use appropriate technologies, resources, modern engineering tools and IT tools to predict and simulate for complex problems in construction engineering management, understanding the limitations.

5.1 Learn the usage and working principles of software and hardware tools in computer, engineering, architecture and other aspects involved in this major, and be able to understand the shortcomings of modern tools.

5.2 For the complex problems in the management process of construction projects, be able to use modern tools such as simulation calculation software to predict and simulate the design process and understand its limitations.

5.3 Be able to develop, select and use appropriate technologies, resources and modern tools to solve the complex problems in the construction project management process under guidance.

## 6 工程与社会 (Engineering and Society)

能够基于本专业相关背景知识进行合理分析, 评价专业工程实践和复杂问题的解决方案对社会、健康、安全、法律以及文化的影响, 并理解应承担的责任。

6.1 认识本专业的应用领域及相关行业工程背景, 学习与本专业相关的技术标准、法律法规、产业政策等。

6.2 具有专业实习、毕业实习等经历, 能够采用技术标准、法律法规对实习中遇到复杂问题的解决方案进行描述、分析、评价。

6.3 能够基于本专业相关背景知识对专业工程实践和复杂问题的解决方案进行合理分析, 评价相关原理、方法、方案、技术手段等对社会、健康、安全、法律及文化的影响, 并理解应承担的责任。

Be able to conduct reasonable analysis based on the relevant background knowledge of this major, evaluate the impact of professional engineering practices and solutions to complex problems on society, health, safety, law and culture, and understand the responsibilities.

6.1 Understand the application fields of this major and the engineering background of related industries, and learn the technical standards, laws and regulations, industrial policies, etc. related to this major.

6.2 Have professional internship, graduation internship and other experience, and be able to use technical standards, laws and regulations to describe, analyse and evaluate solutions to complex problems in the internship.

6.3 Be able to analyse professional engineering practices and solutions to complex problems based on the relevant background knowledge of this major, evaluate the impact of relevant principles, methods, schemes, technical means, etc. on society, health, safety, law and culture, and understand the responsibilities.

## 7 环境和可持续发展 (Environment and sustainable development)

能够理解环境和可持续发展的内涵与意义,具备本专业相关的环境保护和可持续发展等方面的方针、政策和法律、法规等相关知识,能理解和评价本专业工程实践对环境、社会可持续发展的影响。

7.1 理解环境保护和可持续发展的内涵与意义,学习环境保护和可持续发展等方面的方针、政策和法律、法规并理解环境保护与经济可持续发展的协调关系。

7.2 针对建设工程管理过程中的复杂问题,能够合理评价其对环境、社会可持续发展的影响。

Be able to understand the connotation and significance of the environment and sustainable development, have relevant knowledge of environmental protection and sustainable development such as policies, laws, regulations and other relevant knowledge. Be able to understand and evaluate the impact of this major's engineering practice on environmental and social sustainable development.

7.1 Understand the connotation and significance of environmental protection and sustainable development, learn the principles, policies, laws and regulations of environmental protection and sustainable development, and understand the coordinated relationship between environmental protection and sustainable economic development.

7.2 In view of the complex problems in the management process of construction projects, the impact on the sustainable development of the environment and society can be reasonably evaluated.

## 8 职业规范 (Occupational norms)

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。

8.1 具有社会责任感和良好的职业道德，能够坚持正确的伦理道德主张，坚持社会实践过程中的正义和正能量。

8.2 理解并履行工程师的社会责任，能够在建设工程管理实践中理解并遵守工程师职业道德和行为规范，履行责任。

Have humanities and social sciences literacy and a sense of social responsibility, be able to understand and abide by engineering ethics and norms in engineering practice, and fulfill responsibilities.

8.1 Have a sense of social responsibility and good professional ethics, be able to adhere to the correct ethical and moral propositions, and adhere to the justice and positive energy in the process of social practice.

8.2 Understand and fulfill the social responsibility of engineers, be able to understand and abide the professional ethics and codes of conduct of engineers in the practice of construction project management, and fulfill responsibilities.

## 9 个人和团队 (People and teams)

能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

9.1 具有在团队中发挥作用的能力，能独立完成团队分配的工作，承担个体、团队成员以及负责人的角色。

9.2 理解多学科交叉背景下团队合作的重要性，能倾听其他团队成员的意见，组织团队成员开展工作并承担相应的责任。

Able to play the role of individual, team member and leader in a multidisciplinary team..

9.1 Have the ability to play a role in the team, be able to independently complete the work assigned by the team, and assume the roles of individuals, team members and leaders.

9.2 Understand the importance of teamwork in the cross-disciplinary context, be able to listen to the opinions of other team members, organize team members to carry out their work and assume corresponding responsibilities.

## 10 沟通 (Communication)

能够就复杂工程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、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。

10.1 能够读懂英文文献，对全球化与多元文化有基本了解，能够用发展的眼光和包容的心态理解不同文化和不同文明理念的差异。

10.2 能够在解决建设工程复杂管理问题的活动中，撰写报告、陈述发言，表达研究或设计思路、技术路线和方案及所采取的措施和效果等。

Be able to communicate effectively with industry peers and the public on complex engineering issues, including writing reports, designing manuscripts, making statements, clearly expressing or responding to instructions. And have a certain international vision, able to communicate in a cross-cultural context.

10.1 Be able to read English literature, have a basic understanding of globalization and multiculturalism, and be able to understand the differences between different cultures and different civilizations with a development perspective and an inclusive mentality.

10.2 Be able to write reports, make statements, express research or design ideas, technical routes and plans, and measures and effects taken in activities to solve complex management problems of construction projects.

## 11 项目管理（Project Management）

理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

11.1 能够运用工程管理和经济决策的基本原理和方法，并能够理解多学科环境对工程实施的复杂性影响。

11.2 能够将管理原理、经济决策应用于建设工程管理的计划、组织和实现的过程中。

Understand and master engineering management principles and economic decision-making methods, and can apply in a multidisciplinary environment.

11.1 Be able to apply the basic principles and methods of engineering management and economic decision-making, and be able to understand the complex impact of the multidisciplinary environment on project implementation.

11.2 Be able to apply management principles and economic decisions to the planning, organization and implementation of construction project management.

## 12 终身学习 (Lifelong learning)

具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

12.1 具有自主学习的方法，不断提升自身适应发展的能力。

12.2 具有自主学习意识和终身学习意识，适应本专业的快速发展。

Have the awareness of independent learning and lifelong learning, and have the ability to learn and adapt to the development.

12.1 Have a method of independent learning, and master the ability of continuous improvement to adapt to the development.

12.2 Have the awareness of independent learning and lifelong learning, and adapt to the rapid development of this major.

## 三、学分要求 Credits Requirements

40 学分

## 四、课程设置 Course Programs

课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	学分 Credits	开课学期 Semester	开课学院 School	备注 Notes
专业基础课 Professional Foundational Courses 8 学分	管理学原理 Fundamentals of Management	必修 Compulsory	3	第 1 学期 Semester 1	经管学院 School of Economics and Management	
	应用统计 Applied statistics	必修 Compulsory	3	第 3 学期 Semester 3	经管学院 School of Economics and Management	
	系统工程 Systems Engineering	必修 Compulsory	2	第 3 学期 Semester 3	经管学院 School of Economics and Management	
专业核心课 Specialized Core Course 24 学分	房屋建筑学 Housing Architecture	必修 Compulsory	2	第 4 学期 Semester 4	土木工程学院 Civil Engineering College	
	施工技术与施工组织 Construction technology and construction organization	必修 Compulsory	2	第 5 学期 Semester 5	土木工程学院 Civil Engineering College	
	工程合同管理 FIDIC Contract Management FIDIC	必修 Compulsory	2	第 5 学期 Semester 5	经管学院 School of Economics and Management	

专业核心课 Specialized Core Course 24 学分	建设法规 Engineering construction laws and regulations	必修 Compulsory	2	第 5 学期 Semester 5	经管学院 School of Economics and Management	
	工程经济学 A Engineering economics A	必修 Compulsory	3	第 5 学期 Semester 5	经管学院 School of Economics and Management	
	工程项目采购与招投标 Project procurement and bidding	必修 Compulsory	2	第 5 学期 Semester 5	经管学院 School of Economics and Management	
	项目融资 Project investment and financing	必修 Compulsory	2	第 6 学期 Semester 6	经管学院 School of Economics and Management	
	工程项目管理 Project management	必修 Compulsory	2	第 5 学期 Semester 5	经管学院 School of Economics and Management	
	工程估价与案例分析 Project valuation and case analysis	必修 Compulsory	3	第 6 学期 Semester 6	经管学院 School of Economics and Management	
	工程成本规划与控制 Engineering cost planning and control	必修 Compulsory	2	第 6 学期 Semester 6	经管学院 School of Economics and Management	
	建筑信息模型(BIM) Building Information Model (BIM)	必修 Compulsory	2	第 6 学期 Semester 6	土木工程学院 Civil Engineering College	
专业限选课 Specialized Restricted Courses	房地产开发与经营 Real estate development and management	限修 Distributional Elective	2	第 7 学期 Semester 7	经管学院 School of Economics and Management	限修 2 学分 Distribu tional Elective 2 credits
	工程质量安全健康与环境管理 HSE management of engineering quality		1	第 7 学期 Semester 7	经管学院 School of Economics and Management	
	预制装配式结构与工程 Prefabricated structure and engineering		1	第 7 学期 Semester 7	土木工程学院 Civil Engineering College	
	全过程工程咨询管理 Project management consulting of whole process		1	第 7 学期 Semester 7	经管学院 School of Economics and Management	
	绿色建筑与绿色施工 Green building and construction		1	第 7 学期 Semester 7	经管学院 School of Economics and Management	

专业限选课 Specialized Restricted Courses	金融工程导论 Introduction of financial engineer	限修 Distributional Elective	3	第 7 学期 Semester 7	经管学院 School of Economics and Management	限修 6 学分 Distribu tional Elective 6 credits
	数据挖掘 A Data Mining A		3	第 5 学期 Semester 5	经管学院 School of Economics and Management	
	机器学习与高级算法 Machine learning and Advanced algorithms		3	第 5 学期 Semester 5	经管学院 School of Economics and Management	
	商业数据分析 Business Analytics		3	第 6 学期 Semester 6	经管学院 School of Economics and Management	
	人工智能 Artificial Intelligence		3	第 6 学期 Semester 6	经管学院 School of Economics and Management	
总学分 Total Credits			40			