

土木工程专业培养目标

培养适应现代科学技术与经济发展需要，德智体美劳全面发展，掌握土木工程学科的基本原理和基本知识，经过工程师基本训练，能胜任建筑工程、道路与桥梁工程、岩土与地下工程等方面的工程技术与管理工作，具有较好的基础理论、较宽厚的专业知识，较强的实践能力和创新能力，具有一定的国际化视野，能在有关土木工程的勘察、设计、施工、管理、教育、投资与开发等部门从事技术或管理的拔尖创新人才，预期毕业生五年左右达到以下目标：

1. 具备良好的敬业精神、社会责任感和工程职业道德，具有质量意识、环境意识和安全意识，能够将工程与社会可持续发展相结合。
2. 具备系统扎实的专业知识和终身学习的能力，能够适应土木新技术发展，开展创新实践工作；具有良好的表达沟通能力、团队协作精神及组织管理能力。
3. 具备胜任工程师或相应职称的专业技术能力和条件，能够在设计单位、施工企业、房地产企业、投资部门、科研院所、政府管理等部门，从事规划、勘测、设计、施工、管理、教育和研究开发等工作的拔尖创新人才。
4. 具有国际视野和良好的外语应用能力，能进行跨文化的交流、竞争与合作。

II. Training objectives

The major aims of professional training are to cultivate competent high-quality and innovative talents. These talents can fit the demands from modern science and technology and economic development; can get overall development of moral, intellectual, physical, virtue and labor; can grasp sound knowledge in the fields of civil engineering; can be competent in Architecture Engineering, Roadway and Bridge Engineering, Geotechnical and Underground Engineering and other engineering technology and management after basic engineer training; can possess a good basic theory, broad professional knowledge, an international view, and strong practical ability and innovative ability; can be qualified to a

career in survey, design, construction, experiment, management, teaching , investment and development in Civil Engineering. Graduates are expected to achieve the following goals in the next five years:

1. To have a good sense of professionalism, social responsibility, engineering work ethics, quality awareness, environmental awareness and safety awareness to combine engineering with social sustainable development.

2. To have solid professional knowledge and lifelong learning ability to step with the development of new civil technologies and carry out innovative practices; to have good communication skill, teamwork spirit and organization management ability.

3. To be fit for an engineer or have related professional technical ability and conditions; can be engaged in planning, survey, design, construction, management, education and research development work as a high-quality engineering and innovative talents in design , construction enterprises, real estate, investment department, research institutes, government management departments.

4. To have the international vision and good ability of foreign language application to conduct cross-cultural communication, competition and cooperation.

土木工程专业毕业要求

1.工程知识：能够将数学、自然科学、工程基础和专业知用于解决土木工程建设、设计及优化等复杂工程问题。

1.1 能够运用数学、自然科学和工程科学的基本原理，对土木工程专业复杂工程问题进行识别和抽象建模。

1.2 掌握数学和自然科学知识，在土木工程专业复杂工程问题的建模和计算时具有较强的计算推演能力。

2.问题分析：能够应用数学、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土木工程专业复杂工程问题，以获得有效结论。

2.1 掌握土木工程专业基础知识，能够运用图纸、图表和文字等对土木工程专业复杂工程问题进行有效表达。

2.2 具有应用土木工程专业知识，能够运用规范、标准、图集等文献对土木工程专业复杂工程问题中具体案例进行分析、解决和改进，以获得有效结论。

3.设计（开发）解决方案：能够设计针对土木工程专业领域复杂工程问题的解决方案，设计满足特定需求的体系、结构、构件（节点）或者施工方案，并能够在设计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 能够完成满足土木工程特定需求的体系、结构、构件（节点）等设计或施工方案。

3.2 针对复杂工程问题，能够考虑新体系、新工艺、新设备、新技术、新材料等，提出具有一定创新性的工程设计方案。

4.研究：能够基于科学原理并采用科学方法对土木工程专业复杂工程问题进行研究，包括设计实验、收集、处理、分析与解释数据，并通过信息综合得到合理有效的结论并应用于工程实践。

4.1 针对土木工程专业复杂工程问题，具备科学设计实验能力。

4.2 能够对实验结果进行分析和解释并通过信息综合得出有效结论，

指导和验证工程实践内容。

4.3 运用科学方法开展测试与检测，能够对实验数据进行合理的收集和处理。

5. 使用现代工具：能够针对土木工程专业领域的复杂工程问题，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，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

5.1 掌握文献检索的基本方法，具备利用现代信息技术工具收集、分析、判断和选择相关技术信息的能力。

5.2 熟悉与土木工程相关的现代工程工具的使用方法,能够根据工程实际需要进行数值建模和数值计算，并对预测与模拟结果的有效性和局限性进行分析。

6. 工程与社会：能够基于土木工程相关的背景知识和标准，评价土木工程项目的的设计、施工和运行的方案，以及复杂工程问题的解决方案，包括其对社会、健康、安全、法律以及文化的影响,并理解土木工程师应承担的责任。

6.1 基于土木工程相关的背景知识和标准，能够评价土木工程项目的的设计、施工和运行的方案对社会、健康、安全、法律以及文化的影响。

6.2 理解在工程项目全过程中，土木工程师于公众健康、公共安全、社会和文化，以及法律等方面应承担的责任。

6.3 在满足土木工程特定需求的系统设计（开发）方案基础上，能够考虑社会、健康、安全、法律、文化以及环境等因素。

7. 环境和可持续发展：能够理解和评价针对土木工程专业的复杂工程问题的工程实践对环境、社会可持续发展的影响。

7.1 理解土木工程专业及其相关行业的政策法规对环境和可持续发展方面的保障作用。

7.2 能够正确评价土木工程专业的复杂工程问题的工程实践对环保和可持续发展的影响，在工程实践中具有绿色、节能、环保的意识。

8. 职业道德与规范：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行为规范，做到责任担当、贡

献国家和服务社会。

8.1 具有正确的世界观、人生观、价值观。

8.2 具有良好的身心素质、人文社会科学素养，了解国情，维护国家利益。

8.3 理解工程师的职业性质和责任，在从事土木工程活动中自觉遵守职业道德和规范，具有法律意识，履行责任。

9.个人和团队：在解决土木工程专业的复杂工程问题时，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 具有良好的团队合作意识，具有较强的执行力和与他人合作承担具体任务的能力。

9.2 具有任务分解、计划安排和组织实施等能力，能够与团队成员有效沟通。

10.沟通：能够就土木工程专业的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。

10.1 具有较好的文字及语言表达能力，能够就土木工程专业的复杂工程问题与业界同行及社会公众进行有效的沟通和交流。

10.2 具备一定的国际视野，具有跨文化背景下进行沟通和交流的能力。

11.项目管理：在与土木工程专业相关的多学科环境中理解、掌握并应用工程管理原理与经济决策方法，具有一定的组织、管理和领导能力。

11.1 理解并掌握土木工程活动中涉及的工程管理原理和经济决策方法。

11.2 在多学科环境中应用项目管理原理及经济决策方法，具有一定的组织、管理和领导能力。

12. 终身学习：具有自主学习和终身学习的意识，具有提高自主学习和适应土木工程新发展的能力。

12.1 对于自主学习有正确的认识，能够通过自主学习方式掌握和获取

知识的能力。

12.2 对于终身学习有正确的认识，具备不断学习和适应发展的能力。

IV. Requirements

1. Engineering knowledge: Be able to use mathematics, natural science, engineering fundamental and professional knowledge to solve complex engineering problems such as civil engineering modeling, design, and optimization.

2. Problem analysis: Be able to apply the basic principles of mathematics, natural science and engineering science to identify, express and analyze the complex engineering problems of civil engineering specialty through literature research, so as to obtain effective conclusions.

3. Design(development) solutions: Be able to design solutions to complex engineering problems in the field of civil engineering; design structural systems, structures, components (nodes) or construction schemes that meet specific requirements; and embody the sense of innovation in the design process, considering the factors of society, health, safety, law, culture and environment.

4. Research: Be able to study complex engineering problems of Civil Engineering Specialty based on scientific principles and scientific methods, including designing experiments, collecting, processing, analyzing and interpreting experimental data, and apply reasonable and effective conclusions obtained through information synthesis to engineering practice.

5. Using modern tools: Be able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems in the field of civil engineering, including prediction and simulation of complex engineering problems, and understand their limitations.

6. Engineering and society: Be able to evaluate the design, construction and operation of civil engineering projects and solutions to complex engineering problems, based on the background knowledge and standards related to civil engineering, including their impact on society, health, safety, law and culture, and understand the responsibilities of civil

engineers.

7. Environment and sustainable development: Be able to understand and evaluate the impact of engineering practice for complex engineering problems of civil engineering specialty on the sustainable development of environment and society.

8. Professional ethics and norms: To have humanities and social science literacy, sense of social responsibility. Be able to understand and obey professional ethics and norms in engineering practice, so as to take responsibilities, contribute to the country and serve the society.

9. Individuals and teams: Be able to play the roles of individual, team member and person in charge in a multidisciplinary team when solving complex engineering problems of civil engineering specialty.

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

11. Project management: To understand, master and apply engineering management principles and economic decision-making methods in multi-disciplinary environment related to civil engineering, and have certain organization, management, and leadership ability.

12. Lifelong learning: To have the consciousness of autonomous learning and lifelong learning, and the ability to improve autonomous learning and adapt to the new development of civil engineering.