

# 土木工程专业培养方案

## 一、专业培养目标

面向国家建设需求和土木工程未来行业发展方向，以立德树人为根本任务，培养具有“品德优良、基础厚实、知识广博、专业精深”品质，德、智、体、美、劳全面发展的土木工程应用型和创新创业型人才。毕业生应具备优良的思想素质、良好的人文科学素养、扎实的自然科学与土木工程专业基础，掌握土木工程专业知识与规范，获得土木工程执业工程师的基本训练，具备实践能力、社会适应能力、创新创业能力和终身学习能力，具有国际视野、团队精神和环境协调发展意识。能够从事土木工程领域的勘察设计、施工、项目管理、教育、科研等工作，毕业5年左右达到土木工程师执业资格相当水平，成为土木工程及相关领域的技术骨干或后备管理人才。具体目标如下：

(1) 具有优良的政治素质、良好的人文科学素养、职业道德和社会责任感，具有环保和可持续发展意识，能够承担和履行社会责任。

(2) 掌握数学、自然科学以及土木工程基础知识，能够综合运用土木工程专业知识与工程技术，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) 具有国际视野，能够通过自主学习提升专业持续发展能力，适应土木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。

## 二、毕业要求

(1) 工程知识：能够将数学、自然科学、工程基础和土木工程专业知识用于解决土木工程专业复杂工程问题。掌握数学、自然科学、工程科学等方面的基础理论和知识，用于土木工程问题的表述；能针对工程项目的具体研究对象建立数学模型并求解，应用专业知识采集并处理工程数据，将相关知识和数学模型方法用于推演、分析土木工程专业复杂工程问题；能够提出解决土木工程专业复杂工程问题的可行方案，并进行比较与综合。

(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。能够将数学、自然科学、工程科学的原理和逻辑思维，识别和判断土木工程专业复杂工程问题的关键环节，并给予相关科学原理和数学模型正确表达；能够通过信息检索、文献研究分析和相关科学、工程原理，认识到土木工程专业复杂工程问题具有多种解决方案，并能够寻求解决问题的有效途径和可替代的解决方案；借助数学、自然科学、工程科学知识和文献资料，能够研究分析土木工程专业复杂工程方案中的影响因素、关键环节和方案可行性，并进行多方案的技术经济对比分析和获得有效结论。

(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）或施工方案，绘制图纸及编撰技术文档，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。面向解决土木工程专业复杂工程问题的需求，能够掌握工程实践的勘察方法、设计方法和施工技术，了解影响设计目标和技术方案的各种因素；能够针对土木工程实践的特定需求，完成构件及系统设计方案、施工技术方案等关键环节的设计，正确绘制施工图纸并撰写设计文档，能够在设计环节考虑新工艺、新材料和新技术，体现创新意识；能够针对不同的土木工程实践需求在设计方案中考虑社会、安全、健康、法律、文化以及环境等因素，制定出满足国家及社会经济建设需求的合理方案。

(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、分析与解释数据、并通过信息综合得到合理有效的结论。能够运用科学原理，通过文

献研究或相关方法，调研、分析土木工程专业复杂工程问题的关键技术和解决方案；基于土木工程专业理论、针对土木工程专业复杂工程问题选择合理的研究路线、设计实验方案，进行创新性实验，包括实验组织、数据获取、数据处理；能够对实验数据进行分析与解释，并通过信息综合得到合理有效的结论。

(5) 使用现代工具：能够针对土木工程专业复杂工程问题，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。掌握现代土木工程仪器、设备和先进信息处理技术工具，能够针对勘察、设计和施工等方面的复杂工程问题，选择并使用恰当的技术和工具，理解其局限性，能对土木工程专业复杂工程问题进行分析、计算和设计；针对勘察、设计和施工等方面的方案优化设计，能够选择、使用专业软硬件工具，开发满足特定需求的专门工具，用于工程方案的优化、预测和模拟，并理解其局限性。

(6) 工程与社会：能够基于土木工程相关背景知识进行合理分析，评价土木工程专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。理解土木工程的社会作用及土木工程活动对社会、健康、安全、法律及文化的影响；在土木工程实践中具备综合考虑多种制约因素的意识，能够合理地分析、评价和解决土木工程活动对社会、健康、安全、法律以及文化等方面可能产生的风险，对所实施的工程质量负责，并理解应承担的责任。

(7) 环境和可持续发展：能够理解和评价针对土木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。理解和评价土木工程实践对环境保护、社会可持续发展的影响，认识工程实践在环境保护和可持续发展中的地位和作用；了解土木工程实践与环境保护和可持续发展等方面相关的方针政策、法律法规，理解和评价工程实践对环境、社会可持续发展造成的损害和隐患，并制定合理策略降低对人类和环境造成的损害和隐患。

(8) 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。了解中国国情，具有爱国主义情怀和人文社会科学素养，理解个人与社会的关系，树立正确的世界观、人生观、价值观；具备法律意识和社会责任感，理解土木工程师的职业性质，掌握土木行业相关的规范和法规，在工程实践中自觉遵守职业道德和法律法规；理解土木工程师对公共安全、健康、福祉、环境保护的社会责任，理解工程实践对维护国家安全、社会稳定的重要性，能够在工程实践中自觉履行社会责任。

(9) 个人和团队：能够在解决土木工程专业的复杂工程问题时，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。具备良好的组织协调能力和人际交往能力，能够与其他学科的成员有效沟通与合作；能够独立承担土木工程的专项任务，能够在多学科组成的团队中承担个体、团队成员或负责人的角色。

(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。能够运用土木工程及相关领域的知识，针对土木工程专业复杂工程问题与业界同行及社会公众进行有效沟通、交流和回应质疑，掌握标准工程图纸、设计说明书和研究报告的绘制撰写方法和陈述发言技巧；了解土木工程学科的国际发展趋势、研究热点，理解和尊重世界不同文化的差异性和多样性，具备一定的国际视野；熟练使用一门外语，具备外文资料检索、外语沟通与表达能力，能够就土木工程勘察、设计和施工问题在跨文化的背景下进行沟通和交流。

(11) 项目管理：理解并掌握土木专业相关的工程管理原理与经济决策方法，并能在多学科环境中应用。掌握土木工程勘察、设计、施工管理与经济决策的基本原理和方法；能够在多学科环境下，综合应用技术、管理和经济等决策方法，设计土木工程项目的实施方案，并组织 and 领导多学科团队进行项目的实施。

(12) 终身学习：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。能够正确认识自我探索和学习的必要性，并能显现自我探索和学习成效；具有自主学习的能力，不断学习、

适应土木工程发展，具备对不断变化的技术问题的理解、归纳总结和提出问题等能力。

### 三、主干学科

土木工程。

### 四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业后，授予工学学士学位。

### 五、核心课程

核心课程：理论力学、材料力学、结构力学、土力学、木工程材料、工程地质、工程荷载与可靠度设计原理、混凝土结构基本理论、钢结构基本理论、基础工程、混凝土结构设计、土木工程施工、建筑结构抗震与防灾、工程项目管理与法规。

实践课程：房屋建筑学课程设计、混凝土结构课程设计、基础工程课程设计、土木工程施工课程设计、钢结构课程设计、锚固技术与支挡工程课程设计、地下建筑结构课程设计、土木工程造价课程设计、测量实习、北戴河地质认识实习、工程地质实习、土木工程认识实习、土木工程生产实习、毕业实习。

# Undergraduate Program in Civil Engineering

## 1. Academic Objectives

Facing the needs of national construction and the future development direction of civil engineering industry, with the fundamental task of establishing moral education, the university aims to cultivate applied and innovative research talents in civil engineering with the qualities of good moral character, solid foundation, extensive knowledge and profound expertise and comprehensive development of moral, intellectual, physical, aesthetic and labor. Graduates should have excellent ideological quality, good humanities, solid natural science and civil engineering professional foundation, master civil engineering professional knowledge and specifications, obtain the basic training of civil engineering practicing engineers, have practical ability, social adaptability, innovation and entrepreneurship and lifelong learning ability, have international vision, team spirit and environmental coordination and development awareness. They are able to engage in civil engineering field of survey and design, construction, project management, education, scientific research and other work, about 5 years after graduation to achieve a level equivalent to the civil engineer practice qualification, become the backbone of civil engineering and related fields of technology or reserve management personnel. Specific objectives are as follows:

(1) Students will have an excellent ideological and political quality, good humanities and scientific literacy, professional ethics and social responsibility, a sense of environmental protection and sustainable development, and ability to assume and fulfill social responsibility.

(2) Students will acquire basic knowledge of mathematics, natural sciences and civil engineering, and integrate civil engineering expertise and engineering techniques to identify, investigate and solve complex civil engineering problems.

(3) Students will have the sense of teamwork and the ability to communicate and cooperate and can play a key role in cross-functional teams and to assume leadership roles.

(4) Students will have an international outlook to be able to enhance continuous professional development through independent study, to adapt to the scientific and technological development needs of the civil engineering industry and to have the ability to obtain a registered practice qualification.

## 2. Graduation Requirements

(1) Engineering knowledge: Students are required to apply mathematics, natural sciences, engineering fundamentals and civil engineering expertise to solve complex civil engineering problems. Students are required to acquire basic theory and knowledge of mathematics, natural science and engineering science for the formulation of civil engineering problems. Students are required to establish mathematical models and solve them for specific research objects of engineering projects, apply professional knowledge to collect and process engineering data, and apply relevant knowledge and mathematical modelling methods to derive and analyse complex civil engineering problems. Students are required to propose feasible solutions to complex civil engineering problems, and compare and synthesise them.

(2) Problem Analysis: Students are required to apply basic principles of mathematics, natural and engineering sciences to identify, express, and analyse complex engineering problems in civil engineering through literature research in order to obtain valid conclusions. Students are required to apply principles and logical thinking from mathematics, natural science and engineering science to identify and judge key aspects of complex civil engineering problems, and give correct expression to relevant scientific principles and mathematical models. Students are required to recognise that complex civil engineering problems have multiple solutions through information retrieval, literature research and analysis and relevant scientific and engineering principles, and seek effective ways to solve problems and alternative solutions. Students are

required to research and analyse the influencing factors, key aspects and feasibility of solutions in complex civil engineering solutions with the knowledge and literature of mathematical, natural and engineering science, and conduct comparative technical and economic analysis of multiple solutions and obtain valid conclusions.

(3) Design/develop solutions: Students are required to design solutions to complex civil engineering problems, design systems, structures, components (nodes) or construction solutions to meet specific needs, produce drawings and compile technical documentation, and be able to demonstrate a sense of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors. Students are required to master the survey methods, design methods and construction techniques of engineering practice, and understand the factors that influence design objectives and technical solutions, in order to meet the needs of solving complex civil engineering problems. Students are required to complete the design of key aspects such as component and system design solutions and construction technology solutions for the specific needs of civil engineering practice, correctly draw construction drawings and write design documentation, and are able to consider new processes, materials and technologies in the design process, reflecting a sense of innovation. Students are required to consider social, safety, health, legal, cultural and environmental factors in their design solutions to meet the needs of different civil engineering practices, and develop reasonable solutions that meet the needs of the state and social and economic construction.

(4) Research: Students are required to study complex civil engineering problems based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, synthesizing information to obtain reasonable and effective conclusions, and applying them to engineering practice. Students are required to apply scientific principles to research and analyse key technologies and solutions to complex civil engineering problems through literature research or related methods. Students can choose a reasonable research route and design an experimental programme based on civil engineering professional theories and for complex civil engineering problems, and conduct innovative experiments, including experimental organisation, data acquisition and data processing. Students are required to analyse and interpret experimental data and obtain reasonable and valid conclusions through information synthesis.

(5) Use modern tools: Students are required to develop, select and use appropriate techniques, resources, modern engineering tools and information technology tools for complex civil engineering problems, including prediction and simulation of complex engineering problems, and are able to understand their limitations. Students are required to master modern civil engineering instruments, equipment and advanced information processing technology tools to select and use appropriate techniques and tools for complex engineering problems in surveying, design and construction, and are able to analyse, calculate and design complex civil engineering problems and understand their limitations. Students are required to select and use specialist hardware and software tools to develop specialised tools to meet specific needs for the optimisation, prediction and simulation of engineering solutions for the optimal design of solutions in survey, design and construction and understand their limitations.

(6) Engineering and Society: Students are required to undertake sound analysis based on relevant background knowledge of civil engineering and evaluate the social, health, safety, legal and cultural implications of professional engineering practice and solutions to complex civil engineering problems, and understand the responsibilities involved. Students are required to understand the social role of civil engineering and the social, health, safety, legal and cultural impacts of civil engineering activities. Students are required to have an awareness of the multiple constraints in civil engineering practice, be able to reasonably analyse, evaluate and address the social, health, safety, legal and cultural risks that may arise from civil engineering activities, and be responsible for the quality of the work carried out and understand their responsibilities.

(7) Environment and Sustainable Development: Students are required to understand and evaluate the

environmental, socially sustainable impacts of engineering practices that address complex civil engineering problems. Students are required to understand and evaluate the impact of civil engineering practice on environmental protection and sustainable development of society, and recognise the status and role of engineering practice in environmental protection and sustainable development. Students are required to understand the policies, laws and regulations related to civil engineering practice and environmental protection and sustainable development, etc, understand and evaluate the damage and potential hazards caused by engineering practice to the environment and sustainable development of society, and develop reasonable strategies to reduce the damage and potential hazards caused to humans and the environment.

(8) Professional norms: Students will have humanities and social science literacy, social responsibility, and the ability to understand and comply with engineering professional ethics and norms in the practice of engineering and fulfill their responsibilities. Students are required to understand China's national conditions, have patriotism and humanities and social science literacy, understand the relationship between the individual and society, and establish a correct world view, outlook on life and values. Students are required to possess a sense of legal awareness and social responsibility, and understand the professional nature of civil engineers, and master the relevant codes and regulations of the civil engineering industry, and consciously abide by professional ethics and laws and regulations in engineering practice. Students are required to understand the social responsibility of civil engineers for public safety, health, well-being, environmental protection, and understand the importance of engineering practice in maintaining national security and social stability, and be able to consciously fulfill their social responsibility in engineering practice.

(9) Individual and team: Students are required to assume the role of individual, team member and leader in a multidisciplinary context when solving complex civil engineering problems. Students are required to good organizational and coordination skills, presentation and interpersonal skills, and the ability to communicate and cooperate effectively with members of other disciplines. Students are required to ability to independently undertake special tasks in civil engineering and to assume the role of individual, team member or leader in a multidisciplinary team.

(10) Communication: Students will have the ability to communicate and interact effectively with industry peers and the public on complex civil engineering issues, including writing reports and designing submissions, presenting statements, and articulating or responding to instructions clearly. Students should have the international perspective and are able to communicate and interact in a cross-cultural context. Students are required to be able to apply knowledge of civil engineering and related fields, to communicate effectively with industry peers and the public on complex engineering problems in civil engineering, to communicate and respond to questions, and master the methods of drawing and writing standard engineering drawings, design specifications, research reports and presentation skills. Students are required to understand the international development trends and research hotspots of civil engineering disciplines, understand and respect the differences and diversity of different cultures in the world, and have a certain international perspective. Students are required to be proficient in a foreign language, and have the ability to retrieve foreign language materials, communicate and express themselves in a foreign language, and communicate and exchange ideas on civil engineering investigation, design and construction issues in a cross-cultural context.

(11) Project Management: Students are required to understand and master the principles of engineering management and economic decision-making methods relevant to the civil engineering profession, and to apply them in a multidisciplinary environment. Students are required to master the basic principles and methods of civil engineering survey, design, construction management and economic decision making. Students are required to apply a combination of technical, managerial, and economic decision-making methods in a multidisciplinary environment to design the implementation of civil engineering projects and

to organize and lead multidisciplinary teams in the implementation of the projects.

(12) Lifelong learning: Students will have the sense of self-directed and lifelong learning, and the ability to continuously learn and adapt to development. Students are required to have a sound understanding of the need for self-exploration and learning, and be able to demonstrate the effectiveness of self-exploration and learning. Students are required to have the ability to learn on their own, to continuously learn and adapt to civil engineering developments, and to have the ability to understand, summarize, and ask questions about changing technical issues.

### **3. Main disciplines**

Civil Engineering.

### **4. Length of Schooling and Degree**

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Engineering when they have completed the required minimum credits and have met all other requirements.

### **5. Core Courses**

Core Courses: Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Soil Mechanics, Civil Engineering Material, Engineering Geology, Design of Engineering Principles Load and Reliability, Basic Reinforced Concrete Structures, Basic Steel Structure Fundamentals , Foundation Engineering, Design of Reinforced Concrete, Civil Engineering Construction, Building Construction Structure Aseismatic and Disaster Prevention, Engineering Project Management and Regulations

Practical Courses: Architectural Engineering Direction: Design of Building Architecture, Design of Reinforced Concrete Structure, Design of Foundation Engineering, Design of Civil Engineering Construction, Design of Steel Structures, Design of Anchor Technology and Retaining Engineering, Design of Underground Construction Structures, Design of Civil Engineering Cost, Surveying Practice, Geological Survey Field Trip in Beidaihe, Engineering Geology Practice, Civil Engineering Awareness Practice, Civil Engineering Production Practice, Graduation Practice

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course module	课程类别 Course Classification	学时数 Hours	学分 Credits	学期 Semester											
				1	2	1夏	3	4	2夏	5	6	3夏	7	8	
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	40	11.25	13.25		4.25	5.25	1	3.25	1.25		0.25	0.25	
	通识教育选修课程 Selective Courses of General Education	192	12												
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	896	55.5	13	20.5		9	8.5		4.5					
	专业核心课程 Specialized Fundamental Courses	344	21.5					7		3.5	9		2		
	专业拓展课程 Specialized Development	184	11.5							2	5.5		4		
	课程实践 Course Practice	56	3.5												
实践教育 Practical Education	建筑工程方向 Construction engineering	37周 +128学时	31		4	6	2			2	1	4	4	2	6
	岩土与地下工程方向 Geotechnical engineering				4	6	2			2		4	4	3	6
	课外实践 Extracurricular practice	96	6												
	必修课总学分 Required course credits										148				
	选修课总学分 Elective course credits												33		
	最低毕业总学分 Total Credits													181	

## 七、课程设置 (Curriculum)

### 1、通识教育必修课程 (Required Courses of General Education): 730 学时 (730 Hours), 40 学分 (40 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR183004	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	64	4	48	16		考试 Exam	4	
GR181012	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	32	2	28	4		考试 Exam	5	
GR181013	形势与政策 (1) Situation and Policy(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形势与政策 (2) Situation and Policy(2)	4	0.25	4			考查 Term Paper	2	
GR181015	形势与政策 (3) Situation and Policy(3)	4	0.25	4			考查 Term Paper	3	
GR181016	形势与政策 (4) Situation and Policy(4)	4	0.25	4			考查 Term Paper	4	
GR181017	形势与政策 (5) Situation and Policy(5)	4	0.25	4			考查 Term Paper	5	
GR181018	形势与政策 (6) Situation and Policy(6)	4	0.25	4			考查 Term Paper	6	
GR181019	形势与政策 (7) Situation and Policy(7)	4	0.25	4			考查 Term Paper	7	
GR181020	形势与政策 (8) Situation and Policy(8)	4	0.25	4			考查 Term Paper	8	
GR301004	大学生职业生涯规划与就业指导 (1) Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR303005	大学生职业生涯规划与就业指导(2) Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育(1) Mental Health (1)	16	1	16			考查 Term Paper	1	
GR303005	大学生心理素质教育(2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	2夏	
GR081071	大学英语(1) College English (1)	64	4	64			考试 Exam	1	
GR081072	大学英语(2) College English (2)	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育(1)(系列课程) Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育(2)(系列课程) Physical Education (2)	32	1		32		考试 Exam	2	
GR142007	体育(3)(系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR142008	体育(4)(系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	40	492	222	16			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类 (含在线课程) Humanities and Social Sciences Courses (Inc. Online courses)	见附件 1	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 必选。
2	自然科学类 (含在线课程) Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term Paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term Paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term Paper	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5-6	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 896 学时 (896 Hours), 55.5 学分 (55.5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191003	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR191004	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	6	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR011036	地球科学概论 Geosciences	64	4	32	32	8	考试 Exam	2	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	2	
DR021002	工程图学 Engineering Drawing	48	3	48			考试 Exam	1	
DR021225	土木工程制图 Civil Engineering Drawing	32	2	16	16		考查 Term paper	2	
DR022201	理论力学 B Theoretical Mechanics B	48	3	48			考试 Exam	2	
DR022126	材料力学 A Mechanics of Materials A	64	4	58	6		考试 Exam	3	
DR022227	结构力学 A (1) Structural Mechanics A (1)	56	3.5	56			考试 Exam	4	
DR023228	结构力学 A (2) Structural Mechanics A (2)	24	1.5	24			考试 Exam	5	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR022005	工程流体力学 Engineering Fluid Mechanics	32	2	28	4		考试 Exam	4	
DR023229	土力学 Soil Mechanics	48	3	40	8		考试 Exam	5	
DR020008	土木工程专业导论	16	1	16			考查 Term paper	1	
总计 Total		896	55.5	806	82	8			

4、专业核心课程 (Specialized Core Courses): 344 学时 (344 Hours), 21.5 学分 (21.5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR022230	工程荷载与可靠性设计原理 Design of Engineering Principles Load and Reliability	24	1.5	24			考试 Exam	4	
SR022231	工程地质 Engineering Geology	40	2.5	40			考试 Exam	4	
SR022232	土木工程材料 A Civil Engineering Material A	48	3	36	12		考试 Exam	4	
SR023233	混凝土结构基本原理 A Reinforced Concrete Structures Fundamentals A	56	3.5	52	4		考试 Exam	5	
SR023234	钢结构基本原理 Steel Structures Fundamentals	40	2.5	40			考试 Exam	6	
SR023235	基础工程 Foundation Engineering	32	2	32			考试 Exam	6	
SR023236	土木工程施工 Civil Engineering Construction	48	3	48			考试 Exam	6	
SR023237	建筑结构抗震与防灾 Building Construction Structure Aseismic and Disaster Prevention	24	1.5	24			考试 Exam	6	
SR024238	工程项目管理与法规 Engineering Project Management and Regulations	32	2	32			考查 Term paper	7	
总计 Total		344	21.5	328	16				

5、专业拓展课程 (Specialized Development Courses):  
 建筑工程方向 (Architectural Engineering): 选修 240 学时 (240 Hours), 15 学分 (15Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
方向选修课									
SS023240	房屋建筑学 Building Architecture	32	2	32			考试 Exam	5	
SS023241	混凝土结构设计 Design of Reinforced Concrete	32	2	32			考试 Exam	6	
SS023242	结构设计通用软件 Structure Design Software	32	2	20	12		考试 Exam	6	
SS023243	土木工程造价 Civil Engineering Cost	24	1.5	24			考试 Exam	6	必选
SS024244	钢结构房屋设计 Design of Steel Structure	32	2	32			考试 Exam	7	
SS024245	高层建筑结构设计 Design of High-rise Structures	32	2	32			考试 Exam	7	
SS024246	建筑结构试验原理 Experimenta principle of building structure	16	1	16			考试 Exam	7	
SS024247	钢 - 混凝土组合结构 Steel-Concrete Combined Structures	24	1.5	24			考查 Term paper	7	
SS024248	砌体结构 Masonry Structure	16	1	16			考查 Term paper	7	任选
SS024249	装配式建筑结构概论 Introduction to Structure of Assembled Buildings	24	1.5	24			考查 Term paper	7	
SS024250	大跨结构 Large span structure	24	1.5	24			考查 Term paper	7	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
专业选修课									
DR023251	弹性力学 Elasticity	32	2	32			考查 Term paper	5	
SS022252	土木工程专业英语 Specialty English for Civil Engineering	16	1	16			考查 Term paper	4	
SS023253	建筑信息模型技术 (BIM) 概论 Introduction to Building Information Modeling (BIM) Technology	24	1.5	24			考查 Term paper	6	
SS023254	智慧基础设施 (双语、研究生课程) Smart Infrastructure (Bilingual, Graduate Program)	32	2	32			考查 Term paper	6	
IS024291	智能建造导论 Introduction to Intelligent Construction	24	1.5	24			考查 Term paper	7	
SS024255	道桥工程概论 Introduction to Road and Bridge Engineering	32	2	32			考查 Term paper	7	
SS024259	地基处理 Foundation treatment	24	1.5	24			考查 Term paper	7	任选
SS024257	非开挖技术概论 Introduction to Trenchless Technology	32	2	32			考查 Term paper	7	
SS020024	地下能源储存工程地质前沿 Underground Energy Storage Engineering Geological Frontiers	16	1	16			考查 Term paper	7	
SS020070	灾害工程地质学前沿 Disaster Engineering Geology Frontiers	16	1	16			考查 Term paper	7	
IS020005	地下工程新进展 Underground Engineering Frontiers	16	1	16			考查 Term paper	7	
SS024320	地质灾害监测预警理论与方法 Geological Disaster Monitoring and Early Warning Theories and Methods	16	1	16			考查 Term paper	7	
SS024260	土木工程经济学概论 Urban and Real Estate Economics	24	1.5	24			考查 Term paper	7	

岩土与地下工程方向 (Geotechnical and Underground Engineering): 选修 240 学时 (240 Hours), 15 学分 (15Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
方向选修课									
SS023261	地下水科学基础 B Fundamentals of Groundwater Science B	32	2	32			考试 Exam	5	
DR023017	岩体力学 Rockmass Mechanics	32	2	28	4		考试 Exam	6	
SS023241	混凝土结构设计 Design of Reinforced Concrete	32	2	32			考试 Exam	6	
SS023243	土木工程造价 Civil Engineering Cost	24	1.5	24			考试 Exam	6	必选
SS024262	地下建筑结构设计 Design of Underground Construction Structures	32	2	32			考试 Exam	7	
SR024053	锚固技术与支护工程 Anchor Technology and Retaining Engineering	32	2	32			考试 Exam	7	
SS024263	岩土工程勘察 Geotechnical Engineering Investigation	24	1.5	16	8		考试 Exam	7	
SS024264	地质灾害防治 B Prevention and control of geological disasters B	24	1.5	24			考查 Term paper	7	
SS024265	三维地质建模技术 3D Geological Modeling Technology	16	1	16			考查 Term paper	7	任选
SS024266	岩土工程测试与监测技术 Geotechnical Testing and Monitoring Technology	24	1.5	16	8		考查 Term paper	7	
SS024267	隧道工程概论 Introduction to Tunnel Engineering	32	2	32			考查 Term paper	7	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
专业选修课									
DR023251	弹性力学 Elasticity	32	2	32			考查 Term paper	5	
SS022252	土木工程专业英语 Specialty English for Civil Engineering	16	1	16			考查 Term paper	4	
SS023253	建筑信息模型技术 (BIM) 概论 Introduction to Building Information Modeling (BIM) Technology	24	1.5	24			考查 Term paper	6	
SS023254	智慧基础设施 (双语、研究生课程) Smart Infrastructure (Bilingual, Graduate Program)	32	2	32			考查 Term paper	6	
IS024291	智能建造导论 Introduction to Intelligent Construction	24	1.5	24			考查 Term paper	7	
SS024255	道桥工程概论 Introduction to Road and Bridge Engineering	32	2	32			考查 Term paper	7	
SS024259	地基处理 Foundation treatment	24	1.5	24			考查 Term paper	7	任选
SS024257	非开挖技术概论 Introduction to Trenchless Technology	32	2	32			考查 Term paper	7	
SS020024	地下能源储存工程地质前沿 Underground Energy Storage Engineering Geological Frontiers	16	1	16			考查 Term paper	7	
SS020070	灾害工程地质学前沿 Disaster Engineering Geology Frontiers	16	1	16			考查 Term paper	7	
IS020005	地下工程新进展 Underground Engineering Frontiers	16	1	16			考查 Term paper	7	
SS024260	土木工程经济学概论 Urban and Real Estate Economics	24	1.5	24			考查 Term paper	7	

6、课程实践 (Course Practice):  
 建筑工程方向 (Architectural Engineering): 37 周 +128 学时 (37 weeks and 128 hours), 31 学分 (31Credits)

课程代码 Course Code	课程名称 Course Name	周数 ( 学时 ) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	2	考查 Term Paper	1 夏	
PR181010	思想政治社会实践 Political Social Practice	32	2	考查 Term Paper	1 夏	
PR191045	实验物理 (1) Physics Experiments(1)	24 学时	1	考查 Term Paper	2	
PR192046	实验物理 (2) Physics Experiments(2)	24 学时	1	考查 Term Paper	3	
PR191047	实验化学 Chemistry Experiments	48 学时	2	考查 Term Paper	2	
PR024268	工程结构试验 Engineering Structural Experiments	1 周	1	考查 Term Paper	7	
PR023269	房屋建筑学课程设计 Design of Practice of Buildings	2 周	1	考查 Term Paper	5	
PR023270	混凝土结构课程设计 Design of Reinforced Concrete Structures	1 周	1	考查 Term Paper	6	
PR023271	基础工程课程设计 Design Practice of Foundation Engineering	1 周	1	考查 Term Paper	6	
PR023272	土木工程施工课程设计 Design Practice of Civil Engineering Construction	2 周	1	考查 Term Paper	6	
PR023273	土木工程估价课程设计 Design of Civil Engineering Cost	1 周	1	考查 Term Paper	6	
PR024274	钢结构课程设计 Design Practice of Steel Structures	1 周	1	考查 Term Paper	7	
PR122059	测量实习 Surveying Practice	1 周	1	考查 Term Paper	2	
PR011044	北戴河地质认识实习 Geological Survey Field Trip in Beidaihe	2 周	2	考查 Term Paper	1 夏	

课程代码 Course Code	课程名称 Course Name	周数(学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR022275	工程地质实习 Engineering Geology Practice	2周	2	考查 Term Paper	2夏	
PR023276	土木工程认识实习 Civil Engineering Awareness Practice	1周	1	考查 Term Paper	3	
PR023277	土木工程生产实习 Civil Engineering Production Practice	4周	4	考查 Term Paper	3夏	
PR024278	土木工程毕业实习 Civil Engineering Graduation Practice	4周	6	考查 Term Paper	8	
PR024111	土木工程毕业设计(论文) Civil Engineering Graduation Design(Thesis)	12周				
总计 Total		37周 +128学时	31			

岩土与地下工程方向 (Geotechnical and Underground Engineering): 37周 +128学时 (37 weeks and 128 hours), 31学分 (31Credits)

课程代码 Course Code	课程名称 Course Name	周数(学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2周	2	考查 Term Paper	1夏	
PR181010	思想政治社会实践 Political Social Practice	32学时	2	考查 Term Paper	1夏	
PR191045	实验物理(1) Physics Experiments(1)	24学时	1	考查 Term Paper	2	
PR192046	实验物理(2) Physics Experiments(2)	24学时	1	考查 Term Paper	3	
PR191047	实验化学 Chemistry Experiments	48学时	2	考查 Term Paper	2	
PR024268	工程结构试验 Engineering Structural Experiments	1周	1	考查 Term Paper	7	
PR023271	基础工程课程设计 Design Practice of Foundation Engineering	1周	1	考查 Term Paper	6	
PR023270	混凝土结构课程设计 Design of Reinforced Concrete Structures	1周	1	考查 Term Paper	6	

课程代码 Course Code	课程名称 Course Name	周数(学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR023272	土木工程施工课程设计 Design Practice of Civil Engineering Construction	2周	1	考查 Term Paper	6	
PR023273	土木工程估价课程设计 Design of Civil Engineering Cost	1周	1	考查 Term Paper	6	
PR024279	地下建筑结构课程设计 Design of Underground Building Structures	2周	1	考查 Term Paper	7	
PR024280	锚固技术与支护工程课程设计 Design Practice of Anchor Technology and Retaining Engineering	1周	1	考查 Term Paper	7	
PR122059	测量实习 Surveying Practice	1周	1	考查 Term Paper	2	
PR011044	北戴河地质认识实习 Geological Survey Field Trip in Beidaihe	2周	2	考查 Term Paper	1夏	
PR023275	工程地质实习 Engineering Geology Practice	2周	2	考查 Term Paper	2夏	
PR023276	土木工程认识实习 Civil Engineering Awareness Practice	1周	1	考查 Term Paper	3	
PR023277	土木工程生产实习 Civil Engineering Production Practice	4周	4	考查 Term Paper	3夏	
PR024278	土木工程毕业实习 Civil Engineering Graduation Practice	4周	6	考查 Term Paper	8	
PR024111	土木工程毕业设计(论文) Civil Engineering Graduation Design(Thesis)	12周	6	考查 Term Paper	8	
总计 Total		37周 +128学时	31			

#### 7、课外实践 (Extracurricular practice): 6 学分 (6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等,其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标			
	目标 1	目标 2	目标 3	目标 4
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	√			√

九、课程与毕业要求关系矩阵（工程教育认证专业类专业）

课程名称	毕业要求	(1) 工程知识	(2) 问题分析	(3) 设计/开发解决方案	(4) 研究	(5) 使用现代工具	(6) 工程与社会	(7) 环境和可持续发展	(8) 职业规范	(9) 个人和团队	(10) 沟通	(11) 项目管理	(12) 终身学习
思想道德与法治							L	L	H		H		M
中国近现代史纲要							L		M		L		H
马克思主义基本原理									H	M		H	H
毛泽东思想和中国特色社会主义理论体系概论								M	H				H
习近平新时代中国特色社会主义思想概论							L	M	H				H
形势与政策							M	H	H				L
大学生职业生涯规划与就业指导 (1-2)									M	M	L		H
大学生心理素质教育 (1-2)							M			L	M		L
军事理论										M	L		
大学英语 (1-4)					M						H		L
大学英语素质拓展课					M						M		
体育 (1-4)										H	M		
大学计算机	L					M					M		L
程序设计基础 A	L					H					H		M
高等数学 B (1-2)	H												
线性代数	M												
概率论与数理统计	M												
大学物理 (1-2)	H			M									
大学化学	M												

课程名称	毕业要求	(1) 工程知识	(2) 问题分析	(3) 设计/开 发解决方案	(4) 研究	(5) 使用现代 工具	(6) 工程与社 会	(7) 环境和可 持续发展	(8) 职业规范	(9) 个人和团 队	(10) 沟通	(11) 项目管理	(12) 终身学习
土木工程专业导论							H	M	H		H		L
地球科学概论	H							M					
测量学 A	H	M	M	L	H	H							
工程图学		L	L			M					M		
土木工程制图		M	M			H					H		
理论力学 B	H	L	L		M								
材料力学 A	H	L	L		M								
结构力学 A (1) (2)	M	H	H	H	H	L							
工程流体力学		M	M	L		M							
土力学		H	H		H		L	M					
工程荷载与可靠度设计原理	M			M									
工程地质			H	M	H			H					
土木工程材料 A	M						L	H					
混凝土结构基本原理 A			H	M	H								
钢结构基本原理			H	M	H								
基础工程			H	M				H					
土木工程施工			M			L	H		H		H		
建筑结构抗震与防灾			H	H	M	H		L					
工程项目管理与法规			M	H			H	H	H	L		H	
房屋建筑学	H						M	H	L				
混凝土结构设计	H		L	M	H		H				H		
结构设计通用软件	H		M		H	H				L			

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钢结构房屋设计			H	H	H		H	M	L				
高层建筑结构设计	H		H	H	L	M		M					
土木工程造价				H		M		L			H	H	
地下水科学基础B	H			H	L	M		M					
岩体力学	H		M		H	H				L			
地下建筑结构设计			H	H	H		H	M	L				
锚固技术与支挡工程	H						M	H	L				
专业任选课	M			L							M		L
房屋建筑学课程设计				H	L	M	H	M		H			
混凝土结构课程设计			H	H		M		M			H		
基础工程课程设计			H	H		M		L					
钢结构课程设计			H			M			L		H		
土木工程施工课程设				H		M	M						
土木工程造价课程设			L	M		H						M	
地下建筑结构课程设			H				L	M			H		
锚固技术与支挡工程				H		M	H	M		H			
课程设计							M						
思想政治社会实践							M			H			
军事理论及训练										M	L		
实验物理(1)(2)	M	M	M										
实验化学	M	M											
工程结构试验			M	H	H	H	L			H			

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测量实习		H		M		H			M	H	L		
北戴河地质认识实习			L					L				M	
工程地质实习			M					M				H	
土木工程认识实习					M	L	H		H		M		L
土木工程生产实习	H			M		H	H	H	H	H		H	M
毕业实习与毕业设计 (论文)			H	H	H	H	M	M	H	H	H	H	H
社会实践							H	M		H	M		
科研训练			M		H							L	M
创业活动			M				L	M		H	L	H	

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。