

# 给排水科学与工程专业 ( 081003 )

## ( Science and Engineering of Water & Wastewater )

表一

### 一、培养目标 (Educational Objectives) :

培养适应国家、行业和地方经济社会发展需要的，德智体美全面发展，具有良好的职业道德、责任感、团队精神和沟通能力，掌握给排水科学与工程学科基础理论和基本知识，具有宽厚的基础理论、广泛的专业知识、较强的实践能力、创新能力和创业精神，具有一定的国际视野，能够胜任给排水科学与工程领域（尤其是电厂水系统）的项目规划、设计、施工和管理等方面工作的高素质应用型专门人才。

It aims to develop high-qualified applied talents to meet the needs of national culture, industry and local economic and social development, with all-round development, good sense of responsibility, occupation ethics, teamwork and communication skills; to master basic theory and knowledge of water supply and drainage disciplines, with extensive professional knowledge, strong practical ability, innovation ability and entrepreneurial spirit and an international vision; to be capable of the work of water supply and drainage (especially Power plant water system) in project planning, design, construction and management and other aspects.

### 二、毕业要求 (Educational Requirements) :

本专业毕业生应获得以下几方面的知识、能力和素质：

1.工程知识：能够将数学、自然科学、工程基础和专业知识用于解决给排水工程专业复杂工程问题。

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给排水工程专业复杂工程问题，以获得有效结论。

3.设计/开发解决方案：能够设计满足给排水工程特定需求的施工方案，具备实施项目全寿命周期管理的能力，能够对实际工程进行合理的选址、选线，能理解建筑设计意图并进行简单的管道系统和消防系统方案设计，能够设计满足水处理特定需求的工艺、构筑物，并能够在建筑给排水、水处理系统和施工方案设计环节中体现创新意识，综合考虑社会、健康、安全、法律、文化、环境等因素。

4.研究：能够通过文献检索，凝练、研究、分析和表达给排水科学与工程专业的复杂工程问题，以获得有效结论，能够制定给排水工程技术基础实验方案、独立完成实验并进行数据的整理、统计、分析和解释。

5.使用现代工具：能够针对给排水科学与工程复杂工程问题，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简化、预测与模拟，并能够理解其局限性。

6.工程与社会：能够基于工程相关背景知识进行合理分析，评价给排水科学与工程复杂工程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。

7.环境和可持续发展：能够利用给排水科学与工程专业知识对水的获取、利用、排放进行综合规划，实现水资源的合理利用与保护。

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，履行所应承担的责任，能够吃苦耐劳，勇于面对挫折和挑战。

9.个人和团队：能在多学科组成的旨在解决给排水科学与工程复杂工程问题的团队中胜任个体、团队成员或负责人的角色。

10.沟通：能够就给排水科学与工程复杂工程问题与业界同行及社会公众进行有效沟通和交

## 给排水科学与工程培养方案（2017 版）

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。

11.项目管理：能够理解并掌握工程管理原理与经济决策方法，能对实际工程项目进行技术经济分析，并提出合理的进度、成本、质量和安全控制方法，并能在多学科环境中应用。

12.终身学习：具有自主学习和终身学习的观念，能够通过自主学习不断拓展知识领域，适应社会和科技的发展，具有不断寻找解决给排水科学与工程专业复杂工程问题的欲望，具有严谨求实的科学态度和开拓进取精神，具有科学思维的方式和方法，具有创新意识和创新思维。

The graduates of this field should acquire the following knowledge, ability and quality:

1. Engineering knowledge: to solve the complex engineering problems of water supply and drainage with mathematical, natural science, engineering basis and professional knowledge.

2. Analysis of problems: to identify and express the complex engineering problems, and analyze through literature researches with basic principles of mathematics, natural science and engineering science in order to obtain effective conclusions.

3. Design / development solutions: to design construction scheme to meet the specific needs of water supply and drainage with the ability to manage life cycle of the project; to be capable of site selection and line selection of the actual project; to understand the intention of piping system design and fire fighting system design; to design the systems, structures and components (nodes) to meet the specific needs of water supply and drainage and to reflect the sense of innovation in the process of water treatment process, structures, and water supply and drainage, considering such factors as society, health and safety, legality, culture and environment.

4. Studying: to concisely research, analyze and express complex engineering problems in water supply and drainage through literature retrieval in order to obtain effective conclusions; to formulate experiment schemes of water supply and drainage technology, to complete experiment independently and collate the data, statistics, analysis and interpretation..

5. The use of modern tools: to develop, select and apply appropriate technology, resources, modern engineering tools and information technology, including the simplification, prediction and simulation of complex engineering problems and to understand its limitations.

6. Engineering and social engineering: to analyze reasonably based on the background knowledge and evaluate the impact of solutions of complex engineering problems in society, health, safety, law and culture, and understand the responsibilities.

7. Environment and sustainable development: with the knowledge of water supply and drainage science and engineering, the comprehensive planning of water acquisition, utilization and discharge will be carried out to realize the rational utilization and protection of water resources.

8. Occupation norms: to have humanistic social science literacy and social responsibility; to comply with the occupation morals and norms in engineering practice; to fulfill the responsibility, bear hardships and face setbacks and challenges.

9. Person and team: to take a role of individual, team member or leader in a multidisciplinary team that aims to solve complex engineering problems in water supply and drainage.

10. Communication: to communicate effectively with professionals and the public on complex engineering issues in water supply and drainage, including writing reports and designing presentations, statements and responses; to have a certain international vision to communicate under the background of cross-culture.

11. Project management: to understand and grasp the method of project management and economic principle; to carry out technical and economic analysis on the actual projects; to put forward the reasonable methods of schedule and cost, quality and safety control to be used in a multidisciplinary environment.

12. Lifelong learning: with the concept of lifelong learning and, to expand knowledge through the au-

tonomous learning to adapt to the development of society and technology; to have desires of constantly looking for solutions to complex engineering problems; to have rigorous scientific attitude and pioneering spirit, the ways and methods of scientific thinking, innovative consciousness and thinking.

### 三、主干课程（Main Courses）：

画法几何、工程制图、水分析化学、水处理生物学、水力学、水泵与水泵站、电厂水处理、给排水管道系统、水质工程学、建筑给排水工程、水资源利用与保护、水工程施工与施工组织、给排水工程概预算、工业给水处理、工业废水处理等课程。

Graphic Geometry, Engineering Drawing, Water Analytical Chemistry, Microbiology for Water & Wastewater Piping Engineering, Hydraulics, Pump & Pump-Station, Water Treatment for Power Plant, Water Supply and Sewerage Pipe Engineering, Water Quality Engineering, Building Water Supply and Drainage, Utilization and Protection of Water Resources, Water Engineering Construction & Project Management, Budget of Water Supply and Drainage Engineering, Industrial Water Treatment and Industrial Wastewater Treatment.

### 四、主要实践性教学环节（Main Practice Teaching Links）：

1.实验：无机化学、水分析化学、水处理生物学、水质工程学、水处理实验技术、土木工程材料、工程测量

2.设计：给排水管道系统课程设计、水质工程学课程设计、水泵与水泵站课程设计、建筑给排水工程课程设计、给排水工程概预算课程设计、电厂水处理课程设计、水资源利用与保护课程设计

3.实习：认识实习、测量实习、生产实习、毕业实习

1.experiments: inorganic chemistry, water analysis chemistry, water treatment biology, water quality engineering, water treatment experimental technology, civil engineering materials, engineering surveying

2.Curriculum Design: Curriculum Design of Water Supply and Sewerage Pipe Engineering Design, Curriculum Design of Water Quality Engineering, Curriculum Design of Pump & Pump-Station, Curriculum Design of Building Water Supply and Drainage, Curriculum Design of Budget of Water Supply and Drainage, Curriculum Design of Water Treatment for Power Plant, Curriculum Design of Utilization and Protection of Water Resources.

3.Practice: Cognition practice, surveying practice, production practice, graduation practice.

### 五、专业特色（Specialty Features）：

以给排水科学与工程专业为基础，侧重建筑给排水与水处理工程方向，突出电厂水处理特色，注重实践能力培养，毕业生基本功扎实，业务能力强，素质高，能吃苦耐劳，尤其在电厂水处理工程方面有坚实的基础和专业知识和较强的工程实践能力。

With the foundation of the water supply and drainage science and engineering, focus on building water supply and drainage and water treatment engineering, especially on water treatment plant prominent characteristics, and focusing on ability training, The graduates is equipped with solid basic skills, strong business capability, high quality, can be hard, especially with a solid foundation and professional knowledge and strong practical ability in water treatment plant engineering.

### 六、毕业合格标准（Graduation Qualification Standard）：

学制：四年，允许学生延期毕业，延期最多不得超过两年。

学位：学生平均学分绩点 $\geq 65$ ，授予工学学士学位。

毕业合格标准：完成教学计划所要求的教学过程，毕业生总学分不少于 178 学分，其中理论课不少于 132 学分，实践学分不少于 42 学分，课外培养计划学分不少于 4 学分。并参加全国大学外语等级考试达到学校规定的相关标准。

Education System :Four years. Students are allowed to postpone graduation for no more than two years.

Degree: Students will be granted the Bachelor degree of of engineering if their GPA is no less than 65 points.

Graduation Standard: Complete teaching process required by the curriculum system. The graduates should obtain the total credits of no less than 178 credits, including the theoretical teaching of no less than 132 credits and the practical part of no less than 42 credits. Extracurricular training credits should be not less than 4. All students should participate in the College English Test and meet the requirement.

**七、专业课群组说明（Professional Course Group Description）：**

本着出口导向的原则，本专业在第七学期的专业选修课中设置了三个推荐选修课群组，学生可根据就业出口从中选择 4-5 门课程：

（1）建筑给排水方向选修课群组：建筑给排水新技术、高层建筑给排水、建筑暖通空调、水工程监理；

（2）市政方向选修课群组：水处理新技术、水工程法规；

（3）电厂水处理方向选修课群组：工业给水处理、工业废水处理。

In line with the export-oriented principle, there are three recommended optional course groups in the professional elective courses in 7<sup>th</sup> term, from which students can choose 4-5 courses according to the employment export:

(1) the construction drainage direction: building water supply and drainage techniques, high-rise building water supply and drainage, building HVAC, water engineering supervision;

(2) the municipal direction: new technology of water treatment, water engineering law

(3) water treatment in power plants direction: industrial water treatment, industrial wastewater treatment