# 水利水电工程（081504）
# Hydrology and Water Resources

**学科门类：工学（08）　一级学科：水利工程（0815）**

Discipline Category: Engineering (08)

First-Class Discipline: Water Conservancy (0815)

## 一、学科简介

河海大学水利水电工程学科于 1984 年获硕士学位授予权，1993 年取得博士学位授予权，1996 年被评为水利部重点学科，2007 年成为国家重点学科，是水利工程一流学科建设的支撑学科。现有博士生导师 19 名，硕士生导师 20 余名，形成了以中青年教授为学术带头人，双聘院士为科学研究顾问，骨干教师为主体的导师队伍。学科以水利水电系统和大型水电站、泵站、抽水蓄能电站、长距离供水系统、潮汐电站及风力发电等为主要研究对象，着重研究和解决工程规划、设计、运行、调控等理论方法与关键技术，服务于“南水北调”、“西电东送”等工程建设和国家重大战略需求。学科全面参与了三峡工程、南水北调、溪洛渡、白鹤滩等国家重大水利水电工程和我国几乎所有大型抽水蓄能电站的研究，为我国水利水电和新能源建设做出重要贡献。学科主持或参与完成 20 余项基金项目和国家重大科技项目，在理论研究和工程应用等方面取得了多项创新性成果，部分创新研究成果已达国际领先水平，获国家科技进步奖 4 项、省部级科技进步奖 20 余项、国家教学科研成果奖 2 项。毕业生主要在设计院、科研院校、水电开发公司及各级管理部门就业。

## I. Discipline Overview

The discipline of Water Conservancy and Hydropower Engineering at Hohai University was granted the right to award Master degree in 1984, and the right to award Ph.D Degree in 1993. The discipline was rated as the key discipline of the Ministry of Water Resources of the People’s Republic of China in 1996, and granted as the National Level Key Discipline in 2007. It is the key supporting for the World First Class University and

First Class Academic Discipline Construction of hydraulic engineering. The discipline has 19 supervisors for Ph. D. students and more than 20 supervisors for Master Degree students at present, forming a team with young and middle-aged professors as academic leaders, double-appointed academicians as scientific research consultants, and backbone teachers as the main body. All the researches in this discipline mainly focus on large hydropower stations, pumping stations, pumped-storage power stations, tide hydropower stations and wind power, etc., with the aim to investigate and solve the key technology problems in these hydraulic projects including energy planning, design theories, operation control, etc., serving the South-to-North Water Diversion Project, the West-to-East Power Transmission Project and other key projects and major national strategic needs. The discipline has participated in the research of the Three Gorges Project, the South-to-North Water Diversion Project, Xiluodu Project, Baihetan Project and other major national water conservancy and hydropower projects and almost all large-scale pumped storage power stations in China, making important contributions to the construction of water conservancy, hydropower and new energy in China and the world. The discipline has presided over or participated in more than 20 major national science and technology projects, and has gained many innovative research achievements in basic theories and engineering application. Some innovative researches have reached the international leading level, and won 4 National Science and Technology Progress Awards, more than 20 Ministerial and Provincial-Level Science and Technology Progress Awards, and 2 National Teaching Achievement Awards. Graduates are mainly employed in design institutes, scientific research institutions, hydropower development companies and administrative departments.

## 二、培养目标

1. 河海大学博士层次外国留学生应当在水利水电工程领域中具有宽阔的国际视野，能够在世界范围内创新运用和发展水利水电工程的理论、技能和方法，在国际事务中具有竞争优势。

2. 以英语为专业教学语言的学科中，外国留学生毕业时，博士研究生的中文能力应当至少达到《国际汉语能力标准》三级水平。

3. 本学科博士留学研究生旨在培养水利水电工程领域的高层次创新型人才。掌握本学科坚实宽广的基础理论及系统深入的专门知识，具有独立从事科学研究并做出创造性成果的能力；能熟练运用计算机和现代信息技术、阅读本专业外文资料，具有较好的国际学术交流能力；了解中国文化并初步具备汉语日常交流能力。

## II. Training Objectives

1. International PhD graduates of Hohai University are expected to have broad international view in the relevant academic fields; to creatively apply and develop the theories, skills, and methodologies of the relevant disciplines in the world, and to obtain competitive advantage in the international academic affairs.

2. International PhD graduates must meet the requirement of Level 3 in Chinese Language Proficiency Scales upon graduation if they conduct their coursework in English.

3. This discipline aims to cultivate high-level innovative talents in the field of Water Conservancy and Hydropower Engineering with the consolidation of basic theories, systematic professional knowledge, necessary engineering practice, and scientific research and technological work ability, who can independently engage in scientific research and make creative achievements. They are proficient in using computers and modern information technology, have good foreign literature reading and international academic communication ability. Understanding Chinese culture and preliminary ability of daily communication in Chinese.

## 三、主要研究方向

1. 水利水电系统规划与优化调度
2. 水电站和泵站水力学与结构
3. 水力机组安全控制及过渡过程
4. 抽水蓄能及新能源技术
5. 水利水电工程生态调控与管理

## III. Research Directions

1. Water Resources and Hydropower System Planning and Dispatching

2. Hydraulics and Structures of Hydropower Station and Pump Station

3. Transient Process and Safety Control of Hydraulic Unit

4. Technique of Pumped-storage Project and Renewable Energy

5. Ecological Regulation and Management of Hydropower Projects

## 四、学制和学习年限

学术学位全英文博士留学研究生的标准学制为 4 年。实行弹性学制，学习年限最短不少于 3 年，最长不超过 6 年。

## IV. Number of Years Requirement

The PhD program typically requires 4 years to complete. However, the completing time may vary to 3 years as the minimum and 6 years as the maximum.

## 五、学分要求和课程设置

1. 学术学位全英文博士留学研究生课程总学分为 15 学分，其中学位课程为 10 学分，非学位课程为 5 学分。另设教学环节。所有课程学习一般应在入学后 1 年内完成。

2. 汉语课每学分为 24 学时，中国概况课每学分为 18 学时，其他课程每学分为 16 学时。

3. 中国国情教育（水韵课堂）为系列专题讲座，要求学生按照要求完成规定的学习任务。

4. 对于汉语水平已达到毕业要求的学生，可申请免修汉语，具体要求详见留学生课程免修有关规定。

具体课程设置如下：

## V. Credit Requirements and Curriculum

1. International academic PhD students will complete 15 credits, 10 of which are from degree courses,

and 5 of which are from non-degree courses. Students will also complete academic activities. Coursework will be completed in one year after registration.

2. Each credit of Chinese language course is 24 credit hours. Each credit of Introduction to China is 18 credit hours. For other courses, each credit is 16 credit hours.

3. “Water Harmony Lectures” is a series of seminars, which require students to complete the specified learning tasks.

4. For students who have met the Chinese language requirement for the PhD degree, Chinese language courses can be exempted, of which the details can be referred to in relevant regulations.

The specific curriculum is as follows:

# 水利水电工程全英文学术型留学博士研究生课程设置

**Curriculum for English Taught International Academic PhD Students in Water Conservancy and Hydropower Engineering**

| 课程类别 Category | | 课程代码 Course Code | 课程名称 Course Name | 学分 Credit | 学时 Hours | 开课学期 Term | 备注 Remarks |
|---|---|---|---|---|---|---|---|
| 学位课程 Degree Course 10 学分 | 公共课程 General Course | 2022LD000001 | 汉语 I Chinese Language I | 2 | 48 | 秋 Autumn | 必修 Compulsory |
| | | 2022LD000003 | 中国概况 Introduction to China | 2 | 36 | 秋 Autumn | |
| | | 2022LD110001 | 论文写作指导 Guide of Thesis Writing | 2 | 32 | 秋、春 Autumn/ Spring | |
| | 基础课程 Basic Course | 2022LD880001 | 应用数学 Applied Mathematics | 4 | 64 | 秋 Autumn | 选修 2 学分 Optional 2 credits at least |
| | | 2022LD880003 | 随机微分方程 Stochastic Differential Equations | 2 | 32 | 春 Spring | |
| | | 2022LD990101 | 水文学与水文模拟 Hydrology and Hydrological Modelling | 2 | 32 | 秋 Autumn | |
| | | 2022LD770001 | 高等计算力学 Advanced Computational Mechanics | 2 | 32 | 春 Spring | |
| | 专业课程 Major Course | 2022LD020301 | 瞬变流（二） Fluid Transients （II） | 2 | 32 | 春 Spring | 选修 2 学分 Optional 2 credits at least |
| | | 2022LD020104 | 高等工程水动力学 Advanced Engineering Hydrodynamics | 2 | 32 | 春 Spring | |
| 非学位课程 Non-degree Course 5 学分 | | 2022LD110002 | 中国国情教育（水韵课堂） Water Harmony Lectures | 1 | 16 | 秋、春 Autumn/ Spring | 必修 Compulsory |
| | | 2022LD000002 | 汉语 II Chinese Language II | 2 | 48 | 春 Spring | |
| | | 2022LD020201 | 水利工程安全管理 Safety Management of Water Conservancy Project | 2 | 32 | 秋 Autumn | 选修 2 学分 Optional 2 credits at least |
| | | 2022LD020101 | 工程紊流的数值模拟方法及应用 Numerical Simulation Methods and Applications for Engineering Turbulence | 2 | 32 | 秋 Autumn | |
| | | 选修博士课程 Optional courses for PhD | | | | | 选修 Optional |
| 教学环节 Academic Activity | | 学术活动（含博导讲座） Seminar and Conferences (including seminars by PhD advisors) | | | | | 必修 Compulsory |
| | | 实践活动 Practice Activity | | | | | |
| | | 科学研究 Scientific Research | | | | | |

## 六、教学环节

1. 个人培养计划

学术学位博士研究生入学后，应在导师指导下，在规定时间内按照培养方案和学位论文工作有关规定，结合研究方向和本人实际情况制定个人培养计划，其中学习计划在入学 2 个月内提交。

2. 学术活动

学术学位博士研究生学术活动包括参加国内外学术会议、专家学术讲座、博士生导师讲座，以及研究生学术研讨活动等。申请学位论文答辩前必须参加 20 次以上的学术交流活动，其中博士生导师讲座至少 8 次，由本人做的公开的学术报告 1 次（开题报告、中期检查、预答辩、答辩不计入）。本人做的学术报告由指导教师负责对其学术报告效果进行考核。研究生参加学术活动必须填写相关学术活动登记本。

3. 实践活动

为培养劳动实践能力和责任意识，学术学位博士研究生必须参加实践活动，实践活动形式包括助教、助管、助研、生产实践、社会实践等。由导师对学生实践环节的时长和效果进行考核和评价。

4. 科学研究

学术学位博士研究生应积极参加科学研究课题，并应具有在导师指导下独立负责某专题或子课题的研究工作经历。课题完成后由导师提出综合评审意见。

## VI. Academic Activities

1. Study Proposal

The PhD students must prepare a study proposal on how they will complete the PhD degree by considering their research interests, advice from their research advisors, and other requirements mentioned in this document. The proposal must be submitted in two months after official registration.

2. Seminars and Presentations

PhD students must participate in academic conferences, seminars by experts and PhD advisors, and discussion panels. Before their dissertation defense, PhD students must participate in seminars and

conferences over 20 times, including at least 8 seminars by PhD advisors, and deliver at least 1 academic presentation (the activities concerning with their dissertation are not counted). The presentations delivered by the PhD students will be evaluated by their own research advisors. All the seminars and presentations should be recorded in relevant record book.

3. Practice Activities

PhD students are required to participate in practice activities to prepare professional development. Practice activities include teaching assistantship, research assistantship, management assistantship, and industry engagement etc., which are to be assessed by the advisors.

4. Scientific Research

International academic PhD students should vigorously participate in scientific research projects, and shall be capable of conducting independent research on a particular topic or sub-topic under the guidance of their advisors. Their performance will be evaluated by their research advisors.

## 七、论文工作

学术学位博士学位论文研究工作必须经过文献阅读、论文选题、论文计划及开题报告、论文中期检查、科研成果产出、学位论文预审、学位论文评阅、学位论文答辩等环节。具体按照《河海大学博士学位论文工作管理办法》和学院相关文件执行。留学博士研究生可使用英文撰写论文。

## VII. Dissertation

The dissertations of academic PhD students are required to complete the stages of literature review, topic selection, dissertation plan and dissertation proposal, mid-term examination, output of scientific research achievements, pre-examination, review and assessment, and dissertation defense. Detailed requirements can be referred to in “Hohai University PhD. Dissertation Management Measures” and relevant documents in College of Water Conservancy and Hydropower Engineering. Dissertations in English is acceptable.

## 八、本学科推荐阅读的重要书目、专著和学术期刊

VIII. Recommended Bibliographies, Monographs, and Academic Journals of the Discipline


1. 《中国水力发电工程》编审委员会. 中国水力发电工程[M].北京:中国电力出版社,2000.

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4. 张建云,王国庆. 气候变化对水文水资源影响研究[M].北京:科学出版社,2007.

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6. 郭纯青,方荣杰,代俊峰. 水文气象学[M].北京:中国水利水电出版社,2012.

7. 芮孝芳. 水文学原理[M].北京:中国水利水电出版社,2004.

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9. 方国华. 水资源规划及利用（第三版）（原水利水能规划）[M].北京:中国水利水电出版社,2015.

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11. 李广贺. 水资源利用与保护[M].北京:中国建筑工业出版社,2020.

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16. 章光新,张蕾. 湿地生态水文与水资源管理[M].北京:科学出版社,2014.

17. 赵人俊. 流域水文模型—新安江模型与陕北模型[M].北京:中国水利电力出版社,1983.

18. 丛树铮. 水科学技术中的概率统计方法[M].北京:科学出版社,2010.

19. 黄振平. 水文水资源系统风险分析[M].北京:中国水利水电出版社,2013.

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26. 张瑞瑾,谢鉴衡,陈文彪. 河流动力学[M].武汉:武汉大学出版社,2007.

27. 陈玉璞,王惠民编. 流体动力学（第 2 版）[M].北京:清华大学出版社,2013.

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