水文学及水资源（博士）

Hydrology and Water Resources（PhD）

水文学及水资源（081501）
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: Hydraulic Engineering (0815)

一、学科简介

我校水文学及水资源学科创建于1952年，是新中国最早建立的水文学科。1981年获得首批学士、硕士和博士学位授予权。1988、2002和2007年连续三次被评为国家重点学科。本学科是国家“双一流”、“985优势学科创新平台”、“211工程”和国家“111引智计划”重点建设学科。在2016年教育部组织的第四轮学科评估中，水利工程学科获评A+，排名全国第一。拥有水文水资源与水利工程科学国家重点实验室、水资源高效利用与工程安全国家工程研究中心、教育部全球变化与水循环国际联合实验室、国家级水利工程实验教学示范中心和国家级水利学科专业实验教学示范中心。本学科共有专职教师120名，其中正高46名，副高57名；国家级人才计划8名，省部级人才计划34名，双聘院士5名。本学科主持国家自然科学基金重大项目与重点项目共18项，获国家科技进步奖17项，主持完成国家级教学成果奖3项，获全国优秀博士学位论文1篇，拥有国家级教学团队和教育部创新团队各1支。近5年来，主持和承担了各类科研和生产项目700余项，其中主持国家重点研发计划项目5项、国家自然科学基金项目62项，项目经费总额3.2亿元，发表高质量论文1600余篇，出版著作和教材50余部，获省部级以上科技奖32项。本学科还接受联合国教科文组织（UNESCO）和世界气象组织（WMO）的委托，为30多个国家培养近200名高级水文水资源及水环境人才。

本学科坚持“四个面向”，紧密跟踪与引领学科发展方向，积极服务于国家建设事业，基础雄厚，特色显著，总体实力位居国内领先和国际先进水平。研究生就业单位有科研院所、高等学校、政府机关、流域管理机构、勘测规划设计部门等。

I. Discipline Overview

The discipline of Hydrology and Water Resources in our university was founded in 1952, which is the earliest hydrology discipline established in China. The discipline was qualified for granting bachelor, master and doctoral degrees in 1981, and was authorized as national key discipline in 1988, 2002 and 2007. This discipline is the key construction discipline of the national "Double First-Class", "985 Project Innovation Platform", "211" Project and the national "111" Project. In the fourth round of discipline evaluation organized by the Ministry of Education in 2016, the discipline of Water Conservancy Engineering was evaluated A+ and ranking first in the country. It has the State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering Sciences, the National Engineering Research Center of Water Resources Efficient Utilization and Engineering Safety, the International Joint Laboratory of Global Change and Water Cycle of the Ministry of Education, the National Experimental Teaching Demonstration Center of Water Conservancy Engineering and the National Experimental Teaching Demonstration Center of Water Conservancy Specialty. There are 120 full-time professors in this subject, including 46 full professors and 57 deputy associate professors; 8 national talent plan winners, 34 provincial and ministerial talent plan winners and 5 Double employed Academicians. The discipline had hosted 18 National Nature Science Foundation Key Projects and Major Projects, received 17 National Science and Technology Progress Awards, hosted and completed 3 National Teaching Achievement Awards, received 1 National Outstanding Doctoral Dissertation, and has 1 National Teaching Team and 1 Innovation Team of the Ministry of Education. Over the past five years, 700 projects have been hosted and undertaken in various scientific research and production projects, including 5 National Key Research and Development Program Projects and 62 National Natural Science Foundation Projects, with a total project funding of 320 million RMB, 1600 high-quality papers, 50 books, and 32 science and technology awards at provincial and higher levels. In addition, the discipline received 44 prizes, including 2 National Prizes for Progress in Science and Technology. Authorized by UNESCO and WMO, the discipline of Hydrology and Water Resources has trained more than 200 talents in the field of hydrology, water resources and water environment.

The discipline adheres to the "Four Orientations", closely follows and leads the development direction of the discipline, and actively serves the national construction. It has a strong foundation and distinctive characteristics. The overall strength is at the domestic and international leading level. Graduate employment units include scientific research institutes, universities, government agencies, watershed management agencies, survey planning and design departments.

二、培养目标

1. 河海大学博士层次外国留学生应当在水文学及水资源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文学及水资源的理论、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. 本专业博士留学研究生旨在培养本学科领域的高层次人才。培养在本门学科上掌握坚实宽广的基础理论和系统深入的专门知识；具有独立从事科学研究工作的能力；在科学或专门技术上做出创造性的成果；能够熟练应用计算机开展科学研究和英语进行学术交流，了解中国文化并初步具备汉语日常交流能力的高层次学术型人才。

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 talents from abroad for Doctoral Study. To cultivate the high-level academic talents with mastering solid and broad basic theories and systematic and in-depth expertise in the discipline; having the ability to conduct scientific research independently; making creative achievements in science or special technology; being able to proficiently apply computers for scientific

research and academic communication in English, understanding Chinese culture and having preliminary ability of daily communication in Chinese.

三、主要研究方向

1. 水文物理规律模拟及水文预报
2. 水文不确定性理论与应用
3. 水资源系统规划及可持续利用
4. 地下水系统理论与调控
5. 水信息理论与技术
6. 生态水文与环境水文

III. Research Directions

1. Watershed Hydrological Simulation and Forecasting
2. Theory of Hydrological Uncertainty and Application
3. Water Resources System and Sustainable Utilization
4. Groundwater System Theory and Control
5. Theory and Techniques of Hydroinformatics
6. Ecohydrology and Environmental Hydrology

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 16 学分，其中学位课程为 11 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 16 credits, 11 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:

水文学及水资源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 Hydrology and Water Resources

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 11 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	
		2022LD991001	应用地球物理 Applied Geophysics	2	32	春 Spring	
	专业课程 Major Course	2022LD010104	学科前沿专题 Modern Science of the Discipline	1	16	春 Spring	必修 Compulsory
		2022LD010101	分布式水文模型 Distributed Hydrologic Model	2	32	春 Spring	选修 2 学分 Optional 2 credits at least
		2022LD010102	高等地下水动力学 Higher Groundwater Dynamics	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	
		2022LD010103	现代水信息技术 Advanced Techniques for Collection of Water Information	3	48	春 Spring	选修 2 学分 Optional 2 credits at least
		2022LD990101	水文学与水文模拟 Hydrology and Hydrological Modelling	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 Hydrology and Water Resources. 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. 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.

2. 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.

3. 雷志栋，土壤水动力学[M]. 北京：清华大学出版社，1988.

4. 李致家.水文模型的应用与研究[M]. 南京：河海大学出版社，2008.

5. 刘元波，吴桂平，柯长青等. 水文遥感[M]. 北京：科学出版社，2016.

6. 芮孝芳. 水文学原理[M]. 北京：中国水利水电出版社，2004.

7. 芮孝芳. 水文现状及未来[M]. 南京：河海大学出版社，2019.

8. 王文圣，丁晶，金菊良. 随机水文学（第二版）[M]. 北京：中国水利水电出版社，2008.

9. 王国安. 可能最大暴雨和洪水计算原理与方法[M]. 北京：中国水利水电出版社，2009.

10. 王浩，秦大庸，汪党献. 流域生态调度理论与实践[M]. 北京：中国水利水电出版社，2010.

11. 薛禹群，谢春红.地下水数值模拟[M].北京：科学出版社，2007.

12. 徐宗学. 水文模型[M]. 北京：科学出版社，2019.

13. 夏军，左其亭，王根绪等. 生态水文学[M]. 北京：科学出版社，2020.

14. 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.

15. 张建云，芮孝芳（译著）.水文学手册[M].北京：科学出版社，2002.

16. ABBOTT MB. Hydroinformatics: information technology and the aquatic environment. Aldershot; Brookfield, USA: Avebury Technical, 1991.

17. ANDERSON MG, BURTTP. Hydrological Forecasting. Wiley, 1985.

18. BEVEN K. Rainfall-runoff modeling-the Primer（Second Edition）.Wiley, 2012.

19. BLOSCHL G, SIVAPALAN M, WAGENER T, VIGLIONE A, SAVENIJE H. Runoff Prediction in Ungauged Basins: Synthesis across Processes, Places and Scales. Cambridge University Press, 2013.

20. BOITEN W. Hydrometry. Rotterdam; Brookfield, VT: Balkema, 2000.

21. DAVID RM. Handbook of Hydrology. McGraw Hill, 1993.

22. FINDIKAKIS AN, SATO K. Groundwater management practices. Leiden, the Netherlands; Boca Raton, Fla: CRC Press/Balkema，2011.

23. GANOULIS J. Water resources engineering risk assessment. Berlin: Springer-Verlag, 1991.

24. HERSCHY RW. Streamflow measurement. London; New York: E & FN Spon an imprint of Chapman & Hall, 1995.

25. KIRKBYMJ. Hillslope Hydrology. Chichester：John Wiley & Sons, 1978.

26. KRESIC N. Groundwater resources: sustainability, management and restoration. New York: McGraw-Hill, 2009.

27. MAYS LW. Water resources sustainability. New York：McGraw-Hill，2007.

28. PAUL JW, DAVID M, HANNAH and JONATHAN PS. Hydroecology and ecohydrology: past, present and future. Chichester, England; Hoboken, NJ: Wiley, 2007.

29. RAKHECHA PR, SINGH VP. Applied Hydrometeorology. Springer, 2009.

30. SENE K. Hydrometeorology: forecasting and applications. Springer, 2010.

31. SINGH VP. Computer Model of Watershed Hydrology. Littleton and Colorado: Water Resources Publications, 1996.

32. WALTON WC. Groundwater modeling utilities. Boca Raton: Lewis Publishers, 1992.

33. 水利学报

34. 水科学进展

35. 中国科学.E 辑

36. 水力发电学报

37. 水利水电科技进展

38. 水资源保护

39. 河海大学学报（自然科学版）

40. Water Resources Research，American Geophysical Union

41. Geophysical Research Letter，American Geophysical Union

42. Journal of Geophysical Research，American Geophysical Union

43. Journal of Hydrology，Elsevier Publishing House

44. Hydrological Processes，John Wiley & Sons

45. Hydrology and Earth System Science，European Geophysical Union

46. Water Resources Management，Springer

47. Groundwater，John Wiley & Sons

48. Water Science and Engineering