动力工程及工程热物理（0807）

Power Engineering and Engineering Thermal Physics

学科门类：工学（08） 一级学科：动力工程及工程热物理（0807）

Discipline: Engineering (08)

First-Class Discipline: Power Engineering and Engineering Thermal Physics (0807)

一、学科简介

河海大学动力工程及工程热物理学科是由其二级学科流体机械及工程发展而来，该二级学科创建于 1958 年，历史悠久，于 1986 年即具有硕士学位授予权，是全国最早取得硕士学位授予权的学科之一，现为河海大学重点学科，也是“江苏高校优势学科建设工程”主要承担学科之一，于 2011 年获“动力工程及工程热物理”一级学科学位授予权，并新增二级学科“可再生能源科学与工程”。目前学科成员由在职正高职称 7 人、副高级职称 11 人、讲师及教学科研辅助人员 12 人组成。本学科试验室经过“211”的建设，新建成了“水力机械多功能试验台”，“水力机械动态模拟试验台”，“低速风洞试验台”等试验装置，已经在泵站整体水力模型、流体机械的内特性和外特性研究方面发挥了巨大作用，承担了各种课题近百项，先后荣获国家科技进步二等奖 2 项、国家科技进步三等奖 1 项、国家机械局科技进步二等奖 1 项、江苏省科技进步二等奖 1 项、国家专利 10 项，在国内外主要核心刊物上发表论文 150 余篇，出版专著 10 部。本学科培养的人才在国家电网、水电设计、科学研究、抽水蓄能电站管理、大型水电集团、可再生能源利用和事业等单位发挥了突出作用，许多人成为我国大型水电部门的技术骨干，有些走上了重要的领导岗位，本学科研究生连续多年就业率为 100%。

I. Discipline Overview

The Discipline of power engineering and engineering thermal physics develops from its second-class discipline of fluid machinery and engineering, which was founded in 1958 with a long history. It has been granted the right to confer master's degree since 1986, and has been one of the earliest disciplines in China to

confer master's degree. Now it is one of the key disciplines of Hohai university, and also one of the main disciplines of "Priority Academic Program Development of Jiangsu Higher Education Institutions". It has been granted the right to confer master’s degree of the first-class discipline of power engineering and engineering thermal physics since 2011. Furthermore, the second-class discipline "renewable energy science and engineering" has been added since then. At present, the members of this Discipline consist of 7 in-service senior titles, 11 associate senior titles, 12 lecturers and auxiliaries. Through the construction of "211", test devices including "Multi-functional test bench for hydraulic machinery ", "Dynamic simulation test bed for hydraulic machinery " and " Low speed wind tunnel test bed" have been built, and have played important roles in the studies of the whole hydraulic model of pump station and the internal and external characteristics of fluid machinery. The Discipline has undertaken nearly 100 research projects, and has won the second prize of national science and technology progress award twice, the third prize of national science and technology progress award once, the second prize of national machinery administration science and technology progress award once, and the second prize of scientific and technological progress of Jiangsu province once, respectively. The Discipline has been authorized more than 10 national patents, and published more than 150 papers in the core journals at home and abroad, and also has published more than 10 monographs. Talents trained from this discipline have played important roles in the national grid, water and electricity design, scientific research, management of pumped storage power station, large group of water and electricity, renewable energy and business units. Many of them have become technology backbone of large hydropower sections in China. Some of them have taken important leadership positions. The employment rate of graduate students in this discipline has been kept at 100% for many years.

二、培养目标

1. 河海大学硕士层次外国留学生应当在动力工程及工程热物理领域中具有较好的国际视野，能够在多个国家的实际环境中运用和发展动力工程及工程热物理的知识、技能和方法，并具备参与国际

事务和国际竞争的能力。

2. 以英语为专业教学语言的学科、专业中，外国留学生毕业时，硕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. 本学科硕士留学研究生旨在培养动力工程及工程热物理领域坚实的基础理论和系统的专门知识，在动力工程和新能源领域的水能、风能和太阳能利用方向的研究、设计、开 发、施工和管理等专门科研技术工作中具有较强的专业能力和职业素养；具有从事科学研究工作或独立担负专门技术工作的能力；了解中国文化并具备汉语日常交流能力的专门人才。

II. Training Objective

1. International master graduates of Hohai University are expected to have good international view, to apply and develop the theories, skills, and methodologies in the actual environment of several countries, and to participate in the international academic affairs.

2. International master 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 senior professionals in the field of energy and power. To master the solid basic theory and systematic specialized knowledge of power engineering and engineering thermophysics, and have strong professional ability and professionalism in the research, design, development, construction and management of hydropower, wind and solar energy utilization in power engineering and new energy fields. Having the ability to engage in scientific research or independently undertake a special technical work. To cultivate professionals who understand Chinese culture and have the ability to communicate in Chinese.

三、主要研究方向

1. 流体机械及工程安全运行、故障测试与诊断；

2. 流体机械特性、建模技术及优化设计；

3. 水力机组的动态特性、过渡过程控制与仿真；

4. 可再生能源发电技术。

III. Research Directions

1. Safety Operation，Fault Tests and Diagnosis of Fluid Machine and Engineering

2. Fluid Machinery Character, Modeling and Design Optimization

3. Hydraulic Machinery Dynamic Character, Transition Process Control and Simulation

4. Renewable Energy Power Technologies

四、学制和学习年限

学术学位全英文硕士留学研究生的标准学制为 3 年。实行弹性学制，学习年限最短不少于 2 年，最长不超过 5 年。

IV. Number of Years Requirement

The master program typically requires 3 years to complete. However, the completing time may vary to 2 years as the minimum and 5 years as the maximum.

五、学分要求和课程设置

1. 学术学位全英文硕士留学研究生课程总学分为 28 学分，其中学位课程为 21 学分，非学位课程为 7 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 Provision

1. International academic master students will complete 28 credits generally, 21 of which are from degree

courses, and 7 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 requires students to complete the specified learning tasks.

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

The specific curriculum provision is as follows:

动力工程及工程热物理全英文学术型留学硕士研究生课程设置

Curriculum for English Taught International Academic Master Students Majoring in Power Engineering and Engineering Thermal Physics

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 21 学分	公共课程 General Course	2022LM000001	汉语 I Chinese Language I	2	48	秋 Autumn	必修 Compulsory
		2022LM000002	汉语 II Chinese Language II	2	48	春 Spring	
		2022LM000003	中国概况 Introduction to China	2	36	秋 Autumn	
		2022LM110001	论文写作指导 Guide of Thesis Writing	2	32	秋、春 Autumn/ Spring	
	基础课程 Basic Course	2022LM880001	矩阵论 Matrix Theory	2	32	春 Spring	选修 7 学分 Optional 7 credits at least
		2022LM880002	最优化方法 Optimization Methods	2	32	秋 Autumn	
		2022LM880003	数值分析 Numerical Analysis	3	48	秋 Autumn	
		2022LM880004	数学物理方程 Mathematical physical equation	2	32	秋 Autumn	
		2022LM990601	综合能源系统 Integrated Energy System	2	32	春 Spring	必修 Compulsory
	专业课程 Major Course	2022LM060301	流体机械原理 Principle of Fluid Mechanics	2	32	春 Spring	选修 4 学分 Optional 4 credits at least
		2022LM060302	流体机械 CFD 及优化设计 The Fluid Machinery CFD and Optimization Design	2	32	春 Spring	
		2022LM060204	智能控制 Intelligent Control	1	16	春 Spring	
非学位课程 Non-degree Course 7 学分		2022LM110002	中国国情教育（水韵课堂） Water Harmony Lectures	1	16	秋、春 Autumn/ Spring	必修 Compulsory
		2022LM330001	程序设计方法 Methods of Programming	2	32	春 Spring	选修 6 学分 Optional 6 credits at least
		2022LM991501	工程经济学 Engineering Economy	2	32	春 Spring	
		2022LM990201	多目标决策理论及方法 Theory and Method of Multi-Objective Decision-making	2	32	春 Spring	
		选修硕士课程 Optional courses for master					
教学环节 Academic Activity		学术活动（含博导讲座） Seminar and Conferences (including lecturers 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

学术学位硕士研究生入学后，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

学术学位硕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，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 10 次以上的学术交流活动，其中博导讲座至少 2 次。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，学术学位硕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。

VI. Academic Activities

1. Study Proposal

The master students must prepare a proposal on how they will complete the master 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 Conferences

Master students must participate in academic conferences, talks by experts, seminars by PhD advisors, and discussion panels. Before they apply for the master degree, master students must participate in seminars and conferences over 10 times, including 2 seminars by PhD advisors. All the seminars and talks should be recorded in relevant record book.

3. Practical Activities

Master 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., that are to be assessed by the advisors.

七、论文工作

学术学位硕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《河海大学硕士学位论文工作管理办法》和学院相关文件执行。留学硕士研究生可使用英文撰写论文。

VII. Dissertation

The dissertations of academic master 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 Master's Dissertation Management Measures” and relevant documents in College of Energy and Electrical Engineering. Dissertation in English is acceptable.

八、本学科推荐阅读的重要书目、专著和学术期刊

九、VIII. Recommended Reading Bibliographies, Monographs and Academic Journals

1. 郑源,陈德新.水轮机[M].北京:中国水利水电出版社,2011.
2. 关醒凡.现代泵理论与设计[M].北京:中国宇航出版社,2011.
3. 王福军.计算流体动力学分析-CFD 软件原理与应用[M].北京:清华大学出版社,2004.
4. 梅祖彦.抽水蓄能发电技术[M].北京:机械工业出版社,2000.
5. 杨光明,郑圣义.水工金属结构健康诊断理论、方法及应用[M].南京:河海大学出版社,2013.
6. 常近时.水力机械装置过渡过程[M].北京:高等教育出版社,2005.
7. 郑源,张健.水力机组过渡过程[M].北京:北京大学出版社,2008.
8. 赵振宙,郑源.风力机原理与应用[M].北京:中国水利水电出版社,2011.
9. 李允武.海洋能源开发[M].北京:海洋出版社,2008.
10. 田子婵,杨勇平,刘永前.复杂地形的风资源评估研究[M].北京:华北电力大学,2009.

11. 霍志红,郑源等.风力发电机组控制技术[M].北京:中国水利水电出版社,2010.

12. 胡友安,王孟.水工钢闸门数值模拟与工程实践[M].北京:中国水利水电出版社,2010.

13. 水利部建设与管理司.全国大中型闸门和启闭机更新改造规划[M].南京:河海大学,2003.

14. 水利部、电力工业部东北勘测设计研究院等.水利水电工程钢闸门设计规范(SL74—95)[M].北京:中国电力出版设,1993.

15. Wylie E B,Streeter V L,Suo L. Fluid Transients in Systems[M].Englewood Cliffs,NJ: Prentice Hall,1993.

16. 期刊：中国电机工程学报

17. 期刊：水利学报

18. 期刊：农业工程学报

19. 期刊：农业机械学报

20. 期刊：水科学进展

21. 期刊：工程热物理学报

22. 期刊：太阳能学报

23. 期刊：力学学报

24. 期刊：振动与冲击

25. 期刊：机械工程学报

26. 期刊：Energy & Environmental Science

27. 期刊：Renewable & Sustainable Energy Reviews

28. 期刊：Energy Reports

29. 期刊：Solar Energy

30. 期刊：Wind Energy

31. 期刊：Energy

32. 期刊：Renewable Energy

33. 会议：IAHR Symposium on Hydraulic Machinery and Systems