# 能源动力(085800)全日制博士培养方案

# Energy and Power Engineering

## 一、基本信息 Basic Information

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|---|---|---|---|---|---|
| 院系名称<br>School | (020)机械与动力工程学院<br>School of Mechanical Engineering | | | 适用年级<br>Grade | 2026 |
| 适用专业<br>Major | 能源动力(085800)<br>Energy and Power Engineering | | | | |
| 项目类型<br>Program Type | 全日制博士 | | | | |
| 最低学分<br>Min Credit | 7 | 最低GPA学分<br>Min GPA Credit | 0 | 最低GPA<br>Min GPA | 0 |

## 二、学科简介 Introduction

上海交通大学动力工程及工程热物理学科始建于1913年，1953年招收我国解放后第一批研究生，是国家首批一级重点学科，首批一级学科博士点。2011年所依托的机械与动力工程学院入选国家高等教育改革试点学院。在百年发展的历史上，培养了“两弹一星”科学家钱学森、王希季等一大批杰出人才。2016年5月入选全球ESI工程学万分之一学科。本学科设有“动力工程与工程热物理”一级学科博士点并设有"动力工程及工程热物理"博士后流动站。

学科拥有汽车电子控制技术国家工程实验室、燃煤污染物减排国家工程实验室（上海）、船舶与海洋工程动力系统国家工程实验室（上海交大）等3个国家级基地，动力机械与工程教育部重点实验室、太阳能发电及制冷教育部工程研究中心、燃气轮机与民用航空发动机教育部工程研究中心等省部级基地，下设叶轮机械、新能源动力、热能工程、制冷与低温、工程热物理和燃料电池等研究所。本学科师资力量雄厚，有工程院院士3人，中科院院士1人，国家创优争先奖1人，国家级教学名师1人，国家特聘专家3人，长江特聘（讲座）教授3人，国家杰青基金获得者7人，优青4人，青年长江1人，“百千万人才工程”国家级人选4人。拥有国家自然基金创新群体、教育部创新团队和科技部创新人才推进计划重点领域创新团队等先进群体。本学科科研成果丰硕，近年来主持承担国家自然科学基金重大项目、重点项目、国家重点研发专项等20余项，2005年以来获国家自然科学奖3项，国家技术发明奖2项，国家科技进步二等奖2项。

动力工程及工程热物理博士点为我国能源与动力领域累计培养博士数千名，包括工程院院士黄震教授、国际知名制冷专家王如竹教授等，大批博士毕业生成为科学家、技术权威和行业领袖，为我国能源动力学科和行业发展做出了积极贡献。全日制学术博士生培养过程注重理论与实践相结合，以学术引领和工程应用为导向，研究方向引领能源动力学术研究前沿，并注重解决重大工程中的科学问题。毕业生发展目标主要是活跃在能源动力领域国际学术前沿的学者、行业领袖和技术精英。

The discipline of Power Engineering and Engineering Thermophysics(PEET) in Shanghai Jiao Tong University was established in 1913. In 1953, it was selected as the first batch of state key discipline as well as one of the first disciplines in China that offered Doctoral degree program in Power and Energy Engineering. Affliated to the School of Mechanical Engineering, it was selected as one of the national pilot schools by Ministry of Education (MOE) in 2011. Over the past century, the discipline has nurtured tens of thousands of graduates, contributing significantly to scientific and technological developments as well as economic growth at the national and international levels. Notable alumni include Xuesen Qian (co-founder of Jet Propulsion Laboratory) and Xiji Wang, whom were awarded the highest national honor - the Two Bombs and One Satellite Meritorious Award. Engineering discipline including PEET was rated as one of the top 0.01% ESI disciplines in May 2016. Aiming to develop an internationally renowned and cutting-edge research in PEET, there has been rapid progress, engagement with world-class scientists, grooming of national talents, and scientific research in the recent decades.

Cutting-edge research activities currently conducted in PEET are rooted in several national and key regional laboratories, which include National Engineering Laboratory for Automotive Electronic Control Technology, National Engineering Laboratory for Reducing Emissions from Coal Combustion (Shanghai), National Engineering Laboratory for Marine and Ocean Engineering Power System (SJTU) , Key Laboratory for Power Machinery and Engineering of MOE, Engineering Research Center of Chinese Ministry of Education (MOE) for Solar Power and Refrigeration, Gas Turbine and Civil Aero-engine. The full spectrum of research directions include Turbomachinery, Advanced Energy and Powertrain Technology, Thermal Energy, Refrigeration and Cryogenics, Engineering Thermophysics and Full Cell. The faculty includes one member of Chinese Academy of Sciences, three members of Chinese Academy of Engineering, one National Excellence Awardee, one National Renowned Teacher, three National Distinguished Professors, and three Chair Professors of Changjiang Scholars Program. In addition, seven faculty members were awarded The National Science Fund for Distinguished Young Scholars, four faculty members were awarded The National Science Fund for Excellent Young Scholars, one faculty member were awarded the Young Changjiang Scholars Program. Our pursuit of research innovation and global excellence has been recognized worldwide. The research were mainly granted by National High Technology Research Development Program China, National Natural Science Foundation of China, and National Basic Research Program of China. Research outcomes have led to 3 National Natural Science Awards, 2 National Technology Invention Awards and 2 Second-grade State Science and Technology Progress Award.

As a key institute of doctoral degree education in China, PEET is dedicated to nurturing academically inclined, all-rounded, and innovation-orientated students with global perspectives, who can become top engineers or renowned scholars in the global community. There have been thousands of Ph.D. degree students thus far, most of the alumni have grown to scientists, technology experts and industry leaders, such as Professor Zhen Huang, the member of Chinese Academy of Engineering and Professor Ruzhu Wang, an international renowned refrigeration expert. TheDoctoral Programaims to develop students with solid theoretical knowledge as well as engineering practices, who would become researchers and industry leaders in power and energy field.

## 三、培养目标 Program Objective

1、具有能源与动力工程领域坚实宽广的基础理论知识和系统深入的专门知识；
2、掌握能源与动力工程领域的先进工艺和技术；
3、了解能源动力工程领域的技术进展和发展前沿；
4、具有独立从事技术开发和工程应用的能力，能熟练运用本工程领域专业知识和基础理论，并在工程领域取得前沿技术和工程应用方面的创造性研究成果，具备成为工程技术领军人才的潜力；
5、具有良好的国际视野以及一定的外语阅读、写作和交流能力；
6、能胜任大型企业、科研院所技术研发、工程应用或科技管理等工作。

1、Having a good grasp of the basic theories as well as a systematic and in-depth knowledge of power engineering and engineering thermophysics.
2、Mastering advance technology and skills.
3、Understanding the progress, tendency and frontier of his/her own research field.
4、Capable of independent technology development and engineering application. Good at utilizing the fundamental theories, professional knowledge and frontier technology. Obtainment of innovative achievement either in theory or real-world application with the potential to become engineering technology leader.

5、Having good global vision, including fluent reading and translating of professional documents, and academic communication skills.

6、Qualified for engineering technology R&D, or scientific and technical management in large enterprise or research institutions.

## 四、培养方式及学习年限 Training Mode and Study Duration

全日制工程博士生采用全日制学习、导师负责制培养模式。

学制为四年。未能按时完成学业者，经申请批准后其学习年限可适当延长，最长可以延期至六年，在职委培博士生延期至七年。

Full-time Professional Doctoral Programstudents are tutored full-time by supervisors.

The length ofFull-time Professional Doctoral Programis 4 years. Students who fail to complete the program within 4 years could apply for extension, with a maximum length of 6 years upon approval. Part-time doctoral students could apply the program extension to 7 years.

## 五、课程学习要求 Course Requirement

| 课程类别<br>Course Type | 学分要求<br>Min Credits | GPA 学分要求<br>Min GPA Credit | 备注<br>Note |
|---|---|---|---|
| 公共基础课 General Fundamental Courses | 2 | | |
| 专业基础课 Program Core Courses | 0 | | |
| 专业前沿课 Program Frontier Courses | 2 | | |
| 专业拓展课 Program Extension Courses | 0 | | |

## 六、培养过程要求 Training Requirement

(一)培养过程环节要求：

1、资格考试：在第三学期结束前进行，最迟第四学期。资格考试两次不通过者经学院审议、研究生院复议，按退学处理。

全日制工程博士生的资格考试由学院组织，考试形式为：闭卷、笔试，与直博生、硕博连读生一起进行。

考试内容：选取 3 门专业基础课进行考试

2、开题报告:在第四学期进行。开题报告要求就学位论文选题的科学根据、目的意义、研究内容、预期目标、研究方法和课题条件等做出论证. 开题报告的文献阅读量应不少于 50～100 篇。

全日制工程博士生的论文开题由学院按学科统一组织。首次开题不通过者，可申请二次开题；两次开题均不通过者，经学院审议后进入分流淘汰程序

3、年度考核：开题报告通过后，每自然年进行一次。申请预答辩之前须至少参加一次学院统一组织的年度考核并且考核结果为通过。最晚在第 6 学期结束前完成首次年度考核。开题报告通过不满半年者可不参加当年年度考核。未按期在第 6 学期结束前完成首次年度考核者，第 7 学期起不予以注册，且导师记录博士生培养负面清单 1 次。参加学院统一组织的年度考核次数不做限制。具体办法参照《机械与动力工程学院博士生年度考核管理办法》执行。

4、论文预答辩:参加学院统一组织的年度考核且结果为“优秀”或“良好”者，可申请预答辩。申请者最早可于年度考核通过后、正式答辩前提出预答辩申请。预答辩不通过者不能进入后续博士学位申请流程。

5、论文答辩：在第八学期前完成（鼓励条件成熟情况下尽早完成），未完成者最多可延期至十二学期。答辩由学科组织，答辩前将由学院督导进行形式审查，对发表小论文不合格、盲审成绩过低等情况将不予审核通过。

（二）工程实践环节要求：

1、通过在岗参与重大项目，完成工程实践要求。

2、结合重大项目中关键或难点技术环节，了解其发展历史、国内外现状，参加本领域前沿的业务研讨及交流活动，并在活动中做专门报告。

（三） 学术写作与交流要求

1、至少精通一门外国语，能熟练地阅读本专业外文资料，具有较强的写作能力，须有以排序第一作者在国际重要学术期刊或高水平国内期刊上发表与博士学位论文研究工作密切相关的研究性学术论文的经历。国际重要学术期刊和高水平国内期刊的具体认定办法详见七“学术成果要求”。

2、应具备国内外学术交流的能力，在读期间必须在高水平国内外学术会议上以口头报告形式开展学术交流至少 1 次。学术交流的内容须与博士学位论文研究工作密切相关。交流内容等具体要求详见《上海交通大学关于博士研究生参加学术交流的规定》。高水平国内外学术会议的具体认定办法详见七“学术成果要求”。

Requirements for Training Process:

PhD Qualification Examination: The examination will be held before the end of 3rdsemester, no later than the 4thsemester. Anyone who fail the examination twice will apply for quitting school after school's deliberation and the reconsideration of graduate school.

The qualification examination for Full-time Professional Doctoral Program shall be organized by school (close-book written examination). The examination is conducted with doctoral after bachelor's students and the combined master and doctor degree students.

Examination content: Choose three major fundamental courses for the examination.

Dissertation proposal: Dissertation proposal will start in the 4thsemester, which requires an argument on the scientific basis, purpose and significance, research content, expected goals, research methods, and project conditions of intended dissertation topic. Students should read no less than 50 to 100journal papersof related topic during preparation.

Dissertation proposal defense is organized by school. Anyone who fail the defense twice will enter the shunt elimination program after school's deliberation.

Annual progress report:After completion of dissertation proposal, annual progress reports evaluation will be held every year. Before applying for the dissertation pre-defense, the student must attend at least once organized by the school and pass. The first annual progress report must be completed by the end of 6thsemester at the latest. Those who pass the dissertation proposal for less than half a year may not participate in the annual progress report. Those who fail to complete the first annual progress report before the end of the 6thsemester will not be registered from the 7thsemester, and the supervisor will record the negative list for the cultivation of Ph.D students once. There is no limit to the number of annual progress report organized by the school. For specific measures, please refer to*Administrative Measures for Annual Progress Report of Ph.D Students of School of Mechanical Engineering*.

Dissertation pre-defense: Those who have participated in the annual progress report organized by the school and the result is "excellent" or "good" can apply for the pre-defense. The applicant may, at the earliest, submit an application for pre-defense in the next semester after passing theannual progress reportand before the formal defense. Those who do not pass the pre-defense cannot enter the subsequent doctoral degree application process.

Dissertation Defense: Students are required to pass the dissertation defense before the end of the 8thsemester (Students are encouraged to complete as early as possible). Students could apply for extension and should complete the dissertation defense before the end of the 12thsemester. The dissertation defense is organized by discipline. Before the defense, a routine review will be conducted by the school. Anyone who does not meet the graduation requirements or fails the blind review shall not be approved for dissertation defense.

Requirements for engineering practice process:

1. Complete the engineering practice requirements by participating in major projects.

2. Participate in cutting-edge business seminars and exchange activities in this field, and make professional keynote speech.

Requirements for Academic Writing and Communication

Students should be proficient in at least one foreign language and be able to read foreign language materials in their major fluently. With strong writing ability, the student should have the experience of publishing research academic papers that are closely related to the research work of their doctoral dissertation in important international academic journals or high-level domestic journals as the first author. For specific identification methods of important international academic journals and high-level domestic journals, please refer to seventh "Requirements for Academic Achievements".

Students should have the ability of domestic and foreign academic communication. During the study period, students must have at least one academic communication in the form of oral presentation in high-level domestic and foreign academic conferences, and the content of academic communication must be closely related to the research work of doctoral dissertation. Please refer to the *Regulations of Shanghai Jiao Tong University on the Participation of Ph.D Students in Academic Exchange* for the detailed requirements on the form of exchange. The specific identification methods of high-level domestic and foreign academic conferences are detailed in the seventh "Requirements for Academic Achievements".

## 七、学术成果要求 Requirement on Academic Achievements

博士学位论文的创新成果是评价学位论文水平的重要参考，必须是以学位申请人为主在攻读博士学位期间取得，且与学位论文内容密切相关。

用于申请博士学位的学位论文中必须包含不少于三项以申请人为主要完成人并以上海交通大学为第一完成单位的创新性成果。创新性成果的主要完成人一般应为成果第一完成人，如果第一完成人是申请人的博士生导师且申请人排序第二，则相应成果按申请人的 0.5 项成果计算。

博士学位论文的创新性成果应该具有重要的理论或工程应用价值，具体展现形式包括：

(1) 发表在国际重要学术期刊或高水平国内学术期刊上的研究性学术论文。其中，国际重要学术期刊是指 SCI 刊源期刊；高水平国内期刊是指《高质量科技期刊分级目录》相关领域 T1/T2 档核心期刊。国际重要学术期刊与高水平国内期刊认定以论文发表或录用当年为准认定。

(2) 发表在高水平学术会议的会议论文或者口头报告且能提供相应证明材料。高水平学术会议包括本学科公认的国际性学术组织主办的系列专业性学术会议或《上海交通大学资助研究生参加国际会议项目-重要国际会议目录》中的会议。口头报告需提供会议录用摘要证明。如果学术会议论文或口头报告学术贡献与发表期刊论文相同，则认定为一项成果。

(3) 获得授权的重要发明专利且能提供相关实施应用证明材料。

(4) 由中国国家标准管理委员会正式发布国家标准，或由 ISO、IEEE、ASME 等国际组织发布的国际标准，及相关行业归口部门统一管理发布的行业标准。

(5) 由学院学位评定委员会委员和同行专家组成的专家组，或有关权威组织机构认定的其他重大成果。

具体详见《上海交大机械与动力工程学院博士专业学位授予标准》，对达不到创新性成果要求的博士生，将无法进入正式答辩。

The innovative achievements of the doctoral dissertation are an important reference to evaluate the level of the dissertation, which must be obtained by the degree applicants during their doctoral study and closely related to the content of the dissertation.

The dissertation used for the Ph.D degree application must include at least three innovative works with the applicant as the principal composer and Shanghai Jiao Tong University as the first institution. The principal composer of the innovative achievement shall generally be the first author of the achievement. If the first composer is the Ph.D supervisor of the applicant and the applicant ranks second, the applicant shall also be identified as 0.5 principal composer.

The innovative achievements of the Ph.D dissertation should have important theoretical or engineering application value, and the specific manifestation forms include:

Research academic papers published in important international academic journals or high-level domestic academic journals. The important international academic journals refer to the SCI Journals. High-level domestic academic journals refer to the related fields of T1/T2 core periodicals in the *Classification Catalogue of High-quality Sci-Tech Journals*. The accreditation of important international academic journals and high-level domestic journals shall be subject to the year when the paper was published or accepted.

Conference papers or oral presentations presented at high-level academic conferences with supporting materials. High-level academic conferences include a series of professional academic conferences hosted by recognized international academic organizations within the discipline or conferences listed in the *International Conference Program Sponsored by Shanghai Jiao Tong University - List of Important International Conferences*. Oral presentation should provide proof of acceptance summary. If the academic conference paper or oral presentation has the same academic contribution as the published journal paper, they will be considered as the same achievement.

The important invention patent that has been authorized and can provide relevant application proof materials.

National standards officially issued by the Standardization Administration Committee of China, or international standards issued by ISO, IEEE, ASME and other international organizations, as well as industrial standards uniformly managed and issued by relevant industry departments.

Other major achievements recognized by the expert group composed of members of the Academic Degree Assessment Committee and peer experts or by relevant authoritative organizations.

See details in *Awarding Criteria for Professional Doctor Degree from School of Mechanical Engineering, Shanghai Jiao Tong University*. Anyone who cannot meet the innovative requirements is not allowed to apply for the dissertation defense.

## 八、学位论文 Thesis/dissertation work

### 学位论文或实践成果

学位论文是进行学位评定的主要依据，专业学位博士生也可选择实践成果作为学位评定的主要依据。学位论文或者实践成果，应能反映出作者在本学科上已掌握坚实宽广的基础理论、系统深入的专门知识和规范科学的研究方法。

**1、学位论文**

学位论文是进行学位评定的主要依据，应能反映出作者在本学科上已掌握坚实宽广的基础理论、系统深入的专门知识和规范科学的研究方法。

（1）选题与综述

博士学位论文的选题应围绕行业重大、重点工程项目或科技攻关项目开展，选题应具有重要的创新性、先进性、可行性和应用性。

文献综述应在全面搜集、阅读大量有关研究文献的基础上，经过归纳整理、分析鉴别，对所研究的问题在一定时期内已经取得的研究成果、存在问题以及新的发展趋势等进行系统、全面、客观的叙述和评论，为论文课题的确立提供支持和论证。

（2）规范性要求

博士学位论文必须是一篇系统、完整的学术论文，是学位申请者在攻读博士学位期间在导师指导下独立完成的研究成果，应严格遵守《上海交通大学研究生学术规范》和《机械与动力工程学院研究生学术道德规范》进行学位论文工作。

博士学位论文的学术观点必须明确，立论正确，推理严谨，数据真实，图表规范，层次分明，语言准确，文字通畅。

学位论文撰写必须遵循和符合《机械与动力工程学院学位论文撰写指南》的具体要求。

2、实践成果

申请学位实践成果应聚焦工程实际需求，以实体或工程形象展示形式呈现，须体现工程性、创新性、实践性、应用性和可展示性等特征。

（1）实践成果来源与形式

实践成果应来源于技术攻关与工程或设备改造、工艺与产品创新、新材料与新设备的研发、前沿技术引进吸收与再创新、工程设计与实施、技术标准的制定与优化、原创性研究成果转化与产业化探索等。

实践成果的形式主要包括：

①重大装备：依托重要工程项目研制或行业重大发展需求的重大工程装备，通过同行专家的鉴定或评审，并获得实际应用效果；

②仪器设备：依托重要工程项目研制的专用仪器设备，通过同行专家的鉴定或评审，获得推广应用；

③其他硬件产品：依托行业重大需求，研发的相关硬件产品，包括新装备、新设备等，通过同行专家的鉴定或评审，获得工程应用，取得良好的经济效益和社会效益；

④软件产品：依托行业重大需求，研发的相关应用软件产品，获得推广应用，取得良好的经济效益和社会效益；

⑤设计方案：依托重大工程项目完成的方案设计，通过同行专家评审，完成项目实施验证，取得预期成效；

⑥技术标准：省部级（或一级行业协会/学会）及以上行业标准研究与制定，并正式发布和推广应用；

⑦其他体现相关专业领域特色的同等水平的实践成果。

（2）内容要求

通过实践成果申请学位，应包括可展示实体形式和实践成果总结报告书面形式。实践成果总结报告是可展示实体形式的书面表达，是对实践成果完成过程的具体描述和对博士学位申请人独立承担专业实践工作能力的重要诠释。

（3）规范性要求

实践成果可展示实体和总结报告，是学位申请者在攻读博士学位期间在导师指导下独立完成的实践成果，应严格遵守《上海交通大学研究生学术规范》和《机械与动力工程学院研究生学术道德规范》进行实践成果工作。

实践成果总结报告应符合基本的写作规范，要求逻辑严谨，结构合理，层次分明，表达流畅，图表规范，数据可靠。实践成果总结报告正文详细撰写要求参照全国工程专业学位研究生教育指导委员会《工程类博士专业学位研究生学位论文与申请学位实践成果基本要求（试行）》执行。

Dissertation is the main basis for degree evaluation, which should reflect the author's grasp of solid and broad basic theory, systematic and in-depth expertise and standardized scientific research methods in the subject.

Topic Selection and Review

The topic selection of the doctoral dissertation should focus on the major and key engineering projects of the industry or the key projects of science and technology. The topic should be innovative, advanced, feasible and applicable.

Literature review is based on the comprehensive collection and reading of a large number of relevant research literature. After summarizing, analyzing and discriminating, the literature review systematically, comprehensively and objectively narrates and comments the research achievements, existing problems and new development trends of the issues studied in a certain period of time, providing support and demonstration for the establishment of the topic of the dissertation.

Normative requirements

Ph.D dissertation must be a systematic and complete academic paper. Dissertation is the achievement of research completed independently by the applicant under the supervision of supervisor during doctoral study. Students should strictly abide by the *Academic Code for Graduate Students of Shanghai Jiao Tong University* and the *Academic Code of Ethics for Graduate Students of School of Mechanical Engineering* in their dissertation work.

The academic point of view of a Ph.D dissertation must be clear, correct in argument, rigorous in reasoning, true in data, standardized in chart, clear in hierarchy, accurate in language and smooth in text.

Dissertation writing must follow and conform to the specific requirements of *Dissertation Writing Guide of School of Mechanical Engineering*.

## 九、课程设置 Courses

详见下页 Please refer to the next page.

撰稿人签字： 日 期：

校稿人签字： 日 期：

审核人签字： 日 期：

主管院长签字： 院系公章 日期：

| 课程类别 Category | 课程代码 Course Code | 课程名称 Course Name | | 学分 Credit | 授课语言 Language | 开课学期 Semester | 是否必修 Compusory | 可以计算GPA | 必须计算GPA | 备注 Note | 多选组 Course Group |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 中文Chinese | English 英文 | | | | | | | | |
| 公共基础课 General | MARX7006 | 思政课（著作选读） | Selected Readings from the Works of Xi Jinping | 2 | 中文 | 秋季 | 是 | 否 | 否 | | |
| 专业基础课 Program Core Courses | ME6540H | 现代控制理论 | Modern Control Theory | 3 | 中文 | 秋季 | 否 | 是 | 否 | | 只选1门、只选3分 |
| | ME6540 | 现代控制理论 | Modern Control Theory | 3 | 中文 | 春秋季 | 否 | 是 | 否 | | |
| | ME6520 | 数字信号处理 | Digital Signal Processing | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6521H | 数字信号处理与应用 | Digital Signal Processing and Application | 3 | 英文 | 秋季 | 否 | 是 | 否 | | |
| | PE6123 | 计算流体力学与应用 | Computational Fluid Dynamics and Applications | 3 | 英文 | 秋季 | 否 | 是 | 否 | | |
| | PE6122 | 计算流体力学 | Computational Fluid Dynamics | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | PE6201 | 高等传热学 | Advanced Heat Transfer | 3 | 英文 | 秋季 | 否 | 是 | 否 | | |
| | PE6201H | 高等传热学 | Advanced Heat Transfer | 3 | 英文 | 秋季 | 否 | 是 | 否 | | |
| | PE6200 | 高等传热传质学 | Advanced Heat and Mass Transfer | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | ME6104 | 摩擦学与润滑理论 | Tribology & Lubrication Theory | 3 | 中文 | 春季 | 否 | 是 | 否 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | ME6105 | 工程摩擦学导论 | Introduction to Engineering Tribology | 3 | 英文 | 春季 | 否 | 是 | 否 | | |
| | ME6125 | 金属塑性加工力学 | Plastic Mechanics in Metal Processing | 3 | 英文 | 春季 | 否 | 是 | 否 | | |
| | ME6124 | 弹塑性力学 | Elastic & Plastic Mechanics | 3 | 中文 | 春秋季 | 否 | 是 | 否 | | |
| | PE6221 | 高等热力学 | Advanced Thermodynamics | 3 | 英文 | 秋季 | 否 | 是 | 否 | | |
| | PE6221H | 高等热力学 | Advanced Thermodynamics | 3 | 英文 | 春季 | 否 | 是 | 否 | AI+课程 | |
| | PE6220 | 高等工程热力学 | Advance Engineering Thermodynamics | 3 | 中文 | 春秋季 | 否 | 是 | 否 | | |
| | ME6523 | 先进测试技术与仪器 | Advanced Measurement and Instrumentation | 3 | 英文 | 春季 | 否 | 是 | 否 | | |
| | ME6522 | 测试原理、传感器与系统 | Basic Principle,Sensors and Systems for Mechanical | 3 | 中文 | 春秋季 | 否 | 是 | 否 | | |
| | PE6101H | 高等燃烧理论 | Advanced Combustion Theory | 3 | 英文 | 春季 | 否 | 是 | 否 | | |
| | PE6100 | 高等燃烧学 | Advanced Combustion Theory | 3 | 中文 | 春秋季 | 否 | 是 | 否 | | |
| | ME6122 | 应用固体力学 | Applied Mechanics of Solids | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6123 | 固体力学 | Mechanics of Solids | 3 | 英文 | 春季 | 否 | 是 | 否 | | |
| | ME6120H | 高等机械动力学 | Mechanical System Dynamics | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | ME6120 | 高等机械动力学 | Mechanical System Dynamics | 3 | 中文 | 春秋季 | 否 | 是 | 否 | | |
| | IE6102 | 高等统计学 | Advanced Statistics | 3 | 中文 | 秋季 | 否 | 是 | 否 | 工业工程 | |
| | IE6104 | 生产与服务系统分析 | Analysis of Production System and Service System | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6100H | 高等机构学 | Advanced Mechanism and Machine Science | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6142 | 声学原理及计算方法 | Theories and Computation of Acoustics | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6180 | 计算机图形学 | Computer Graphics | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6500 | 塑性变形理论与数值模拟 | Plastic Deformation Theory and Numerical Simulation | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6524 | 误差分析与测试数据处理 | Error Analysis and Data Processing in Measurement | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME6560 | 研究实验技能 | Experimental Skill for Research | 3 | 中文 | 秋季 | 否 | 否 | 否 | | |
| | NU6100 | 高等反应堆工程 | Advanced Reactor Engineering | 3 | 中文 | 秋季 | 否 | 是 | 否 | 核专业课 | |
| | NU6106 | 核燃料循环 | Nuclear Waste & Environment | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 | |
| | NU6112 | 两相流与沸腾换热 | Tow-phase Flow & Boiling Heat Transfer | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 | |
| | PE6120 | 高等工程流体力学 | Advanced Fluid Dynamics in Engineering | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | PE6502 | 内燃机燃烧与排放控制 | Combustion and Emission Control in Internal Combustion Engine | 3 | 中文 | 秋季 | 否 | 否 | 否 | | |
| | IE6101 | 高等运筹学 | Advanced Operations Research | 3 | 英文 | 春季 | 否 | 是 | 否 | 工业工程 | |
| | IE6107 | 数据挖掘 | Data Mining | 3 | 英文 | 春季 | 否 | 是 | 否 | 工业工程 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | IE6112 | 质量及可靠性工程 | Quality and Reliability Engineering | 3 | 中文 | 春季 | 否 | 否 | 否 | 工业工程 | |
| | ME6140 | 高等振动理论 | Theory of Advanced Vibrations | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | ME6146 | 转子动力学 | Rotordynamics | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6152 | 船舶振动噪声综合控制 | Marine Vibration and Noise Control | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6160 | 机器人性能仿真与控制原理 | Performance Simulation and Control of Robot | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6182 | 现代机械设计学 | Modern Mechanical Design | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6320 | 机器视觉与应用 | Machine Vision and Its Applications | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6420 | 汽车多能源管理与优化 | Vehicle Multi-Energy Management and Optimization | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6426 | 智能网联汽车技术 | Intelligent and Connected Vehicle Technology | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | ME6542 | 智能控制技术 | Intelligent Control Technology | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | ME7184 | 多学科综合设计 | Multidisciplinary Design | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | NU6102 | 核材料科学 | Nuclear Material | 3 | 中文 | 春季 | 否 | 是 | 否 | 核专业课 | |
| | NU6104 | 核反应堆安全学 | Nuclear Reactor Safety | 3 | 中文 | 春季 | 否 | 是 | 否 | 核专业课 | |
| | NU6108 | 现代辐射测量及应用 | Modern Radiation Detection and Applications | 3 | 中文 | 春季 | 否 | 是 | 否 | 核专业课 | |
| | NU6114 | 流场测试基础 | Fundenmentals of Flow Fields Measurement | 3 | 中文 | 春季 | 否 | 否 | 否 | 核专业课 | |
| | PE6103 | 燃烧化学动力学 | Combustion Chemical Kinetics | 3 | 英文 | 春季 | 否 | 是 | 否 | | |
| | PE6202 | 热辐射传热 | Thermal Radiation Heat Transfer | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | PE7124 | 多相流理论与计算 | Multiphase Flow Theory and Simulation | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | PE7126 | 湍流与传输理论 | Turbulent Flow and Transportation Theory | 3 | 中文 | 春季 | 否 | 是 | 否 | | |
| | PE7426 | 高等传输理论与化学反应工程 | Advanced Transmission Theory and Chemical Reaction | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| 专业前沿课 Program Frontier Courses | ME8208 | 先进制程制造工艺 | Advanced Semiconductor Manufacturing Processes | 3 | 中文 | 秋季 | 否 | 是 | 否 | 集成电路 | |
| | ME8210 | AI 赋能的芯片三维集成 | AI-Empowered Three Dimensional Chip Integration | 3 | 中文 | 秋季 | 否 | 是 | 否 | 集成电路 | |
| | ME8322 | AI+医用机器人技术 | AI+ Medical Robotics Technology | 2 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME8500 | 声学/力学超材料 | Acoustic/Mechanical Metamaterials | 3 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | ME8522 | 智能传感与驱动技术 | Intelligent Sensing and Driving Technology | 3 | 中文 | 秋季 | 否 | 是 | 否 | AI+课程 | |
| | ME8562 | 机器人设计工程的科学 | Science on Design Engineering of Robots | 2 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | NU8106 | 熔盐放射化学 | Molten Salt Radiochemistry | 3 | 中文 | 秋季 | 否 | 是 | 否 | 核专业课 | |
| | NU8112 | 聚变堆材料 | Materials for Fusion Reactors | 2 | 中文 | 秋季 | 否 | 是 | 否 | | |
| | NU8126 | 核能科学发展前沿 | Frontiers in Nuclear Energy | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 | |

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|---|---|---|---|---|---|---|---|---|---|---|
| | PE8100 | 低碳能源技术 | Low Carbon Energy Technology | 3 | 中文 | 秋季 | 否 | 是 | 否 | |
| | PE8400 | 先进低温技术及应用 | Advanced Cryogenic Technology and its Applications | 3 | 中文 | 秋季 | 否 | 是 | 否 | |
| | PE8544 | 先进电化学储能材料技术 | Advanced Material Technology for Electrochemical Energy | 3 | 中文 | 秋季 | 否 | 是 | 否 | |
| | PE8550 | 燃气轮机产品设计技术 | Gas Turbine Product Design Technology | 1 | 中文 | 秋季 | 否 | 是 | 否 | 授课地点 |
| | IE6116 | 算法设计与分析 | Algorithm Design and Analysis | 3 | 中文 | 春季 | 否 | 是 | 否 | AI+、工业 |
| | ME8140 | 复杂装备动力学 | Dynamics of Complex Equipment | 2 | 中文 | 春季 | 否 | 是 | 否 | 集成电路 |
| | ME8160 | 柔性机构建模、分析与设计 | Modeling, Analysis and Design of Compliant Mechanisms | 3 | 中文 | 春季 | 否 | 是 | 否 | 集成电路 |
| | ME8200 | 智能制造装备与技术 | Smart Manufacturing Equipment and Technology | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | ME8206 | 超精密光学制造技术 | Ultra-precision Optical Manufacturing Technology | 3 | 中文 | 春季 | 否 | 是 | 否 | 集成电路 |
| | ME8320 | 软体机器人技术 | Soft Robotics | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | ME8400 | 储能及动力电池智能管理技术 | Intelligent Battery Management Technologies for Energy Storage | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | ME8502 | 仿生系统与功能材料 | Bionic Systems and Functional Materials | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | ME8520 | 基于数字孪生的装备测试技术 | Digital Twin Based Equipment Testing Technology | 1 | 中文 | 春季 | 否 | 是 | 否 | 卓工先进 |
| | NU8102 | 核能综合利用理论与技术 | Theory and Technology of Comprehensive Utilization of | 3 | 中文 | 春季 | 否 | 是 | 否 | 核专业课 |
| | NU8108 | 核电站建设标准与规范 | Standards and Specifications for Nuclear Power Plant | 1 | 中文 | 春季 | 否 | 是 | 否 | 授课地点 |
| | NU8110 | 核化学与放射化学前沿 | Frontiers of Nuclear Chemistry and Radiochemistry | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | PE8120 | 光刻流体力学 | Fluid Mechanics in Lithography | 1 | 中文 | 春季 | 否 | 是 | 否 | 集成电路 |
| | PE8422 | 先进储能系统热管理技术 | Advanced Thermal Management Technologies for Energy Storage | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | PE8540 | 可再生合成燃料和碳中和动力技术前沿 | Frontiers in Renewable Synthetic Fuels and | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | PE8546 | 换能器原理与先进应用基础 | Principle of Transducers and Advanced Application | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | GE9003 | 工程实践I | Engineering Practice I | 1 | 中文 | 春秋季 | 是 | 否 | 否 | |
| | GE9004 | 工程实践Ⅱ | Engineering Practice II | 1 | 中文 | 春秋季 | 是 | 否 | 否 | |
| 专业拓展课 Program Extension Courses | ME6126 | 高等结构动力学 | Advanced Structural Dynamics | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | ME6503 | 先进工程应用中的高温材料 | High Temperature Materials for Advanced Engineering | 3 | 英文 | 秋季 | 否 | 否 | 否 | |
| | ME7166 | 足式机器人设计与控制 | Design and Control of Legged Robots | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | ME7429 | 汽车控制工程 | Modern Vehicle Control Engineering | 3 | 英文 | 秋季 | 否 | 否 | 否 | |
| | NU6116 | 传热流动的数值分析 | Numerical Analysis of Heat Transfer and Flow | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 |
| | NU6118 | 非动力核技术应用 | Application of No-Power Nuclear Technology | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 |
| | NU6121 | 核反应堆设计原理 | Nuclear Reactor Theory and Design | 3 | 英文 | 秋季 | 否 | 否 | 否 | 核专业课 |

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|---|---|---|---|---|---|---|---|---|---|---|
| | NU6122 | 先进反应堆数值模拟 | Advanced Simulation of Nuclear Power | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 |
| | NU6124 | 严重事故现象与管理 | Severe Accident Phenomenology And Management | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 |
| | NU6130 | 高等反应堆物理 | Advanced Reactor Physics | 3 | 中文 | 秋季 | 否 | 否 | 否 | 核专业课 |
| | PE6140 | 叶轮机械气动力学 | Turbomachinery Aerodynamics | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | PE6408 | 制冷与热管理系统的数字化仿真与智能控制 | Digital Simulation and Intelligent Control of | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | PE6424 | 先进动力循环分析 | Analysis of Advanced Thermal Power Cycles | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | PE6441 | 新能源系统 | New Energy Systems | 3 | 英文 | 秋季 | 否 | 是 | 否 | |
| | PE6523 | 先进空气动力学测量技术基础与实践 | Fundamentals and Practices of Advanced Aerodynamics | 3 | 英文 | 秋季 | 否 | 否 | 否 | |
| | PE6542 | 能源电化学基础 | Fundamentals of Electrochemistry for Energy | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | PE6544 | 智慧城市能源系统人工智能 | AI for Energy Systems in Smart City | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | PE7540 | 先进能源材料导论 | Introduction on Advanced Energy Materials | 3 | 中文 | 秋季 | 否 | 否 | 否 | |
| | PE8140 | 能源装备与工业大数据分析 | Energy Equipment and Big Data Analysis | 2 | 中文 | 秋季 | 否 | 是 | 否 | |
| | KE6002 | 研究生公共体育 | Physical Education | 0 | 中文 | 春季 | 是 | 否 | 否 | |
| | ME6151 | 先进噪声控制技术 | Advanced Noise Control Techniques | 3 | 英文 | 春季 | 否 | 否 | 否 | |
| | ME6200 | 弹塑性加工理论 | Solid Mechanics in Machining | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | ME6202 | 微细制造 | Micro Manufacturing | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | ME6204 | 薄板成形理论及技术 | Sheet Metal Forming Theory and Technology | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | ME6207 | 超精密智能制造技术 | Ultra-precision Smart Manufacturing | 3 | 英文 | 春季 | 否 | 否 | 否 | |
| | ME6210 | 多尺度建模理论与方法 | Multi-scale Modeling Theory and Method | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | ME6423 | 现代汽车动力总成技术 | Advanced Powertrain Technologies | 3 | 英文 | 春季 | 否 | 否 | 否 | |
| | ME8560 | 氢能与燃料电池 | Hydrogen Energy and Fuel Cell | 3 | 中文 | 春季 | 否 | 是 | 否 | |
| | NU6132 | 核反应堆多物理分析 | Nuclear Reactor Multi-physics Analysis | 3 | 中文 | 春季 | 否 | 否 | 否 | 核专业课 |
| | NU6134 | 聚变堆与包层技术 | Fusion Reactor and Blanket Technology | 3 | 中文 | 春季 | 否 | 否 | 否 | 核专业课 |
| | NU6136 | 辐照材料学 | Radiation Materials Science | 3 | 中文 | 春季 | 否 | 否 | 否 | 核专业课 |
| | NU6138 | 核燃料设计与分析 | Design and Analysis of Nuclear Fuel | 3 | 中文 | 春季 | 否 | 否 | 否 | 核专业课 |
| | NU8100 | 蒙特卡罗方法及其在核能技术中的应用 | Monte Carlo Method and Its Application in Nulcear Energy | 3 | 中文 | 春季 | 否 | 是 | 否 | 核专业课 |
| | PE6106 | 激光诊断技术原理及应用 | Principles and Applications of Laser Diagnostic Techniques | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | PE6108 | 质谱分析原理及在能源研究中的应用 | Principles of Mass Spectrometry and Its Applications in Energy | 3 | 中文 | 春季 | 否 | 否 | 否 | |
| | PE6145 | 航空发动机/燃气轮机前沿技术 | Aero-Engine/Gas Turbine Frontier Technology | 3 | 英文 | 春季 | 否 | 否 | 否 | |

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| | PE6300 | 湍流两相流动的模化与数值仿真 | Modeling and Numerical Simulation of Turbulent | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE6404 | 制冷低温系统的设计与实践 | Design and Practice of Refrigeration and Cryogenic | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE6420 | 能源清洁与梯级利用 | Energy Clean and Cascade Utilization | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE6422 | 热力系统建模与仿真 | Analysis of Energy Utilization Systems | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE6442 | 建筑节能与太阳能利用 | Building Energy Saving and Solar Energy Utilization | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE6504 | 内燃机性能仿真与优化 | Simulation and Optimization of Internal Combustion Engine | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE6508 | 车用动力智能化技术 | Intelligent Technology for Vehicular Power Systems | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE7106 | 计算燃烧学 | Computational Combustion | 3 | 中文 | 春季 | 否 | 否 | 否 | | |
| | PE8200 | 微纳尺度汽液相变传热 | Micro and Nanoscale Liquid-vapor Phase Change Heat | 2 | 中文 | 春季 | 否 | 是 | 否 | | |