

(082700)核科学与技术学科 2020 级全日制直博研究生培养方案

2020 Full-time Doctoral after Bachelor's Program for Nuclear Science and Engineering

一、基本信息 Basic Information

院系名称 School	机械与动力工程学院 School of Mechanical Engineering	适用年级 Grade	2020 级 2020 Class		
适用专业 Major	核科学与技术 Nuclear Science and Engineering	标准学制 Duration	5 年 5 Years		
学习形式 Study Mode	全日制 Full time				
项目类型 Program Type	学术型 Academic				
培养层次 Program Level	直博生 Doctoral after Bachelor's				
最低学分 Min Credit	40	最低 GPA 学分 Min GPA Credit	19	最低 GPA Min GPA	2.7

二、学科简介 Introduction

上海交通大学核反应堆工程专业始建于 1958 年，是国内首批创建并开展研究生培养工作的专业。1998 年获得“核能科学与工程”联合博士学位授权点，2001 年获批“核科学与技术”一级学科博士后流动站。2006 年增加学科设置、拓宽专业方向，成立了核科学与工程学院。2010 年获批核科学与技术一级学科点。

The discipline of Nuclear Science and Engineering at SJTU originated from the major of Nuclear Reactor Engineering which was established in 1958, and it is among the earliest ones in related field in China. In 1998, the joint doctoral program of "Nuclear Science and Engineering" was set up. In 2001, the first-level post-doctoral research station of "Nuclear Science and Technology" was approved. In 2006, the School of Nuclear Science and Engineering (SNSE) was established by increasing subjects and broadening the scope of specialties. In 2010, it was approved to be the first-level discipline in the field of Nuclear Science and Technology.

核科学与技术学科下设 6 个研究方向：核安全与系统仿真、反应堆热工水力、核燃料循环与材料、核辐射防护与环境保护、核反应堆物理、先进核能系统。本专业具有一支国际化、高水平的师资队伍，共有 25 名专职教师，教授 6 名，其中曙光学者 1 名、优青 1 名，副教授 16 名，所有专业教师均有博士学位，且具有海外经历。

The research fields in SNSE include six research directions: nuclear safety and system simulation, reactor thermo-hydraulics, nuclear fuel cycle and materials, nuclear radiation protection, reactor physics and advanced nuclear reactor systems. SNSE consists of 25 faculty members, and all have doctoral degree and overseas' experience. Among them, it includes 6 Professors (1 Shuguang Scholar, 1 faculty member awarded the National Science Fund for Excellent Young Scholars) and 16 associate professors.

核科学与技术学科重实践、宽基础、严要求，培养学科交叉复合的创新人才。本专业注重对接国家核能发展重大需求，主持了国家“973”项目、国家自然科学基金重点项目、国家重点研发专项和国家科技重大专项课题等十余项，建成“上海市核电工程技术研究中心”和“先进

核能系统热工水力基础研究国际合作基地”等实践平台，形成了研究生培养和科研工作的基础。同时，本学科与美国密西根大学、德国KIT、日本东京大学、韩国科技大学等世界知名大学建成了国际交流合作平台。

SNSE emphasizes on academic practice, broad foundation and strict requirements to cultivate students to be interdisciplinary, innovative as well as with global vision. In order to satisfy the fast development of nuclear energy application in China, SNSE hosted over 10 national key research projects, including National '973' Project, Key Projects of NSFC, National Basic Research Programs, National Science and Technology Major Projects. Academic practice platforms aiming to graduate education and research work have been established, such as "Shanghai Nuclear Power Engineering Technology Research Center" and "International Cooperation Base for Basic Research on Thermal-Hydraulic of Advanced Nuclear Reactor System". Meanwhile, SNSE has close international cooperation and develops exchange programs with University of Michigan, Karlsruhe Institute of Technology, University of Tokyo, Korea Advanced Institute of Science and Technology, etc.

三、培养目标 Program Objective

围绕学校研究生人才培养的总体目标，培养数理基础坚实、知识结构宽广，专业领域知识精通，创新能力强、具备社会责任感、具有国际视野和国际竞争力的核工程前沿领域专业人才，能胜任高等教育专业教学、科学研究、技术研发和科技管理等工作。

The postgraduate education objective is focused on nurturing the talents with solid mathematical foundation, broad knowledge structure, high proficiency in a professional field, strong innovation ability, good sense of social responsibility, and global vision and competitiveness in the frontier of nuclear science and engineering. The postgraduates will be qualified for conducting teaching, research and management in universities, research institutions and industries.

学生毕业时应达到：

- 1、具有坚实的数理基础理论知识，宽广的核工程及相关专业基础知识，深入了解学科的进展、动向和最新发展前沿；
- 2、具有敏锐的洞察力，具备对工程科学及技术问题的深入理解和综合分析能力；
- 3、具有独立从事科学研究的能力，并在本学科领域的某一方面理论或实践上取得创造性研究成果；
- 4、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和国际学术交流的能力；
- 5、具备优秀的学术素养、职业道德和社会责任感。

After graduation, you will:

1. Have the solid mathematical foundation and broad knowledge in nuclear engineering and related areas with deep understanding of the progress, trends and latest development of the discipline;
2. Have the keen insight, and be equipped with the comprehensive analytical skills for solving the engineering scientific and technical problems;
3. Be able to engage in scientific research independently and get creative achievements in a specific aspect of theory or practice in the discipline;
4. Show proficiency in at least one foreign language, read foreign language literature of your major fluently, and have good skills in writing and international academic communicating;

5. Have excellent academic accomplishment, professional ethics and social responsibility.

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

全日制直博生采用全日制学习、导师负责制培养模式。

学制为五年。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，最长可以延期至七年。

Full-time Doctoral after Bachelor's Program students are tutored full-time by supervisors.

The length of Full-time Doctoral after Bachelor's Program is 5 years. Students who fail to complete the program within 5 years could apply for extension, with a maximum length of 7 years upon approval.

五、课程学习要求 Course Requirement

全日制直博生，课程总学分 ≥ 40 学分。其中 GPA 统计源的课程 ≥ 19 学分，必须选择一门全英文课程。

Full-time Doctoral after Bachelor's Program. Minimum credits: 40 credits, including at least 19 credits from GPA courses. One English-teaching course required.

1. 公共基础课程 12 学分

General Courses, 12 credits.

- a) MARX7001 中国马克思主义与当代，2 学分，必修
MARX7001 Marxism in China, 2 credits, compulsory.
- b) MARX6003 自然辩证法概论，1 学分，必修
MARX6003 Dialectic of Nature, 1 credit, compulsory.
- c) FL6001 学术英语，2 学分，必修
FL6001 English for Academic Purposes, 2 credits, compulsory
- d) GE6001 学术写作、规范与伦理，1 学分，必修，院系开课
GE6001 Academic Writing, Norms and Ethics, 1 credit, compulsory, offered by ME.
- e) 数学课，6 学分，必修
Mathematics, 6 credits, compulsory.

2. 专业前沿课：GE6011 学术报告会，1 学分，必修

Frontier Course.

GE6011, Academic Seminar, 1 credit, compulsory.

3. 专业基础课、专业选修课： ≥ 27 学分

Core Courses and Elective Courses. Minimum credits: 27 credits.

4. 统计如下：

Summarized as below.

课程类别 Course Type	学分要求 Required Credits	门数要求 Required Courses	GPA 学分要求 Min GPA	备注 Note
公共基础课 General Courses	12	6	≥ 19	
专业基础课 Core	≥ 27	NA		跨学科选课不超过 2

Courses、专业选修课 Elective Courses			门,且仅作为非 GPA 统计源课程。
专业前沿课 Frontier Courses	1	1	No more than 2 interdisciplinary courses can be selected, which are counted as non-GPA course.

六、培养过程要求 Training Requirement

资格考试: 在第三学期结束前进行,不通过者在第四学期补考,两次不通过者经学院审议按退学处理。

PhD Qualification Examination: The examination will be held before the end of 3rd semester. Anyone who fail the examination twice will apply for quitting school after school's deliberation.

直博生的资格考试由学院组织,考试形式为:闭卷、笔试,与硕博连读生一起进行。

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

考试内容: 选取 3 门专业基础课进行考试

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

开题报告: 在第五学期起开题,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作出论证。开题报告的文献阅读量应不少于 50~100 篇。

Thesis proposal: Thesis proposal will start in the 5th semester, 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 100 journal papers of related topic during preparation.

直博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。

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

年度报告: 在开题报告完成一年左右完成。博士生需以书面的形式递交年度进展报告给所属学科,在年度进度报告中须详细阐述论文研究工作的进展情况及所取得的阶段性成果。

Annual report: Annual report shall be organized within one year after thesis proposal is finished. The annual report must be submitted to the relevant discipline in written form. In the report, the student should elaborate the progress of the dissertation research and results achieved.

学科组织由导师或指导小组负责人参加的至少 3 人的年度报告考核小组,对本学科的博士生年度进展报告进行评估,其形式可结合研究生的学术讨论或专题研究报告会进行。导师应对年度进展报告做出综合评估,督促研究生顺利开展课题研究和学位论文撰写。经年度报告考核小组评估,如认为该生不符合博士生培养条件,将停止作为博士生继续培养。

An annual report assessment committee of at least three members, including supervisor or chair of dissertation committee, should be organized to evaluate the annual reports. This can be done in the form of academic discussion or symposium on selected topics. Supervisors should evaluate the annual report comprehensively, guiding the doctoral students to carry out the dissertation work as scheduled. Anyone who fails the annual report assessment should quit doctoral degree program.

论文预答辩: 在第八学期以后、正式答辩前三个月进行。预答辩由学科组织,同时必须由二名学位委员会成员参加。

Thesis pre-defense: After the 8th semester of doctoral program, and three months before the formal defense. The pre-defense is organized by discipline and at least 2 members should be from the Degree Evaluation Committee of ME School.

论文答辩: 在第十学期结束前完成, 未完成者最多可延期至第十四学期。答辩前由学院组织督导逐一进行形式审查, 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。

Dissertation Defense: Students are required to pass the dissertation defense before the end of the 10th semester. Students could apply for extension and should complete the dissertation defense before the end of the 14th semester. 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.

详见一览表:

See the list for details

	直博生 Full-time Doctoral after Bachelor's Program
资格考试 Qualification Examination	√
开题报告 Thesis Proposal	√
年度报告 Annual Report	√
预答辩 Pre-defense	√
答辩 Defense	√
实践实习环节 Engineering Practice	—

七、学术成果要求 Requirement on Academic Requirement

对于博士研究生在学期间发表论文的要求如下:

Paper Publication Requirements for doctoral students:

1、每位博士生在其申请学位论文答辩之前, 必须在核心及核心以上期刊或者国际会议上发表至少三篇论文(期刊论文二篇以上、会议论文一篇以上)。其中: 至少一篇论文(一作)要用英文在国际 SCI 源刊物上发表或录用、至少一篇论文为国际会议论文。

It is required that the doctoral students should have at least 3 papers published in core journals or international academic conferences (at least 2 journal papers, 1 international academic conference paper) before applying for the dissertation defense. Among these papers, at least 1 paper should be published or accepted by SCI Journal, at least 1 paper published in international academic conference.

2、发表学术论文的第一作者单位必须是上海交大。

The affiliation of the first author should be Shanghai Jiao Tong University (SJTU).

具体详见《上海交大机械与动力工程学院关于研究生在学期间发表学术论文要求规定(2012 版)》, 对达不到发表论文要求的博士生, 将无法进入正式答辩。

See details in "Paper Publication Requirement of ME School, SJTU". Anyone who cannot meet related requirements is not allowed to apply for the dissertation defense.

八、学位论文 Thesis/dissertation work

1、学位论文基本要求 Basic Requirements

博士研究生应选择学科前沿领域或对科技进步、经济建设和社会发展有重要意义的课题作

为博士学位论文的选题，博士学位论文能够表明作者具有独立从事科学研究工作的能力，反映作者在本门学科上掌握了坚实宽广的基础理论和系统深入的专业知识。

The doctoral students should choose topics related to the frontier field of the discipline or that of great significance to the progress of science and technology or economic and social development as their dissertation theme. The doctoral dissertation should demonstrate that the author is capable of undertaking scientific research independently and has a good grasp of the basic theories as well as a systematic and in-depth knowledge of the field of study.

博士学位论文的选题应具有科学性、学术性、创新性、先进性和可行性。论文选题鼓励与国家自然科学基金项目、省部级以上的重点科研项目等相结合。

The doctoral students shall choose scientific, academic, innovative, advanced and feasible topics as their doctoral dissertation work. They are encouraged to combine their dissertation work with the National Natural Science Foundation of China and/or provincial- and ministerial-level key research projects.

学位论文必须是一篇系统的、完整的学术论文，是学位申请者本人在导师的指导下独立完成的研究成果，论文不得抄袭和剽窃他人成果。学位论文的学术观点必须明确，且立论正确，推理严谨，数据可靠，层次分明，文字通畅。博士学位论文字数一般为8~10万。学位论文中使用的术语、符号、代号必须全文统一并符合规范化要求。计量单位一律采用国务院发布的《中华人民共和国法定计量单位》。

A graduate dissertation shall be a systematic and complete academic paper, and should be completed by the applicant under the instruction of his/her supervisor. No cheating or plagiarizing is allowed. The graduate theses shall demonstrate clear academic insights, with accurate arguments, rigorous reasonings, reliable statistics, well-organized structures and fluent expressions. The terms, symbols and codes used in the dissertation must be unified and conform to the requirements of standardization. All units of measurement shall adopt the "Statutory Unit of the People's Republic of China" promulgated by the State Council.

2、学位论文的撰写格式 Format for Dissertation

根据国家标准《学位论文编写规则》(GB/T 7713.1)，对学位论文撰写提出以下要求：

The following requirements are put forward for the dissertation writing according to the national standard "Rules for the Preparation of Dissertation" (GB/T 7713.1).

学位论文应使用中文撰写。申请国际评审与答辩的论文可以用英文撰写论文,但必须列出详细的中文摘要。

The dissertation should be written in Chinese. Dissertation for International review and defense can be written in English with a detailed Chinese abstract.

学位论文一般包括以下12部分，依次为封面、题名页、扉页、摘要、目录、符号说明（非必须）、正文、参考文献、注释（非必须）、附录（非必须）、致谢、学术论文和科研成果目录。

The dissertation generally consists of the following 12 parts: cover, title page, flyleaf, abstracts, contents, List of Symbols (if necessary), main body, reference, annotation (if necessary), appendix (if necessary), acknowledgements, List of Publications and achievements.

3、学位论文的草稿，应至少在学习结束前三个月完成，并提交导师审阅通过，然后按学校和学院的规定组织论文预答辩、评审和答辩工作。

The draft of the dissertation should be completed at least three months before the end of the study, and submitted to the supervisor for review and approval, and then the pre-defense, review and defense of the dissertation should be organized according to the regulations of the school.

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：

说明：

1. 培养方案制定完成并经院系学位委员会审核通过后，全日制请将本表格电子版(word)发送至 SherryLi327@sjtu.edu.cn, 非全日制请将本表格电子版(word)发送至 jshen@sjtu.edu.cn;
2. 请在新研究生教育管理信息系统完成新培养方案的申请，并在审核通过后将本表格的纸质版（签字盖章）送交研究生院存档。

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	可以计算 GPA	必须计算 GPA	备注 Note
		中文 Chinese	English 英文						
公共基础课 General Courses	FL6001	学术英语	English for Academic Purposes	2	英文 in English	秋季 Fall	是 Yes	是 Yes	必修 Compulsory
	MARX7001	中国马克思主义与当代	Marxism in China	2	中文 in Chinese	春季 Spring	是 Yes	是 Yes	必修 Compulsory
	MARX6003	自然辩证法概论	Dialectic of Nature	1	中文 in Chinese	秋季 Fall	是 Yes	是 Yes	必修 Compulsory
	GE6001	学术写作、规范与伦理	Scientific Writing, Integrity and Ethics	1	中文 in Chinese	春秋季 Spring/Fall	否 No	否 No	必修 Compulsory
	MATH6009	数学物理方程	Mathematical-Physical Equation	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	必修, 5选2, 至少6学分数学类课程 Compulsory, Must take two of them.
	MATH6015	最优化方法	Optimization Methods	3	中文 in Chinese、 英文 in English	春秋季 Spring/Fall	是 Yes	否 No	
	MATH6004	计算方法	Numerical Analysis	3	中文 in Chinese、 英文 in English	春秋季 Spring/Fall	是 Yes	否 No	
	MA26073	矩阵理论	Matrix Theory	3	中文 in Chinese、 英文 in English	春秋季 Spring/Fall	是 Yes	否 No	
	STAT6001	基础数理统计	Basic Mathematical Statistics	3	中文 in Chinese、 英文 in English	春秋季 Spring/Fall	是 Yes	否 No	
专业基础课 Program Core Courses	ME6100H	高等机构学	Advanced Mechanism and Machine Science	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	ME6102	机械设计可靠性分析	Reliability Analysis of Mechanical Design	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
	ME6104	摩擦学与润滑理论	Tribology & Lubrication Theory	3	中文 in Chinese	春季 Spring	是 Yes	否 No	二选一
	ME6105	工程摩擦学导论	Introduction to Engineering Tribology	3	英文 in English	春季 Spring	是 Yes	否 No	
	ME6120	高等机械动力学	Mechanical System Dynamics	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	
	ME6122	应用固体力学	Applied Mechanics of Solids	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	二选一
	ME6123	固体力学	Mechanics of Solids	3	英文 in English	春季 Spring	是 Yes	否 No	

ME6124	弹塑性力学	Elastic & Plastic Mechanics	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	二选一
ME6125	金属塑性加工力学	Plastic Mechanics in Metal Processing	3	英文 in English	秋季 Fall	是 Yes	否 No	
ME6140	高等振动理论	Theory of Advanced Vibrations	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
ME6142	声学原理及计算方法	Theories and Computation of Acoustics	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
ME6145	结构声学	Structural Acoustics	3	英文 in English	春季 Spring	否 No	否 No	
ME6146	转子动力学	Rotor Dynamics	3	中文 in Chinese	春季 Spring	否 No	否 No	
ME6160	机器人性能仿真与控制原理	Performance Simulation and Control of Robot	3	中文 in Chinese	春季 Spring	否 No	否 No	
ME6180	计算机图形学	Computer Graphics	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	二选一
ME6181	高等计算机图形学	Advanced Computer Graphics	3	英文 in English	秋季 Fall	是 Yes	否 No	
ME6182	现代机械设计学	Modern Mechanical Design	3	中文 in Chinese	春季 Spring	否 No	否 No	
ME6220	软件工程 II	Software Engineering II for Manufacturing	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
ME6320	机器视觉与应用	Machine Vision and Its Applications	3	中文 in Chinese	春季 Spring	否 No	否 No	二选一
ME6321	计算视觉及其智能化应用	Computational Imaging and Intelligent Application	3	英文 in English	春季 Spring	否 No	否 No	
ME6340	机械电子学	Mechatronics	3	中文 in Chinese	春季 Spring	否 No	否 No	
ME6401	汽车系统动力学	Software Engineering for Automotive Electronic Control System	3	英文 in English	秋季 Fall	是 Yes	否 No	
ME6500	塑性变形理论与数值模拟	Plastic Deformation Theory and Numerical Simulation	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
ME6520	数字信号处理	Digital Signal Processing	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	二选一
ME6521H	数字信号处理与应用	Digital Signal Processing and Application	3	英文 in English	秋季 Fall	是 Yes	否 No	
ME6522	测试原理、传感器与系统	Basic Principle of Sensors and Systems for Mechanical Measurement	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	二选一
ME6523	先进测试技术与仪器	Advanced Measurement and Instrumentation	3	英文 in English	春季 Spring	是 Yes	否 No	
ME6524	误差分析与测试数据处理	Error Analysis and Data Processing in Measurement	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
ME6540H	现代控制理论	Modern Control Theory	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	

ME6542	智能控制技术	Intelligent Control Technology	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
PE6100	高等燃烧学	Advanced Combustion Theory	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	二选一
PE6101	高等燃烧理论	Advanced Combustion Theory	3	英文 in English	春季 Spring	是 Yes	否 No	
PE6103	燃烧化学动力学	Combustion Chemical Kinetics	3	英文 in English	春季 Spring	是 Yes	否 No	
PE6120	高等工程流体力学	Advanced Fluid Dynamics in Engineering	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	二选一
PE6121	高等流体力学	Advanced Fluid Mechanics	3	英文 in English	秋季 Fall	是 Yes	否 No	
PE6122	计算流体力学	Computational Fluid Dynamics	3	中文 in Chinese	春季 Spring	是 Yes	否 No	二选一
PE6123	计算流体力学与应用	Computational Fluid Dynamics & Applications	3	英文 in English	秋季 Fall	是 Yes	否 No	
PE7124	多相流理论与计算	Multiphase Flow Theory and Simulation	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
PE7126	湍流与传输理论	Turbulent Flow and Transportation Theory	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
PE6200	高等传热传质学	Advanced Heat and Mass Transfer	3	中文 in Chinese	春季 Spring	是 Yes	否 No	二选一
PE6201H	高等传热学	Advanced Heat Transfer	3	英文 in English	秋季 Fall	是 Yes	否 No	
PE6202	热辐射传热	Thermal Radiation Heat Transfer	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
PE6205	微尺度流动与传热	Microfluidic Flow and Heat Transfer	3	英文 in English	春季 Spring	是 Yes	否 No	
PE6220	高等工程热力学	Advance Engineering Thermodynamics	3	中文 in Chinese	春秋季 Spring/Fall	是 Yes	否 No	二选一
PE6221H	高等热力学	Advanced Thermodynamics	3	英文 in English	春秋季 Spring/Fall	是 Yes	否 No	
NU6100	高等反应堆工程	Advanced Reactor Engineering	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
NU6102	核材料科学	Nuclear Material	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
NU6104	核反应堆安全学	Advance Engineering Thermodynamics	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
NU6106	核燃料循环	Nuclear Waste & Environment	3	中文 in Chinese	秋季 Fall	否 No	否 No	
NU6108	现代辐射测量及应用	Modern Radiation Detection and Applications	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
NU6111	多相流与传热	Multiphase Flow and Heat Transfer	3	英文 in English	春季 Spring	是 Yes	否 No	
NU6112	两相流与沸腾换热	Tow-phase Flow & Boiling Heat Transfer	3	中文 in Chinese	秋季 Fall	否 No	否 No	
NU6114	流场测试基础	Flow Field Test Basis	3	中文 in Chinese	春季 Spring	否 No	否 No	

专业前沿课 Program Frontier Courses	GE6011	学术报告会	Academic Reports	1	中文 in Chinese	春秋季 Spring/Fall	否 No	否 No	必修 Compulsory
	NU8128	核能科学发展前沿	Nuclear Science Development Frontier	3	中文 in Chinese	秋季 Fall	否 No	否 No	
专业选修课 Program Elective Courses	ME6106	计算几何学	Computational Geometry	3	中文 in Chinese	春季 Spring	否 No	否 No	
	ME6126	高等结构动力学	Advanced Structural Dynamics	3	中文 in Chinese	秋季 Fall	否 No	否 No	
	ME6149	气动声学	Aeroacoustics	3	英文 in English	秋季 Fall	否 No	否 No	
	ME6151	先进噪声控制技术	Advanced Noise Control Techniques	3	英文 in English	秋季 Fall	否 No	否 No	
	ME7162	步行机器人机构学	Walking Robotic Mechanisms	3	中文 in Chinese	春季 Spring	否 No	否 No	
	ME7184	多学科综合设计	Multidisciplinary Design	3	中文 in Chinese	春季 Spring	否 No	否 No	
	ME6200	弹塑性加工理论	Solid Mechanics in Machining	3	中文 in Chinese	春季 Spring	否 No	否 No	
	ME6202	微细制造	Micro Manufacturing	3	中文 in Chinese	春季 Spring	否 No	否 No	
	ME6204	薄板成形理论及技术	Sheet Metal Forming Theory and Technology	3	中文 in Chinese	春季 Spring	否 No	否 No	
	ME6207	超精密智能制造技术	Ultra-precision Smart Manufacturing	3	英文 in English	春季 Spring	否 No	否 No	
	ME6209	先进复合材料及其加工技术	Advanced Composites and Their Manufacturing Techniques	3	英文 in English	春季 Spring	否 No	否 No	
	ME6222	软件技术基础	Foundation of Software Technology	3	中文 in Chinese	秋季 Fall	否 No	否 No	
	ME6301	可穿戴式系统	Wearable Systems	3	英文 in English	秋季 Fall	否 No	否 No	
	ME6343	工业智能维护与预知诊断	Intelligent Maintenance and Prognostics for Industrial Systems	3	英文 in English	春季 Spring	否 No	否 No	
	ME6420	汽车多能源管理与优化	Vehicle Multi-energy Management and Optimization	3	中文 in Chinese	秋季 Fall	否 No	否 No	
	ME6423	现代汽车动力总成技术	Advanced Powertrain Technologies	3	英文 in English	春季 Spring	否 No	否 No	
ME6424	汽车电子控制软件工程	Software Engineering for Automotive Electronic Control System	3	中文 in Chinese	春季 Spring	否 No	否 No		

ME6426	智能网联汽车技术	Intelligent and Connected Vehicle Technology	3	中文 in Chinese	春季 Spring	否 No	否 No	
ME7429	汽车控制工程	Modern Vehicle Control Engineering	3	英文 in English	春季 Spring	否 No	否 No	
ME6503	先进工程应用中的高温材料	High Temperature Materials for Advanced Engineering Applications	3	英文 in English	春季 Spring	否 No	否 No	
ME6527	先进激光诊断原理与技术	Advanced Laser Diagnostic Technology	3	英文 in English	春季 Spring	否 No	否 No	
ME7528	高等测试技术	Advanced Techniques in Measurement	3	中文 in Chinese	春季 Spring	否 No	否 No	
ME7544	动态规划与最优控制	Dynamic Programming & Optimal Control	3	中文 in Chinese	秋季 Fall	否 No	否 No	
ME6560	研究实验技能	Experimental Skill for Research	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6105	先进排放控制技术	Advanced Emission Control Technologies	3	英文 in English	春季 Spring	否 No	否 No	
PE7106	计算燃烧学	Computational Combustion	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6140	叶轮机械气动力学	Turbomachinery Aerodynamics	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6143	叶轮机械试验方法与设计	Turbomachinery Experimental Design	3	英文 in English	春季 Spring	否 No	否 No	
PE6207	计算材料热物理	Computational Materials Thermophysics	3	英文 in English	秋季 Fall	否 No	否 No	
PE6208	强化传热理论与技术	Theory and Technology on Enhanced Heat Transfer	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6300	湍流两相流动的模化与数值仿真	Modeling and Numerical Simulation of Turbulent Two-phase Flow	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6302	煤粉燃烧与气化理论	Theory of Coal Combustion and Gasification	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6304	微细颗粒动力学	Fine Particle Dynamics	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6307	循环流化床燃烧技术	Circulating Fluidized Bed Combustion	3	英文 in English	秋季 Fall	否 No	否 No	
PE6400	热泵系统及应用	Heat Pump Systems and Applications	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6402	现代人工环境技术	Modern Artificial Environment Technology	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6404	制冷低温系统的设计与实践	Design and Practice of Refrigeration and Cryogenic Systems	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6406	制冷空调系统的仿真优化与控制	Simulation, Optimization and Control of Refrigeration and HVAC Systems	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6420	能源清洁与梯级利用	Energy Clean and Cascade Utilization	3	中文 in Chinese	春季 Spring	否 No	否 No	

PE6422	热力系统建模与仿真	Analysis of Energy Utilization Systems	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6424	先进动力循环分析	Analysis of Advanced Thermal Power Cycles	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE7426	高等传输理论与化学反应工程	Advanced Transmission Theory and Chemical Reaction Engineering	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6441	新能源系统	New Energy Systems	3	英文 in English	秋季 Fall	是 Yes	否 No	
PE6442	建筑节能与太阳能利用	Building Energy Saving and Solar Energy Utilization	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6500	内燃机电控技术	Electronic Control Technology in Internal Combustion Engine	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6502	内燃机燃烧与排放控制	Combustion and Emission Control in Internal Combustion Engine	3	中文 in Chinese	秋季 Fall	否 No	否 No	
PE6504	内燃机性能仿真与优化	Simulation and Optimization of Internal Combustion Engine Performance	3	中文 in Chinese	春季 Spring	否 No	否 No	
PE6521	航空发动机系统工程	Aviation Propulsion System from Genetic Engineering to System Integration	3	英文 in English	秋季 Fall	否 No	否 No	
PE6523	先进空气动力学测量技术基础与实践	Analysis of Advanced Thermal Power Cycles	3	英文 in English	秋季 Fall	否 No	否 No	
PE7540	先进能源材料导论	Introduction on Advanced Energy Materials	3	中文 in Chinese	春季 Spring	否 No	否 No	
NU6116	传热流动的数值分析	Numerical Analysis of Heat Transfer and Flow	3	中文 in Chinese	秋季 Fall	否 No	否 No	
NU6118	非动力核技术应用	Application of No-Power Nuclear Technology	3	中文 in Chinese	秋季 Fall	否 No	否 No	
NU6121	核反应堆设计原理	Nuclear Reactor Theory and Design	3	英文 in English	秋季 Fall	否 No	否 No	
NU6122	先进反应堆数值模拟	Advanced Simulation of Nuclear Power	3	中文 in Chinese	秋季 Fall	否 No	否 No	
NU6124	严重事故现象与管理	Severe Accident Phenomenology And Management	3	中文 in Chinese	秋季 Fall	否 No	否 No	
NU6128	汽液两相流动与传热	Two Phase Flow and Heat Transfer	3	中文 in Chinese	秋季 Fall	否 No	否 No	