

# 控制科学与工程学科(一级学科代码: 0811)学术型 硕士研究生培养方案(留学生) (Control Science and Engineering)

## 一. 学科简介(Introduction)

控制科学与工程以控制论、系统论、信息论为基础,以工程系统为主要对象,以数理方法、人工智能和信息技术为主要工具,研究各种控制策略及控制系统的理论、方法和技术,是研究动态系统的行为、受控后的系统状态以及达到预期动静态性能的一门综合性学科。研究内容涵盖基础理论、工程设计和系统实现,是机械、电力、化工、冶金、航空、航天、船舶等工程领域实现自动化不可缺少的理论基础和技术手段,在工业、农业、国防、交通、科技、教育、社会经济乃至生命系统等领域有着广泛应用,特别在智能制造、智能电网、智慧城市、智能运载等领域有着基础支撑作用。

本学科研究方法包括理论与实际相结合,定量与定性相结合,实验与仿真相结合,软件与硬件相结合,信息获取与利用相结合,系统认知与优化相结合,科学分析与工程实践相结合,解决工程控制问题与凝练控制科学问题相结合,事实性、概念性与程序性知识学习与分析、评价和创造的高层次认知能力相结合等。

控制科学与工程学科包括控制理论与控制工程、检测技术与自动化装置、模式识别与智能系统等二级学科或学科方向。

上海大学控制科学与工程学科,是上海市高原学科、上海市双一流医工结合支撑学科,也是国家一流学科的支撑学科之一,致力于为“一带一路”地区及全世界培养面向电气、仪表、冶金、能源等行业发展需要的、具有国际视野的、复合型创新人才。

### Subject introduction

The discipline of Control Science and Engineering is based on cybernetics, system theory and information theory, and take engineering system as the main object. With mathematical method, artificial intelligence and information technology as main tools, the theory, method and technology of various control strategies and control systems are studied. It is a comprehensive subject to study the behavior of dynamic system, the state of controlled system and the expected dynamic and static performance. The research covers basic theory, engineering design and system implementation. It is an indispensable theoretical basis and technical means to realize automation in mechanical, electrical, chemical, metallurgical, aviation, aerospace, ship and other engineering fields. It is widely used in industry, agriculture, national defense, transportation, science and technology, education, social economy and even life system, especially as a basic supporting role in smart manufacturing, smart grid, smart city, smart transportation and other fields.

The research methods of this subject include the combination of theory and practice, quantitative and qualitative, experiment and simulation, software and hardware, information acquisition and utilization, system cognition and optimization, scientific analysis and engineering practice, solving engineering control problems and refining scientific problems, factual, conceptual and procedural knowledge learning and analysis, evaluation and creation of high-level cognitive ability.

The discipline of Control Science and Engineering includes the second disciplines such as control theory and control engineering, detection technology and automation devices, pattern recognition and intelligent systems.

The discipline of Control Science and Engineering of Shanghai University is a supporting discipline of Shanghai plateau discipline, Shanghai medicine and engineering combination for world-class universities and world-class disciplines, and one of the first-class disciplines in the country. It is dedicated to cultivate innovative talents for "The Belt and Road" region and

the world in the field of Electrical, instrumentation, metallurgy, energy and other industries with an international perspective to the development of industry.

## 二 .学位标准( Degree for Require)

获本专业研究生学位基本要求：应掌握控制科学与工程学科相关的专业知识和技能，具备学术素养和学术道德；能独立开展科学研究、实践、学术交流等；学位论文符合培养方案要求的规范和质量要求；满足上海大学控制科学与工程学科专业要求的学位授予科研成果量化指标。

Degree standard

Basic requirements for postgraduate degree in this discipline: Graduates should master the related professional knowledge and skills in the discipline of Control Science and Engineering, and should follow academic literacy and academic ethics; should be able to independently carry out scientific research, practice, academic exchanges, etc. The dissertation should meet the requirements and quality standards of the training program; and the academic achievements should fulfill the quantitative indicators set up for Control Science and Engineering major of Shanghai University.

## 三 .培养目标(Objectives)

1、国际研究生应当熟悉中国历史、地理、社会、经济等中国国情和文化基本知识，了解中国政治制度和外交政策，理解中国社会主流价值观和公共道德观念，形成良好的法治观念和道德意识。

Training objectives

International graduate students should be familiar with China's national condition and Chinese culture including history, geography, society, economy etc; understand the mainstream values and public morality of Chinese society; establish a good concept of the rule of law and moral consciousness.

2、国际研究生应当具备包容、认知和适应文化多样性的意识、知识、态度和技能，能够在不同民族、社会和国家之间的相互尊重、理解和团结中发挥作用。

International graduate students should have the awareness, knowledge, attitudes and skills to be inclusive, cognizant and adapt to cultural diversity, and play a positive role in mutual respect, understanding and solidarity among different peoples, societies and nations.

培养具有创新思维、创业潜质和国际化视野的控制科学与工程领域复合型人才。培养学生掌握控制理论、先进控制系统与技术、检测技术、系统工程、人工智能与模式识别、系统建模与仿真和生命科学交叉应用等方面坚实的基础理论和系统的专业知识，具有从事控制科学研究、系统设计与技术开发、解决实际工程控制问题的能力，了解本学科最新研究成果和发展动向，并在学位论文中做出理论结合实际的创新成果，成为控制科学与工程学科的专门人才。

The students are trained to be professional individuals in Control Science and Engineering fields who are fully developed on every aspect of personal capabilities, personalities. Graduates will be trained to systematically master the solid basic theory and professional knowledge of control theory, advanced control systems and technologies, detection technology, systems engineering, artificial intelligence and pattern recognition, system modeling and simulating, the interdisciplinary life science applications, etc. Students will be well educated to have the ability to research control science, system design and technical development and solve practical engineering control problems, to know the latest research developments and trends of the discipline, to make innovations of applying theory to practice in the thesis, and become specialists of Control Science and Engineering.

3、身体健康、心理健康。

Physical and mental health.

#### 四 . 修业年限(Duration)

本专业硕士学制为2.5年。在校学习年限最长不超过6年。

The master program is of two and a half years duration. The maximum length of study at school is no more than 6 years.

#### 五 . 培养方向(Research Areas)

1. 控制理论与控制工程Control Theory and Control Engineering
2. 检测技术与自动化装置Detecting Technology and Automatic Equipment
3. 模式识别与智能系统Pattern Recognition and Intelligent Systems

#### 六 . 语言要求(Language Requirements)

雅思(A)成绩6.0分以上(含)或托福成绩80分以上(含)。

IELTS 6.0 or TOEFL IBT 80 or above received within the recent two years.

#### 七 . 课程设置与学分要求(Curriculum and Credit Requirement)

本学科硕士生的学分最低为44学分，专业基础课不高于10学分，创新创业课不低于2学分，学术研讨课不低于2学分。详细设置请查看附表。

The minimum credits for master's degree students are 44 credits, of which the professional basic courses are not more than 10 credits, and the course of innovation and entrepreneurship and academic seminar course are no less than 2 credits. Please see the attached table for detailed settings.

#### 八 . 培养计划制定(Development of Training Plan)

攻读硕士学位的研究生入学后，应在导师指导下按照本学科当年度培养方案的要求制订培养计划，在入学后1个月内，登录研究生管理系统，输入培养计划，同时，打印的纸质版培养计划报学院(学科)学位评定分委员会审核批准后，由学院留存备案并统一递送至研究生院培养管理处。凡列入培养计划的课程必须修读合格方可进行答辩。

After enrolling in the master's degree, students should determine a training plan under the guidance of your supervisor in accordance with the requirements of the current year's training program. Within one month after enrollment, students should log in the postgraduate management system, input the training plan, print out and submit to Academic Degree Evaluation Subcommittee of the college for review and approval. The printed version will be kept by the college for record and submitted to Training and Management Office. Courses included in the training program must be qualified before thesis defense.

#### 九 . 必修环节 (Compulsory courses)

1. Course assessment

In September of the second year after enrollment, the postgraduate examination will be conducted for the graduate students. The course assessment is divided into qualified and unqualified according to:

(1) The credits for the training plan have been completed, and the number of courses with a score of 60 to 75 is within 2, and the course is qualified;

(2) The credits of the training plan have been completed, and the number of courses with scores of 60 to 75 is more than 2, the course assessment is unqualified, and the first level warning is given. If the assessment is not

qualified before the mid-term assessment, the dissertation opening report and the mid-term assessment shall be postponed for three months;

(3) If the credits of the training plan are not completed, the course assessment is unqualified, and the second-level warning is given. If the course assessment is not qualified before the mid-term assessment, the dissertation opening report and mid-term assessment must be extended for 6 months;

(4) The training plan is assessed to be unqualified if the training courses are not completed until September 1st of the third year after enrollment; or the score of one course is less than 60 for the first time and is still less than 60 after retaking the course.

## 2. Dissertation opening report and mid-term assessment

The dissertation opening report and the mid-term assessment are held in the winter semester of the second year after the graduate student enrollment.

### (1) Dissertation opening report

Generally, the opening report should be completed during the 4th semester after obtaining the required credits. In order to ensure that master students have one year to engage in dissertation research, the time from the opening report to the dissertation defense is not less than one year.

The opening report will be organized by the supervisor, and the graduate students will report in public, and invite graduate students of the senior and junior grades to attend the report. More than 3 experts (with deputy seniors or above titles) except for the supervisor will form an evaluation panel for the opening report. The results of the evaluation are four grades including excellent, good, qualified and unqualified. If the results of the evaluation are qualified or above, students proceed their research work. Those who fail for the first time can restart the opening report within two months, and those who are still unqualified shall be handled according to the Measures for the Mid-term Assessment of Graduate Students of Shanghai University.

The opening report of master's degree students should be printed on A4 paper and filled in two copies of the opening report of master's degree thesis of Shanghai University. When the opening report meeting of master's students is over, the supervisor writes out the comprehensive comments and examines and approves them according to the prescribed procedure. Those who are qualified can enter the stage of thesis work. (The opening report material is self-contained and will be filed to the Science and Technology Archives Office of the Archives after the end of the project and the defense is passed. The other one is submitted to the College for archiving, and at the same time, it is registered on the graduate information management system of the graduate school website for information submission.)

After the adoption of the opening report, the title of the paper can be slightly adjusted without changing the main research contents, but in principle, the main research contents can not be changed at will. If there are special reasons to change the research content, a written report will be written by the student. After the instructor's signature and approval by the head of the department or institute, the report shall be submitted to the Training Management Department of the Graduate School for the record, and the opening report shall be made again within 1-2 months.

The opening report generally includes the following contents: ①The Source, Selection and Significance of the Subject. Explain the theoretical and practical value of the topic, focusing on the current situation of research at home and abroad, and the course and purpose of my topic selection. Explain the theoretical and practical value of the topic, focusing on the current situation of research at home and abroad, and the course and purpose of my topic selection. ②The main content, conception and preliminary opinions of the

subject research. Emphasis is placed on the analysis of academic ideas, technical routes, key technologies, experimental schemes, social surveys and expected results. ③The research methods and experimental means to be adopted, the scientific research conditions needed, the difficulties that the research work may encounter and the methods and measures to solve them are described. ④ Estimate the workload and funding of the project, as well as the research progress plan. ⑤Major references (no less than 30 articles required).

#### (2) Mid-term assessment

In order to continuously improve the scientificity and effectiveness of postgraduate research and play a screening role in the process of postgraduate training, Postgraduates must undergo mid-term assessment before they formally enter the dissertation work. Mid-term assessment usually ends before the winter semester of the 2nd academic year. The mid-term assessment mainly examines the morality, academic achievement and research capability of graduate students. Only students with good ethics, qualified academic performance and research ability can pass the mid-term examination, and continue their thesis work. Students who fail to pass two courses, or to meet the credits requirements (less than 3/4) due to the suspension of study, can delay their mid-term examination. Students will fail the mid-term examination, if they ①have failed 3 courses; ②are considered lack research capabilities; ③violate moral principles or academic integrity, and those who fail to pass the examination will be eliminated.

The mid-term assessment shall be carried out by the system of diversion and elimination, and the ranking results of the assessment shall be submitted to the Graduate School for the record. The mid-term assessment will be implemented in accordance with the "Shanghai University Graduate Mid-term Assessment and Distribution and Elimination Management Measures (Trial Implementation)".

#### 3. Thesis defense rehearsal

The rehearsal of thesis defense of the master's thesis should be held one month before the formal defense. The organization of the rehearsal and the number and the title requirements of members in evaluation panel are the same as the formal defense. Only a rehearsal passer can make a formal defense.

The above process is subject to "Measures for the Management of Postgraduate Training of the School of Mechatronic Engineering and Automation of Shanghai University" (for Trial Implementation). In the process of implementing the system of centralized topic opening and centralized pre defense, each discipline should set up a subject thesis proposal group and a discipline dissertation pre Defense Committee, which is responsible for organizing the centralized opening and pre defense of graduate students' dissertations, and implementing the tutor avoidance system. In general, there are no less than 5 members in the opening group and pre Defense Committee of subject dissertation, including no less than 2 off campus experts. The requirements for professional titles are the same as those for opening and defending. Strict separation and elimination are required. Each discipline should rank the assessment results of the graduate students who participate in the centralized opening of dissertation or the centralized pre defense, and deal with the unqualified graduate students in strict accordance with the assessment requirements.

## 十 . 科学研究与学位论文 (Research and Dissertation)

学位论文是研究生培养的重要环节, 是培养研究生创新能力、分析问题和解决问题能力的主要手段。工作中主要加强以下几个环节:

1. 硕士生应在导师指导下拟订学位工作计划, 包括各阶段的主要学习内容。在开题报

告前应充分查阅国内外文献资料，提交与专业相关的科技综述报告。

2. 研究生在导师的指导下，选定研究课题，选题应与本专业的基础研究或国民经济建设相结合。开题报告在第一学年结束前进行，应包括发展现状、选题意义、研究内容、技术路线、进度安排以及预期成果等。开题报告须进行公开报告，并由3名以上具有高级职称的专家审议。

3. 强调导师对学位论文的审查制度，严惩论文抄袭和学术造假行为。

4. 强调导师对学位论文的预答辩制度。凡未进行预答辩或预答辩未通过者均不可直接组织正式答辩。

5. 规范学位论文答辩制度以及学位授予程序。硕士生学位论文评阅和论文答辩可按《上海大学学位授予工作实施细则》的规定办理。

6. 申请硕士学位时，需满足《上海大学机电工程与自动化学院研究生申请学位创新成果要求》。

7. 留学硕士研究生，可以用汉语或英语撰写学位论文和进行论文答辩。使用非汉语接受学历教育的留学硕士研究生，学位论文摘要应当用汉语撰写。留学硕士研究生的学位论文答辩必须在我校进行。

Scientific research and thesis work

The dissertation is an important part of postgraduate training, and it is the main means to cultivate graduate students' ability to innovate, to analyze and solve problems. This part mainly strengthens the following links:

1. Master students should develop a degree work plan under the guidance of the supervisor, including the main learning content at each stage. Before the opening report, students should fully study the domestic and foreign literature and submit a scientific and reviewing report related to the subject.

2. Under the guidance of the instructor, the graduate students should select the research topic, which is combined with the basic research of the subject or the national economic construction. The opening report shall be conducted before the end of the first school year and shall include the current development status, the meaning of the topic, the research content, the technical route, the schedule and the expected results. The opening report shall be publicly reported and reviewed by more than three experts with senior professional titles.

3. Emphasize the supervisor censorship system, and severely punish plagiarism and academic fraud.

4. Emphasize the defense rehearsal system for dissertations. Anyone who fails to pass a defense rehearsal cannot attend a formal defense.

5. Standardize the dissertation defense system and degree awarding procedures. The evaluation and defense of master's degree thesis can be handled in accordance with the Rules for the Implementation of Degree Granting in Shanghai University.

6. When applying for a master's degree, students need to meet the requirements for innovative achievements of graduate students in school of Mechatronic Engineering and Automation, Shanghai University.

For Foreign postgraduates, they can write their dissertations and defend their dissertations in Chinese or English. For master's degree graduates who use non-Chinese to receive academic education, abstracts of dissertations should be written in Chinese. The dissertation defense of master's degree for foreign postgraduates must be carried out in our university.

## 十一 . 培养方式(Training Methods)

在校培养或联合培养

Training in school or joint training

附表. 课程与必修环节

## 控制科学与工程学科攻读硕士学位研究生课程与必修环节

类别	课程编号	课程名称 (Course Name)	学时	学分	开课学期	备注
公共平台课	公共平台课作为学校面向全校开设的公共课程, 学生可在导师指导下选择公共平台课程列入培养计划, 课程学分计入总学分					
公共课	0CS000027	公共体育(Public Physical Education)	20	1.0	01	必修
	0LY000001	中国概况(General Situation of China)	60	3.0	01	必修
	0LY000002	综合汉语B(Comprehensive Chinese B)	60	3.0	01	必修
	4CS000001	创业与创新(Entrepreneurship and Innovation)	20	2.0	03	创新创业课二选一
专业基础课	2XSL09202	控制中的数学基础( (Mathematic Fundamentals in Control) )	40	4.0	01	必修
	2XSL09203	线性系统理论( (Linear System Theory) )	40	4.0	01	必修
专业选修课	3XSL09201	混杂控制与切换系统( (Hybrid Control and Switched Systems) )	40	4.0	02	选修
	3XSL09202	网络化控制系统( (Networked control systems) )	40	4.0	03	选修
	3XSL09203	复杂网络引论( (Introduction to Complex Networks) )	40	4.0	03	选修
	3XSL09204	交流电机控制理论与方法( (Control theory and method of AC electrical machines) )	40	4.0	02	选修
	3XSL09205	电力设备的在线监测和故障诊断( (On-line monitoring and diagnosis for power equipment) )	40	4.0	03	选修
	3XSL09206	离散事件与计算智能技术( (Discrete Events and Computational Intelligence Techniques) )	40	4.0	01	选修
	3XSL09208	互联网安全( (Internet Infrastructure Security) )	40	4.0	03	选修
	3XSL09209	计算机视觉与增强现实(Computer vision and augmented reality)	40	4.0	02	选修
	3XSL09210	现代测量测试与传感技术(Modern measurement, testing and sensing technology)	40	4.0	01	选修
	3XSL09211	计算机视觉(Computer Vision)	40	4.0	02	
学术规范与写作课	2XS092004	学术英语写作(Scientific Writing)	20	2.0	02	必修
创新创业课	4XSL09202	前沿发展讲座: 汽车电动化介绍( (Introduction to Vehicle Electrification) )	20	2.0	03	创新创业课二选一
学术研讨课	6XSL00001	学术研讨课(Academic Seminars)	20	2.0	01	

跨专业或学院选修课	学生可根据自身情况在导师指导下跨专业、学院选取非本专业课程列入培养计划，课程学分计入总学分。		
补修课	根据学生具体情况由导师指定选修本科生主干课2-3门（不计入总学分）		
必修环节	课程考核	01	须通过考核后方可进入下一环节
	学位论文开题	04	
	中期考核	05	
	学位论文预答辩	10	

学位委员会主席签字：

学院盖章：