

西安交通大学

XI'AN JIAOTONG UNIVERSITY

Graduate Program for International Students



Graduate School

2020.07



机械工程学院/材料科学与工程学院

School of Mechanical Engineering/School of Materials Science and Engineering

机械材料类国际研究生中英文培养方案

International Graduate Programs in Mechanical Engineering and Materials Science

一、培养目标 (Program objectives)

机械工程学院与材料科学与工程学院提供的硕士培养旨在帮助国际学生获得机械工程和材料科学与工程领域的相关知识和技能,进而与学生的学习要求相匹配,并为其取得相应事业成功或进一步深造奠定坚实的基础。在整个培养过程中,学生将通过课程学习、实验室实践、专题研究等培养方式,发展和提升其自主研究,培养分析、设计和实验能力。

The Master's program offered by the School of Mechanical Engineering (ME) and School of Materials Science and Engineering (MSE) aims to help the students to gain knowledge and skills in the related field that match their interest, and to build solid foundation for a successful career in professional mechanical/material science and engineering or pursuing higher academic degree program. In this program, the students will develop their analyzing, designing and experimental abilities through course studies, lab activities, specific studies, and independent research, etc.

博士培养旨在培养学生的全面素质,帮助他们获得学术和道德上的双重荣誉。通过培训、博士候选人应该牢固地掌握基础理论和系统的专业知识,能够独立的科学研究和教学,获得创新成果在机械工程,材料科学与工程,展示科学态度,努力解决科技问题严谨和务实。

The Doctoral program aims at cultivating the all-around qualities in doctoral candidates, helping them to achieve both academic and moral excellence. Through the training, doctoral candidates should have a firm grasp of the basic theories and systematic, specialized knowledge, be capable of independent scientific research and teaching, gain innovative achievements in Mechanical Engineering, Materials Science and Engineering, demonstrate scientific attitude, and strive to resolve science and technology difficulties in a rigorous and pragmatic way.

二、研究方向 (Research fields)

- 1、机械工程, Mechanical Engineering.
- 2、材料科学与工程, Materials Science and Engineering.

三、学习年限 (Length of programs)



硕士全日制项目为期两年，包括一年的课程学习和一年的课题研究，并提交论文完成。申请经批准后，可延长至三年。

The full-time Master's program lasts two years, consisting of one-year course studies and one-year project research completed with the submission of thesis. The duration can be extended to three years after approval is granted.

博士全日制课程至少持续三年。学制可延长至六年。

The full-time PhD program lasts at least three years. The duration can be extended to six years.

四、培养方式 (Program overview)

1. 导师应根据本培养方案的要求与因材施教的原则，从各个学生具体情况出发，在学生入学后制定培养计划。

Supervisors should follow the instructions of this document and make an individual study plan for the students after their registration at the School of International Education.

2. 整个培养过程应贯彻理论联系实际的方针，使学生掌握本学科的基础理论和专门知识，掌握科学研究的基本方法，并有一定的实验技能。

Student education should combine theoretical and practical aspects. The students should master fundamental theories, professional knowledge, as well as basic methods of scientific research, and have certain experimental skills.

3. 学生应当积极参加校内外学术报告会、讲座会及其他学术活动。

Students should actively participate scientific conferences, seminars, and other forms of academic activities.

4. 硕士生和博士生培养实行中期考核。硕士生第三学期由导师/系所组织一次中期考核，考核通过者继续攻硕；未通过者，可以参加下学期的中期考核。博士生第四学期由系所组织一次中期考核，考核通过者继续攻博；未通过者，可以参加下学期的中期考核。

Both Master's and PhD programs have a mid-term assessment. For Master's candidates, mid-term assessment will be organized by the student supervisor or department in third semester; for PhD students, mid-term assessment will be organized by the student supervisor or department in fourth semester. Students who pass the assessment can continue studying; whereas those who fail the assessment may take the next examination in the next semester.

5. 在完成学位课程学习和大量阅读具体研究方向上的国内外学术论文并进行初步研究探索之后，博士生应当在第二学期末进行学位论文选题报告。

After finishing courses and intensive literature survey of certain research field followed by preliminary research, the doctoral students should complete the dissertation proposal at the end of the second semester.

五、课程学习 (Course work)

根据《西安交通大学国际研究生按类培养实施细则》（以下简称《细则》）确定本学科国际硕士或博士研究生相关课程和学分要求，并制定详细列表。新港报告纳入国际留学生选修课，学生听够 20 场讲座后可记 2 学分。



(一) 硕士研究生(Master programs)

机械工程硕士学位以及材料科学与工程硕士学位课程学习应至少取得 24 学分, 包括: 公共课(汉语(I) 2 学分、中国概况(I) 2 学分) 4 学分、专业学位课至少 8 学分, 选修课至少 12 学分。

The academic Master's programs of Master of Mechanical Engineering and Master of Material Science and Engineering consist of at least 24 credits for course work. Required courses include *Comprehensive Chinese I* (2 credits), *Outline of China I* (2 credits), degree courses (no less than 8 credits), and elective courses (no less than 8 credits). Innovation Harbour Lectures are included in elective courses for international students, 2 credits will be granted after attending 20 Lectures.

必修环节包括: 学术活动(讲座) 1 学分、中期考核 3 学分。

Other compulsory activities include academic lectures (1 credit) and mid-term assessment (3 credits).

机械工程及材料科学与工程国际硕士研究生课程设置和学分要求

Curriculum Design and Credit Requirements of Master's Degree Programs in ME and MSE

课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
公共学位课 Public Course	1	272003	LITE610112	中国概况 Outline of China	2	必修 4 学分 4 credits required
	2	272004	LITE610227	综合汉语 Comprehensive Chinese	2	
机械工程 专业学位课 Degree Course for ME	1	012190	MACH740201	纳米表面工程与摩擦学 Nano-surface Engineering and Tribology	2	至少修 8 学分 A minimum of 8 credits required
	2	012191	MACH640101	现代测量技术 Modern Measurement Technology	2	
	3	012197	MACH640401	振动理论 Theory of Vibration	2	
	4	012195	MACH640301	高等传热学 Advanced Heat Transfer	2	
	5	012192	MACH640201	CAD/CAM/CAE 理论与应用 (A) Theory and Application	2	



课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
				of CAD/CAM/CAE (A)		
	6	012189	MACH740101	有限元法原理及工程应用 Principle of Finite Element Methods and Engineering Application	2	
	7	012196	MACH641001	现代控制工程 Modern Control Engineering	2	
	8	091002	MATH600107	计算方法 (A) Computational Method A	3	
材料科学与工程 专业学位课 Degree Course for MSE	1	022038	MATL750302	固态相变 Phase Transitions in Solids	2	至少修 8 学分 A minimum of 8 credits required
	2	022049	PHYS740102	固体物理 Solid State Physics	2	
	3	022050	MATL740202	材料科学前沿 Frontiers of Materials Science	2	
	4	022035	MATL712102	材料结构性能关系 Structure-property Relations of Materials	2	
	5	022052	MATL740402	电子显微镜及其在材料科学中的应用 Electron Microscopy and its Application in Materials Science	2	
	6	091002	MATH600107	计算方法 (A) Computational Method A	3	
选修课 Elective Course	1	012193	MACH740301	增材制造技术 Additive Manufacturing Technology	2	至少修 12 学分 A minimum of 12 credits
	2	012199	MACH641301	机械故障诊断 Fault Diagnosis for Machinery	2	



课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
	3	012200	MACH641201	微纳制造技术 Micro/Nano Manufacturing Technologies	2	required
	4	012201	MACH640801	工程摩擦学 Engineering Tribology	2	
	5	012202	MACH640501	数控装备技术 Numerical Control Equipment Technologies	2	
	6	012203	MACH641101	精密定位系统的理论与设计 Theory and Design of Precision Positioning Systems	2	
	7	012194	MACH740401	微机电系统与传感器 MEMS and Sensors	2	
	8	012204	MACH640601	生物力学技术 Bio-mechatronics Technology	2	
	9	013705	MACH741001	电活性聚合物材料和结构入门 Introduction to electroactive polymer materials and structures	2	
	10	013735	MACH641701	高级塑性成形技术 Advanced Plastic Forming Technology	2	
	11	013736	MACH641801	生物仿生工程基础及应用 Foundation and Applications of Biomimetic Engineering	2	
	12	022021	MATL711302	智能材料	2	



课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
				Smart Materials		
	13	022053	MATL740502	先进能源材料 Advanced Energy Materials	2	
	14	022026	MATL711702	材料微观缺陷理论 Theory of Defects in Materials	2	
	15	023001	MATL712902	材料物理性能 Physical Properties of Materials	2	
	16	023017	MATL740702	激光加工原理及激光材料加工技术 Laser Processing Principles And Laser Materials Processing Technology	2	
必修环节 Compulsory Activity for ME & MSE	1	001997	BXHJ600399	学术活动(讲座)(硕) Lectures (Master)	1	必修 4 学分 4 credits required
	2	001983	BXHJ600799	中期考核 Mid-term Assessment	3	

(二) 国际博士研究生(Doctoral Programs)

机械工程博士学位以及材料科学与工程博士学位课程学习应至少取得 12 学分，包括：公共课（汉语（II）2 学分、中国概况（II）2 学分）4 学分、专业学位课至少 4 学分，选修课至少 4 学分。

The PhD programs in Mechanical Engineering and Materials Science and Engineering consist of at least 12 credits for course work. Required courses include *Comprehensive Chinese II* (2 credits), *Outline of China II* (2 credits), degree courses (no less than 4 credits), and elective courses (no less than 4 credits). Innovation Harbour Lectures are included in elective courses for international students, 2 credits will be granted after attending 20 Lectures.

必修环节包括：学术活动（讲座）2 学分、开题报告 2 学分、中期考核 6 学分。

Other compulsory activities include academic lectures (doctoral) (2 credits), Dissertation Proposal (2 credits), and mid-term assessment (6 credits).



机械工程及材料科学与工程国际博士研究生课程设置和学分要求
Curriculum Design and Credit Requirements of Doctoral Degree Programs in
ME and MSE

课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
公共学位课 Public Course	1	272003	LITE610112	中国概况 Outline of China	2	必修 4 学分 4 credits required
	2	272004	LITE610227	综合汉语 Comprehensive Chinese	2	
机械工程 专业学位课 Degree Course for ME	1	012190	MACH740201	纳米表面工程与摩擦学 Nano-surface Engineering and Tribology	2	至少修 4 学分 A minimum of 4 credits required
	2	012191	MACH640101	现代测量技术 Modern Measurement Technology	2	
	3	012197	MACH640401	振动理论 Theory of Vibration	2	
	4	012195	MACH640301	高等传热学 Advanced Heat Transfer	2	
	5	012192	MACH640201	CAD/CAM/CAE 理论与应用 (A) Theory and Application of CAD/CAM/CAE (A)	2	
	6	012189	MACH740101	有限元法原理及工程应用 Principle of Finite Element Methods and Engineering Application	2	
	7	012196	MACH641001	现代控制工程 Modern Control Engineering	2	
	8	091002	MATH600107	计算方法 (A) Computational Method A	3	



课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
材料科学与工程 专业学位课 Degree Course for MSE	1	022038	MATL750302	固态相变 Phase Transitions in Solids	2	至少修 4 学分 A minimum of 4 credits required
	2	022049	PHYS740102	固体物理 Solid State Physics	2	
	3	022050	MATL740202	材料科学前沿 Frontiers of Materials Science	2	
	4	022035	MATL712102	材料结构性能关系 Structure-property Relations of Materials	2	
	5	022052	MATL740402	电子显微镜及其在材料科学中的应用 Electron Microscopy and its Application in Materials Science	2	
	6	091002	MATH600107	计算方法 (A) Computational Method A	3	
选修课 Elective Course	1	012193	MACH740301	增材制造技术 Additive Manufacturing Technology	2	至少修 4 学分 A minimum of 4 credits required
	2	012199	MACH641301	机械故障诊断 Fault Diagnosis for Machinery	2	
	3	012200	MACH641201	微纳制造技术 Micro/Nano Manufacturing Technologies	2	
	4	012201	MACH640801	工程摩擦学 Engineering Tribology	2	
	5	012202	MACH640501	数控装备技术 Numerical Control Equipment Technologies	2	



课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
	6	012203	MACH641101	精密定位系统的理论与设计 Theory and Design of Precision Positioning Systems	2	
	7	012194	MACH740401	微机电系统与传感器 MEMS and Sensors	2	
	8	012204	MACH640601	生物力学技术 Bio-mechatronics Technology	2	
	9	013705	MACH741001	电活性聚合物材料和结构入门 Introduction to electroactive polymer materials and structures	2	
	10	013735	MACH641701	高级塑性成形技术 Advanced Plastic Forming Technology	2	
	11	013736	MACH641801	生物仿生工程基础及应用 Foundation and Applications of Biomimetic Engineering	2	
	12	022021	MATL711302	智能材料 Smart Materials	2	
	13	022053	MATL740502	先进能源材料 Advanced Energy Materials	2	
	14	022026	MATL711702	材料微观缺陷理论 Theory of Defects in Materials	2	
	15	023001	MATL712902	材料物理性能 Physical Properties of Materials	2	
	16	023017	MATL740702	激光加工原理及激光材料加工技术 Laser Processing Principles	2	



课程类型 Course Type	序号 NO.	课程编号 Course number	统一编码 Course Code	课程名称 Course Title	学分 Credit	备注 Note
				And Laser Materials Processing Technology		
必修环节 Compulsory Activity for ME & MSE	1	001999	BXHJ800399	学术活动(讲座) (博) Lecture (Doctor)	2	必修 10 学分 10 credits required
	2	001986	BXHJ800499	开题报告 Dissertation Proposal	2	
	3	001994	BXHJ800199	中期考核 Mid-term Assessment	6	

六、培养环节 (Compulsory Activities)

1. 学术活动 (讲座) (Lectures)

国际硕士研究生学术活动 (讲座) 分为必听讲座和选听讲座。必听讲座包括“科学道德与学风建设”1 次、“普通学术讲座”1 次; 选听讲座包括与学科紧密相关的“学科前沿系列专题讲座” (由各二级学科组织若干教授对本学科前沿知识进行讲座, 每个讲座由 5 个以上讲座组成) 一个系列和在全校范围内选听“学术讲座”1 次, 完成全部 8 个讲座后记 1 学分。

Master's degree students are required to attend 8 lectures, including 2 compulsory ones (one on Scientific Morality and Construction of Study Style, and one general academic lecture), 1 optional serial lecture on specific topics of frontiers knowledge closely related to the respective disciplines (professors of second-level disciplines are organized to offer lectures, and each lecture series include 5 specific lectures) and 1 elective academic lecture in the university. Students will obtain 1 credit with full attendance to 8 lectures.

国际博士研究生学术活动 (讲座) 分为必听讲座和选听讲座。必听讲座为“科学道德与学风建设”; 选听讲座包括与学科紧密相关的“学科前沿系列专题讲座” (由各二级学科组织若干教授对本学科前沿知识进行讲座, 每个讲座由 5 个以上讲座组成) 一个系列和在全校范围内选听“学术讲座”1 次, 自己公开讲座 1 次, 完成后记 2 学分。

Doctoral students are required to attend 7 lectures, including one compulsory lecture (one on Scientific Morality and Construction of Study Style), 1 optional serial lecture on specific topics of frontiers knowledge closely related to the respective disciplines (professors of second-level disciplines are organized to offer lectures, and each lecture series include 5 specific lectures) and 1 elective academic lecture in the university. In addition, they are required to give a lecture. Students will obtain 2 credits by completing the whole series of activities.

2. 论文 (Thesis / Dissertation)



申请硕士学位需要完成一篇符合各项要求的论文。论文应基于个人或团队合作的研究项目，在此之中每个学生都拥有自己的角色和责任。相关课题研究通过解决工程问题，使学生将课程学习与实践经验相结合。

A satisfactory thesis is required when a master's candidate applies for a Master's degree. The thesis will be based on an individual or team-working research project in which each student has a defined role and responsibility. The project leading to the thesis enables the students to combine course studies with practical experience by solving engineering problems.

申请博士学位的论文应在导师指导下完成。需要通过文献阅读和调查来确定研究的主题和范围。博士生应充分发挥导师和自己的长处，在研究领域做出创造性的成绩。

Doctoral dissertation should be completed under the guidance of the supervisor. The research topic and scope need to be identified through literature reading and investigation. PhD candidates should draw on the advantages of their supervisors and themselves to make creative achievement in their research field.

学生应在第二学期开始时准备材料，并在第二学期结束时确定初步论文主题。提案报告必须完成并在教研组会议上报告，征求意见。在第三学期开始时，应确定期末课题和论文工作计划，包括不同时期的主要内容、要求和完成期限等。在科研过程中，博士生应向相关部门提交会议进度报告。

Students should prepare materials at the beginning of the second semester and identify the preliminary topic by the end of the second semester. The proposal report must be finished and reported at the conference of teaching and research section to seek for evaluation and opinions. At the beginning of the third semester, final topic and paper work plan should be identified and worked out, including main content in different periods, requirements and completion deadlines, etc. During the process of scientific research, doctoral candidates should present a progress report on the meeting organized by the relevant departments.

每位博士研究生必须以第一作者或第二作者(导师为第一作者时)的身份在期刊上发表一篇研究论文，并以西安交通大学为发表单位。期刊水平应符合研究生院或更高层次的要求。论文应与毕业论文紧密相关。

Each doctoral candidate is required to publish a research paper in periodicals as the primary author or the second author (the supervisor being the primary author) with Xi'an Jiaotong University (XJTU) as the signed unit. The level of the periodicals should meet the standard set by the Graduate School or meet even higher levels. The journal articles should be closely related to the graduation dissertation.

研究生毕业论文的工作量、篇幅和形式应符合西安交通大学学位论文的要求。论文在理论指导和计算上应简洁、严谨、准确。演讲应以务实的科学态度进行。

The workload, length and form of graduate thesis /dissertation should be in line with the requirements of the dissertation of XJTU. The dissertation should be concise, rigorous and accurate in theoretical guidance and computation. The presentation should be conducted with a pragmatic scientific attitude.

论文匿名评审需要五名熟悉研究领域的高级职称评审人员。至少有一名评审人员应来自其他大学。答辩需经审稿人同意后方可进行。如果一个审稿人不同意，应该添加另一个审稿人；如果有两名评审人员拒绝论文，申请人必须修改其论文，并在论文答辩前重新申请评审程序。



The anonymous review of the dissertation requires five reviewers with senior titles who are familiar with the research field. At least one reviewer should come from other university. The oral defense can only be conducted after the dissertation passes the reviewing by the reviewers. If one reviewer disapproves the dissertation, another reviewer should be added; if two reviewers reject the paper, the applicant must revise his or her dissertation and go through the review process another time before taking oral dissertation defense.

论文必须经过两个过程:评审和答辩。毕业生在进行答辩时,应回答与论文相关的问题,并表现出对专业基础理论和专业知识的掌握。

In oral defense for his or her thesis / dissertation, the candidate is supposed to answer questions related to the thesis / dissertation and demonstrate his or her mastery of basic professional theories and specialized knowledge.

七、培养环节时间节点(Timeline and milestones)

	课程学习 Course Work	开题报告 Dissertation proposal	中期考核 Mid-term Assessment	预答辩 Pre-Oral Defense Reporting	论文答辩 Oral Thesis / Dissertation Defense
硕士 Master's program	第一学年 First academic year	第二学期 Second semester	第三学期 Third semester	第四学期/最后一 个学期 Fourth semester/Last semester	第四学期/最后一 个学期 Fourth semester/Last semester
博士 Doctoral program	第一学年 First academic year	第二学期 Second semester	第四学期 Fourth semester	第六学期/最后一 个学期 Sixth semester/Last semester	第六学期/最后一 个学期 Sixth semester/Last semester

