

## 序 言

为进一步贯彻落实教育部《关于深化研究生教育的意见》《关于深入推进专业学位研究生培养模式改革的意见》《关于改进和加强研究生课程建设的意见》和《山东理工大学深化研究生教育改革实施方案》的文件精神,学校出台了《山东理工大学关于修订研究生培养方案的指导意见》,决定全面修订 2019 版研究生培养方案。

本次培养方案修订以习近平新时代中国特色社会主义思想为指导,贯彻落实党的十九大精神和全国教育大会精神,立足国家重大战略和重点基础学科的建设与发展需求,以培养拔尖创新人才为目标,以提高研究生培养质量为核心,健全扎实系统的知识结构和课程体系,强化学术与实践创新能力培养,提高研究生批判思维能力和国际学术视野,促进教学与科研协调发展,构建开放式、国际化的研究生培养体系,培养“五有”人才。

突出分类培养,要求各培养单位分别制定博士、硕博连读、学术硕士、全日制专业硕士、非全日制专业硕士、国际学生博士、国际学生学术硕士等七类培养方案。

突出国际化,要求博士培养方案设置全英文授课方向,硕士培养方案开设全英文或双语课程;将博士研究生参加国际交流作为毕业条件之一,硕士研究生参加国际交流可获得培养环节学分。

突出全过程监管,除课程设置外,本次培养方案修订还将开题、中期考核、科研实践、教学实践、国际交流、创新创业等培养环节纳入考核,获得相应学分方允许毕业。

突出交叉培养,要求博士、学术硕士学位授权一级学科培养方案,针对学科聚焦发展计划创新平台设置交叉研究方向,同时鼓励各学科针对科技发展前沿设置跨学科研究方向。

实行毕业资格与学位资格分离,研究生修满规定学分,并通过论文答



辩者，则准予毕业，并颁发毕业证书；达到学校规定的学术成果要求，经各培养单位学位评定分委员会审核，报学校学位评定委员会审议通过后授予学位，并颁发学位证书。

学校于 2018 年下半年，正式启动了 2019 版研究生培养方案修订工作。经前期调研、培养单位内部研讨、培养方案制定指导专家组审核，在充分征求各学科建设专家委员会意见的基础上，形成培养方案终稿。本次共修订机械工程、农业工程、化学工程与技术、电气工程等 12 个学术学位博士研究生培养方案，55 个学术学位硕士研究生培养方案，21 个全日制专业学位硕士研究生培养方案，23 个非全日制专业学位硕士研究生培养方案，经山东理工大学学位评定委员会 2019 年第一次会议审定通过后，从 2019 级研究生开始执行。

山东理工大学研究生院

2019 年 6 月

## 学校简介

山东理工大学创建于1956年，坐落在历史悠久的齐文化发祥地——山东省淄博市，是山东省重点建设的理工科大学。学校现为国家级人才培养模式创新实验区、首批国家级“卓越工程师教育培养计划”试点单位、全国大学外语教学改革试点单位、全国大学生KAB创业教育基地、全国教育信息化试点单位，山东省“应用型人才培养特色名校”立项建设单位，山东省高水平应用型专业群立项建设单位，山东省首批一流学科立项建设单位。

学校于1998年获批硕士学位授权单位，1999年开始招收攻读硕士学位研究生，2009年开始招收攻读全日制硕士专业学位研究生；2013年获批博士学位授权单位，2014年开始招收攻读博士学位研究生；2017年获得推荐优秀应届本科毕业生免试攻读硕士学位研究生资格。

学校现有山东省一流学科3个，一级学科博士后科研流动站1个，博士学位授权一级学科4个，硕士学位授权一级学科26个，硕士学位授权二级学科4个（不含一级学科覆盖点）；拥有工程硕士（含13个招生领域）、农业硕士（含4个招生领域）、金融硕士、国际商务硕士、翻译硕士、工商管理硕士、艺术硕士等7个专业学位授权类别，覆盖工学、理学、经济学、法学、文学、管理学、艺术学等7大学科门类，形成了以工为主、理工结合、特色鲜明、优势突出的多层次协调发展的高层次人才培养与学位授予体系。截至2018年12月31日，在学研究生共计3192人，其中博士研究生79人、全日制硕士研究生1862人、非全日制硕士研究生527人，在职攻读硕士学位人员724人。

学校现有博士学位研究生指导教师98人，硕士学位研究生指导教师842人。其中，双聘院士5人，法国欧洲科学、艺术与人文学院院士1人，山东省“一事一议”引进顶尖人才1人，“千人计划”专家4人，“万人计划”领军人才2人，国家有突出贡献中青年专家2人，新世纪百千万人才工程国家



级人选 4 人，享受国务院特殊津贴人选 16 人；中科院“百人计划”1 人，教育部新世纪优秀人才支持计划 1 人；泰山系列人才 15 人，山东省有突出贡献中青年专家 21 人；省级教学名师 12 人，学校特聘教授 33 人。

学校设有国家工程技术研究中心 1 个，国家地方联合工程研究中心 2 个，有省级工程技术研究中心 17 个、省检测研发公共服务基地 1 个、省级协同创新中心 3 个、山东省重点实验室 2 个、山东省高校重点实验室 5 个、省级人文社科研究基地 5 个、省工程实验室 1 个，山东工程技术研究院设在我校。“十一五”以来，学校先后承担省部级以上课题 1900 余项，其中国家“863”计划、国家“973”计划、国家科技支撑计划、国家自然科学基金、国家社会科学基金等各类国家级项目 500 余项；荣获省部级以上科研奖励 200 余项，其中 2006 年、2007 年各获得国家技术发明二等奖 1 项，2008 年、2009 年、2011 年、2012 年、2013 年、2015 年各获得国家科技进步二等奖 1 项。

学校坚持立德树人根本任务，以培养“五有”人才为目标，不断深化研究生教育改革，在研究生招生、培养、学位授予、管理等方面多措并举，全面提升研究生培养质量。出台校内优秀生源选拔、校外研究生生源基地建设、硕博连读等政策，不断提高生源质量；加强研究生教育教学改革与建设，建立健全培养质量监督、控制与保障体系，规范研究生培养的各环节；严格学位论文开题、中期筛选、复制比检测、匿名评审、集中答辩等过程监控，确保学位论文质量；加强研究生思想引领，通过定期举办或组织研究生参加“学术论坛”“中国研究生创新实践系列大赛”“春天的诗会”“科技文化艺术节”“稷下大讲堂”等品牌文化活动，浓厚校园学术氛围，丰富校园文化生活，在以文化人和实践育人中弘扬社会主义核心价值观。

多年来，累计向社会输送毕业研究生 6000 余人，其中一大批毕业生已成为所在行业领域的中坚骨干力量，得到社会企事业单位的一致好评，提高了学校的社会声誉。

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## 机械工程学科

山东理工大学机械工程学科始建于1956年，1998年开始培养硕士研究生，2013年获批机械工程一级学科博士点，2014年获批机械工程博士后科研流动站，是“八五”至“十三五”期间连续6届山东省重点学科，拥有国家工程技术研究中心1个、国家级机械工程实验教学示范中心1个、山东省重点学科3个、山东省重点实验室3个、山东省高校协同创新中心2个、山东省工程技术研究中心6个，在2016年全国第四轮一级学科整体水平评估中进入B-档，位列山东省属高校第一，在2017年国务院学位委员会学位授权点专项评估中，机械工程博士学位授权学科评估合格，在2018年机械工程学科入选山东省一流学科。

机械工程学科现有专任教师85人，其中教授20人、副教授32人、博士生导师14人，硕士生导师46人。拥有外聘院士1名、长江学者讲座教授2名、百千万人才工程国家级人选2名、泰山学者特聘教授5名、泰山产业领军人才1名、山东省泰山学者优势特色学科人才团队支持计划1名、山东省有突出贡献的中青年专家9名，并有4人享受国务院特殊津贴。2014-2018年，本学科共承担国家级项目34项，省部级项目46项，企业委托项目175项，获省部级以上科技奖励13项，其中一等奖2项、二等奖7项，发表高水平学术论文600余篇，授权发明专利189件。机械工程学科立足山东省机械制造业，长期致力于机械设计及其理论、机械制造及其自动化和机械电子工程等领域的理论及应用研究，有效解决上述领域的核心关键共性技术问题，培养了大量具有创新能力的高级专门人才。

机械工程学科立足山东省机械制造业，长期致力于机械设计及其理论、机械制造及其自动化和机械电子工程等领域的理论及应用研究，有效解决上述领域的核心关键共性技术问题，培养了大量具有创新能力的高级专门人才。

The mechanical engineering discipline in Shandong University of Technology (SDUT) was established in 1956. In 1988, the first batch of postgraduates were enrolled in the mechanical engineering discipline. In 2013, the mechanical engineering was authorized as the first-level discipline doctoral program. In 2014, the post-doctoral research station of mechanical engineering discipline was also approved, which was the key discipline of Shandong province for 6 consecutive terms during the period from the eighth five-year plan to the 13th five-year plan. There is 1 national engineering technology research center, 1 national mechanical engineering experimental teaching demonstration center, 3 Shandong provincial key discipline, 3 Shandong



provincial key labs, 2 Shandong provincial collaborative innovation center, 6 Shandong provincial engineering technology research center in the mechanical discipline. In the fourth round of overall level assessment of first-level disciplines in 2016, it entered the B-level and ranked the No.1 among all Shandong provincial colleges and universities. In the special assessment of the degree authorization program of the state council academic degrees committee, it passed the assessment of the authorized doctoral degree discipline in mechanical engineering. In 2018, the mechanical engineering discipline was selected as the first-class discipline in Shandong province.

Now, there are 85 full-time teachers in the mechanical engineering discipline including 20 professors, 32 vice professors, 14 doctoral advisors and 46 master's supervisors. Besides, the mechanical engineering discipline have many high-level experts, including external academician ( 1 person ), Yangtze scholar professors ( 2 persons ), national talents engineering candidates ( 2 persons ), Taishan scholar distinguished professor ( 5 persons ), Taishan industry leaders ( 1 person ), Shandong Taishan Scholar Advantages Subject Talent Team Support Plan ( 1 person ), Young and middle-aged experts with outstanding contributions in Shandong Province ( 9 persons ), and four professors acquire special allowance from the State Council. In the past five years ( 2014 – 2018 ), we have undertaken 34 national projects, 46 provincial projects, 175 enterprise commissioned projects, and we have achieved 13 Science and technology awards of provincial and national level including 2 first prizes and 7 second prizes. Meanwhile, more than 600 high-level academic papers have been published and 189 invention patents have been granted.

The mechanical engineering discipline is based on machine manufacture in Shandong province and focuses on theory and application of the subjects including mechanical design and theory, machine manufacture and automation and mechatronics engineering. Thus, some key generic technical problems in the above-mentioned areas have been effectively solved, and a large number of senior specialized personnel with innovative capabilities have been cultivated.

# 学术学位博士研究生培养方案

学科代码：0802

## Training Scheme for Doctoral Degree

Credit Code: 0802

### 一、培养目标 ( Educational Objectives )

为适应经济建设和社会发展的需要，培养德、智、体全面发展，能从事本学科领域内的教学、科研以及管理工作的高层次专门人才，具体要求：

1. 坚持对华友好的政治立场，积极促进中外友好合作与交流，遵守中国的法律法规，尊重中国的社会公德和风俗习惯，熟悉中国文化；具有良好的职业道德和敬业精神，具有科学严谨、求真务实的治学态度和工作作风，德智体美劳全面发展。

2. 掌握本学科坚实宽广的基础理论、系统深入的专门知识；熟悉本学科的发展方向及国际学术研究前沿，具有独立从事科学研究工作的能力，在所从事的研究方向上做出创造性成果。

3. 熟练掌握汉语，能运用汉语熟练阅读本专业的文献资料，并具有撰写学术论文和进行学术交流的能力。

4. 具有健康的体魄和健全的人格，以及良好的社会适应能力。

In order to meet the satisfaction of economic construction and society development, this discipline cultivate all-round development and high-level specialists who can engage in teaching, scientific research and management. The specific requirements are listed below.

1. Adhere to a friendly political stance with China and promote a cooperation and exchanges between China and foreign countries. Abide by the Chinese laws and regulations and respect Chinese social ethics and customs. Be familiar with Chinese culture and keep good professional ethics and dedication spirit. Keep rigorous, realistic and pragmatic attitude and work style and a comprehensive development of morality, intelligence, body, beauty and labor.

2. Master some basic theories and specialized knowledge of this discipline; be familiar with the development direction of this discipline and international academic research frontier, be able to engage in scientific research work independently and make creative achievements in the research direction.



3. Master Chinese language and be able to use Chinese language reading literature materials of this major, besides, have the ability to write academic papers and academic communication with others.

4. Have a healthy body, sound personality and good social adaptability.

## 二、研究方向 ( Research Orientation )

机械工程（一级学科）学术博士学位研究生培养方案设以下 5 个研究方向：

1. 数字化制造与质量控制
2. 非传统加工工艺与装备（全英文授课方向）
3. 光机电一体化
4. 机械设计及高性能零件
5. 车辆及其电子电气（交叉方向）

各研究方向详见附表 1。

1. Numerical Manufacture and Quality Control
2. Non-traditional Manufacture Process and Equipment )
3. Mechanical Design and High Performance Component
4. Optical-Mechanical-Electrical Integration
5. Vehicle Engineering, Electronics and electrical ( Crossing direction )

As listed in Table 1.

## 三、学习年限 ( Length of Schooling )

全日制博士研究生学制 4 年，学习年限为 3-6 年。科学研究和论文撰写时间不少于 2 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

在基本学制规定时间内，研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由，研究生在基本学制结束前 2 个月向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告，并经学位评定分委员会组织审查通过，报校学位评定委员会办公室审核批准后，可最多延长申请学位年限 1 年。

The length of schooling for full-time doctoral students is 4 years and the length of schooling can be adjusted within the range of 3-6 years. The time of scientific research and writing thesis should be no less than 2 years ( dating from passing opening report ). With the permission of the tutor, the candidates can apply for graduation, but the time requirement of scientific research and paper writing remains unchanged. Time off from school is not included in study years.

Within the limit time prescribed by the basic length of schooling, the graduate students

should complete the dissertation defense, degree conferring examination and other work. As a result of academic warrant, two months before the end of graduate students in the basic length of schooling to the propose dissertation progress reports and dissertations report to academic degree evaluation committee. If the report is approved by the academic degree evaluation committee organization after it is reported to the academic degree evaluation committee, the length of extension degree is no more than 1 year.

#### 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

博士研究生课程学习实行学分制，课程分为必修课程和选修课程，必修课程分为公共必修课和学科平台必修课，选修课程分为方向选修课和素养选修课，一般以课内 16 学时为 1 学分，总学分不低于 15 学分。公共必修课不低于 4 学分，学科平台课不低于 4 学分，选修课不低于 2 学分，其中 1 门学科平台课为必选课程，选修课可从其它学科平台课、方向选修课、素养选修课中选。

对于跨一级学科考入或以同等学力考入的博士研究生，必须补修覆盖本学科硕士研究生的基础理论课程 2 门及以上，考核合格后方可参与开题答辩，成绩不计入总学分。

课程设置情况见附表 2。

The credit system is adopted in the study of doctoral postgraduate courses. The courses are divided into compulsory courses and optional courses, public compulsory courses and subject platform compulsory courses, and elective courses are divided into orientation elective courses and quality optional courses. Generally, 16 class hours are regarded as 1 credit, and the total credit is no less than 15 credits. Public compulsory courses should be no less than 4 credits, subject platform courses should be no less than 4 credits, and optional courses should be no less than 2 credits. One subject platform course should be a required course, and optional courses may be selected from other subject platform courses, direction optional courses, and quality elective courses.

For those doctoral candidates who are admitted to interdisciplinary disciplines or with the same academic level, they must make up more than 2 basic theory courses covering the postgraduate students of this discipline. Only when they pass the examination, can they participate in the thesis proposal defense, and their scores are not included in the total credits.

The courses are listed in Table 2.

#### 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

充分发挥博士研究生导师的主导作用和指导小组的群体优势，发挥博士研究生的主动性、自觉性和创造性，依托重点学科和科研平台，实行导师负责和集体培养相结合的办法，在培养过程中实行导师负责制。导师负责制订研究生培养计划，组织开题、中期、



答辩，指导科学研究和学位论文等工作，且对研究生的思想品德、学术道德有引导、示范和监督的责任。鼓励开展经常性的学术交流和科研协作，培养研究生的创造性思维、科学研究能力与团队协作精神。

### 1. 开题报告

开题时间由导师确定，一般应在第3学期末完成。开题应有5人以上的专家组对开题报告提出评价和修改意见。主要考核博士研究生的课程成绩、文献阅读、学术调研等情况。开题通过后计1学分，开题不通过可限期重做，两次不通过终止培养。

### 2. 中期考核

中期考核一般应在第4学期末完成，由学科组织实施，并有5人以上的专家组对博士研究生的中期考核进行会议评价，主要对博士研究生的学术科研能力、实践能力、综合素质及论文进展情况进行考核，通过后计1学分，考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

### 3. 创新创业

(1) 博士研究生在学期间参加国际学术会议宣读本人论文并交流发言1次，或做公开学术报告2次，计1学分；

(2) 博士研究生在学期间参加学校组织的“学术道德规范讲座”和国内外知名专家学者的专题讲座、学术报告、研究生论坛等学术研讨活动不少于10次，计1学分；

(3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖，计1学分；

(4) 撰写完成国家自然科学基金申请书1份，导师负责考核，考核合格计1学分。

需完成不低于1学分的创新创业项目。

In order to give full play to the leading role of the tutor and the group advantage of the guidance group, and give full play to the initiative, consciousness and creativity of the doctoral students. Relying on the key disciplines and scientific research platform, the methods combining the tutor responsibility with the collective training is implemented, and the tutor responsibility system is implemented in the training process. The supervisor is responsible for formulating the training plan for graduate students, organizing the proposal and mid-term defense, guiding scientific research and dissertation, etc., besides, the tutors have the responsibility of guiding, demonstrating and supervising the ideological and moral character and academic ethics of graduate students. Encourage regular academic exchanges and scientific research cooperation, and cultivate the creative thinking, scientific research ability and team spirit of graduate students.

#### 1. Dissertation Proposals

The starting time is determined by the tutor and should be completed at the end of the third

semester. The proposal should be evaluated and modified by a group of more than 5 experts. It mainly evaluates the course performance, literature reading and academic research of doctoral students. One credit will be counted after passing the thesis proposal. If the thesis proposal fails, it can be re-done within limit time. If the thesis proposal still fails at the second time, the cultivation will be terminated.

## 2. Metaphase Filtration

Mid-term examination generally should be completed in the fourth semester. It should be organized by each discipline, and have more than 5 panel to evaluate meeting doctoral mid-term examination. It mainly focuses on academic scientific research ability, practical ability and comprehensive quality carries on the inspection and the progress of the paper of doctoral students. Passing examination, they will obtain one credits. Those students who can not pass the examination will be regarded as incomplete study when they are verified by the graduate school and the results will be reported to the headmaster's office.

## 3. Innovation and Entrepreneurship

(1) During the study period, doctoral students should attend an international academic conference to read their thesis and give a speech at the conference, or make two public academic reports, which will be counted as 1 credit.

(2) During the study period, doctoral students should participate in the "lectures on academic ethics" organized by the university, some special lectures, academic reports, BBS and other academic seminar activities for graduate students for no less than 10 times, which counts as one credit.

(3) 1 credit will be counted when the students participate in national science and technology competition, creative design competition, innovation and entrepreneurship competition and winning awards.

(4) Write and complete one application form of the national natural science foundation of China (NSFC), and the tutor should be responsible for the assessment.

Finally, the students must complete at least 1 credit of innovation and entrepreneurship project.

## 六、学位论文 (Academic Dissertation)

博士学位论文是博士研究生科学研究工作的全面总结,是描述其研究成果、反映其研究水平的重要学术文献,是申请和授予博士学位的基本依据。学位论文撰写是博士研究生培养的关键和核心,必须严格按照规范执行,本学科博士研究生的学位论文应满足以下基本要求:

1. 论文应在导师的指导下由博士研究生独立完成,论文应有较强的系统性和创造性成果,对机械工程学科的发展与国家经济建设具有较大的理论意义或应用价值。

2. 博士研究生在校期间应把主要精力投入与博士论文有关的科学研究和论文的撰



写上，论文内容必须以博士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 博士研究生用于完成学位论文的时间，一般不少于2年。

4. 按照《山东理工大学博士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节，论文答辩要做到公正、公开，严格要求。

其他论文要求按照《山东理工大学关于研究生学位论文工作的有关规定》、《山东理工大学博士学位授予工作实施细则》等相关文件执行。

Doctoral dissertation is a comprehensive summary of the scientific research work for each doctoral candidate, it is also an important academic document describing their research results and it reflect their research level. It is a basis for applying for and awarding doctoral degrees. Writing dissertation is the key point of the cultivation of doctoral students, which must be carried out in strict accordance with the standard. The dissertation of doctoral students in this discipline should meet some basic requirements:

1. The thesis should be completed independently by doctoral students under the guidance of the supervisor, and should be systematic and have some creative results, which have great theoretical significance or application value to the development of mechanical engineering discipline and national economic construction.

2. Doctoral students should put their energy into the scientific research and writing doctoral thesis, and the content of the thesis must be in accordance with the experiment, observation or investigation materials completed by the doctoral students.

3. Generally, the time used by doctoral students to complete the dissertation is not less than 2 years.

4. According to the "rules for the implementation of doctoral degree awarding of SDUT", the thesis proposal, mid-term assessment, pre-defense and formal defense and other links should be organized. The thesis defense should be fair, open and strictly required.

Other papers shall be executed in accordance with the <relevant provisions of SDUT on the work of postgraduate academic dissertations>, <detailed rules for the implementation of doctoral degree awarding work of SDUT> and other relevant documents.

## 七、毕业与学位要求 ( Graduate and Degree Requirements )

博士研究生修满规定学分，通过论文答辩，并符合学校规定的其他毕业要求者，则准予毕业，并颁发博士毕业证书；在获得博士毕业证书的基础上，如达到学校规定的学术成果要求，满足学校制定的博士学位授予标准，经各培养单位学位评定分委员会审核，报学校学位评定委员会审议通过后可授予博士学位，并颁发博士学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；



2. 修读完培养方案规定课程和其他培养环节，成绩考核合格；
3. 完成博士学位论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

## （二）学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学博士学位授予工作实施细则》以及机械工程学院学位授予有关规定。

Doctoral students who have completed the required credits, passed the thesis defense, and met other requirements for graduation stipulated by the university will be permitted to graduate, and the doctoral diploma will be issued. On the basis of obtaining the doctoral diploma, if it meets the requirements of academic achievements stipulated by the university and meets the standards for awarding doctoral degree set, it can be awarded the doctoral degree and the doctoral degree certificate after being examined and approved by the academic degree evaluation sub-committee of each department and then submitted to the academic degree evaluation committee of the university.

### 1. Graduation Requirements

(1) Keep good moral character and academic ethics, seek truth from facts, have the courage to innovate.

(2) After completing the training program and other training sections, the students passed the examination.

(3) The students complete the defense of doctoral dissertation with qualified results.

(4) Comply with other requirements stipulated by the university.

### 2. Academic Degree Requirements

The interim measures for the implementation of the academic degrees regulations of the People's Republic of China, the detailed rules for the implementation of the awarding of doctoral degrees of SDUT and the relevant provisions on the awarding of academic degrees of the mechanical engineering department should be strictly implemented.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>培养德、智、体全面发展，能围绕所从事的研究方向，对相关科学问题和工程技术问题进行深入系统研究，胜任机械工程领域内的教学、科研以及管理工作的高层次专门人才。</p> <p>To cultivate high-level professional talents with comprehensive moral, intellectual and physical development, who can conduct in-depth and systematic research on relevant scientific problems and engineering technical questions based on the research orientation that they are engaged in, and those persons who are competent for teaching, scientific research and management in the field of mechanical engineering</p>	<p>中国文化、汉语、科研素养与创新 能力、科技英语写作，科学道德与 学术规范</p> <p>Chinese culture、Chinese language、 scientific literacy and innovation ability、 scientific English writing, scientific ethics and academic norms</p>
综合能力	<p>掌握坚实宽广的基础理论和系统深入的专门知识，了解学科发展方向及国内外研究前沿，具有国际学术视野和学术原创精神，能够独立、创造性地从事科学研究工作，具有主持较大型科研、技术开发及工程项目的能力，或解决和探索我国经济和社会发展问题的能力。</p> <p>Master broad basic theory and system of specialized knowledge, understand the subject development direction and research frontier. Keep international academic vision and original spirit. Be able to work independently and creatively engaged in scientific research. Has presided over the larger scientific research, technological development and the ability of the project, or solve the problem and explore the economic and social development of our country.</p>	<p>应用泛函分析、非线性分析、数据 挖掘与机器学习、机械工程学科前 沿</p> <p>Applied functional analysis 、 Nonlinear analysis、Data mining and machine learning、The frontiers of mechanical engineering</p>
研究方向	<p>数字化制 造与质量 控制</p> <p>掌握数控技术软、硬件设计，数控装备设计开发，数控技术在传统机电设备升级改造中的应用，数控加工技术，以及机械产品计算机辅助设计、辅助制造等知识，熟悉机械制造业信息化、传感器、数据采集与处理、计算机接口等技术，并将以上知识和技术应用于机械设计制造领域，以及企业的经营管理、产品开发、生产制造和售后服务等环节，实现产品设计制造信息化、生产过程控制和制造智能化，促进装备制造业技术进步和技术升级，提升装备制造业的科学技术含量和市场竞争能力。</p> <p>Master software and hardware design of numerical control (NC) technology and equipment design and development and application of NC in the traditional mechanical and electrical equipment upgrades. NC machining technology, and machinery products, such as computer-aided design, aided manufacturing, be familiar with mechanical manufacturing informatization, sensor, data acquisition and processing, computer interface technology. They can apply the above knowledge and technology in the field of</p>	<p>现代制造技术、机械故障诊断学、 最优控制及算法、信号与处理、数 控机床误差补偿技术、计算材料学 与材料设计</p> <p>Modern manufacturing technology、 Mechanical fault diagnostics、Optimal control and algorithm、Signal and processing、CNC machine error compensation technology、 Computational materials science and material design</p>

	mechanical design and manufacturing, the management of the enterprise management, product development, manufacturing and after-sales service, product design and manufacturing informatization, and manufacture of intelligent control of the production process, to promote the equipment manufacturing industry technical progress and technical upgrading. Improve the scientific and technological content and market competitiveness of the equipment manufacturing industry.	
非传统加工 工艺与 装备	<p>掌握非传统加工原理、工艺及快速成型技术，熟悉非传统加工设备的特性、控制系统原理以及对各种难加工材料的加工工艺。研究非传统加工工艺和装备技术、难加工材料高效精密加工理论与工具技术、微细/微纳制造基础理论和装备技术，特种加工的表面工程技术与方法，并将以上方法和技术应用于非传统加工工艺与装备等技术领域。</p> <p>Master nontraditional processing principle, technology and rapid prototyping technology, be familiar with the characteristics of nontraditional processing equipment, control system principle and processing technology of various difficult-to-process materials. Research on nontraditional machining technology and equipment technology, high-efficiency precision machining theory and tool technology of difficult-to-process materials, basic theory and equipment technology of Micro/Nano-manufacturing, surface engineering technology and method of special machining, and apply the above methods and technology to nontraditional machining technology and equipment and other technical fields.</p>	<p>现代表面工程，特种加工理论与技术，耦合系统的加载测试理论与应用</p> <p>Modern surface engineering、Special machining theory and technology、Coupled system loading test theory and application</p>
光机电一 体化	<p>掌握光电测量与控制、数控技术与机电装备、机电测量与控制、机器人与微纳制造技术等方面的专业知识，熟悉光学测量设备及其应用、专用数控系统设计与机电装备、传感器实时在线检测、机器人设计与制造等研究领域的技术前沿与发展趋势，并将以上知识和技术应用于光机电一体化技术等领域，为山东省的高端装备与智能制造产业提供理论和技术支持。</p> <p>Master photoelectric measurement and control, numerical control technology and mechanical and electrical equipment, electrical measurement and control, robot and Micro/Nano manufacturing technology, professional knowledge, be familiar with optical measurement equipment and its application, special CNC system design and mechanical and electrical equipment, real-time online detection sensor, the robot design and manufacture of technological frontier in the field of research and development trend, and applies the above knowledge and technology light mechanical and electrical integration technology, high-end equipment and intelligent manufacturing industry for Shandong province to provide theoretical and technical support.</p>	<p>振动、冲击、噪声现代理论，流体振动理论分析及信号处理，流动与传热数值计算，机器人与智能控制，科学计算可视化</p> <p>Modern theory of vibration、Impact and noise、Theoretical analysis of fluid vibration and signal processing、Numerical calculation of flow and heat transfer、Robot and intelligent control、Visualization of scientific calculation.</p>



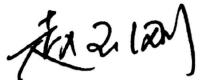

	<p>机械设计 及高性能 零件</p>	<p>掌握机械优化设计技术、摩擦学设计技术、机构动力学分析、耐热耐蚀等高性能金属零件设计等领域的专业知识，研究机构构型与装备设计以及高性能零件的材料性能与制造工艺，各种机械中有关机构的结构、运动和受力等共性问题，高性能零件的液态成型技术，耐热耐蚀金属材料及应用等，并将以上知识和技术应用于机械设计 &amp; 高性能零件的设计与研发中，为山东省传统机械行业的发展提供理论和技术支持。</p> <p>Master of mechanical optimization design technology, the tribology design technology, mechanism dynamics analysis, heat corrosion and other high performance metal parts design in areas such as professional knowledge, research organization configuration, equipment design, material properties and manufacturing process of high performance parts. All kinds of mechanical structure, movement and stress distribution of relevant institutions in common problems, such as high performance liquid molding technology of the parts, heat resistant corrosion resistant metal materials and application, etc., will be more than knowledge and technology used in mechanical design and development of high performance parts, for the development of traditional machinery industry in Shandong province to provide theoretical and technical support</p>	<p>现代机构学，现代机械设计，机械动力学，摩擦学理论及应用，材料结构与性能检测技术</p> <p>Modern mechanism science、modern mechanical design、Mechanical dynamics、tribology theory and application、Material structure and performance testing technology</p>
	<p>车辆及其 电子电气</p>	<p>掌握车身设计与制造、车辆电气与控制、电动汽车设计与制造、工程车辆及其遥控等方面的专业知识，进行汽车电子电气设备、电动车的整车设计、控制、电源管理、电力驱动的研究与开发，特种车辆的无线遥控原理和方法，电动汽车动力系统及其控制等方面的研究，并将以上知识和技术应用于车辆及其电子电气领域，为山东省汽车工业特别是新能源汽车、低速汽车开发提供理论和技术支持。</p> <p>Master body design and manufacturing of cars, electric vehicles and control the design and manufacture, engineering vehicles and the remote control of professional knowledge, automotive electronic electric equipment, electric vehicle design, control, power management, the research and development of the electric drive, wireless remote control principle and methods of the special vehicle, electric vehicle power system and its control. More knowledge and technology can be applied in the vehicles and the electrical fields for the Shandong province automobile industry, especially the new energy vehicles, low speed motor development and provide theoretical and technical support</p>	<p>电动汽车技术，汽车电子控制技术，现代汽车系统集成及虚拟开发技术，高等车辆动力学</p> <p>Electric vehicle technology、Automotive electronic control technology、Modern automotive system integration and virtual development technology、Advanced vehicle dynamics</p>

附表 2: 培养计划 (Training Plan)

学科名称	机械工程 Mechanical Engineering		学科代码	0802		
单位名称	机械工程学院 Mechanical Engineering Department		培养类型	学术博士研究生 Doctoral Postgraduates		
学分要求	总学分 Total Credits: $\geq 15$ , 必修课程学分 Credit for Compulsive Course: $\geq 4$ , 平台课程学分 Credit for Subject Courses $\geq 4$ , 选修课程学分 Credit for Optional Course: $\geq 2$					
课 程 设 置						
课程类型	课程编码	课程名称	学 分	学 期	备注	
公共必修课程 $\geq 4$ 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
学科平台课程 $\geq 4$ 学分	B11004	应用泛函分析 Applied Functional Analysis	3	1	必选	
	B11005	非线性分析 Nonlinear Analysis	2	1	选修 4 学 分	
	B11006	数据挖掘与机器学习 Data Mining and Machine Learning	2	1		
	B01034	机械工程学科前沿 Frontier of Mechanical Engineering	2	1		
方向选修课程 $\geq 2$ 学分	B05001	科学计算可视化 Visualization of Scientific Computing	2	1		
	B04002	最优控制及算法 Optimal Control and Algorithms	2	1		
	B01010	现代制造技术 Modern Manufacturing Technology	2	1		
	B01011	现代表面工程 Modern Surface Engineering	2	1		
	B01013	现代机构学 Modern Mechanisms	2	1		
	B01014	现代机械设计 Modern Mechanical Design	2	1		
	B01015	机械动力学 Mechanical kinetics	2	1		
	B01016	计算材料学与材料设计 Computational Material Science and Material Design	2	1		



	B01017	摩擦学理论及应用 Tribological Theory and Applications	2	1
	B01018	信号与处理 Signal and Processing	2	1
	B02019	振动、冲击、噪声现代理论 Modern Theory of Vibration, Impact and Noise	2	1
	B02020	高等车辆动力学 Dynamics of Higher Vehicles	2	1
	B02021	电动汽车技术 Electric Vehicle Technology	2	1
	B01023	机器人与智能控制 Robot and Intelligent Control	2	1
	B01028	材料结构与性能检测技术 Testing of Material Structure and Properties	2	1
	B01026	机械故障诊断学 Mechanical Fault Diagnosis	2	1
	B01022	流体振动理论分析及信号处理 Theory of Fluid Vibration and Signal Processing	2	1
	B02024	流动与传热数值计算 Numerical Fluid Flow and Heat Transfer	2	1
	B01031	数控机床误差补偿技术 Error Compensation Technology of NC Machine Tools	2	1
	B01032	特种加工理论与技术 Non-traditional machining theory and technology	2	1
	B01033	耦合系统的加载测试理论与应用 Loading Mearsuring Theory and Application for Coupled System	2	1
	B02029	汽车电子控制技术 Automotive Electronic Control Technology	2	2
	B02002	现代汽车系统集成及虚拟开发技术 Modern Automotive System Integration and Virtual Development Technology	2	2
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2
	G09064	科研与人文修养 Scientific Research and Humanity Cultivation	1	1
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2

	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
补修课程 不计学分					导师 确定
其他培养环节 (≥3 学分)					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>开题时间由导师确定, 一般应在第 3 学期完成。通过后计 1 学分, 开题不通过可限期重做, 两次均未通过, 经培养单位、研究生院审核, 报校长办公会批准, 做退学处理。</p> <p>The starting time is determined by the tutor and should be completed in the third semester. If you fail to pass the proposal, you can do it again within a time limit. If you fail twice, you will be approved by the headmaster's office after the examination of the training department and the graduate school.</p>				3-5
中期考核 (1 学分)	<p>一般应在第 4 学期完成, 主要对博士研究生的学术科研能力、实践能力、综合素质及论文进展情况进行考核, 通过后计 1 学分, 考核不合格的, 经培养单位、研究生院审核, 报校长办公会批准, 做肄业处理。</p> <p>Generally should be completed in the fourth semester, mainly to the doctoral graduate student's academic research ability, practical ability, comprehensive quality and paper progress to carry on the examination, through the post-total of 1 credit, examination unqualified, by the training unit, graduate school audit, report President office approval, do associate study processing.</p>				3-6
创新创业 ≥1 学分	<p>1. 参加国际学术会议宣读本人论文并交流发言 1 次, 或做公开学术报告 2 次;</p> <p>2. 参加学校组织的“学术道德规范讲座”和国内外知名专家学者的专题讲座、学术报告、研究生论坛等学术研讨活动不少于 10 次;</p> <p>3. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖;</p> <p>4. 撰写完成国家自然科学基金申请书 1 份, 由导师负责考核。</p> <p>每项记 1 学分。</p> <p>(1) Attend academic conferences and read papers at the conference, or make public academic reports twice.</p> <p>(2) Participate in national science and technology competition, creative design competition, innovation and entrepreneurship competition and winning awards.</p> <p>(3) Participate in high-level science and technology competition, creative design, innovation and entrepreneurship competition and win some awards.</p> <p>(4) Write and complete one application form of the national natural science foundation of China (NSFC), and the tutor should be responsible for the assessment.</p> <p>1 credit for each item.</p>				1-8
培养单位 教授委员会主任			培养单位 负责人		



## 学术学位硕士研究生培养方案

学科代码：0802

### Training Program for Academic Master Candidates

Credit Code: 0802

#### 一、培养目标 (Educational Objectives)

为适应经济建设和社会发展的需要，培养德、智、体全面发展，能从事本学科领域内的教学、科研以及管理工作的高层次专门人才，具体要求：

1. 坚持对华友好的政治立场，积极促进中外友好合作与交流，遵守中国的法律法规，尊重中国的社会公德和风俗习惯，熟悉中国文化；具有良好的职业道德和敬业精神，具有科学严谨、求真务实的治学态度和工作作风，德智体美劳全面发展。

2. 掌握机械工程领域相关的基础理论和专业知识，具有学科前沿的综合视野，培养能够综合运用先进集成设计技术、生产制造技术、试验与检测技术、机电液一体化等相关技术，具有独立担负专门技术工作和从事科学研究的能力。

3. 比较熟练地掌握汉语，并具备一定的汉语听、说、读和写作能力；积极向上，具有良好的精神面貌、行为习惯以及健全的人格。

4. 培养从事机械工程领域教学和科学研究、产品设计开发、生产加工、制造测试、生产技术管理等工作的创新型、应用型国际化工程技术人才。

In order to meet the satisfaction of economic construction and society development, this discipline cultivate all-round development and high-level specialists who can engage in teaching, scientific research and management. The specific requirements are listed below.

1. Adhere to a friendly political stance with China and promote a cooperation and exchanges between China and foreign countries. Abide by the Chinese laws and regulations and respect Chinese social ethics and customs. Be familiar with Chinese culture and keep good professional ethics and dedication spirit. Keep rigorous, realistic and pragmatic attitude and work style and a comprehensive development of morality, intelligence, body, beauty and labor.

2. Master some basic theory and professional knowledge in mechanical engineering field, and keep a wide comprehensive viewpoint. Cultivate the ability to apply advanced integrated design technology, production and manufacturing technology, test and detection technology, electromechanical and hydraulic integration and other related technologies, and the ability to



independently undertake special technical work and engage in scientific research.

3. Master Chinese language and have some Chinese listening, speaking, reading and writing skills. Be positive, and have good mental outlook, behavior habits and sound personality.

4. To cultivate innovative and application-oriented international engineering and technical talents that engaged in teaching and scientific research in the fields of mechanical engineering, product design and development, production processing, manufacturing testing, production technology management and other work.

## 二、研究方向 ( Research Orientations )

机械工程学科学术硕士留学研究生培养方案设以下 3 个研究方向：

1. 机械设计及理论
2. 机械制造及其自动化
3. 机械电子工程（交叉方向）

各研究方向详见附表 1。

The education program of academic master of mechanical engineering discipline include 3 different research subjects,

1. Mechanical Design and Theory
2. Machine Manuscript and Automation
3. Mechatronic Engineering

As listed in Table 1.

## 三、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years ( can be adjusted in the range of 2-4 years ) . The scientific research and thesis writing time is not less than 1 year ( calculated from the date of opening statement ) . With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school is not counted as the number of years of study.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程教学实行学分制，课程分为必修课和选修课，研究生须在规定的学习年限内完成不少于 28 学分的学习任务，其中课程学分不低于 25 学分、不高于 27 学分（必修课不低于 16 学分，选修课不低于 9 学分）；必修环节不低于 3 学分。同等学历或跨专业攻



读全日制学术型硕士学位研究生,应补修本领域本科阶段主干课程2门(可由导师指定),经考试成绩及格(不计学分),方可申请答辩。课程设置详细情况见附表2。

Courses are divided into compulsory courses and elective courses. Graduate students are required to complete learning tasks with no less than 28 credits within the study period, including no less than 25 credits of courses and no more than 27 credits of courses (no less than 16 credits of compulsory courses and no less than 9 credits of elective courses). Besides, the compulsory courses are required with No less than 3 credits. Candidates with the same educational background or studying for full-time academic master's degree in different majors should take 2 main undergraduate courses in the field and pass the examination (without credits) before applying for thesis defense. The curriculum was attached in table 2 in detail.

## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士留学研究生培养实行导师负责制,导师负责制订研究生培养计划,且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量,研究生应通过文献阅读、学术调研,确定论文选题和研究内容,经导师同意后于第三学期末提交开题报告。由本学科5人及以上专家组成评审小组对学生所做开题报告进行评审,提出评价和修改意见,不通过者可限期重做,仍不通过者终止培养。开题报告由中文或英文完成,开题通过后即获得1学分。

### 2. 中期筛选

研究生课程学习结束后,以研究生培养方案为依据,在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习及科研情况,及时发现研究生培养过程中存在的问题,探讨解决问题的方法,明确今后努力的方向。中期筛选考核合格,可继续完成学位论文;考核不合格者,经所在单位签署意见,研究生院审核,报校长办公会批准,终止学籍,做研究生肄业处理。中期考核通过后即获得1学分。

### 3. 创新创业

完成下列3项中的1项,即获得创新创业1学分:

- (1) 参加学术会议并宣读论文,或做公开学术报告2次;
- (2) 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖;
- (3) 参加6次以上与本学科相关的学术报告,并提交总结。

The cultivation of overseas graduate students with academic master's degree is carried out under the system of tutor responsibility. The tutor is responsible for formulating the training plan

for graduate students, and has the responsibility of guiding, demonstrating and supervising the ideological, moral character and academic ethics of graduate students.1. Dissertation Proposals.

In order to ensure the quality of the dissertation, the graduate students should determine the topic selection and research content of the dissertation by reading literatures and doing academic research, and submit the proposal report at the end of the third semester with the consent of the supervisor. An evaluation team composed of 5 or more experts from the discipline will review the proposal report made by the students, and put forward evaluation and modification suggestions. Those who fail to pass the proposal can re-do it within limit time, and those who still fail to pass the proposal will be terminated. The thesis proposal is completed in Chinese or English, and 1 credit will be awarded upon passing the thesis proposal.

## 2. Metaphase Filtration

After the completing the postgraduate courses, based on the postgraduate training program, a comprehensive assessment will be conducted on the political thought and moral quality, basic theory and professional knowledge, scientific research innovation, practical ability and health status of graduate students in the fourth semester. The purpose is to summarize and evaluate the study and scientific research since the admission of graduate students, find out the problems in the training process of graduate students in time, discuss the methods to solve the problems, and define the direction of future efforts. Those students passing the mid-term examination can continue to complete the dissertation; others who can not pass the mid-term examination will be asked to terminate school roll after signing opinion by mechanical department, graduate school and then, the results will be reported to the chairman office. After passing the mid-term examination, the students will get 1 credit.

## 3. Innovation and Entrepreneurship

If the students complete one of the following three items, they will get 1 credit for innovation and entrepreneurship.

(1) Attend academic conferences and read papers at the conference, or make public academic reports twice.

(2) Participate in high-level science and technology competition, creative design, innovation and entrepreneurship competition and win some awards.

(3) Participate in academic reports related to the discipline for more than 6 times and submit the summaries on the reports.

## 六、学位论文 ( Academic Dissertation )

1. 硕士学位论文应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 按照《山东理工大学硕士学位授予实施细则》组织论文开题、中期考核、学位



论文预答辩和正式答辩等环节，论文答辩要做到严格要求、公正、公开。

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》，it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.

## 七、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求，可获得毕业证书；在获得毕业证书的基础上，如满足学位授予标准，可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，修满规定的学分；
3. 完成论文答辩，成绩合格；
4. 符合学校有关规定的其他要求

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》以及机械工程学院学位授予有关规定。

If graduation requirements are achieved, the postgraduate diploma will be obtained; On the basis of obtaining the graduation certificate, if meeting the degree conferring standard, the degree conferring certificate can also be granted.

#### 1. Graduation Requirements

(1) Have good moral character and academic ethics, seek truth from facts, have the courage to innovate.

(2) Complete the required courses and other training links, and complete the required credits.

(3) Complete the thesis defense and pass the examination.

(4) Comply with other requirements stipulated by the school.

## 2. Academic Degree Requirements

It shall strictly implement the interim implementation measures of the academic degree regulations of the People's Republic of China, the evaluation measures of master's degree theses of SDUT, the implementation rules of the master's degree awarding of SDUT and some other relevant provisions of the academic degree awarding of mechanical engineering department.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>德、智、体全面发展, 熟悉中国文化, 比较熟练地掌握汉语, 并具备一定的汉语听、说、读和写作能力, 积极向上, 具有健全的人格, 具有团队合作精神, 能够熟练运用机械工程领域相关的基础理论和专业知识, 具有独立担负专门技术工作和从事科学研究的基本素质。</p> <p>Develop morally, intellectually and physically, be familiar with Chinese culture, master Chinese more skillfully, and have certain Chinese listening, speaking, reading and writing ability, positive upward, with a sound personality, teamwork spirit, be able to skillfully use the basic theory and professional knowledge in the field of mechanical engineering, with independent specialized technical work and engaged in scientific research of the basic quality.</p>	<p>中国传统文化、汉语写作、汉语口语、论文写作与学术规范、科研素养与创新能力、科技英语写作</p> <p>Traditional Chinese culture 、 Chinese writing、 oral Chinese、 thesis writing and academic norms 、 scientific research quality and innovation ability, scientific English writing</p>
综合能力	<p>掌握机械工程领域坚实宽广的基础理论和系统的专门知识, 了解本学科发展方向及国内外研究前沿, 具有国际学术视野和学术原创精神, 能够综合运用先进集成设计技术、生产制造技术、试验与检测技术、机电液一体化等相关技术, 具有独立担负专门技术工作和从事科学研究的能力。</p> <p>Grasp the broad field of mechanical engineering specialized knowledge, basic theory and system of knowledge of the subject development direction and research front, both at home and abroad with international academic vision and academic originality, can the integrated use of integrated design technology, manufacturing technology, advanced test and inspection technology, mechanical and electrical integration of liquid and other related technology, with independent specialized technical work and engaged in scientific research ability.</p>	<p>数值分析、矩阵理论、有限元法、优化方法、数理统计、Precision and Ultraprecision Machining Technology、机构分析与综合、人工智能理论及应用</p> <p>Numerical analysis、 Matrix theory、 Finite element method、 optimization method、 Mathematical statistics 、 Precision and Ultraprecision Machining Technology 、 Mechanism analysis and synthesis、 Theory and application of artificial intelligence</p>
研究方向	<p>机械设计及理论</p> <p>掌握现代设计的基本理论与方法、现代测试分析与数据处理、CAD 等知识; 熟悉传感和自动控制、机构分析与综合、机械创新设计、现代设计理论与方法; 并应用于机械产品创新设计、研究和开发过程中, 提高机械产品的科学技术含量和市场竞争能力。</p> <p>Master the basic theories and methods of modern design, modern test analysis and data processing, CAD and other knowledge; Familiar with sensing and automatic control, mechanism analysis and synthesis, mechanical innovation design, modern design theory, technology and methods; And applied in the process of innovative design, research and development of mechanical products, improve the scientific and technological content of mechanical products and market competitiveness.</p>	<p>机构分析与综合、现代设计理论与方法学、机械系统建模与仿真、现代机械设计、创新设计、机械产品 CFD 分析</p> <p>Mechanism analysis and synthesis 、 Modern design theory and methodology、 Mechanical system modeling and simulation、 Modern mechanical design、 Innovative design 、 CFD analysis of mechanical products</p>

<p>机械制 造及其 自动化</p>	<p>掌握数控技术软、硬件设计，数控装备设计开发，数控加工技术等知识；掌握机械产品计算机辅助设计、辅助制造等技术和信息管理、信息集成等原理，并与现代生产管理技术相结合；掌握特种加工原理、工艺、电加工工艺原理及快速成型技术，熟悉特种加工设备的特性、控制系统原理以及对各种难加工材料的加工工艺，并将以上知识和技术应用于机械设计制造领域，促进装备制造业技术进步和技术升级，提升装备制造业的科学技术含量和市场竞争能力。</p> <p>Master the software and hardware design of nc technology, nc equipment design and development, NC machining technology and other knowledge; Master mechanical products computer-aided design, manufacturing and other technologies and information management, information integration and other principles, and combine with modern production management technology; Master special machining principle, process, technology principle and rapid prototyping technology, familiar with the characteristics of special processing equipment, control system principle and processing technology of all kinds of difficult processing materials, and applies the above knowledge and technology in the field of mechanical design and manufacturing, to promote the equipment manufacturing industry technical progress and technical upgrading, improve the science and technology content of the equipment manufacturing industry and the market competition ability.</p>	<p>数控技术、先进制造技术、特种加工理论与技术、表面工程技术与装备、先进研究方法（机械）、金属切削理论、模具设计制造技术</p> <p>Numerical control technology、Advanced manufacturing technology、Special machining theory and technology、Surface engineering technology and equipment、Advanced research methods（machinery）、Metal cutting theory、Die design and manufacturing technology</p>
<p>机械电 子工程</p>	<p>熟悉掌握机械技术、电工电子技术、计算机接口与控制技术、信息技术、传感器与检测技术、自动控制等技术，熟悉机械制造业信息化、传感器、数据采集与处理等技术，并进行有机融合，并综合研究应用于机械产品设计开发和应用中，凸现出机械产品具有智能化、自动化、集成化、微型化等科技含量和特色优势。</p> <p>Master of mechanical technology, electrical and electronic technology, computer interface and control technology, information technology, sensor and detection technology, automatic control technology, familiar with machinery manufacturing industry informationization, sensors, data acquisition and processing technology, and carry on the organic fusion, and comprehensive research is applied in mechanical product design, development and applications, the highlights of mechanical products with intelligence, automation, integration, miniaturization and other scientific and technological content and special advantage.</p>	<p>机电一体化技术、工业应用计算机控制技术、机器人理论及应用、微纳加工技术及应用、传感器原理与设计、现代控制理论</p> <p>Mechatronic integration technology、Industrial application computer control technology、Robot theory and application、Micro-nano processing technology and application、Sensor principle and design、Modern control theory</p>



附表 2: 培养计划 (Training Plan)

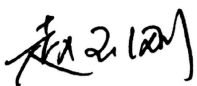

学科名称	机械工程 Mechanical Engineering		学科代码	0802		
单位名称	机械工程学院 Mechanical Engineering Department		培养类型	学术学位硕士研究生 Foreign Postgraduates		
学分要求	总学分 Total Credits: 28, 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq 9$ 。					
课 程 设 置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 $\geq 11$ 学分	G11001	数值分析 Numerical Analysis	3	1	必选	
	010048	精密与超精密加工技术 (全英文) Precision and Ultraprecision Machining Technology	2	1		
	G11002	矩阵理论 Matrix theory	2	1		
	020062	优化方法 Optimization Method	2	1		
	020061	有限元法 Finite element method	2	1		
	010003	机构分析与综合 Mechanism analysis and synthesis	2	1		
	010049	人工智能理论及应用 Theory and application of artificial intelligence	2	1		
方向选修课程 $\geq 8$ 学分	010002	机电一体化技术 Mechatronics technology	32	2		
	010004	计算机辅助设计与制造 Computer Aided Design and Manufacturing	32	2		
	010005	计算机图形学 Computer Graphics	32	2		
	010008	模具设计与制造技术 Die Design and Manufacturing Technology	32	2		



010009	神经网络技术及其应用 Neural Network Technology and Application	32	2
010010	数控技术 Numerical Control Technology	32	2
010011	特种加工理论与技术 Non-traditional Machining Theory and Technology	32	2
010012	先进制造技术 Advanced manufacturing technology	32	2
010013	现代设计理论与方法学 Modern design theory and methodology	32	2
010020	工业应用计算机控制技术 Industrial Application Computer Control Technology	32	2
010021	机械系统建模与仿真 Mechanical system modeling and simulation	32	2
010023	数字图像处理技术 Digital image processing technology	32	2
010027	现代机械设计 Modern mechanical design	32	2
010029	传感器原理与设计 Fundamental and Design of Sensor	32	2
010031	机器人理论及应用 Theory and application of robotics	32	2
010032	表面工程技术与装备 Surface Engineering and Equipment	32	2
010035	振动理论与工程应用 Theory and engineering application of vibration	32	2
010059	先进研究方法（机械） Advanced Research Methods (Mechanical)	32	1
010046	试验测试仪器及分析方法 Test Instrument and Analysis Method	32	2
010050	创新设计 Innovative design	32	2
010051	微纳加工技术及应用 Technology and application of micro-nano machining	32	2
010052	工程摩擦学 Engineering tribology	32	2
010053	机械产品 CFD 分析 Computational Fluid Dynamics Analysis of Mechanical Product	32	2



	010054	金属切削理论 Metal Cutting Theory	32	2	
	G11003	数理统计 Mathematical statistics	32	1	
	020063	弹性力学 Elasticity	32	2	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G09064	科研与人文修养 Scientific Research and Humanity Cultivation	1	1	
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
补修课程 不计学分					
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后提交开题报告。开题答辩小组由本学科 5 人以上专家组成，负责对研究生所做开题报告进行评审，做出评价、提出修改意见，评审不通过者需限期重做，再次开题仍不通过的终止培养。学位论文开题报告审核通过一年后方可申请学位论文送审、答辩。</p> <p>Determine the topic selection and research content of the paper by reading some literatures and doing some academic research, and submit the proposal report with the consent of the tutor. The thesis proposal defense team is composed by more than 5 experts in this discipline, who are responsible for reviewing the thesis proposal report made by the graduate students, making evaluation and putting forward modification suggestions. Those who fail in the evaluation should redo it within a time limit, and the cultivation will be terminated if the thesis proposal fails again. One year after the dissertation proposal is approved, the candidate can apply for the dissertation submission and defense.</p>				3
中期考核 (1 学分)	<p>对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。</p> <p>Comprehensive assessment is conducted on the political thought and moral quality, basic theory and professional knowledge, scientific research innovation, practical ability and health status of postgraduates. If some graduates fail to pass the assessment, they will be regarded as incomplete study when they are verified by the graduate school and the results will be reported to the headmaster's office.</p>				4-5

<p>创新创业 (1 学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次； 2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖； 3. 参加 6 次以上与本学科相关的学术报告，并提交总结； 每项记 1 学分，需完成 1 学分。</p> <p>1. Attend academic conferences and read papers at the conference, or make public academic reports twice. 2. Participate in high-level science and technology competition, creative design, innovation and entrepreneurship competition and win some awards. 3. Participate in academic reports related to the discipline for more than 6 times and submit the summaries on the reports. 1 credit for each item and no less than 1 credit is required.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



# 材料加工工程学科学术学位硕士研究生培养方案

学科代码：080503

## Training Program of Materials Processing Engineering

### Discipline for Academic Master Candidates

Credit Code: 080503

#### 一、学科简介 ( Brief Introduction to Discipline )

材料成型及控制工程专业成立于 1998 年，1999 年开始招收第一届本科生，2003 年获批准材料加工工程硕士点，2012 年成为山东省名校工程重点建设专业，2016 年入选山东省高水平应用型重点专业群，2018 年入选山东省新旧动能转换对接产业项目重点专业群。

材料加工工程学科现有专任教师 25 人，其中教授 6 人、副教授 8 人、博士生导师 4 人、硕士生导师 9 人，具有博士学位的教师占 70%。拥有国务院政府特殊津贴获得者 1 名、山东省专业技术拔尖人才 1 名、淄博市“英才计划”人选 1 名，形成了一支年龄结构、职称结构、学历结构合理的高水平师资队伍。

近 10 年来，本学科共承担国家级项目 11 项，省部级项目 20 余项及横向课题 50 余项，获得国家科技进步二等奖 1 项，其他各类奖励 10 余项，发表高水平学术论文 120 余篇，其中被 SCI/EI 收录 80 余篇，出版著作、教材 8 部，授权发明专利 25 项。本学科依托“国家级机械工程实验教学示范中心”、“山东省现代金属材料成形工程技术研究中心”、“山东省高校精密模具重点实验室”等教学科研平台，支撑学科特色和内涵发展。

在多年的建设与发展过程中，材料加工工程学科形成了以先进材料制备及加工技术、材料设计及加工过程数值模拟、材料改性技术和增材制造等特色研究方向。本学科始终以共性技术问题为导向，开展应用技术研究，形成原创性应用技术成果，产生了巨大的经济与社会效益。

Material shaping and control engineering specialty was established in 1998 and began to enroll the first undergraduate students in 1999. In 2003, it was approved as a master's degree specialty in material processing engineering. In 2012, it became one of the key construction majors of Shandong Province famous schools. In 2016, it was selected into the high-level

application type specialties group in Shandong Province. In 2018, it was selected into the key professional group of the new and old kinetic energy conversion new docking industry project in Shandong Province.

There are 25 full-time teachers in the material processing engineering discipline and 70% of teachers have got doctoral degrees, including 6 professors, 8 associate professors, 4 doctoral supervisors, 9 master student supervisors. The supervisor team has lots of high-level experts, including gainers of the special government allowance of the State Council (1 person), top professional talents in Shandong Province (1 person), "British Talents" in Zibo City (1 person), which formed a high-level faculty with reasonable age structure, title structure and academic structure.

In the past 10 years, the discipline has undertaken 11 national-level projects, more than 20 provincial-level projects and more than 50 crosswise projects, and won the second prize of the National Science and Technology Progress Award, more than 10 other types of awards. In addition, the discipline has published more than 120 papers, including more than 80 articles indexed by SCI/EI, published 8 books/textbooks and 25 authorized invention patents. The discipline relies on the "National Mechanical Engineering Experimental Teaching Demonstration Center", "Shandong Province Modern Metal Materials Forming Engineering Technology Research Center" and "Shandong Province University Precision Mold Key Laboratory" and other teaching and research platforms to support the development of the discipline characteristics and connotation.

In the progress of construction and development for years, the materials processing engineering discipline has formed characteristic research directions such as advanced material preparation and processing technology, material design and processing numerical simulation, material modification technology and additive manufacturing. The discipline has always been guided by common technical issues, carrying out application technology research, forming original application technology achievements, and generating huge economic and social benefits.

## 二、培养目标 (Educational Objectives)

为适应经济建设和社会发展的需要,培养德、智、体全面发展,能从事本学科领域内的教学、科研以及管理工作的高层次专门人才,具体要求:

1. 坚持对华友好的政治立场,积极促进中外友好合作与交流,遵守中国的法律法规,尊重中国的社会公德和风俗习惯,熟悉中国文化;具有良好的职业道德和敬业精神,具有科学严谨、求真务实的治学态度和工作作风,德智体美劳全面发展。

2. 掌握材料加工工程领域相关的基础理论和专业知识,深入了解本学科的发展状况和发展趋势,掌握材料的制备、加工及组织结构与性能研究的基本方法,具有从事科学研究和担负专门技术工作的能力,能够胜任本学科及相近学科的教学、科学研究和工程



技术开发等工作。

3. 比较熟练地掌握汉语，并具备一定的汉语听、说、读和写作能力；积极向上，具有良好的精神面貌、行为习惯以及健全的人格。

4. 培养从事材料加工工程领域教学和科学研究、产品设计开发、生产加工、制造测试、生产技术管理等工作的创新型、应用型国际化工程技术人才。

In order to meet the needs of economic construction and social development, cultivate high-level professionals with all-round development of morality, intelligence and physique who can engage in teaching, scientific research and management in the field of their own disciplines, the specific requirements are as follows:

1. Persist in the political perspective of China friendship, promote friendly cooperation and exchanges between China and foreign countries, abide by China's laws and regulations, respect China's morality and customs, and be familiar with Chinese culture; been professional, ethical, dedication to the career, and rigorous, realistic and pragmatic during academic research, teaching and work; Pursue all-round mature including moral, intelligence, physical and aesthetical.

2. Master the basic theory and systematic knowledge of material processing engineering, acquaint the development and trend of this subject, master the basic methods of material synthesis, processing, and research concerning structure or property. Be able to engage in scientific research and related expertise work, and be qualified to undertaking teaching, scientific researching and engineering developing of materials processing and similar subject.

3. Master Chinese language skill, and be able to listening, speaking, reading and writing in Chinese. Be positive and optimism with health mental, decent behavior and sound personality.

4. Foster innovative, practical internationalized engineers been able to engage in various engineering work, such as teaching, researching, product design or developing, and works concerning product processing, manufacturing, testing, production management, etc.

### 三、研究方向 ( Research Orientation )

材料加工工程（二级学科）学术硕士留学研究生培养方案设以下 4 个研究方向：

1. 先进材料制备及加工技术
2. 材料设计及加工过程数值模拟
3. 材料改性技术
4. 增材制造（交叉方向）

各研究方向简介详见附表 1。

Four research fields were set up for overseas postgraduate student's educational program majoring on materials processing engineering ( second-level discipline ). The brief introduction of each research field is shown in appendix 1.

1. Advanced material synthesis and processing
2. Material design and process simulation
3. Material enhancement or strengthening
4. Additive manufacturing

As listed in Table 1.

#### 四、学习年限 (Length of Schooling)

学制3年, 修业年限2-4年, 科学研究和论文撰写时间不少于1年(从开题通过之日起计算)。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years (can be adjusted in the range of 2-4 years). The scientific research and thesis writing time is not less than 1 year (calculated from the date of opening statement). With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school is not counted as the number of years of study.

#### 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程教学实行学分制, 课程分为必修课和选修课, 研究生须在规定的学习年限内完成不少于28学分的学习任务, 其中课程学分不低于25学分、不高于27学分(必修课不低于16学分, 选修课不低于9学分); 必修环节不低于3学分。同等学历或跨专业攻读全日制学术型硕士学位研究生, 应补修本领域本科阶段主干课程2门(可由导师指定), 经考试成绩及格(不计学分), 方可申请答辩。课程设置详细情况见附表2。

The courses are divided into compulsory courses and elective courses. Postgraduates must complete no less than 28 credits. The credits of courses are no less than 25 credits and no more than 27 credits (compulsory courses are no less than 16 credits and elective courses are no less than 9 credits); the compulsory training are no less than 3 credits. For full-time academic master's degree postgraduates with the same educational background or cross-specialty, two main courses (designated by tutors) at the undergraduate stage should be supplemented. Only after passing the examination (without credit), can they apply for defense. Course list is given in appendix 2.

#### 六、培养方式与培养环节 (Training Mode and Cultivating Process)

学术硕士留学研究生培养实行导师负责制, 导师负责制订研究生培养计划, 且对研究生的思想品德、学术道德有引导、示范和监督的责任。

##### 1. 开题报告



为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告。由本学科 5 人及以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。开题报告由中文或英文完成，开题通过后即获得 1 学分。

## 2. 中期考核

研究生课程学习结束后，以研究生培养方案为依据，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习及科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的方法，明确今后努力的方向。中期筛选考核合格，可继续完成学位论文；考核不合格者，经所在单位签署意见，研究生院审核，报校长办公会批准，终止学籍，做研究生肄业处理。中期考核通过后即获得 1 学分。

## 3. 创新创业

完成下列 3 项中的 1 项，即获得创新创业 1 学分：

- (1) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (2) 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (3) 参加 6 次以上与本学科相关的学术报告，并提交总结。

The supervisor or steering group is responsible for the training of academic master's degree applicants, including the formulation of training programs and the guidance of ideological morality, academic morality.

### 1. Opening statement

In order to ensure the quality of dissertation, Postgraduates should determine the topic and content of dissertation through literature reading and academic research, and submit the opening report at the end of the third semester with the consent of their tutors. Assessment panel composed of five or more experts in this subject will evaluate the opening report and put forward comments on evaluation and revision. Those who fail to pass the program must re-do the opening report another time, and those who fail to pass the program twice will terminate the training. The opening report will be completed in Chinese or English, and one credit will be awarded after the completion of the opening report.

### 2. Mid-term inspection

In order to evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed in the fourth semester. The education of "unqualified" graduate students will be



terminated after the approval of colleges and graduate schools. After the mid-term inspection is passed, one credit will be obtained.

### 3. Innovation and entrepreneurship

Complete one of the following three items, i. e. get one credit for innovation and entrepreneurship:

(1) Participate in academic conferences and read papers, or make public academic reports twice;

(2) To participate in high-level scientific competitions, creative design, innovation and entrepreneurship competitions and win awards;

(3) Participate in more than 6 academic reports related to his research filed and submit a summary.

## 七、学位论文 (Academic Dissertation)

1. 硕士学位论文应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节，论文答辩要做到严格要求、公正、公开。

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》，it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.

## 八、毕业与学位要求 (Graduate and Degree Requirements)

满足毕业要求，可获得毕业证书；在获得毕业证书的基础上，如满足学位授予标准，可授予学位证书。

### (一) 毕业要求



1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，修满规定的学分；
3. 完成论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

## (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》以及机械工程学院学位授予有关规定。

Graduate students who meet the requirements for graduation will receive a diploma. On the basis of a diploma, graduate students who meet the criteria for awarding a degree can be awarded a degree certificate.

### 1. Graduation requirements

(1) Have good moral character cultivation and academic morality, seeking truth from facts, courage to innovate;

(2) Complete the training plan including courses and other training links, and the results are qualified;

(3) Pass the thesis defense, and the results are qualified;

(4) Meet other requirements of Shandong University of Technology.

### 2. Degree requirements

Strictly implement the Provisional Implementation Measures of the Regulations of the People's Republic of China on Academic Degrees, the Evaluation Measures for Master's Degree Dissertations of Shandong University of Technology, the Implementation Rules for Master's Degree Granting of Shandong University of Technology, and the relevant regulations for degree granting of Mechanical Engineering College.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>熟悉中国文化, 熟练掌握汉语, 能进行专业阅读和写作, 以及国际学术交流; 具有从事科学研究和担负专门技术工作的能力, 能够胜任本学科及相近学科的教学、科学研究和工程技术开发等工作。</p> <p>Familiar with Chinese culture, proficient in Chinese, capable of academic reading and writing, as well as international communication; Be able to engage in scientific research and related expertise work, and be qualified to undertaking teaching, scientific researching and engineering developing of materials processing and similar subject.</p>	<p>中国传统文化、汉语写作、汉语口语、论文写作与学术规范、先进材料成形技术导论、表面技术</p> <p>Chinese Traditional Culture、Chinese Writing、Chinese Speaking、Thesis Writing and Academic、Introduction to Advanced Materials Processing Technology、Surface Technology</p>
综合能力	<p>掌握材料加工工程专业的基础理论和系统的专门知识, 深入了解本学科的发展状况和发展趋势, 掌握材料的制备、加工及组织结构与性能研究的基本方法。</p> <p>Master the basic theory and systematic knowledge of material processing engineering, acquaint the development and trend of this subject, master the basic methods of material synthesis, processing, and research concerning structure or property.</p>	<p>数值分析、数理统计、现代材料分析方法, 凝固理论与技术、表面技术、材料热力学</p> <p>Numerical Analysis. Mathematical Statistics、Modern Methods of Materials Testing、Solidification Theory and Technology、Surface Technology、Materials Thermodynamics</p>
研究方向	<p>先进材料制备及加工技术</p> <p>熟悉铝、镁、钛等轻质金属及高性能钢铁的特性, 掌握各种合金制备与加工技术, 如材料凝固过程控制技术、塑性成形技术、连接技术等, 掌握各种合金材料成分、组织及性能之间的内在规律, 能运用合金现代材料加工理论, 对材料加工过程进行控制及优化, 为高性能材料及其制备提供理论支持或技术指导。</p> <p>Familiar with the feature of lightweight metals such as aluminum, magnesium, titanium and high performance steel, master alloy preparing and processing technology, such as solidification process control technique, plastic forming technique, bonding technique, etc., master scientific correlations between composition, structure and performance of alloys, can on the basis of the theory of modern alloy material processing, be able to control and optimize the process of material manufacturing, and provide theory or technique support for the high performance materials development.</p>	<p>先进材料成形技术导论、液态成形新技术、先进塑性成形工艺、高温合金与金属间化合物、冶金传输原理</p> <p>Introduction to Advanced Materials Processing Technology、New Technology of Liquid Forming、Advanced Plastic Forming Technology、High Temperature Alloy and Intermetallic Compound、Principles of Transfer in Metallurgy</p>



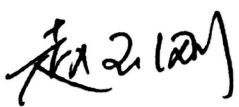
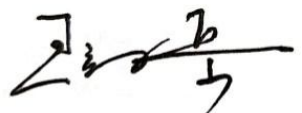
<p>材料设计 及加工过 程数值模 拟</p>	<p>掌握材料液态成型、塑性成型、连接成型和增材制造过程中的材料设计及加工过程的温度场、应力场、流场、相变过程、凝固过程的模拟技术等；能根据模拟结果优化制造工艺，为新材料的制备及新工艺的实施提供指导。</p> <p>Master the alloy design of liquid forming, plastic forming, bonding forming or additive manufacturing, and the simulation of temperature, stress, flow, transformation and solidification during material processing. Be able to optimize the manufacturing process based on simulation and provide guidance for new materials preparing or new technique implementing.</p>	<p>先进材料成形技术导论、先进塑性成形工艺、液态成形新技术、有限元法、冶金传输原理</p> <p>Introduction to Advanced Materials Processing Technology、New Technology of Liquid Forming、Advanced Plastic Forming Technology、Finite Element Method、Principles of Transfer in Metallurgy</p>
<p>材料改性 技术</p>	<p>掌握不同的工艺方法，使材料的整体或者局部成分与组织得到改变，从而达到使金属材料的耐磨性、抗腐蚀性、强度与韧性或者其它性能得到提高或改善。</p> <p>Master the methods to enhance or improve the wear resistance, corrosion resistance, strength and toughness or other properties of metallic materials by composition or structure adjustment on entirety or partial scale.</p>	<p>先进材料成形技术导论、金属腐蚀与防护技术、体视学原理、材料中的扩散与相变</p> <p>Introduction to Advanced Materials Processing Technology、Corrosion and Protection of Metals、Principles and Applications of Stereology、Diffusion and Phase Transition in Materials</p>
<p>增材制造</p>	<p>了解增材制造用粉体特性与制备方法，掌握增材制造设备与工艺及关键技术，利用增材制造技术制备高品质材料和产品，建立增材制造工艺-组织-性能之间的基本关系。</p> <p>Understand the powder performance and preparing methods for additive manufacturing technology, master the facility, process and key technique of additive manufacturing, be able to synthesis high-quality materials and products using additive manufacturing technology, and establish the basic relationship between process, structure and performance for additive manufacturing technology.</p>	<p>先进材料成形技术导论、增材制造技术、材料中的扩散与相变</p> <p>Introduction to Advanced Materials Processing Technology、Additive Manufacturing Technology、Diffusion and Phase Transition in Materials</p>

附表 2: 培养计划 (Training Plan)

学科名称	材料加工工程 Materials Processing Engineering		学科代码	080503	
单位名称	机械工程学院 Mechanical Engineering Department		培养类型	学术学位硕士研究生 Foreign Postgraduates	
学分要求	总学分 Total Credits: 28, 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq 9$ 。				
课 程 设 置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture	2	1	
	G13101	汉语 Chinese	2	1	
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科平台课程 $\geq 11$ 学分	G11001	数值分析 Numerical Analysis	3	1	必选
	G11003	数理统计 Mathematical Statistics	2	1	
	010025	现代材料分析方法 Modern Methods of Materials Testing	2	2	
	010022	凝固理论和技术 Solidification Theory and Technology	2	2	
	010055	表面技术 (全英文) Surface Technology (English)	2	2	
方向选修课程 $\geq 8$ 学分	010042	材料热力学 Materials Thermodynamics	2	2	
	010018	材料中的扩散与相变 Diffusion and Phase Transition in Materials	2	2	
	010056	增材制造技术 Additive Manufacturing Technology	2	2	
	010044	液态成形新技术 New Technology of Liquid Forming	2	2	
	010041	先进材料成形技术导论 (全英文) Introduction to Advanced Materials Processing Technology (English)	1	2	
	020061	有限元法 Finite Element Method	2	2	



	010047	先进塑性成形工艺 Advanced Plastic Forming Technology	2	2	
	010030	冶金传输原理 Principles of Transfer in Metallurgy	2	2	
	010019	高温合金与金属间化合物 High Temperature Alloy and Intermetallic Compound	2	2	
	010058	金属腐蚀与防护技术 Corrosion and Protection of Metals	2	2	
	010057	体视学原理 Principles and Applications of Stereology	2	2	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G09064	科研与人文修养 Scientific Research and Humanity Cultivation	1	1	
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后提交开题报告。开题答辩小组由本学科 5 人以上专家组成，负责对研究生所做开题报告进行评审，做出评价、提出修改意见，评审不通过者需限期重做，再次开题仍不通过的终止培养。学位论文开题报告审核通过一年后方可申请学位论文送审、答辩。</p> <p>The research subject and contents should be selected based on reference survey and academic investigation. The inspect board is composed of more than 5 experts in this subject, who are responsible for reviewing the thesis proposal report submitted by the graduate students, making evaluation and putting forward modification suggestions. Those who fail in the evaluation shall be redone within a time limit, and the cultivation shall be terminated if the thesis proposal fails again. One year after the dissertation proposal is approved, the candidate can apply for the dissertation submission and defense.</p>				3
中期考核 (1 学分)	对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。考核不合格的，经学院、研究生院				4-5

	<p>审核，报校长办公会批准，做肄业处理。</p> <p>A comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools.</p>	
<p>创新创业 (1 学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</p> <p>每项记 1 学分，需完成 1 学分。</p> <p>1. Participate in academic conferences and presentation of papers, or do public academic reports for 2 times;</p> <p>2. Participate and win awards in high level science and technology competitions, creative design, innovation and entrepreneurship competitions;</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary.</p> <p>1 credit for each, the minimum credit is 1.</p>	1-5
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p> 



# 仪器科学与技术学科学术学位硕士研究生培养方案

学科代码：0804

## Training Program of Instrument Science and Technology

### Discipline for Academic Master Candidates

Credit code: 0804

#### 一、学科简介 ( Brief Introduction to Discipline )

仪器科学与技术学科相应本科专业测控技术与仪器于 2000 年被教育部批准成立，2001 年本科招生；二级学科硕士点“测试计量技术及仪器（080402）”于 2004 年开始招生；仪器科学与技术（0804）学科于 2011 年被教育部批准为一级学科硕士学位授权点，并于 2012 年开始以一级学科仪器科学与技术进行硕士研究生的招生。仪器仪表工程专业学位硕士授权点于 2010 年得到教育部批准，于 2011 年开始招生。该学科相应本科专业自成立以来，一直为学校重点建设的专业之一。在 2011 年山东省高等学校数据采集及专业评估中，山东理工大学测控技术与仪器专业连续四年获得山东省仪器仪表类专业评估第二名。2012 年测控技术与仪器专业被评为山东省特色专业。2013 年被确定为山东省名校建设工程辐射专业。

学位点现有专职教师 33 人，其中，正教授 9 人，副教授（含高级实验师）11 人，讲师 13 人，博士生导师 5 人，硕士生导师 17 人，具有博士学位教师 23 人，享受国务院政府特殊津贴 1 人，山东省有突出贡献的中青年专家 2 人，全国优秀教师 1 人，全国仪器类教学指导委员会委员 1 人。近 5 年来，承担原国家 973 项目 3 项，国家 863 重大专项课题 1 项，国家自然科学基金项目 17 项，省部级项目 21 项，企事业单位合作项目 80 余项，获省部级科技奖励 6 项，高水平论文 250 余篇，授权发明专利 39 项。

经过近二十年的发展，本学科在人才培养、科研平台、学术研究和社会服务等方面都取得了长足进步，形成了自己的特色。培养的硕士学位研究生能够在各自技术领域解决实际工程问题，为山东乃至全国的经济和社会发展做出了积极的贡献。

Undergraduate professional "measurement and control technology and instruments" corresponding to the discipline of "instrument science and technology" was approved by the Ministry of Education in 2000, and undergraduate enrollment began in 2001. The second-level



master's degree program "testing measurement technology and instruments (08040(2))" began to enroll in 2004. In 2011, the "instrument science and technology" (080(4)) discipline was approved by the Ministry of Education as a master's degree discipline for first-level disciplines. In 2012, it began to enroll students who want to achieve a master's degree in "instrument science and technology". The professional master's degree discipline about "instrumentation engineering" was approved by the Ministry of Education in 2010 and began enrolling students in 2011. Since the establishment of the corresponding undergraduate major in this discipline, it has been one of the key construction majors of Shandong University of Technology. In the data collection and professional evaluation of Shandong Province's higher education institutions in 2011, Shandong University of Technology's "measurement and control technology and instrumentation" profession won the second place in Shandong Province's instrumentation professional evaluation for four consecutive years. In 2012, the "measurement and control technology and instrumentation" profession was rated as a specialty in Shandong Province. In 2013, it was identified as a radiation project for the construction of famous schools in Shandong Province.

Now, there are 33 full-time teachers in the discipline, including 9 professors, 11 associate professors (including senior experimenters), 13 lecturers, 5 doctoral supervisors, 17 master's tutors, and 23 of them have doctoral degrees. The supervisor team has lots of high-level experts, including one person with the State Council special allowance, two young and middle-aged experts with outstanding contributions in Shandong Province, one national outstanding teacher, and one member of the National Instrument Teaching Steering Committee. In the past five years, the discipline has undertaken and completed 3 national 973 projects, 1 national 863 major special project, 17 national natural science fund projects, 21 provincial and ministerial projects, and more than 80 enterprise and enterprise cooperation projects. There are 6 provincial and ministerial-level science and technology awards, more than 250 high-level papers, and 39 invention patents.

After nearly two decades of development, the discipline has made great progress in personnel training, scientific research platforms, academic research, and social services, and has formed its characteristics. The master's degree students can solve practical engineering problems in their respective technical fields and make positive contributions to the economic and social development of Shandong and even the whole country.

## 二、培养目标 (Educational Objectives)

为适应经济建设和社会发展的需要,培养德、智、体全面发展,能从事本学科领域内的教学、科研以及管理工作的高层次专门人才,具体要求:

1. 坚持对华友好的政治立场,积极促进中外友好合作与交流,遵守中国的法律法规,尊重中国的社会公德和风俗习惯,熟悉中国文化;具有良好的职业道德和敬业精神,具有科学严谨、求真务实的治学态度和工作作风,德智体美劳全面发展。



2. 掌握仪器科学与技术学科相关的基础理论和系统的专门知识,了解本学科相关理论和技术的发展水平以及所从事研究方向的国内外发展动态。能够从事理论和实验研究,具有发现问题、分析问题和解决问题的能力,具有独立从事科学研究和技术开发的能力。

3. 比较熟练地掌握汉语,并具备一定的汉语听、说、读和写作能力;积极向上,具有良好的精神面貌、行为习惯以及健全的人格。

4. 为高等学校、科研单位、行业管理部门、仪器及装备制造企业培养精密仪器、精密机械、计量技术、测试与传感器技术、工业自动化方面的创新型、应用型高层次工程技术人才。

To meet the needs of economic construction and social development, we will train high-level professionals who can engage in teaching, research, and management in the subject area and have comprehensive development in all aspects of morality, intelligence, and so on. Specific requirements:

1. Adhere to the political stance of friendly relations with China, actively promote friendly cooperation and exchanges between China and foreign countries, abide by Chinese laws and regulations, respect China's social morality and customs, and be familiar with Chinese culture; have good professional ethics and professionalism, scientific rigor and truth-seeking Pragmatic academic attitude and work style, moral, intellectual, and artistic development.

2. Master the basic theory and system expertise related to instrument science and technology disciplines, understand the development level of relevant theories and technologies in this discipline, and the domestic and international development trends of the research direction, and be able to engage in theoretical and experimental research, have the ability to discover, analyze, and solve problems, have the ability to independently engage in scientific research and technology development.

3. Master Chinese proficiently with certain listening, speaking, reading and writing skills; Positive, with a good mental outlook, behavioral habits and a sound personality.

4. To train innovative and applied high-level engineering and technical personnel for institutions of higher learning, scientific research institutions, industry management departments, instruments and equipment manufacturing enterprises, involving precision instruments, precision machinery, metrology technology, test and sensor technology, industrial automation, and so on.

### 三、研究方向 ( Research Orientation )

仪器科学与技术 (一级学科) 学术硕士留学研究生培养方案设以下 2 个研究方向,

1. 精密仪器及机械

## 2. 测试计量技术及仪器（交叉方向）

各研究方向简介详见附表 1。

Academic Master's training programs of instrument science and technology discipline for foreign postgraduates in Shandong University of Technology is set up with the following two research directions. Details are shown in attached table 1.

1. Precision instruments and machinery

2. Measuring and Testing Technologies and Instruments

As listed in Table 1.

## 四、学习年限（Length of Schooling）

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years（can be adjusted in the range of 2-4 years）. The scientific research and thesis writing time is not less than 1 year（calculated from the date of opening statement）. With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school is not counted as the number of years of study

## 五、课程设置与学分要求（Curriculum and Credit Requirements）

课程教学实行学分制，课程分为必修课和选修课，研究生须在规定的学习年限内完成不少于 28 学分的学习任务，其中课程学分不低于 25 学分（必修课不低于 16 学分，选修课不低于 9 学分）；必修环节不低于 3 学分。同等学历或跨专业攻读全日制学术型硕士学位研究生，应补修本领域本科阶段主干课程 2 门（可由导师指定），经考试成绩及格（不计学分），方可申请答辩。课程设置详细情况见附表 2。

The courses is divided into compulsory courses and elective courses. Postgraduates must complete no less than 28 credits. The credits of courses are no less than 25 credits and no more than 27 credits（compulsory courses are no less than 16 credits and elective courses are no less than 9 credits）；the compulsory training are no less than 3 credits. For full-time academic master's degree postgraduates with the same educational background or cross-specialty, two main courses（designated by tutors）at the undergraduate stage should be supplemented. Only after passing the examination（without credit），can they apply for defense.

Course list is given in Tab. 2.

## 六、培养方式与培养环节（Training Mode and Cultivating Process）

学术硕士留学研究生培养实行导师负责制，导师负责制订研究生培养计划，且对研



研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告。由本学科 5 人及以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。开题报告由中文或英文完成，开题通过后即获得 1 学分。

### 2. 中期筛选

研究生课程学习结束后，以研究生培养方案为依据，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习及科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的方法，明确今后努力的方向。中期筛选考核合格，可继续完成学位论文；考核不合格者，经所在单位签署意见，研究生院审核，报校长办公会批准，终止学籍，做研究生肄业处理。中期考核通过后即获得 1 学分。

### 3. 创新创业

完成下列 3 项中的 1 项，即获得创新创业 1 学分：

- (1) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (2) 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (3) 参加 6 次以上与本学科相关的学术报告，并提交总结。

The supervisor or steering group is responsible for the training of academic master's degree applicants, including the formulation of training programs and the guidance of ideological morality, academic morality.

#### 1. Opening statement

To ensure the quality of dissertation, Postgraduates should determine the topic and content of dissertation through literature reading and academic research, and submit the opening report at the end of the third semester with the consent of their tutors. Assessment panel composed of five or more experts in this subject will evaluate the opening report and put forward comments on evaluation and revision. Those who fail to pass the program must re-do the opening report another time, and those who fail to pass the program twice will terminate the training. The opening report will be completed in Chinese or English, and one credit will be awarded after the completion of the opening report.

#### 2. Mid-term inspection

To evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and professional knowledge,

scientific research innovation, practical ability and state of health is performed in the fourth semester. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools. After the mid-term inspection is passed, one credit will be obtained.

### 3. Innovation and entrepreneurship

Complete one of the following three items, i. e. get one credit for innovation and entrepreneurship:

(1) Participate in academic conferences and read papers, or make public academic reports twice;

(2) To participate in high-level scientific competitions, creative design, innovation and entrepreneurship competitions and win awards;

(3) Participate in more than 6 academic reports related to his research filed and submit a summary.

## 七、学位论文 ( Academic Dissertation )

1. 硕士学位论文应具有系统的、完整的研究思路和计划, 应对科技进步和国民经济建设具有较大的理论意义或实用价值, 学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作, 必须由作者独立完成。研究工作必须坚持实验性原则, 论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节, 论文答辩要做到严格要求、公正、公开。

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》, it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求, 可获得毕业证书; 在获得毕业证书的基础上, 如满足学位授予标准, 可授予学位证书。



### (一) 毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，修满规定的学分；
3. 完成论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》以及机械工程学院学位授予的有关规定。

Graduate students who meet the requirements for graduation will receive a diploma. On the basis of a diploma, graduate students who meet the criteria for awarding a degree can be awarded a degree certificate.

#### 1. Graduation requirements

(1) Have good moral character cultivation and academic morality, seeking truth from facts, courage to innovate;

(2) Complete the training plan including courses and other training links, and the results are qualified;

(3) Pass the thesis defense, and the results are qualified;

(4) Meet other requirements of Shandong University of Technology.

#### 2. Degree requirements

Observe the "Provisional Measures for the Implementation of the Regulations of the People's Republic of China", "Measures for the Evaluation of Master's Degree Papers of Shandong University of Technology", "Administrative Rules for the Granting of Master's Degree by Shandong University of Technology" and relevant regulations for the granting of degrees by the School of Mechanical Engineering.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>德、智、体全面发展，比较熟练地掌握一门外国语，能顺利阅读本学科领域的科技资料及文献，并具备一定的听、说和写作能力，积极向上，具有健全的人格，具有团队合作精神，能够熟练运用仪器科学与技术领域相关的基础理论和专业知识，具有独立担负专门技术工作和从事科学研究的基本素质。</p> <p>Comprehensive development, involving moral, intellectual, and physical aspects; mastering a foreign language more skillfully; being able to successfully read scientific and technical materials and literature in the subject area, and having certain listening, speaking and writing skills; positive and healthy Personality, team spirit; able to use the basic theories and professional knowledge related to instrument science and technology, with the basic qualities of independent technical work and scientific research.</p>	<p>中国传统文化、汉语写作、汉语口语、论文写作与学术规范、科研素养与创新能力、科技英语写作</p> <p>Traditional Chinese culture、Chinese writing、oral Chinese、thesis writing and academic norms、scientific research quality and innovation ability、scientific English writing</p>
综合能力	<p>掌握仪器科学与技术领域坚实宽广的基础理论和系统的专门知识，了解本学科发展方向及国内外研究前沿，具有国际学术视野和学术原创精神，能够综合运用精密测量、测试及控制系统设计、仪器仪表、计量管理等相关技术，具有独立担负专门技术工作和从事科学研究的能力。</p> <p>Master the solid and broad basic theory and system expertise in instrument science and technology, understand the development direction of this discipline and the research frontier at home and abroad, and have an international academic vision and academic original spirit, be able to apply related technologies such as precision measurement, test and control system design, instrumentation, measurement management, etc., and has the ability to independently undertake specialized technical work and engage in scientific research.</p>	<p>数值分析、数理统计、矩阵理论、最优化理论与方法、精密测量技术、现代信号分析及其应用、现代光电测试技术</p> <p>Numerical Analysis、Mathematical Statistics、Matrix Theory、Optimization Theory and Method、Precision Measurement Technology、Modern Signal Analysis and Its Application、Modern Photoelectric Testing Technology</p>



研究 方向	精密仪器及机械	<p>以精密机械、电子学、光学和计算机技术等多学科理论和技术基础的融合为基本特征，培养学生具有精密机械设计、现代测试与传感技术、机器人技术等理论知识、较强的创新能力和实践能力。</p> <p>Based on the integration of multidisciplinary theory and technical foundations such as precision mechanics, electronics, optics and computer technology, students are trained to master the theoretical knowledge of precision mechanical design, modern testing and sensing technology, robotics, and have strong innovations and practical ability.</p>	<p>精密测量技术、现代信号分析及其应用、现代光电测试技术、现代精密仪器设计、现代控制理论与仪器系统设计、多传感器信息融合技术</p> <p>Precision Measurement Technology、Modern Signal Analysis and Its Application、Modern Optoelectronic Testing Technology、Modern Precision Instrument Design,Modern Control Theory and Instrument System Design、Multi-sensor Information Fusion Technology</p>
	测试计量技术及仪器	<p>掌握智能测试技术及仪器的基本理论与现代测试方法，以现代测试技术及控制理论、现代传感及信息融合技术、现代信号及信息处理技术等为理论基础，开展现代检测技术、智能测试仪器、虚拟仪器技术与测控系统的研究与开发，提高测控系统的精度及可靠性。</p> <p>Master the basic theory and modern test methods of intelligent test technology and instruments, and carry out modern detection technology and intelligent test instruments based on modern test technology and control theory, modern sensing and information fusion technology, modern signal and information processing technology. Research and development of virtual instrument technology and measurement and control system to improve the accuracy and reliability of the measurement and control system.</p>	<p>精密测量技术、现代光电检测技术、测控总线技术及应用、现代控制理论与仪器系统设计、多传感器信息融合技术</p> <p>Precision Measurement Technology,Modern Photoelectric Detection Technology、Measurement and Control Bus Technology and Application、Modern Control Theory and Instrument System Design、Multi-sensor Information Fusion Technology</p>

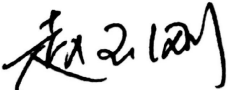



**附表 2： 培养计划 ( Training Plan )**

学科名称	仪器科学与技术 Instrument Science and Technology		学科代码	0804		
单位名称	机械工程学院 School of Mechanical Engineering		培养类型	学术学位硕士研究生 Foreign Postgraduates		
学分要求	总学分 Total Credits: $\geq 0$ , 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq 9$ 。					
课 程 设 置						
课程类型	课程编码	课程名称	学 分	学 期	备注	
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture		1		
	G13101	汉语 Chinese		1		
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 $\geq 11$ 学分	G11001	数值分析 Numerical Analysis	3	2	必选	
	010048	精密与超精密加工技术 Precision and Ultraprecision Machining Technology	2	1		
	110002	最优化理论与方法 Optimization Theory and Methods	2	2		
	010006	精密测量技术 Precision Measurement Technology	2	2		
	010033	现代信号分析及其应用 Modern Signal Analysis and Its Application	2	2		
	010026	现代光电测试技术 Modern Photoelectric Testing Technology	2	2		
方向选修课程 $\geq 8$ 学分	G11002	矩阵理论 Matrix Theory	2	1		
	G11003	数理统计 Mathematical Atatistics	2	1		
	050027	信号与系统 Signals and Systems	2	1		
	010001	测控电路 Measurement and Control Circuit	2	2		
	010015	虚拟仪器 Virtual Instrument	2	2		



	010023	图像处理技术 Digital Image Processing Technology	2	2	
	010028	现代精密仪器设计 Design of Modern Precision Instruments	2	2	
	010034	测控总线技术及应用 Measurement and Control Bus Technology and Its Application	2	2	
	010037	现代控制理论与仪器系统设计 Modern Control Theory and Instrument System Design	2	2	
	010060	模式识别与人工智能 Pattern Recognition and Artificial Intelligence	2	2	
	010039	多传感器信息融合技术 Multisensor Information Fusion Technology	2	2	
	010040	工业测控系统及设计 Industrial Measurement and Control System and Design	2	2	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G09064	科研与人文修养 Scientific Research and Humanity Cultivation	1	1	
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
补修课程 不计学分				导师 确定	
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后提交开题报告。开题答辩小组由本学科 5 人以上专家组成，负责对研究生所做开题报告进行评审，做出评价、提出修改意见，评审不通过者需限期重做，再次开题仍不通过的终止培养。学位论文开题报告审核通过一年后方可申请学位论文送审、答辩。</p> <p>Through the literature reading and academic research to determine the topic selection and research content, and submit the opening report with the consent of the instructor. The assessment panel composed of more than 5 experts review the student's opening report and put forward comments and amendments. Those who do not pass the program can re-do it within the time limit, and those who do not pass the program will terminate the training. After the examination of the dissertation opening report is passed for one year, students can apply for the dissertation for review and defense.</p>				3

<p>中期考核 (1 学分)</p>	<p>对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。</p> <p>To sum up and evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools.</p>	<p>4</p>	
<p>创新创业 (1 学分)</p>	<p>参加学术会议并宣读论文，或做公开学术报告 2 次； 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖； 3. 参加 6 次以上与本学科相关的学术报告，并提交总结； 每项记 1 学分，需完成 1 学分。</p> <p>1. Participate in academic conferences and presentation of papers, or do public academic reports for 2 times; 2. Participate and win awards in high level science and technology competitions, creative design, innovation and entrepreneurship competitions; 3. Participate in more than 6 academic reports related to the subject and submit a summary. 1 credit for each, the minimum credit is 1.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



# 交通运输工程学科学术学位硕士研究生培养方案

学科代码：0823

## Transportation Engineering Subject of Academic

## Postgraduate Training Program

Credit Code: 0823

### 一、学科简介 ( Brief Introduction to Discipline )

交通运输工程学科自 1977 年开始本科招生，2000 年获载运工具运用工程学科硕士学位授予权，2003 年获交通运输规划与管理学科硕士学位授予权，2006 年获交通信息工程及控制学科硕士学位授予权，2011 年获交通运输工程一级学科硕士学位授予权。

2006 年交通信息工程及控制学科获批山东省重点学科，2006 年获批山东省道路智能控制与运输安全工程技术研究中心。交通运输专业 2007 年被评为山东省品牌专业，2010 年被评为国家级特色专业，2012 年成为山东省名校工程重点建设专业，2016 年获批山东省高水平应用型专业群立项建设。经过多年的建设发展，本学科在山东省处于领先地位。

现有专职教师 40 人，其中博士生导师 2 人，硕士生导师 28 人，教授 8 人，副教授 21 人，具有博士学位人员 32 人，具有海外经历教师 12 人，聘请校外兼职导师 8 名，指导教师中博士学位比例 80%，形成了一支职称、学历、学缘结构、年龄层次合理的研发队伍。培养的研究生获得山东省研究生优秀科技创新成果奖 3 项，山东省优秀硕士学位论文 1 篇，就业率 100%。

本学科现有国家级电动汽车智能化动力集成技术国家地方联合工程技术研究中心 1 个，山东省道路智能控制与运输安全工程技术研究中心、山东省高校新能源汽车协同创新中心、山东省车辆工程技术研究中心、山东省基础地理空间信息工程技术研究中心等 4 个省级技术研究中心，拥有智能运输系统研究平台、多通道并行驾驶行为虚拟仿真平台和无人机空地协同中心 3 个校级科研平台，为学科建设和人才培养提供教学科研支撑。

学科主要面向道路交通运输系统，以交通信息及安全工程、智能汽车与网联技术、道路与轨道交通工程、交通运输规划与管理为主要研究方向，紧紧围绕交通运输工程领

域的基础理论和关键技术，形成了智能交通与车路网联协同发展的学科特色，达到了省一流学科水平。

Transportation Engineering has enrolled undergraduates since 1977. In 2000, it got The Right to Grant Master's Degrees in Transportation Vehicle Application Engineering. In 2003, it got The Right to Grant Master's Degrees in Transportation Planning and Management. In 2006, it got The Right to Grant Master's Degrees in Transportation Information Engineering and Control. In 2011, it got The Right to Grant Master's Degrees in Transportation Engineering.

In 2006, the subject of traffic information engineering and control was approved as a key subject in Shandong Province, and in 2006, the Shandong Road Intelligent Control and Transportation Safety Engineering Technology Research Center was approved. Transportation specialty was awarded Shandong Brand Major in 2007, National Characteristic Major in 2010, Key Construction Major in Engineering in Famous Schools of Shandong Province in 2012, and approved for the establishment of high level applied professional groups in Shandong Province in 2016. After years of construction and development, this subject is in the leading position in Shandong Province.

At present, there are 40 full-time teachers, including 2 doctoral tutors, 28 master tutors, 8 professors, 21 associate professors, 32 doctoral staff, 12 overseas experienced teachers, 8 part-time tutors, 80% of tutors, have doctoral degrees, formed a research and development team with reasonable title, educational background, academic structure and age level. The graduate students trained have won three outstanding achievements for outstanding scientific and technological innovation achievements of graduate students in Shandong Province, and One Excellent Master's Degree Thesis in Shandong Province, with an employment rate of 100%.

This subject has one national-level integrated technology research center of electric vehicle intellectualized power engineering, four provincial-level technologies including Shandong Road Intelligent Control and Transportation Safety Engineering Research Center, Shandong University New Energy Vehicle Collaborative Innovation Center, Shandong Vehicle Engineering Research Center and Shandong Basic Geospatial Information Engineering Technology Research Center. The technology research center has three university-level scientific research platforms: intelligent transportation system research platform, multi-channel parallel driving behavior virtual simulation platform and UAV space-ground collaboration center, which provide teaching and scientific research support for Subject Construction and personnel training.

The subject is mainly oriented to road traffic transportation system, closely centering on the basic theories and key technologies in the field of transportation engineering, focusing on traffic information engineering and control, intelligent network automobile and its application, road and rail transit engineering, transportation planning and management, forming the disciplinary characteristics of the coordinated development of intelligent transportation and vehicle-road network, reaching the provincial first-class subject level.



## 二、培养目标 ( Educational Objectives )

为适应经济建设和社会发展的需要,培养德、智、体全面发展,能从事本学科领域内的教学、科研以及管理工作的高层次专门人才,具体要求:

1. 遵守中国法律和学校规章制度,热爱中国文化,积极促进中外友好合作与交流;比较熟练的掌握中文;具有实事求是、科学严谨的治学态度和勇于开拓创新的工作作风。
2. 掌握交通运输工程学科扎实的基础理论和系统的专门知识,具有独立从事本领域科学研究、技术开发、工程实施与管理能力,具有良好职业素养,了解本领域的技术现状和发展趋势,能够运用所学知识解决工程问题。
3. 比较熟练地掌握一门外国语,能顺利阅读本学科领域的科技资料及文献,并具备一定的听、说和写作能力。
4. 从事交通运输工程领域的科学研究、交通运输系统规划及设计、产品设计与开发、工程设计及管理、教学等工作,为科研单位、高等院校、行业管理等部门以及交通运输企业培养高层次的创新型专门技术人才。

In order to meet the satisfaction of economic construction and society development, this discipline cultivate all-round development and high-level specialists who can engage in teaching, scientific research and management. The specific requirements are listed below.

1. Comply with Chinese laws and school rules and regulations, love Chinese culture, actively promote friendly cooperation and exchanges between China and foreign countries; master Chinese in a more proficient manner; have a realistic and rigorous academic attitude and a courageous pioneering and innovative work style.
2. Master the solid basic theory and systematic expertise of Transportation Engineering subject, have the ability to independently engage in scientific research, technology development, project implementation and management in this field, have good professional accomplishment, understand the current situation and development trend of technology in this field, and be able to use the knowledge learned to solve engineering problems.
3. Have a good command of a foreign language, can read scientific and technological materials and documents in the field of this subject smoothly, and have a certain listening, speaking and writing ability.
4. High-level innovative specialized technical talent is trained for institutions of higher learning, research institutes, industry management, and transportation companies, they are engaged in scientific research, transportation system planning and design, product design and development, engineering design and management in the field of transportation engineering.

## 三、研究方向 ( Research Orientation )

交通运输工程 (一级学科) 学术硕士学位研究生培养方案设以下 4 个研究方向:

1. 交通信息工程与控制
2. 智能网络汽车及其应用（交叉方向）
3. 道路及轨道交通工程
4. 交通运输规划与管理

各研究方向详细见附表 1。

There are four research directions in the training program for postgraduates with master's degree in transportation engineering (first-level discipline):

1. Traffic information engineering and control
2. Intelligent network automobile and its application
3. Road and rail transit engineering
4. Transportation planning and management

See Schedule 1 for details.

#### 四、学习年限 (Length of Schooling)

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意并符合《交通与车辆工程学院全日制硕士研究生提前毕业的暂行规定》的要求，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The school system is three years and the length of study is 2-4 years. The time for scientific research and thesis writing is not less than one year (calculated from the date of the adoption of the thesis opening). With the consent of the tutor and in accordance with the "Interim Regulations on the Early Graduation of Full-time Master's Graduates from the Institute of Transportation and Vehicle Engineering", the tutor may apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The period of suspension does not take into account the length of study.

#### 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程教学实行学分制，课程分为必修课程和选修课程，学生需在规定时间内完成不少于 32 学分的学习任务，其中必修不少于 16.5 学分，选修不少于 9 学分，实践不少于 3 学分。同等学历学术型硕士学位研究生，应补修本领域本科阶段主干课程 2 门及导师指定的其它课程，经考核成绩合格（不计学分，成绩不计入成绩单），方可申请答辩。课程设置情况见附表 2。

The course is divided into compulsory courses and elective courses. Students need to complete no less than 32 credits in the prescribed time. Among them, compulsory courses are no less than 16.5 credits, elective courses are no less than 9 credits, and practice is no less than 3



credits. Academic master's degree postgraduates may apply for graduation defense only after they have completed two main courses in the undergraduate stage of their field and other courses designated by their tutors and passed the examination results (not counting credits and not counting the results in their transcripts). The curriculum is shown in Schedule 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订研究生培养计划，组织开题、中期、答辩，指导科学研究和学位论文等工作，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做（两次开题时间间隔不得少于 3 个月），仍不通过者终止培养。学位论文开题报告审核通过一年后方可申请学位论文送审、答辩。

### 2. 中期考核

研究生课程学习结束后，根据研究生培养方案安排，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期考核小组确定考核成绩为“合格”者，可以继续完成学位论文；考核成绩为“不合格”者，限期整改再检，再检仍不合格的，经所在单位签署意见，研究生院审核，报分管校长批准，终止学籍，做研究生肄业处理。

### 3. 创新创业（1 学分）

- (1) 参加 6 次以上与本学科相关的学术报告，并提交总结；
- (2) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等。

每项记 1 学分，需完成 1 学分。

#### 1. Opening report of dissertation

In order to ensure the quality of the dissertation, graduate students should determine the topic selection and research content through literature reading and academic research, and submit the opening report with the consent of the instructor. A judging panel consisting of more than 5 experts from this subject will review the opening report of the students, and provide



evaluation and revision opinions. If they do not pass, they may redo within a time limit ( the interval between two opening reports shall not be less than 3 months ), those who still fail to pass will be terminated. After the examination of the dissertation opening report is passed for one year, you can apply for the dissertation for review and defense.

## 2. Medium-term screening

After the basic study of postgraduate courses, based on the postgraduate training program, in the fourth semester, the graduates' political thoughts and moral qualities, basic theories and professional knowledge, scientific research innovation, practical ability and health status will be comprehensively evaluated. The purpose is to summarize the evaluation of postgraduate study and research since enrollment, to find out the problems in the process of postgraduate training, to explore ways to solve problems, and to clarify the direction of future efforts. The mid-term screening assessment team determines that the assessment results are “qualified” and can continue to complete the dissertation; if the assessment results are “unqualified”, the applicants will sign the opinions, the graduate school will review, report to the principal to approve, terminate the student status, and deal with ungraduated.

## 3. Innovation and entrepreneurship ( 1 credits )

( 1 ) Participate in more than 6 academic reports related to the subject and submit a summary;

( 2 ) Participate in academic conferences and read papers, or make public academic reports 2 times;

( 3 ) Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions.

1 credit for each completed content, and 1 credits are required to be obtained.

## 七、学位论文 ( Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本领域硕士研究生的学位论文应满足以下基本要求：

1. 硕士学位论文应具有系统的、完整的研究思路 and 计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节，论文答辩要做到严格要求、公正、公开。

Master's degree thesis is a comprehensive summary of the scientific research work of



master's students, is an important academic document describing their research results and reflecting their research level, and is the basic basis for applying of master's degree. The writing of dissertation is the key and core of the cultivation of master's students, and it must be carried out in strict accordance with the standard. The dissertation of master's students in this discipline should meet the following basic requirements:

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》, it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.

## 八、毕业与学位要求 ( Graduation and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节, 成绩考核合格;
3. 完成论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

学位获取要求按照《山东理工大学硕士学位授予工作实施细则》《交通与车辆工程学院关于全日制硕士研究生学位授予的补充规定》等相关文件执行。

Meet the requirements of graduation, can obtain a diploma; On the basis of obtaining the graduation certificate, if the degree awarding criteria are met, the degree certificate can be granted.

#### 1. Requirement for Graduation

(1) With good moral cultivation and academic ethics, seeking truth from facts and having the courage to innovate;

(2) Completed the courses and other training links stipulated in the training program, and

completed the required credits;

(3) Complete thesis defense and pass the examination;

(4) Other requirements in accordance with the relevant regulations of the school.

## 2. Degree Requirements

Requirements for obtaining a degree refer to the "Shandong University of Technology master's degree work implementation details," "School of Transportation and Vehicle Engineering graduate degree on a full-time Masters granted Supplementary Regulations" and other related documents.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>遵纪守法, 爱岗敬业, 具有良好的思想品质和职业道德。具有自我完善、独立思考和从事专业工作能力, 具备相应综合素质、文化修养、创新意识和初步的批判性思维能力。</p> <p>Abide by the law, love work, with good ideological quality and professional ethics. Self-improvement, independent thinking and professional work ability, with the corresponding comprehensive quality, cultural accomplishment, innovation consciousness and preliminary critical thinking ability.</p>	<p>汉语写作、汉语口语、论文写作与学术规范</p> <p>Theoretical and Practical Research on Socialism with Chinese Characteristics、Dialectics of Nature、Chinese Writing、Oral Chinese、Paper Writing and Academic Norms</p>
综合能力		<p>掌握交通运输工程领域坚实的基础理论和丰富的专业知识及管理知识, 了解国内外交通运输工程领域工程技术的现状和发展趋势, 掌握解决交通运输工程有关问题的先进技术方法和手段, 具备良好的学术素养和学术道德, 在交通运输工程领域中能从事科技创新与技术开发、工程设计与实施、系统规划与管理、新技术推广与应用等方面工作。</p> <p>Master the solid transportation engineering theory and the basis of abundant professional knowledge and management knowledge, understanding of transportation engineering field engineering technology at home and abroad present situation and development trend, to master the advanced technology to solve the problem of transportation engineering related methods and means, have good academic accomplishment and moral, can be engaged in scientific and technological innovation in the field of transportation engineering and technology development, engineering design and implementation, system planning and management, popularization and application of new technology, etc.</p>	<p>矩阵理论、交通运输工程学、智能交通理论与应用、预测与决策技术</p> <p>Matrix Theory、Transportation Engineering、Intelligent Transportation Theory and Application、Prediction and Decision Technology.</p>
研究方向	交通信息工程及控制	<p>掌握电子、计算机、控制、网络通讯、人工智能、交通运输工程等知识, 能从事人、车、路协同及交通运输系统优化控制等方面的研究, 促进交通运输系统运行安全与畅通。</p> <p>Master the knowledge of electronics, computer, control, network communication, artificial intelligence, transportation engineering, etc., can be engaged in the research of human, vehicle, road coordination and optimization control of the transportation system, promote the safety and smooth operation of the transportation system.</p>	<p>交通信号控制、现代鲁棒控制理论、交通信息技术、运输安全工程、交通流理论与模拟</p> <p>Vehicle-road Collaboration Technology、Traffic Signal Control、Modern Robust Control Theory、Traffic Information Technology、Transportation Safety Engineering、Traffic Flow Theory and Simulation</p>

智能网联汽车及应用	<p>掌握主/被动型传感器感知、多传感器信息融合、高精度定位建图、多尺度轨迹规划、协同优化与群体决策理论、智能网联汽车的纵向、横向运动控制，智能汽车网联通信与安全防护等知识，能从事智能网联汽车感知、决策、控制、通信等方面的研究与技术开发。</p> <p>Master master/passive sensors, multi-sensor information fusion, and high precision positioning built figure, multi-scale trajectory planning, the collaborative optimization and group decision theory, intelligent made cars, and the longitudinal and transverse motion control, smart cars made communication and knowledge of safe protection, can be engaged in intelligent made car perception, decision-making, control, communication and other aspects of the research and technology development.</p>	<p>智能优化算法、智能数字图像处理、机器学习、系统建模与仿真、智能网联汽车理论与应用、车路协同技术、智慧物流与物联网技术、交通大数据处理技术、高级辅助驾驶技术</p> <p>Intelligent Optimization Algorithm、Intelligent Digital Image Processing、Machine Learning、System Modeling and Simulation、Intelligent Connected Vehicle Theory and Application、Vehicle-road Collaboration Technology、Intelligent Logistics and Internet of Things Technology、Traffic Big Data Processing Technology、Advanced Assisted Driving Technology</p>
道路与轨道交通工程	<p>掌握相关数学、力学、道路工程材料、运输安全工程、交通运输工程等理论知识，能从事道路和桥梁工程的勘察、设计、论证、监测、施工、管理、减灾防灾与风险评估等领域研究，促进道路和桥梁工程设计理念、施工工艺、监测测量技术的发展。</p> <p>Master relevant mathematics, mechanics, road engineering materials, transportation safety engineering, transportation engineering theory knowledge, to be involved in road and bridge engineering survey, design, and argumentation, monitoring, construction, management, and risk assessment in the areas of research, disaster prevention and reduction to promote road and bridge engineering design, construction technology, the development of monitoring and measurement technology.</p>	<p>多模式交通整合与优化方法、高等路基路面工程、弹塑性力学、有限元分析(交通)、沥青与沥青混合料、水泥与水泥混凝土、工程灾害学</p> <p>Multi-mode Traffic Integration and Optimization Method、Advanced Subgrade and Pavement Engineering、Elastic-plastic Mechanics、Finite Element Analysis (Transportation)、Bitumen and Bituminous Mixture、Cement and Cement Concrete、Engineering Disaster Science</p>
交通运输规划与管理	<p>掌握交通运输工程学、系统科学、经济学、信息科学和环境科学等知识，能从事交通运输系统规划、设计、管理与经济的政策、理论、方法及影响等方面的研究。</p> <p>Master the knowledge of transportation engineering, system science, economics, information science and environmental science, and can be engaged in the research of transportation system planning, design, management and economic policies, theories, methods and influences.</p>	<p>交通运输规划模型、交通枢纽规划与设计、交通运输技术经济学、交通运输系统设计</p> <p>Transportation Planning Model、Transportation Hub Planning and Design、Economics of Transportation Technology、Transportation System Design</p>



附表 2: 培养计划 ( Training Plan )

学科名称	交通运输工程 Transportation engineering		学科代码	08023	
单位名称	交通与车辆工程学院 School of Transportation and Vehicle Engineering		培养类型	学术硕士 Academic master	
学分要求	总学分 Total Credits: $\geq 32$ , 必修课程学分 Credit for Compulsive Course: 16.5, 选修课程学分 Credit for optional course: 9				
课 程 设 置					
课程类型	课程编码	课程名称	学分	学期	备注
公共必修课程 5 学分	G16006	中国文化 Chinese Culture	2	1	
	G16007	汉语 Chinese	2	1	
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科平台课程 11.5 学分	G11001	数值分析 Numerical analysis	3	1	
	G11002	矩阵理论 Matrix theory	2.5	1	
	020027	交通运输工程学 (英文) Transportation Engineering (English)	2	2	
	020074	交通大数据处理技术 Traffic Big Data Processing Technology	2	2	
	020018	预测决策技术 Prediction and Decision Technology	2	2	
方向选修课程 $\geq 8$ 学分	020030	控制理论及应用 Control Theory and Application	2	2	
	020053	GIS&GPS&RS 原理与方法 GIS&GPS&RS Principles and Methods	2	2	
	020048	智能优化算法 Intelligent Optimization Algorithm	2	2	
	020050	智能数字图像处理 Intelligent Digital Image Processing	2	2	
	020108	机器学习 Machine Learning	2	2	
	020016	交通信号控制 Traffic Signal Control	2	2	

020051	现代鲁棒控制理论 Modern Robust Control Theory	2	2
020070	交通信息技术 Traffic Information Technology	2	2
020034	运输安全工程 Transportation Safety Engineering	2	2
020037	交通流理论与模拟 Traffic Flow Theory and Simulation	2	2
020029	系统建模与仿真 System Modeling and Simulation	2	2
020071	智能网联汽车理论与应用 Intelligent Connected Vehicle Theory and Application	3	2
020072	车路协同技术 Vehicle-road Collaboration Technology	2	2
020107	智能车辆关键技术与设计方法 Key Technology and Design method of Intelligent Vehicle	2	2
020035	汽车电液控制技术 Automotive Electro-hydraulic Control Technology	2	2
020013	汽车电子控制系统设计与开发 Design and Development of Automotive Electronic Control System	2	2
020073	智慧物流与物联网技术 Intelligent Logistics and Internet of Things Technology	2	2
020069	智能交通理论与应用 Intelligent Transportation Theory and Application	2	2
020075	高级辅助驾驶技术 Advanced Assisted Driving Technology	2	2
020076	高等路基路面工程 Advanced Subgrade and Pavement Engineering	2	2
020077	弹塑性力学 Elastic-plastic Mechanics	2	2
020061	有限元分析 Finite Element Analysis	2	2
020079	沥青与沥青混合料 Bitumen and Bituminous Mixture	2	2
020080	水泥与水泥混凝土 Cement and Cement Concrete	2	2



	020081	工程灾害学 Engineering Disaster Science	2	2	
	020082	多模式交通整合与优化方法 Multi-mode Traffic Integration and Optimization Method	2	2	
	020017	交通运输规划模型 Transportation Planning Model	2	2	
	020052	交通枢纽规划与设计 Transportation Hub Planning and Design	2	2	
	020036	交通运输技术经济学 Economics of Transportation Technology	2	2	
	020038	交通运输系统设计 Transportation System Design	2	2	
素养选修课程 ≤1 学分	150084	东方哲学与现代化 Eastern Philosophy and Modernization	1	2	
	130043	中国古代韵文阅读与欣赏 Ancient Chinese Poetry Reading and Appreciation	1	2	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>为保证论文质量，研究生应通过文献阅读和学术研究确定论文的选题和研究内容，并经导师同意提交提案报告。由 5 名或 5 名以上本学科专家组成的评审小组将对学生提出的建议进行评审，并提出意见和修改意见。提案未通过的，可以在一定期限内补办（两次提案之间的时间间隔不得少于 3 个月），提案未通过的，可以终止培训。</p> <p>In order to ensure the quality of the dissertation, the graduate students should determine the topic selection and research content of the thesis through literature reading and academic research, and submit the proposal report with the consent of the tutor. A review panel composed of 5 or more experts of the subject will review the proposal made by students and put forward comments and amendments. Those who fail to pass the proposal can redo it within a time limit (the time interval between the two proposals shall not be less than 3 months), and those who still fail to pass the proposal can terminate the training.</p>				3
中期考核 (1 学分)	<p>研究生课程学习基本完成后，根据研究生培养计划，在第四学期对研究生的政治道德素质、基础理论和专业知识、科研创新、实践能力和综合素质进行综合评价。其目的是总结和评价研究生入学以来的学习和科研情况，及时发现研究生培养过程中存在的问题，探索解决问题的途径，明确今后努力的方向。中期评审小组将评审结果确定为“不合格”研究生，经学院和研究生院审核后，</p>				4



	<p>报校长办公室批准，做肄业处理。</p> <p>After the study of postgraduate courses is basically completed, based on the postgraduate training program, a comprehensive assessment will be conducted in the fourth semester on the political and moral qualities, basic theories and professional knowledge, scientific research innovation, practical ability and comprehensive quality of postgraduates. Its purpose is to summarize and evaluate the study and scientific research situation since the admission of graduate students, timely find the problems in the process of postgraduate training, explore the way to solve the problems, and make clear the direction of future efforts. The mid-term screening and assessment team shall determine the assessment results as "unqualified" graduate students, and the school of economics and graduate school shall review and submit to the President's office for approval, terminate the student status, and finish the graduate study.</p>		
<p>创新创业 (1 学分)</p>	<ol style="list-style-type: none"> <li>1. 参加 6 次以上与本学科相关的学术报告，并提交总结；</li> <li>2. 进行 3 个月的出国访学研修或学术交流；</li> <li>3. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>4. 参加全国性的科技竞赛、创意设计、创新创业竞赛等。</li> </ol> <p>每项记 1 学分，需完成 1 学分。</p> <ol style="list-style-type: none"> <li>1. Conduct overseas visiting study or academic exchange for more than 3 months;</li> <li>2. Take part in academic conferences and read papers, or to do public academic report 2 times;</li> <li>3. Participated in national science and technology competition, creative design, innovation and entrepreneurship competition and won awards;</li> <li>4. Participated in more than 6 academic reports related to the subject and submitted summaries;</li> </ol> <p>1 credit for each item and 1 credits need to be completed.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



## 车辆工程学科学术学位硕士研究生培养方案

学科代码：080204

### Vehicle engineering Academic postgraduate training program

Credit Code: 080204

#### 一、学科简介 ( Brief Introduction to Discipline )

车辆工程专业始建于 1978 年，是山东省最早设立的车辆工程本科专业，1997 年成为硕士学位授权学科，2013 年成为博士学位授权学科，现已形成学士、硕士、博士、博士后完整的人才培养体系。

车辆工程专业现有教师 32 人，其中教授 11 人，副教授 12 人，讲师 9 人，拥有博士学位的教师 28 人，博士生导师 7 人，新世纪百千万人才工程国家级人选 1 人，享受国务院政府特殊津贴 1 人，泰山学者特聘专家 1 人，山东省有突出贡献的中青年专家 3 人，山东省教学名师 1 人，山东省优秀研究生指导教师 1 人，山东省高校车辆工程重点学科首席专家 3 人，形成了一支职称结构、学历结构、学缘结构、年龄层次合理、科研经验丰富的优秀团队。

经过多年的发展，团队先后获得国家技术发明二等奖 1 项、国家科技进步三等奖 1 项，省部级一等奖 6 项、二等奖 10 项，主持国家 863 计划等国家级项目 21 项、省部级项目 56 项，发表论文 520 篇，其中被 SCI、EI 收录 212 篇，出版著作、教材 15 部，获得授权发明专利 200 余项。培养的研究生获得山东省研究生优秀科技创新成果奖 8 项，山东省优秀硕士学位论文 3 篇，就业率 100%。

本专业是国家级特色专业，拥有车辆工程国家级教学团队、机械工程（含车辆工程）国家级实验教学示范中心、车辆工程与交通国家级虚拟仿真实验教学中心。车辆工程学科“八五”到“十二五”期间连续五届遴选为山东省强化建设重点学科，2016 年入选山东省高水平应用型立项建设专业，2018 年入选山东省一流学科，山东省车辆工程示范工程技术研究中心、山东省高校新能源汽车协同创新中心也设立在本学科。

Vehicle engineering was established in 1978, which is the earliest undergraduate major of

vehicle engineering in Shandong province. It became the authorized subject for master's degree in 1997, and became the authorized subject for doctor's degree in 2013. Now it has formed a complete talent cultivation system for bachelor, master, doctor and postdoctoral students.

Vehicle engineering professional teachers existing 32 people, including 11 professors, 12 associate professors, 9 lecturers, teachers have a doctorate in 28 people, 7 doctoral supervisors, the new century national pacesetter engineering candidate 1 person, enjoy special government allowances of the state council, 1 Taishan scholars distinguished experts, 3 young and middle-aged expert with outstanding contribution in Shandong province, Shandong province teaching teacher 1 person, 1 outstanding graduate student teachers in Shandong province, Shandong university vehicle engineering, chief expert three key disciplines, formed a professional title structure, academic structure, learn edge, age, level of reasonable structure, scientific research and experienced team.

After years of development, the team won the second prize of national technological innovation has a national science and technology progress third prize, 1 item, six provincial first prize, second prize 10 and leading the national 863 project 21 national projects, such as 56 provincial projects, published 520 papers, among them by SCI, EI, included 212 articles, published works, 15 textbooks, more than 200 authorized invention patents. The graduate students have won 8 outstanding scientific and technological innovation achievement awards in Shandong province, 3 excellent master's degree theses in Shandong province, and the employment rate is 100%.

This major is a national characteristic major, with a national teaching team of vehicle engineering, a national experimental teaching demonstration center of mechanical engineering (including vehicle engineering), and a national virtual simulation experimental teaching center of vehicle engineering and transportation. Vehicle engineering discipline "five-year" to the "twelfth five-year" period of five consecutive terms selection is to strengthen the construction of key disciplines in Shandong province, in 2016 in Shandong province high level professional applied project construction, Shandong province in 2018 first-class discipline, vehicle engineering demonstration engineering technology research center, in Shandong province colleges and universities in Shandong province new energy automobile collaborative innovation center is set up in this subject.

## 二、培养目标 ( Educational Objectives )

立足国家和区域能源发展战略，面向车辆工程领域科技前沿，培养德、智、体、美全面发展，具备高水平综合素质的车辆工程领域的高层次创新专门技术人才。

1. 掌握车辆工程领域坚实的基础理论和丰富的专业知识及管理知识，了解国内外车辆工程领域工程技术的现状和发展趋势，掌握解决车辆工程有关问题的先进技术方法和手段，具备良好的学术素养和学术道德，在车辆领域中能从事科学研究或独立担负专门



技术工作。

2. 掌握一门外国语，能熟练阅读专业文献资料和撰写论文。

3. 为企业、高等学校、科研院所以及行业管理部门培养从事车辆工程领域的科学研究、技术开发、生产制造、试验检测、管理与人才培养等工作的创新型高层次人才。

Full of national and regional energy development strategy, oriented to the forefront of vehicle engineering science and technology, train high-level innovative technical talents in the field of vehicle engineering with high comprehensive quality and comprehensive development of moral, intellectual, physical and aesthetic

1. Grasp the vehicle engineering field solid basic theory and rich professional knowledge and management knowledge, understanding of the field of vehicle engineering both at home and abroad present situation and development trend of engineering technology, to master the advanced technology to solve the problem of vehicle engineering related methods and means, have good academic accomplishment and moral, can be engaged in scientific research in the field of vehicle or independent specialized technical work to do.

2. Master a foreign language, read professional literature and write papers skillfully.

3. To train innovative and research-oriented high-level engineering and technical personnel engaged in scientific research, technology development, manufacturing, testing, management and personnel training in the field of vehicle engineering for enterprises, institutions of higher learning, scientific research institutes and industry management departments.

### 三、研究方向 ( Research Orientation )

车辆工程 ( 二级学科 ) 学术学位硕士研究生培养方案设以下 4 个研究方向:

1. 新能源汽车能源与动力系统 ( 跨学科交叉方向 )
2. 汽车电子电气与控制
3. 车辆系统动力学
4. 车辆数字化设计与制造

详见附表 1。

1. Energy and power system of new energy vehicles
2. Automotive electronics and control
3. Vehicle system dynamics
4. Digital design and manufacturing of vehicles

See schedule 1 for details.

### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年 ( 从开题通过之

日起计算)。经导师同意并符合《交通与车辆工程学院全日制硕士研究生提前毕业的暂行规定》的要求,可申请提前毕业,但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years of schooling, 2-4 years of study, scientific research and paper writing time is not less than 1 years (calculated from the date of the opening of the question). Upon the consent of the tutor and in accordance with the requirements of the interim provisions on early graduation of full-time graduate students of the School of Traffic and vehicle engineering, an application for early graduation may be made, but the time requirements for scientific research and essay writing remain unchanged. The time of recess is not counted as the length of study.

### 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程分为必修课程和选修课程,学生需在规定时间内完成 16.5 个必修学分和 9 个选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程,考核合格后方可参与开题答辩,成绩不计入成绩单。

课程设置情况见附表 2。

The course is divided into compulsory and elective courses, and students are required to complete a compulsory 16.5 credits and take 9 credits of study tasks within a specified period of time.

Interdisciplinary graduate students are required to study 2 or more courses according to the requirements of the tutor, after the assessment is qualified before they can participate in the reply, the results are not counted in the report card.

The course setup is shown in Schedule 2.

### 六、培养方式与培养环节 (Training Mode and Cultivating Process)

学术硕士研究生培养实行导师负责制,鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划,且对研究生的思想品德、学术道德有引导、示范和监督的责任。

#### 1. 开题报告

为确保学位论文的质量,研究生应通过文献阅读、学术调研,确定论文选题和研究内容,经导师同意后于第三学期末提交开题报告。开题答辩小组由本学科 5 人以上专家组成,负责对研究生所做开题报告进行评审、做出评价、提出修改意见,评审不通过者需限期重做,再次开题仍不通过的终止培养。

#### 2. 中期考核

研究生课程学习结束后,根据研究生培养方案安排,在第四学期对研究生的政治思



想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。

### 3. 创新创业

- (1) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (2) 参加全国性的科技竞赛、创意设计、创新创业竞赛等活动；
- (3) 参加 6 次以上与本学科相关的学术报告，并提交总结。

每项记 1 学分，需完成 1 学分。

Academic graduate students develop a mentor responsibility system and encourage the implementation of a guidance group ( team ) based on the responsibility of mentors. The tutor is responsible for formulating the postgraduate training plan, and has the responsibility of guiding, demonstrating and supervising the ideological and moral character and academic ethics of the graduate students.

#### 1. Report on the opening of the question

In order to ensure the quality of dissertation, graduate students should, through literature reading, academic research, determine the topic selection and research content, with the consent of the tutor to submit a report on the topic.

The evaluation panel, which is composed of more than 5 experts in the subject, evaluates the report of the students and puts forward the evaluation and modification opinions, and the non-passing person can redo the time limit ( two open question intervals must not be less than 3 months ) , and the training is still not terminated by the person. Degree thesis Open topic Report after one year can apply for a degree thesis to be examined, reply.

#### 2. Mid-term screening

After the basic completion of Postgraduate course learning, based on the postgraduate training program, the fourth semester of graduate students ' political thought and moral quality, basic theory and professional knowledge, scientific research innovation, practical ability and comprehensive quality and other aspects of comprehensive assessment. The purpose of this paper is to summarize and evaluate the research situation of graduate students since enrolling in school, to find out the problems existing in the process of postgraduate training in time, to explore ways to solve problems, and to clarify the direction of future efforts. Mid-term Screening assessment team to determine the assessment results for the "unqualified" graduate students, by the College, Graduate school audit, reported to the principal's office approval, termination of school status, do graduate students to deal with.

#### 3. Innovation and Entrepreneurship

- (1) Attend academic conferences and read papers, or make public academic reports 2

times;

(2) To participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions and other activities;

(3) To participate in more than 6 academic reports related to the subject and submit a summary.

1 credits per item, 1 credits must be completed.

## 七、学位论文 ( Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：

1. 硕士学位论文应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节，论文答辩要做到严格要求、公正、公开。

Master's degree thesis is a comprehensive summary of the scientific research work of master's students, is an important academic document describing their research results and reflecting their research level, and is the basic basis for applying of master's degree. The writing of dissertation is the key and core of the cultivation of master's students, and it must be carried out in strict accordance with the standard. The dissertation of master's students in this discipline should meet the following basic requirements:

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》, it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.



## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德,实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节,修满规定的学分;
3. 完成论文答辩,成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

学位获取要求按照《山东理工大学硕士学位授予工作实施细则》、《交通与车辆工程学院关于全日制硕士研究生学位授予的补充规定》等相关文件执行。

Meet the requirements of graduation, can obtain a diploma; On the basis of obtaining the graduation certificate, if the degree awarding criteria are met, the degree certificate can be granted.

#### 1. Requirement for Graduation

- (1) With good moral cultivation and academic ethics, seeking truth from facts and having the courage to innovate;
- (2) Completed the courses and other training links stipulated in the training program, and completed the required credits;
- (3) Complete thesis defense and pass the examination;
- (4) Other requirements in accordance with the relevant regulations of the school.

#### 2. Degree Requirements

Degree requirements are met 《Shandong university of science and technology master's degree awarding implementation rules》、《 Supplementary provisions of the school of transportation and vehicle engineering on the awarding of full-time master's degrees》 and other relevant documents.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>遵纪守法, 爱岗敬业, 具有良好的思想品质和职业道德。具有自我完善、独立思考和从事专业工作能力, 具备相应综合素质、文化修养、创新意识和初步的批判性思维能力。</p> <p>Abide by the law, love work, with good ideological quality and professional ethics. Self-improvement, independent thinking and professional work ability, with the corresponding comprehensive quality, cultural accomplishment, innovation consciousness and preliminary critical thinking ability.</p>	<p>中国特色社会主义理论与实践研究、自然辩证法、马克思主义与科学方法论、中国传统文化、东方哲学与现代化、中国古代韵文阅读与欣赏</p> <p>Chinese Culture, Chinese traditional culture, Oriental Philosophy and Modernization, Chinese ancient verse reading and appreciation</p>
综合能力	<p>掌握车辆工程领域坚实的基础理论和丰富的专业知识及管理知识, 了解国内外车辆工程领域工程技术的现状和发展趋势, 掌握解决车辆工程有关问题的先进技术方法和手段, 具备良好的学术素养和学术道德, 在车辆领域中能从事科学研究、技术开发、生产制造、试验检测、管理与人才培养等工作。科学研究或独立担负专门技术工作。能够应用计算机和网络技术进行信息处理和管理, 能运用外语进行学习、交流和工作。</p> <p>Grasp the vehicle engineering field solid basic theory and rich professional knowledge and management knowledge, understanding of the field of vehicle engineering both at home and abroad present situation and development trend of engineering technology, to master the advanced technology to solve the problem of vehicle engineering related methods and means, have good academic accomplishment and moral, can be engaged in scientific research in the field of vehicle or independent specialized technical work to do.</p>	<p>研究生英语、口语、论文写作与学术规范、数值分析、数理统计、矩阵理论、有限元法、车辆测试与实验技术、系统建模与仿真、车辆系统动力学、计算机辅助几何设计</p> <p>Thesis Writing and Academic, Numerical analysis, Matrix theory, Mathematical statistics, Finite element method, Vehicle testing and experimental technology, System modeling and simulation, Vehicle system dynamics, Computer aided geometric design</p>
研究方向	<p>通过对先进电动汽车技术、电动汽车控制技术、新能源汽车技术、动力系统设计与集成控制等内容的系统学习, 结合电动汽车相关基金研究和项目开发, 培养电动汽车能源与动力系统领域具有扎实的理论功底和较强实践能力的复合型人才, 能够从事电动汽车能源系统及其应用技术、电动汽车动力系统及其应用技术、电动汽车能源动力系统匹配与能量管理等方面的研究工作。</p>	<p>控制理论及应用、电动车控制技术、现代汽车电机及其控制、电动汽车动力电池及其应用技术、汽车动力系统设计</p> <p>Control theory and application, Electric vehicle control technology, Modern automobile motor and control, Electric vehicle power battery and</p>



	<p>Based on advanced technology electric vehicles, electric vehicles control technology, new energy automotive technology, power system design and integration control the content of the system such as study, combining with the relevant fund research and project development, electric cars, electric cars, energy and power systems with solid theoretical knowledge and strong practice ability of inter-disciplinary talent, to engage in the electric car energy system and its application technology, electric vehicle power system and its application technology, the electric car energy power matching and energy management system research work.</p>	<p>application technology, Automotive power system design</p>
汽车电子电气与控制	<p>通过对汽车电子、控制理论、电机学及嵌入式系统等内容的系统学习，结合未来汽车尤其是电动汽车相关的项目开发，培养汽车电气与电子领域具有扎实的理论功底和较强的研究开发能力的综合型人才，研究开发新能源汽车电机技术、汽车电子控制技术、汽车电源系统、整车控制系统及电机与电机控制系统等的研究工作。</p> <p>Based on automotive electronics, control theory, electrical machinery and embedded system contents of the system such as study, combined with the future project development in the field of auto especially electric cars, automotive electrical and electronic fields with solid theoretical knowledge and strong ability of research and development of comprehensive talent, technology research and development of new energy automobile motor, automotive electronic control technology, power system, the vehicle control system and motor and motor control system such as research.</p>	<p>控制理论及应用、电动车控制技术、现代汽车电机及其控制、智能控制理论及应用、实时仿真技术与应用</p> <p>Control theory and application, electric vehicle control technology, Modern automobile motor and control, Intelligent Control Theory and Application, Real-time simulation technology and application</p>
车辆系统动力学	<p>以现代设计理论与方法、计算机技术、系统分析、车辆系统性能为基础，研究汽车动力学与动态设计、汽车结构强度分析与优化设计、汽车振动噪声分析与控制、车辆动力传动理论与控制技术。</p> <p>On the basis of modern design theory and method, computer technology, system analysis and vehicle systematicness, this paper studies automobile dynamics and dynamic design, automobile structural strength analysis and optimization design, automobile vibration and noise analysis and control, automobile power transmission theory and control technology.</p>	<p>CAE 技术、车辆地面力学、车辆平顺性与悬架系统设计、振动与噪声测试技术、汽车振动分析与噪声控制、汽车轻量化技术</p> <p>CAE technology, Vehicle ground mechanics、Vehicle ride comfort and suspension system design, Vibration and noise testing technology, Automobile vibration analysis and noise control, Automotive lightweight technology</p>

	<p>车辆数字化设计与制造</p>	<p>以计算机图形学、系统仿真技术、逆向工程、知识工程、多媒体技术等知识为基础,采用有限元分析、优化设计、参数化设计方法,主要围绕新能源汽车轻量化技术、车身成形与制造质量控制、车身高质量建模、基于知识的车身设计方法等方面进行研究开发,培养从事车辆工程数字化、轻量化设计开发的具有扎实理论功底和较强研究开发能力的综合型人才。</p> <p>In computer graphics, the system simulation technology, reverse engineering and knowledge engineering, multimedia technology as the foundation, finite element analysis and optimization design, the parameterized design method, mainly around the new energy automobile lightweight body forming and manufacturing technology, quality control, high quality car body modeling, the perspectives of body design method based on the knowledge of the development, cultivate engaged in the development of digital and lightweight vehicle engineering design with solid theoretical knowledge and strong research and development ability of comprehensive talent.</p>	<p>CAE 技术、汽车车身现代设计方法、汽车轻量化技术、先进工程材料及成型技术 CAE technology, Automotive lightweight technology, Modern design method of automobile body, Advanced engineering materials and molding technology</p>
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**附表 2：培养计划 ( Training Plan )**

学科名称	车辆工程 Vehicle Engineering		学科代码	080204	
单位名称	交通与车辆工程学院 School of Transportation and Vehicle Engineering		培养类型	学术硕士研究生 Foreign Postgraduates	
学分要求	总学分 Total Credits: $\geq 32$ , 必修课程学分 Credit for Compulsive Course: 16.5, 选修课程学分 Credit for optional course: $\geq 9$ 。				
课程 设 置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1	
	G13101	汉语 Chinese	2	1	
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科基础课程 11.5 学分	G11001	数值分析 Numerical analysis	3	1	
	G11002	矩阵理论 Matrix theory	2.5	1	
	020029	系统建模与仿真 System modeling and simulation	2	2	
	020001	车辆测试与实验技术 Vehicle testing and experimental technology	2	2	
	020003	车辆系统动力学 Vehicle system dynamics	2	2	
专业选修课程 $\geq 9$ 学分	G11003	数理统计 Mathematical statistics	2	1	
	020061	有限元法 Finite element method	2	2	
	020011	计算机辅助几何设计 Computer aided geometric design	2	1	
	020030	控制理论及应用 Control theory and application	2	2	
	020005	电动车控制技术 Electric vehicle control technology	2	2	
	020047	现代汽车电机及其控制 Modern automobile motor and control	2	2	

	020065	电动汽车动力电池及其应用技术 Electric vehicle power battery and application technology	2	2	
	020046	汽车动力系统设计与集成控制 Automotive power system design	2	1	
	020066	智能控制理论及应用 Intelligent Control Theory and Application	2	2	
	020028	实时仿真技术与应用 Real-time simulation technology and application	1.5	1	
	020006	CAE 技术 CAE technology	3	2	
	020002	车辆地面力学 Vehicle ground mechanics	2	2	
	020032	车辆平顺性与悬架系统设计 Vehicle ride comfort and suspension system design	2	2	
	020067	振动与噪声测试技术 Vibration and noise testing technology	2	2	
	020012	汽车振动分析与噪声控制 Automobile vibration analysis and noise control	2	2	
	020031	汽车轻量化技术 Automotive lightweight technology	2	2	
	020007	汽车车身现代设计方法 Modern design method of automobile body	2	1	
	020068	先进工程材料及成型技术 Advanced engineering materials and molding technology	2	2	
素质选修课程 ≤1 学分	150084	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	130043	中国古代韵文阅读与欣赏 Chinese ancient verse reading and appreciation	1	2	
补充课程 不计学分					导师 确定
其他培养环节（3 Credit）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后提交开题报告。开题答辩小组由本学科 5 人以上专家组成，负责对研究生所做开题报告进行评审，做出评价、提出修改意见，评审不通过者需限期重做，				3



	<p>再次开题仍不通过的终止培养。学位论文开题报告审核通过一年后方可申请学位论文送审、答辩。</p> <p>In order to ensure the quality of the dissertation, graduate students should determine the topic selection and research content through literature reading and academic research, and submit the opening report with the consent of the instructor. A panel of experts from more than 5 students in this discipline will review the opening report of the students, and provide evaluation and revision opinions. If they do not pass, they may redo within a time limit (the interval between two opening questions shall not be less than 3 months). The cultivation will be terminated if the dissertation proposal fails again.</p>		
<p>中期考核 (1 学分)</p>	<p>对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。</p> <p>After the basic study of postgraduate courses, based on the postgraduate training program, in the fourth semester, the graduates' political thoughts and moral qualities, basic theories and professional knowledge, scientific research innovation, practical ability and comprehensive quality will be comprehensively evaluated. The purpose is to summarize the evaluation of postgraduate study and research since enrollment, to find out the problems in the process of postgraduate training, to explore ways to solve problems, and to clarify the direction of future efforts. The mid-term screening and assessment team determines that the graduates whose assessment results are "unqualified" will be reviewed by the college and graduate school, approved by the principal's office, terminated, and treated as graduate students.</p>	<p>4</p>	
<p>创新创业 (1 学分)</p>	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</li> <li>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</li> </ol> <p>每项记 1 学分，需完成 2 学分。</p> <ol style="list-style-type: none"> <li>1. Participate in academic conferences and read papers, or make public academic reports 2 times;</li> <li>2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;</li> <li>3. Participate in more than 6 academic reports related to the subject and submit a summary;</li> </ol> <p>1 credit for each credit, 1 credits required.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	

# 动力工程及工程热物理学科学术学位硕士研究生培养方案

学科代码：0807

## Power Engineering and Engineering Thermophysics academic postgraduate training program

Credit Code: 0807

### 一、学科简介 ( Brief Introduction to Discipline )

能源与动力工程专业设立于 2001 年，是山东省首批“卓越工程师教育培养计划”专业和山东省“十三五”高水平应用型重点专业群专业，2006 年获批“动力机械及工程”二级学科硕士学位点，2017 年获批“动力工程及工程热物理”一级学科硕士学位点。

本学科共有教师 40 人，其中教授 10 人，副教授 12 人，讲师 18 人，具有博士学位 33 人，博士生导师 3 人，硕士生导师 28 人，山东省有突出贡献的中青年专家 2 人，辽宁省“百千万人才工程”之“百”层次人才 1 人。

经过多年的建设和发展，已形成一支以教授、博士为主体，职称、学历、年龄层次合理、学缘结构互补的导师梯队。近五年，承担国家级项目 25 项，省部级项目 37 项，发表高水平学术论文 400 余篇，获得山东省技术发明奖、中国商业联合会科学技术奖等省部级一等奖 2 项、二等奖 1 项、三等奖 1 项。现拥有山东省清洁能源工程技术研究中心、山东省石油焦煅烧余热利用工程技术研究中心、山东高校低品位能源及余热利用重点实验室、山东理工大学节能技术研究院等科研平台，实验室面积 2560m<sup>2</sup>，仪器设备总值 2460 余万元。共培养硕士研究生 48 人，联合培养博士研究生 7 人。本学科在高温固体余热利用和低品位能源利用方面形成了显著的特色与优势，在国内具有一定的知名度，同时入选了山东理工大学学科亮点发展计划——博士一级学科建设专项和省一流学科建设专项。

The energy and power engineering was built in 2001, and became the first batch of distinguished engineer training project and Shandong Province's Thirteen-five high level practical important subject. It obtained the authorization to grant Master degree of second class and first class in 2006 and 2017, respectively.

There are 40 staff in total, including 10 professors, 12 associate professors and 18 lectures,



of whom 33 have doctoral degree. There are 3 Ph.D. supervisors and 28 Master supervisors, 1 Shandong Province's distinguished expert and 1 Liaoning Province's hundred level expert of hundred-thousand-ten-thousand talents project.

After so many years of development and establishment, a personnel including professors and doctors with appropriate positions, educational degree and ages is formed. In the past five years, we were granted 25 items of national research project and 37 items of provincial research project and more than 400 pieces of paper were published. Also, the rewards of Shandong province technology invention and Chinese commercial unit scientific technology were granted by first level twice, second level once and third level once. The labs we have built include Shandong province clean energy research center, Shandong province burning of oil char research center, Shandong province low grade energy research center and energy conservation research center of Shandong University of technology. The labs are occupying more 2560 square meters and the total value of the facilities are worth more than 24 million Chinese Yuan. In the past, 48 Masters and 7 Ph.Ds. got their degrees. This subject formed very distinguished advantages in the field of solid exhausted heat usage and low grade energy usage and is famous in China. Besides, it was chosen to be a member of progress program of shinning subject of Shandong University of Technology, Ph.D. degree authorization of first level and Shandong province first class subject establishment.

## 二、培养目标 ( Educational Objectives )

为适应经济建设和社会发展的需要，培养德、智、体全面发展，能从事本学科领域内的教学、科研以及管理工作的高层次专门人才，具体要求：

1. 具有良好的职业道德和敬业精神，以及科学严谨、求真务实的治学态度和工作作风。

2. 掌握动力工程及工程热物理学科扎实的基础理论和系统的专门知识，能够综合运用能源高效转化与利用、污染物控制、试验与检测、数值模拟等相关技术，具有独立从事科学研究和担负专门技术工作的能力。

3. 比较熟练地掌握中文，能顺利阅读本学科领域的科技资料及文献，并具备一定的听、说和写作能力。

4. 为企业、科研单位、高等学校及行业管理部门培养动力工程及工程热物理领域的创新型高级专门人才，从事该领域的产品设计开发、生产加工、制造测试、科学研究、教学及生产技术管理等工作。

1. The master graduate student of this discipline culture should have good professional ethics and professionalism, as well as scientific and rigorous, pragmatic attitude and work style.

2. Grasp the energy engineering field solid basic theory and rich professional knowledge



and management knowledge, to master the advanced technology to solve the problem of energy effectively conversion and usage, pollution control, test and check, numerical simulations, and have the ability to solely do scientific research and finish independent specialized technical work.

3. Proficiency in Chinese, reading professional literature and writing papers skillfully.

4. To train innovative and research-oriented high-level engineering and technical personnel engaged in scientific research, technology development, manufacturing, testing, management and personnel training in the field of energy and power engineering for enterprises, scientific research institutes, institutions of higher learning and industry management departments.

### 三、研究方向 ( Research Orientation )

动力工程及工程热物理学科 ( 一级学科 ) 全日制学术硕士学位研究生培养方案设以下 4 个研究方向:

1. 传热传质与余热利用
2. 低品位能源燃烧
3. 动力机械与控制
4. 可持续能源利用 ( 交叉方向 )

详见附表 1。

The following 4 research directions were set in Power Engineering and Engineering Thermophysics ( first-level discipline ) academic postgraduate training program:

1. Heat and mass transfer and exhausted heat usage
2. Low grade energy and combustion
3. Power machinery and control
4. Sustainable energy and usage ( interdisciplinary cross direction )

See schedule 1 for details.

### 四、学习年限 ( Length of Schooling )

学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意并符合《交通与车辆工程学院全日制硕士研究生提前毕业的暂行规定》的要求, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years of schooling, 2-4 years of study, scientific research and paper writing time is not less than 1 years ( calculated from the date of the opening of the question ). Upon the consent of the tutor and in accordance with the requirements of the interim provisions on early graduation of full-time graduate students of the School of Traffic and vehicle engineering, an application for



early graduation may be made, but the time requirements for scientific research and essay writing remain unchanged. The time of recess is not counted as the length of study.

## 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 16 个必修学分和 9 个选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上本领域本科阶段主干课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置详细情况见附表 2。

The course is divided into compulsory and elective courses, and students are required to complete a compulsory 16.5 credits and take 9 credits of study tasks within a specified period of time.

Interdisciplinary graduate students are required to study 2 or more courses according to the requirements of the tutor, after the assessment is qualified before they can participate in the reply, the results are not counted in the report card.

The course setup is shown in Schedule 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告。开题答辩小组由本学科 5 人以上专家组成，负责对研究生所做开题报告进行评审、做出评价、提出修改意见，评审不通过者需限期重做（两次开题时间间隔不得少于 3 个月），再次开题仍不通过的终止培养。开题报告通过即可获得 1 学分。

### 2. 中期考核

研究生课程学习结束后，根据研究生培养方案安排，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。中期筛选通过即可获得 1 学分。

### 3. 创新创业

- (1) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (2) 参加全国性的科技竞赛、创意设计、创新创业竞赛等活动；
- (3) 参加 6 次以上与本学科相关的学术报告，并提交总结。

每项记 1 学分，需完成 1 学分。

Academic graduate students develop a mentor responsibility system and encourage the implementation of a guidance group ( team ) based on the responsibility of mentors. The tutor is responsible for formulating the postgraduate training plan, and has the responsibility of guiding, demonstrating and supervising the ideological and moral character and academic ethics of the graduate students.

### 1. Report on the Opening of the Question

In order to ensure the quality of dissertation, graduate students should, through literature reading, academic research, determine the topic selection and research content, with the consent of the tutor to submit a report on the topic.

The evaluation panel, which is composed of more than 5 experts in the subject, evaluates the report of the students and puts forward the evaluation and modification opinions, and the non-passing person can redo the time limit ( two open question intervals must not be less than 3 months ) , and the training is still not terminated by the person. Degree thesis Open topic Report after one year can apply for a degree thesis to be examined, reply.

### 2. Mid-term Screening

After the basic completion of Postgraduate course learning, based on the postgraduate training program, the fourth semester of graduate students' political thought and moral quality, basic theory and professional knowledge, scientific research innovation, practical ability and comprehensive quality and other aspects of comprehensive assessment. The purpose of this paper is to summarize and evaluate the research situation of graduate students since enrolling in school, to find out the problems existing in the process of postgraduate training in time, to explore ways to solve problems, and to clarify the direction of future efforts. Mid-term Screening assessment team to determine the assessment results for the "unqualified" graduate students, by the College, Graduate school audit, reported to the principal's office approval, termination of school status, do graduate students to deal with.

### 3. Innovation and Entrepreneurship

(1) Attend academic conferences and read papers, or make public academic reports 2 times;

(2) To participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions and other activities;

(3) To participate in more than 6 academic reports related to the subject and submit a summary.

1 credits per item, 1 credits must be completed.



## 七、学位论文 ( Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结,是描述其研究成果、反映其研究水平的重要学术文献,是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心,必须严格按照规范执行,本学科硕士研究生的学位论文应满足以下基本要求:

1. 硕士学位论文应具有系统的、完整的研究思路和计划,应对科技进步和国民经济建设具有较大的理论意义或实用价值,学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作,必须由作者独立完成。研究工作必须坚持实验性原则,论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节,论文答辩要做到严格要求、公正、公开。

Master's degree thesis is a comprehensive summary of the scientific research work of master's students, is an important academic document describing their research results and reflecting their research level, and is the basic basis for applying of master's degree. The writing of dissertation is the key and core of the cultivation of master's students, and it must be carried out in strict accordance with the standard. The dissertation of master's students in this discipline should meet the following basic requirements:

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》, it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.

## 八、毕业与学位要求 ( Graduation and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，成绩考核合格；
3. 完成论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

## (二) 学位要求

学位获取要求按照《山东理工大学硕士学位授予工作实施细则》、《交通与车辆工程学院关于全日制硕士研究生学位授予的补充规定》等相关文件执行。

Meet the requirements of graduation, can obtain a diploma; On the basis of obtaining the graduation certificate, if the degree awarding criteria are met, the degree certificate can be granted.

### 1. Requirement for Graduation

(1) With good moral cultivation and academic ethics, seeking truth from facts and having the courage to innovate;

(2) Completed the courses and other training links stipulated in the training program, and completed the required credits;

(3) Complete thesis defense and pass the examination;

(4) Other requirements in accordance with the relevant regulations of the school.

### 2. Degree Requirements

Degree requirements are met Shandong University of Technology master's degree awarding implementation rules, Supplementary provisions of the school of transportation and vehicle engineering on the awarding of full-time master's degrees and other relevant documents.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>具有良好的职业道德和敬业精神，以及科学严谨、求真务实的治学态度和工作作风。</p> <p>Have good professional ethics and professionalism, as well as scientific and rigorous, pragmatic attitude and work style.</p>	<p>中国文化、汉语、论文写作与学术规范》</p> <p>Chinese Culture、 Chinese、 Thesis Writing and Academic</p>
综合能力	<p>主动适应创新型国家建设，主动迎接国际性竞争，满足国家经济建设和社会发展中面临的多样性、全方位、高水平的人才需求，成为德、智、体全面发展的动力工程及工程热物理学科高层次专门技术人才，能够胜任与动力工程及工程热物理学科相关的科学研究、工程设计、产品开发和教学工作。</p> <p>Grasp the solid basic theory and rich professional knowledge and management knowledge, understanding of the field of energy and power engineering both at home and abroad present situation and development trend of engineering technology, to master the advanced technology to solve the problem of energy engineering related methods and means, have good academic accomplishment and moral, can be engaged in scientific research in the field of energy or independent specialized technical work to do.</p>	<p>《数值分析、数理统计、数理方程、矩阵理论、高等传热学、高等流体力学、高等工程热力学、高等燃烧学、计算流体力学、动力机械实验与测试技术、系统建模与仿真、格子玻尔兹曼方法的基础与工程应用》</p> <p>Numerical Analysis、Mathematical Statistics、Mathematical Equations、Matrix Theory、Advanced Heat Transfer、Advanced Fluid Mechanics、Advanced Thermodynamics、Advanced Combustion、Computational Fluid Dynamics、Experiment and Measurement Technology of Power Machinery、System Modeling and Simulating、Fundamentals and Applications of LBM Method</p>
研究方向	<p>传热传质与余热利用</p> <p>掌握传热传质基本理论和现代测试分析与数据处理等知识；熟悉新型节能技术、强化传热技术和数值计算方法；并应用于各类工业余热利用技术和余热利用装备的研发，全面提升能源利用效率。</p> <p>Grasp the basic fundamentals of heat and mass transfer and modern analysis and measurement methods and data process methods; know well the new techniques of energy conservation, heat transfer enhancement and numerical simulations; apply them to all kinds of industrial exhausted heat usage and equipment development, improve the energy usage efficiency.</p>	<p>《多相流基础、数值传热学、热泵技术、蓄能原理与应用、低温制冷技术》</p> <p>Fundamentals of Multiphase Flows、 Numerical Heat Transfer、Heat Pump Technology、Energy Storage Principle and Application、Cryo-Refrigeration Technology</p>

低品位能源燃烧	<p>掌握各种能源清洁转换和高效利用基本理论和现代测试分析与数据处理等知识；熟悉低品位气体燃烧机理和燃烧过程控制的知识；并应用于高效、稳定、高处理能力的低品位气体燃烧装备开发。</p> <p>Grasp the basic fundamentals of high performance usage of transmission of clean energy and to use the modern analysis and process method to process data; know well the low grade gas combustion features and combustion control methods; apply them to the development of combustion devices.</p>	<p>《多孔介质燃烧理论与技术、洁净煤技术、流化床理论及应用》</p> <p>Combustion Theory and Application of Porous Media、Clean Coal Technology、Fluidized Bed Theory and Application</p>
动力机械与控制	<p>掌握内燃机的先进燃烧理论、污染物生成机理和现代测试分析与数据处理等知识；熟悉提高内燃机能量利用效率的方法和减少有害排放的技术途径；掌握运用数值模拟技术分析内燃机工作过程的知识。</p> <p>Grasp the advanced combustion theory of internal combustion energy, pollution formation and modern analysis of measurement and data process; know the high efficiency usage of internal engine combustion and to reduce the pollution emissions; know how to simulation internal combustion engine work process.</p>	<p>《高等内燃机学、内燃机现代设计技术、动力机械强度与可靠性、弹性力学与有限元、断裂力学、实验力学、振动与噪声、高温构件力学行为分析》</p> <p>Advanced Internal Combustion Engine Fundamentals、Modern Design Technology of Internal Combustion Engine、Strength and Reliability of Power Machinery、Elasticity and Finite Element、Fracture Mechanics、Experimental Mechanics、Vibration and Noise, Mechanical Behavior Analysis of High Temperature Components</p>
可持续能源利用	<p>掌握固体燃料燃烧原理、污染物排放特性、污染物控制技术和方法；掌握有机固废焚烧处理基本原理、技术和方法；掌握能源行业相关废弃物资源化利用原理、技术和方法。</p> <p>Grasp the combustion theory of solid fuel, pollution and emission features, pollution control technology and method; know how to dispose solid waste fuel, theory and method; know the related waste usage method, principle and technology.</p>	<p>《燃烧污染物控制技术、生物质热化学转化技术、固体废弃物处理与资源化、系统热管理技术及应用》</p> <p>Combustion Pollution Control、Biomass Thermo-Chemical Conversion、Solid Waste Disposal and Recycling、System Thermal Management Technology and Application</p>



**附表 2： 培养计划 ( Training Plan )**



学科名称	动力工程及工程热物理 Power engineering and engineering thermal physics		学科代码	0807		
单位名称	交通与车辆工程学院 School of Transportation and Vehicle Engineering		培养类型	学术硕士研究生 Academic graduate students		
学分要求	总学分 Total Credits: $\geq 32$ , 必修课程学分 Credit for Compulsive Course: 16, 选修课程学分 Credit for optional course: $\geq 9$ 。其他培养环节 Other training sessions: 3					
课 程 设 置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 11 学分	G11001	数值分析 Numerical Analysis	3	1		
	G11005	数理方程 Mathematical Equations	2.5	1		
	020083	高等传热学 Advanced Heat Transfer	2.5	1		
	020084	高等流体力学 Advanced Fluid Mechanics	3	2		
方向选修课程 $\geq$ 向学分	G11003	数理统计 Mathematical Statistics	2	1	不低 于9 学分	
	G11002	矩阵理论 Matrix Theory	2.5	1		
	020021	高等工程热力学 Advanced Thermodynamics	2.5	2		
	020085	高等燃烧学 Advanced Combustion	2	2		
	020023	计算流体力学 Computational Fluid Dynamics	2	2		
	020024	动力机械实验与测试技术 Experiment and Measurement Technology of Power Machinery	2	2		



020029	系统建模与仿真 System Modeling and Simulating	2	2
020092	格子玻尔兹曼方法的基础与工程应用 Fundamentals and Applications of LBM Method	2	2
020039	多相流基础 Fundamentals of Multiphase Flows	2	2
020040	数值传热学 Numerical Heat Transfer	2	2
020086	热泵技术 Heat Pump Technology	2	2
020087	蓄能原理与应用 Energy Storage Principle and Application	2	2
020088	低温制冷技术 Cryo-Refrigeration Technology	2	2
020089	多孔介质燃烧理论与技术 Combustion Theory and Application of Porous Media	2	2
020090	洁净煤技术 Clean Coal Technology	2	2
020091	流化床理论及应用 Fluidized Bed Theory and Application	2	2
020093	高等内燃机学 Advanced Internal Combustion Engine Fundamentals	2	2
020041	内燃机现代设计技术 Modern Design Technology of Internal Combustion Engine	2	2
020094	弹性力学与有限元 Elasticity and Finite Element	3	2
020095	断裂力学 Fracture Mechanics	2	2
020096	实验力学 Experimental Mechanics	2	2
020097	动力机械强度与可靠性 Strength and Reliability of Power Machinery	2	2
020098	振动与噪声 Vibration and Noise	2	2
020099	高温构件力学行为分析 Mechanical Behavior Analysis of High Temperature Components	2	2



	020056	燃烧污染物控制技术 Combustion Pollution Control	2	2	
	020106	生物质热化学转化技术 Biomass Thermo-Chemical Conversion	2	2	
	020100	固体废弃物处理与资源化 Solid Waste Disposal and Recycling	2	2	
	020101	系统热管理技术及应用 System Thermal Management Technology and Application	2	2	
素养选修课程 ≤1 学分	031001	中国传统文化 Chinese Traditional Culture	1	2	
	150084	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	130043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	170070	经济学基础 Foundations of Economics	1	2	
	050024	计算机科学前沿技术应用系列讲座 The Lectures on the Frontier Technology and Application of the Computer Science	1	2	
	150020	社会研究方法 Social research methods	1	2	
	020060	科研素养与创新能力 Scientific Research Literacy and Innovation Ability	1	2	
	130042	诗歌与审美艺术 Poetry and aesthetic art	1	2	
	100014	实验设计与统计分析 Experimental design and statistical analysis	1	2	
		G14010	科技英语写作 Scientific English Writing	1	2
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后提交开题报告。开题答辩小组由本学科 5 人以上专家组成，负责对研究生所做开题				3

	<p>报告进行评审，做出评价、提出修改意见，评审不通过者需限期重做（两次开题时间间隔不得少于3个月），再次开题仍不通过的终止培养。学位论文开题报告审核通过一年后方可申请学位论文送审、答辩。开题报告通过即可获得1学分。</p> <p>In order to ensure the quality of the dissertation, graduate students should determine the topic selection and research content through literature reading and academic research, and submit the opening report with the consent of the instructor. A panel of experts from more than 5 students in this discipline will review the opening report of the students, and provide evaluation and revision opinions. If they do not pass, they may redo within a time limit (the interval between two opening questions shall not be less than 3 months). The cultivation will be terminated if the dissertation proposal fails again.</p>		
<p>中期考核 (1学分)</p>	<p>对研究生的基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过即可获得1学分。</p> <p>After the basic study of postgraduate courses, based on the postgraduate training program, in the fourth semester, the graduates' basic theories and professional knowledge, scientific research innovation, practical ability and comprehensive quality will be comprehensively evaluated. The purpose is to summarize the evaluation of postgraduate study and research since enrollment, to find out the problems in the process of postgraduate training, to explore ways to solve problems, and to clarify the direction of future efforts. The mid-term screening and assessment team determines that the graduates whose assessment results are "unqualified" will be reviewed by the college and graduate school, approved by the principal's office, terminated, and treated as graduate students.</p>	<p>4</p>	
<p>创新创业 (1学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告2次； 2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖； 3. 参加6次以上与本学科相关的学术报告，并提交总结； 每项记1学分，需完成1学分。</p> <p>1. Participate in academic conferences and read papers, or make public academic reports 2 times; 2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards; 3. Participate in more than 6 academic reports related to the subject and submit a summary; 1 credit for each credit, 1 credits required.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



## 农业工程学科

山东理工大学农业工程学科成立于 1956 年，1999 年开始招收硕士研究生，2014 年招收博士研究生。农业工程学科在本、硕、博多层次人才培养、科学研究、学科建设等方面形成了自己的特色和优势，拥有近 60 年的发展历史，是我校发展历史最长的学科。2016 年农业工程学科成为山东省首批立项建设的“一流学科”，“现代农业装备”入选学校两大“聚焦工程”之一。我院农业工程学科师资力量雄厚，学院现有教职工 126 人，其中教授 24 人，副教授 38 人，拥有博士学位 87 人，博士生导师 22 人，硕士生导师 65 人，具有国际学术背景教师比例达到 36%。

历经 60 余年的建设和发展，农业工程学科已成为我省农业工程领域高端人才集聚地、科技研创发源地、创新人才供给地。本学科致力于农业工程领域人才培养、科学研究和技术开发，服务于农业装备制造发展 and 山东装备制造业强省建设。本学科的目标是促进农业机械化、集成化、自动化、智能化，为提高我国农业综合生产能力、实现农业现代化提供智力和技术支撑。

The agricultural engineering discipline in Shandong University of Technology (SDUT) was established in 1956. In 1988, the first batch of postgraduates were enrolled in the agricultural engineering discipline. In 2014, the agricultural engineering began to recruit Ph.D. postgraduates. With nearly 60 years of development history, the agricultural engineering discipline is the longest subject in our university. At present, it has formed its own characteristics and advantages in the aspects of talent training, scientific research and discipline construction. In 2016, the discipline of agricultural engineering became first group "first-class disciplines" in Shandong Province, and "modern agricultural equipment" was selected as one of the two "focus projects" in Shandong University of Technology. There are 126 faculty members in School of Agricultural Engineering and Food Science, including 24 professors, 38 associate professors, 87 doctoral degree personnels, 22 doctoral supervisors and 65 master supervisors. The proportion of teachers with international academic background is 36%.

After more than 60 years of construction and development, the agricultural engineering discipline has become the gathering place of high-end talents, the source of scientific and technological research, and the supply place of innovative talents in the field of agricultural engineering in our province. This discipline is committed to personnel training, scientific research and technological development in the field of agricultural engineering, serving the development of agricultural equipment manufacturing industry and the construction of strong provinces in Shandong equipment manufacturing industry. The objective of this discipline is to

promote agricultural mechanization, integration, automation and intellectualization, and to provide intellectual and technical support for improving China's agricultural comprehensive production capacity and realizing agricultural modernization.



## 学术学位博士研究生培养方案

学科代码：0828

### Program for Cultivating Doctoral Students

Credit Code: 0828

#### 一、培养目标 ( Educational Objectives )

面向农业工程领域科技前沿，围绕发展中国家重大战略需求和区域发展需要，培养热爱中国文化、身心健康、品学兼优、理论扎实、专业知识宽广、具有创新能力和国际竞争力，能从事农业工程学科领域教学、科研和管理工作的高级创新人才。

1. 遵纪守法，学风严谨，学术正派，团结协作，品行端正，具有较强的事业心和责任感。

2. 掌握本学科坚实宽广的基础理论、系统深入的专门知识和必要的实践技能，熟悉本学科的发展方向及国际学术前沿。

3. 具备知识获取、终身学习和学术创新能力，独立从事科学研究工作能力，并在所从事研究方向上做出创新性成果，能熟练阅读本学科外文资料，并具有较强的外文写作和国际学术交流能力。

Facing the frontier of science and technology in the field of agricultural engineering, focusing on the major strategic needs of developing countries and regional development, we will cultivate students who love Chinese culture, have mind and body health, are excellent both in conduct and academy, have a solid foundation of theory, broad professional knowledge, innovative ability and international competitiveness. The students will become senior innovative talents in the field of teaching, scientific research and technical management of agricultural engineering.

1. Compliance with discipline and law, rigorous style of study, academic integrity, unity and cooperation, good conduct, and have a strong sense of enterprise and responsibility.

2. Master the solid and broad basic theory, systematic and in-depth expertise and necessary practical skills of the discipline, and be familiar with its development direction and international academic frontiers.

3. Have the ability of knowledge acquisition, lifelong learning and academic innovation, independently engage in scientific research work, and make innovative achievements in the direction of research, skilled reading of foreign language materials of the subject, and strong

foreign language writing and international academic exchange ability.

## 二、研究方向 ( Research Orientation )

1. 农业机械化生产技术与装备；
2. 农产品加工技术与装备；
3. 农业生物质能源与材料；
4. 精准农业航空技术与装备。

详见附表 1。

1. Agricultural Mechanization Production Technology and Equipment
2. Agricultural Products Processing Technology and Equipment
3. Agricultural biomass energy and materials
4. Precision Agricultural Aviation Technology and Equipment

The brief introduction of each research field is shown in appendix 1.

## 三、学习年限 ( Length of Schooling )

学制 4 年，学习年限 3–6 年，科学研究和论文撰写时间不少于 2 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间（累计不超过 2 年）不计入学习年限。

4 years ( can be adjusted in the range of 3–6 years ) . The scientific research and thesis writing time is not less than 2 year ( calculated from the date of opening statement ) . With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school ( cumulative not more than 2 years ) is not counted as the number of years of study.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 8 必修学分和 3 选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The courses are divided into compulsory courses and elective courses. The credits of courses are no less than 8 credits and no more than 3 credits. For full-time academic master's degree postgraduates with the same educational background or cross-specialty, two main courses ( designated by tutors ) at the undergraduate stage should be supplemented. Only after passing the examination ( without credit ) , can they apply for defense. Course list is given in appendix 2.



## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订研究生培养计划，组织开题、中期筛选、毕业答辩，指导科学研究和学位论文等工作，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

入学后课程考核成绩合格，第 2 学期到第 4 学期初完成开题。开题报告评审由本学科 5 人及以上的专家（校外专家不少于 2 名）组成，不通过可限期重做，重审仍未通过终止培养。

### 2. 中期筛选

开题通过 1 年后进行中期考核，包括研究生的思想表现、课程学习状况、开题报告情况、学位论文工作进展及综合素质等，考核不合格的，延期半年，再不合格经学院学位评定分委会研究审核，报学校做肄业处理。

### 3. 创新创业

参加学术会议并宣读论文，或做公开学术报告 2 次；参加全国性的科技创新创业竞赛等；参加不少于 6 次与本学科相关的学术报告，并提交总结。

The supervisor or steering group is responsible for the training of academic master's degree applicants, including the formulation of training programs and the guidance of ideological morality, academic morality.

### 1. Opening report

After enrollment, the course examination results are qualified, and the opening report is completed from the second to the beginning of the fourth semester. Assessment panel composed of five or more experts in this subject ( no fewer than two outside school experts ) will evaluate the opening report and put forward comments on evaluation and revision. Those who fail to pass the program must re-do the opening report another time, and those who fail to pass the program twice will terminate the training.

### 2. Mid-term inspection

In order to evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed at one year after opening report. If the examination is not qualified, it shall be postponed for half a year, and then it shall be examined by the academic degree evaluation sub-committee of the college and submitted to the school for undergraduate study.

### 3. Innovation and entrepreneurship



Participate in academic conferences and read papers, or make public academic reports twice; To participate in high-level scientific competitions, creative design, innovation and entrepreneurship competitions and win awards; Participate in more than 6 academic reports related to his research filed and submit a summary.

## 六、学位论文 ( Academic Dissertation )

博士学位论文是博士研究生科学研究工作的全面总结,是描述其研究成果、反映其研究水平的重要学术文献,是申请和授予博士学位的基本依据。学位论文撰写是博士研究生培养的关键和核心,必须严格按照规范执行,本学科博士研究生的学位论文应满足以下基本要求:

1. 论文应在导师的指导下由博士研究生独立完成,论文应有较强的系统性和创造性成果,对农业工程学科的发展与国家经济建设具有较大的理论意义或应用价值。
2. 博士研究生在校期间应把主要精力投入与博士论文有关的科学研究和论文的撰写上,论文内容必须以博士研究生本人完成的第一手实验、观测或调查的材料为主。
3. 其他学位论文要求按照《山东理工大学关于研究生学位论文工作的有关规定》、《山东理工大学博士学位授予工作实施细则》等相关文件执行。

Doctoral dissertation is a comprehensive summary of the scientific research work for each doctoral candidate, it is also an important academic document describing their research results and it reflect their research level. It is a basis for applying for and awarding doctoral degrees. Writing dissertation is the key point of the cultivation of doctoral students, which must be carried out in strict accordance with the standard. The dissertation of doctoral students in this discipline should meet some basic requirements:

1. The thesis should be completed independently by doctoral students under the guidance of the supervisor, and should be systematic and have some creative results, which have great theoretical significance or application value to the development of agricultural engineering discipline and national economic construction.
2. Doctoral students should put their energy into the scientific research and writing doctoral thesis, and the content of the thesis must be in accordance with the experiment, observation or investigation materials completed by the doctoral students.
3. Other papers shall be executed in accordance with the <relevant provisions of SDUT on the work of postgraduate academic dissertations>, <detailed rules for the implementation of doctoral degree awarding work of SDUT> and other relevant documents.

## 七、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,



可授予学位证书。

### （一）毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养计划规定课程和其他培养环节，成绩考核合格；
3. 完成论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

### （二）学位要求

根据《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及农业工程与食品科学学院学位授予有关规定严格执行。

Doctoral students who have completed the required credits, passed the thesis defense, and met other requirements for graduation stipulated by the university will be permitted to graduate, and the doctoral diploma will be issued. On the basis of obtaining the doctoral diploma, if it meets the requirements of academic achievements stipulated by the university and meets the standards for awarding doctoral degree set, it can be awarded the doctoral degree and the doctoral degree certificate after being examined and approved by the academic degree evaluation sub-committee of each department and then submitted to the academic degree evaluation committee of the university.

#### 1. Graduation Requirements

(1) Keep good moral character and academic ethics, seek truth from facts, have the courage to innovate.

(2) After completing the training program and other training sections, the students passed the examination.

(3) The students complete the defense of doctoral dissertation with qualified results.

(4) Comply with other requirements stipulated by the university.

#### 2. Degree Requirements

The interim measures for the implementation of the academic degrees regulations of the People's Republic of China, the detailed rules for the implementation of the awarding of doctoral degrees of SDUT and the relevant provisions on the awarding of academic degrees of the mechanical engineering department should be strictly implemented.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>掌握农业工程学科某一领域坚实宽广的基础理论、系统深入的专门知识, 熟练运用本学科的研究方法和实验手段; 把握本学科及相关学科领域的研究现状和发展趋势。</p> <p>Master the solid and broad basic theory, systematic and in-depth expertise in a certain field of agricultural engineering, skillfully use the research methods and experimental means of this discipline, and grasp the current situation and development trend of this discipline and related disciplines.</p>	<p>中国传统文化、汉语写作、汉语口语、论文写作与学术规范、科研素养与创新能力、科技英语写作</p> <p>Traditional Chinese culture 、 Chinese writing 、 oral Chinese 、 thesis writing and academic norms 、 scientific research quality and innovation ability, scientific English writing</p>
综合能力	<p>善于发现问题和解决问题, 能够对研究所涉及的农业工程问题进行鉴别、分析和解决; 能根据学科和社会经济发展需求, 提出有价值的科学研究问题, 就有撰写科研项目书并独立开展高水平研究的能力; 具有良好的沟通交流能力。</p> <p>Good at finding and solving problems, can identify, analyze and solve the agricultural engineering problems involved in the research; can put forward valuable scientific research problems according to the needs of discipline and socio-economic development, has the ability to write scientific research project books and independently carry out high-level research; has good communication and communication skills.</p>	<p>农业工程综合专题、食品化学进展、生物质热化学转化技术与原理、精准农业航空技术、遥感原理与应用</p> <p>Comprehensive Theme of Agricultural Engineering、Advances in Food Chemistry、Biomass Thermochemical Conversion Technology and Principle 、 Precision Agricultural Aviation Technology、Principle and Application of Remote Sensing</p>
研究方向	<p>以服务北方旱作区主要农作物生产为目的, 以实现高效、生态、可持续农业发展的生产装备为目标, 在土壤耕作制度与模式、秸秆处理、土地耕整、高效精准种植、谷物通用联合收获、特色经济作物播种收获关键技术与智能装备等方面展开研究, 运用智能技术与现代设计理论和方法, 研究农机装备新原理、新方法和新技术。</p> <p>Aiming at serving the production of main crops in the dryland area of North China, aiming at realizing the production equipment of high efficiency, ecology and sustainable agricultural development, the key technologies and intelligent packaging of soil tillage system and mode, straw treatment, land consolidation, high efficiency and precision planting, grain general</p>	<p>机械土壤动力学、机械与农业生物系统、农业物料学、农机试验与仿真技术、现代测试与控制技术、图像处理技术、自动导航理论与技术</p> <p>Agricultural Machinery Test and Simulation Technology 、 Mechanical and Agricultural Biosystem、 Agricultural Material Science、 Modern Testing and Control</p>



		<p>combined harvesting, special cash crop sowing and harvesting are discussed. Researches are carried out in the aspects of equipment, and new principles, methods and technologies of agricultural machinery equipment are studied by using intelligent technology and modern design theory and methods.</p>	<p>Technology、 Image Processing Technology、 Theory and Technology of Automatic Navigation</p>
	<p>农业生物质 能源与材料</p>	<p>以农业生物质为研究对象，研究定向热解耦合精炼提质协同规律，生物质预处理及全组分生物转化机制，研发农业生物质定性炼制制取高品位生物燃油和化学品、生物质基功能性新材料制造关键技术与装备。</p> <p>Taking agricultural biomass as the research object, the synergistic law of directional pyrolysis coupled refining, the mechanism of biomass pretreatment and total component biotransformation were studied, and the key technologies and equipment for the qualitative refining of agricultural biomass to produce high-grade biofuel, chemicals and biomass-based functional new materials were developed.</p>	<p>生物质热化学转化技术与原理、热工过程数值计算方法、生物质复合材料、有机分析化学</p> <p>Biomass Thermochemical Conversion Technology and Principle 、 Numerical Calculation Method of Thermal Process 、 Biomass Composite 、 Organic Analytical Chemistry</p>
	<p>农产品加工 技术与装备</p>	<p>本方向以农产品为研究对象，运用农业物料学、食品生物化学、微生物学、营养学等基础知识，研究农产品加工、贮藏及副产品综合利用中的基础科学与工程技术问题。主要从事农产品干燥技术，果蔬贮藏保鲜和病害预警控制技术，农产品低温挤压与成型技术及设备，活性天然产物的生物合成、提取、分离纯化、结构与功能研究及功能食品开发，基于生物传感器的农产品安全快速检测技术及仪器等方面的研究。</p> <p>Agricultural products are taken as the research object, and basic science and engineering technology in agricultural products processing, storage and comprehensive utilization of by-products are studied by using basic knowledge of agricultural materials science, food biochemistry, microbiology, nutrition and so on. Mainly engaged in agricultural drying technology, fruit and vegetable storage and disease early warning and control technology, low-temperature extrusion and moulding technology and equipment of agricultural products, biosynthesis, extraction, separation and purification of active natural products, structure and function research and functional food development, rapid detection technology of agricultural products safety based on biosensor research on instruments.</p>	<p>农业物料学、食品化学进展、食品生物技术进展、脂质生物化学、果蔬采后生理学、食品安全传感检测技术</p> <p>Agricultural Material Science、Advances in Food Chemistry 、 Advances in Food Biotechnology 、 Lipid Biochemistry 、 Fruits Postharvest Physiology、 Detecting Technology of Food Safety Sensor</p>

	<p>精准农业航空技术与装备</p>	<p>以农用无人机和有人驾驶飞机为研究对象，面向作物重大病虫害遥感诊断和精准防控，开展精准农业航空基础理论、关键技术、核心部件及智能装备的研究开发和集成应用，提高精准农业航空技术与装备的自主创新研发能力。</p> <p>Taking agricultural unmanned aerial vehicles and manned aerial vehicles as research objects, remote sensing diagnosis and precise prevention and control of major crop diseases, insects and weeds are oriented. Research, development and integrated application of basic theory, key technologies, core components and intelligent equipment of precision agricultural aviation are carried out to improve the ability of independent innovation and research and development of precision agricultural aviation technology and equipment.</p>	<p>精准农业航空技术、遥感原理与应用、植保机械与施药技术、多源光谱图像分析技术及应用</p> <p>Precision Agricultural Aviation Technology、Principle and Application of Remote Sensing、Plant Protection Machinery and Pesticide Application Technology、Multi-source spectral image analysis technology and application</p>
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附表 2: 培养计划 (Training Plan)

学科名称	农业工程 Agricultural Engineering		学科代码	0828	
单位名称	农业工程与食品科学学院 School of Agricultural Engineering and food science		培养类型	学术博士研究生 Doctoral Postgraduates	
学分要求	总学分 Total Credits: 14, 必修课程学分 Credit for Compulsive Course: 8, 选修课程学分 Credit for Optional Course: 3。				
课程 设置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 ≥4 学分	130062	中国文化 Chinese Culture	2	1	
	130063	汉语 Chinese	2	1	
学科平台课程 ≥4 学分	030157	农业工程综合专题 Comprehensive Theme of Agricultural Engineering	2	1	必选
	B03004	机械土壤动力学 Mechanical Soil Dynamics	2	1	选修 4 学 分
	B03005	机械与农业生物系统 Mechanical and Agricultural Biosystem	2	1	
	030160	食品化学进展 Advances in Food Chemistry	2	1	
	030158	农业物料学 Agricultural Material Science	2	1	
	B03013	生物质热化学转化技术与原理 Biomass Thermochemical Conversion Technology and Principle	2	1	
	030159	精准农业航空技术 Precision Agricultural Aviation Technology	2	1	
	B03015	遥感原理与应用 Principle and Application of Remote Sensing	2	1	
方向选修课程 ≥向学分	B03017	农机试验与仿真技术 Agricultural Machinery Test and Simulation Technology	2	1	
	B03018	现代测试与控制技术 Modern Testing and Control Technology	2	1	
	B03019	图像处理技术 Image Processing Technology	2	1	

	B03020	自动驾驶理论与技术 Theory and Technology of Automatic Navigation	2	1	
	030161	食品生物技术进展 Advances in Food Biotechnology	2	1	
	030082	脂质生物化学 Lipid Biochemistry	2	1	
	030163	果蔬采后生理学 Fruits Postharvest Physiology	2	1	
	030236	食品安全传感检测技术 Detecting Technology of Food Safety Sensor	2	1	
	B03025	热工过程数值计算方法 Numerical Calculation Method of Thermal Process	2	1	
	B03026	生物质复合材料 Biomass Composite	2	1	
	B03027	有机分析化学 Organic Analytical Chemistry	2	1	
	B03028	植保机械与施药技术 Plant Protection Machinery and Pesticide Application Technology	2	1	
	030165	多源光谱图像分析技术及应用 Multi-source spectral image analysis technology and application	2	1	
素养选修课程 ≥养学分	G31001	中国传统文化 Chinese Traditional Culture	1	1	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	1	
	G02060	科研素养与创新能力 Research literacy and Innovation Ability	1	1	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	开题时间由导师确定。 The starting time is determined by the tutor and should be completed in the third semester.				3-5



<p>中期考核 (1 学分)</p>	<p>对研究生的思政、科研、实践及综合素质等进行考核。考核不合格的，延期半年，再不合格经学院学位评定分委会研究审核，报学校做肄业处理。</p> <p>Generally should be completed in the fourth semester, mainly to the doctoral graduate student's academic research ability, practical ability, comprehensive quality and paper progress to carry on the examination, through the post-total of 1 credit, examination unqualified, by the training unit, graduate school audit, report President office approval, do associate study processing.</p>	<p>3-5</p>	
<p>创新创业 (1 学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次； 2. 参加高水平科技竞赛、创意设计、创新创业竞赛等并获奖； 3. 参加 6 次以上与本学科相关的学术报告，并提交总结； 每项记 1 学分，需完成 1 学分。</p> <p>1. Attend academic conferences and read papers at the conference, or make public academic reports twice. 2. Participate in national science and technology competition, creative design competition, innovation and entrepreneurship competition and winning awards. 3. Participate in more than 6 academic reports related to the subject and submit a summary. One credit is required for each entry.</p>	<p>2-7</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



# 学术学位硕士研究生培养方案

学科代码：0828

## Training program for academic postgraduates

Credit Code: 0828

### 一、培养目标 ( Educational Objectives )

面向农业工程领域科技前沿，围绕发展中国家重大战略需求和区域发展需要，培养热爱中国文化、身心健康、品学兼优、基础理论扎实、专业知识宽广、具有创新能力和国际竞争能力、能从事农业工程学科领域教学、科研以及技术管理工作的高级创新人才。

1. 遵纪守法，学风严谨，学术正派，团结协作，品行端正，具有较强的事业心和责任感。

2. 掌握本学科坚实宽广的基础理论、系统深入的专门知识和必要的实践技能，熟悉本学科的发展方向及国际学术前沿。

3. 具备知识获取、终身学习和学术创新能力，独立从事科学研究工作能力，并在所从事研究方向上做出创新性成果，能熟练阅读本学科外文资料，并具有较强的外文写作和国际学术交流能力。

Facing the frontier of science and technology in the field of agricultural engineering, focusing on the major strategic needs of developing countries and regional development, we will cultivate students who love Chinese culture, have mind and body health, are excellent both in conduct and academy, have a solid foundation of theory, broad professional knowledge, innovative ability and international competitiveness. The students will become senior innovative talents in the field of teaching, scientific research and technical management of agricultural engineering.

1. Compliance with discipline and law, rigorous style of study, academic integrity, unity and cooperation, good conduct, and have a strong sense of enterprise and responsibility.

2. Master the solid and broad basic theory, systematic and in-depth expertise and necessary practical skills of the discipline, and be familiar with its development direction and international academic frontiers.

3. Have the ability of knowledge acquisition, lifelong learning and academic innovation, independently engage in scientific research work, and make innovative achievements in the direction of research, skilled reading of foreign language materials of the subject, and strong



foreign language writing and international academic exchange ability.

## 二、研究方向 ( Research Orientation )

1. 农业机械化工程
2. 农业生物环境与能源工程
3. 农业电气化与信息化
4. 农业水土工程
5. 农产品加工技术与装备

详见附表 1。

1. Agricultural mechanization engineering
2. Agricultural Bioenvironment and Energy Engineering
3. Agricultural electrification and informationization
4. Agricultural Soil and Water Engineering
5. Agricultural Products Processing Technology and Equipment

The brief introduction of each research field is shown in appendix 1.

## 三、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间（累计不超过 2 年）不计入学习年限。

3 years ( can be adjusted in the range of 2-4 years ) . The scientific research and thesis writing time is not less than 1 year ( calculated from the date of opening statement ) . With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school ( cumulative not more than 2 years ) is not counted as the number of years of study.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 16 必修学分和 9 选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 1 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The courses are divided into compulsory courses and elective courses. The credits of courses are no less than 16 credits and no more than 9 credits. For full-time academic master's degree postgraduates with the same educational background or cross-specialty, one main courses ( designated by tutors ) at the undergraduate stage should be supplemented. Only after

passing the examination ( without credit ) , can they apply for defense.

Course list is given in appendix 2.

## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制,鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划,且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

研究生在导师的指导下,通过查阅文献、收集资料和调查研究后确定研究课题,写出选题文献综述,完成预实验,在第三学期完成开题。由本学科专业5人以上专家组成评审小组对学生的课程成绩、文献阅读、学术调研和开题报告进行考核和评审,提出评价和修改意见,不通过者可限期重做,仍不通过者终止培养。开题通过后即获得1学分。

### 2. 中期筛选

中期考核在第五学期进行。对研究生的思政、科研、实践及综合素质等进行考核,中期考核通过后即获得1学分。考核不合格的,经培养单位、研究生院审核,报校长办公会批准,做肄业处理。

### 3. 创新创业

达到以下条件之一,即获得创新创业1学分:

- (1) 参加学术会议并宣读论文,或做公开学术报告2次;
- (2) 参加全国性的科技竞赛、创意设计、创新创业竞赛等;
- (3) 参加6次以上与本学科相关的学术报告,并提交总结。

#### 1. Opening report

In order to ensure the quality of dissertation, Postgraduates should determine the topic and content of dissertation through literature reading and academic research, and submit the opening report at the end of the third semester with the consent of their tutors. Assessment panel composed of five or more experts in this subject will evaluate the opening report and put forward comments on evaluation and revision. Those who fail to pass the program must re-do the opening report another time, and those who fail to pass the program twice will terminate the training. The opening report will be completed in Chinese or English, and one credit will be awarded after the completion of the opening report.

#### 2. Mid-term inspection

In order to evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and



professional knowledge, scientific research innovation, practical ability and state of health is performed in the fourth semester. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools. After the mid-term inspection is passed, one credit will be obtained.

### 3. Innovation and entrepreneurship

Complete one of the following three items, i. e. get one credit for innovation and entrepreneurship:

(1) Participate in academic conferences and read papers, or make public academic reports twice;

(2) To participate in high-level scientific competitions, creative design, innovation and entrepreneurship competitions and win awards;

(3) Participate in more than 6 academic reports related to his research filed and submit a summary.

## 六、学位论文 (Academic Dissertation)

1. 硕士学位论文应具有系统的、完整的研究思路和计划,应对科技进步和国民经济建设具有较大的理论意义或实用价值,学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作,必须由作者独立完成。研究工作必须坚持实验性原则,论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 硕士研究生用于做学位论文的时间,应不少于1年(自硕士论文开题报告考核通过起至硕士论文答辩前)。

4. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节,论文答辩要做到严格要求、公正、公开。

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

3. The time used by master's students to do dissertation should be not less than 1 year (from the examination of the master's thesis opening report to the master's thesis defense).

4. According to the Rules of 《The Implementation of Master's Degree Granting in Shandong University of Technology》, it is required to organize such links as thesis opening, mid-term assessment, dissertation pre-defense and formal defense, and dissertation defense should be strict, fair and open.

## 七、毕业与学位要求 ( Graduation and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

具有良好的品德修养和学术道德,实事求是、勇于创新;  
修读完培养方案规定课程和其他培养环节,成绩考核合格;  
完成论文答辩,成绩合格;  
符合学校有关规定的其他要求。

### (二) 学位要求

根据《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学硕士学位授予工作实施细则》以及农业工程与食品科学学院学位授予有关规定严格执行。

Graduate students who meet the requirements for graduation will receive a diploma. On the basis of a diploma, graduate students who meet the criteria for awarding a degree can be awarded a degree certificate.

#### 1. Graduation Requirements

(1) Keep good moral character and academic ethics, seek truth from facts, have the courage to innovate.

(2) After completing the training program and other training sections, the students passed the examination.

(3) The students complete the defense of doctoral dissertation with qualified results.

(4) Comply with other requirements stipulated by the university.

#### 2. Degree Requirements

The interim measures for the implementation of the academic degrees regulations of the People's Republic of China, the detailed rules for the implementation of the awarding of doctoral degrees of SDUT and the relevant provisions on the awarding of academic degrees of the mechanical engineering department should be strictly implemented.



附表 1：研究方向简介（Brief Introduction on Research Orientation）

类别		培养目标	支撑课程
综合素质		<p>热爱中国文化、身心健康、品学兼优、基础理论扎实、专业知识宽广、勇于创新。 Familiar with Chinese culture, proficient in Chinese, mind and body health, capable of excellence in both basic theory, professional knowledge and courage to innovate.</p>	<p>中国文化、论文写作与学术规范 Chinese Culture、Thesis Writing and Academic</p>
综合能力		<p>具有创新精神、创新能力和国际竞争能力、能从事农业工程学科领域教学、科研以及技术管理工作的高级创新人才。 With innovative spirit, innovative ability and international competitiveness, senior innovative talents who can engage in teaching, scientific research and technical management of agricultural engineering disciplines.</p>	<p>汉语、试验设计与数据分析方法 Chinese、Design and Analysis of Experiments</p>
研究方向	农业机械化工程	<p>综合应用机械、信息、生物、自动化等科学技术，以农业产前、产中、产后各个环节及农业资源综合利用等为主要研究内容，为提高劳动生产率、降低生产成本、改善土地产出率、提高资源利用率、促进农业持续性发展，开展农业生产机械化与自动化生产技术，以及农业机械化生产规划与管理的研究。 Comprehensive application of science and technology, such as machinery, information, biology and automation, and comprehensive utilization of agricultural resources in various links before, during and after childbirth are the main research contents. In order to improve labor productivity, reduce production costs, improve land productivity, improve resource utilization and promote sustainable development of agriculture, we should carry out the research. Research on mechanization and automation technology of agricultural production and planning and management of agricultural mechanization production.</p>	<p>高等农业机械学、高等农业工程学、高等农业机械化管理学、可靠性理论及应用、农业设施学、动力机械实验与测试技术、内燃机电子控制技术 Advanced Agricultural Machinery、Advanced Agricultural Engineering、Advanced Agricultural Mechanization Management、Reliability Theory and Application、Agricultural Facilities、Power Machinery Experiment and Testing Technology、Internal Combustion Engine Electronic Control Technology</p>

<p>农业生物 环境能源 工程</p>	<p>以热能工程原理、热化学转化技术、现代测控技术、现代材料技术为基础，进行生物质高值化综合应用技术的研究开发，为可持续发展能源战略提供技术保障。主要研究秸秆类生物质热化学转化原理；生物质热解液化工艺、装备及应用；生物质新型材料工艺等。提高生物质能源品质、提供高价值应用技术。</p> <p>Based on the principles of thermal energy engineering, thermochemical conversion technology, modern measurement and control technology and modern material technology, the research and development of high-value integrated application technology of biomass is carried out, which provides technical guarantee for sustainable energy strategy. This paper mainly studies the thermochemical conversion principle of straw biomass, biomass pyrolysis liquefaction technology, equipment and application, biomass new material technology, etc. Improve the quality of biomass energy and provide high value application technology.</p>	<p>高等传热学、燃烧物理学、农业生物环境工程、生物质工程原理、工程热力学、生物质能热化学转化原理、生物质复合材料制备技术、热工过程数值计算方法</p> <p>Advanced Heat Transfer、Agricultural Bioenvironmental Engineering、Principles of Biomass Engineering、Engineering Thermodynamics、Advanced Combustion, Renewable Energy Engineering、Thermal Parameter Testing Technology、Thermochemical Transformation Principle Of Biomass Energy、Multiphase Flow and Its Application、Biomass Composite Preparation Technology、Numerical Calculation Method of Thermal Process</p>
<p>农业电气 化与信息 化</p>	<p>面向农业生产过程电气化与自动化、智能化检测和信息处理的需求，集电子工程、通信技术、生物科学技术以及信息化技术于一体，开展科学研究、系统集成和工程应用研究，主要包括农产品品质检测、农业装备的智能检测与控制技术、农业智能信息系统集成技术，面向作物重大病虫草害遥感诊断和精准防控，开展精准农业航空关键技术、核心部件及智能装备的研究开发与集成应用等。</p> <p>Facing the needs of electrification and automation, intelligent detection and information processing in agricultural production process, it integrates electronic engineering, communication technology, biotechnology and information technology, and carries out scientific research, system integration and engineering application research, mainly including quality detection of agricultural products, intelligent detection of agricultural equipment. Control technology and integration technology of agricultural intelligent information system, remote sensing diagnosis and precise control of crop diseases, pests and weeds, research, development and integrated application of key technologies, core components and intelligent equipment of precision agricultural aviation, etc.</p>	<p>农业信息系统工程、智能传感器与新型仪表技术、数据采集技术、单片机原理与开发、人工智能及其应用、数字信号处理、虚拟仪器与技术</p> <p>Agricultural Information System Engineering、Intelligent Sensor and Instrument Technology、Data Acquisition Technology、Computer Vision Detection and Image Processing、Precision Agriculture Aviation Technology and Application、Plant protection machinery and application technology、Plant Protection Drone Flying Defense Technology</p>



<p>农业水土 工程</p>	<p>重点开展农业水土资源高效利用、水土保持及土壤污染及修复理论与技术，包括安全高效的微咸水灌溉技术、黄河三角洲中重度盐碱土改良理论及技术、农业水分监测与精量灌溉、劣质水灌溉土壤环境及农产品品质分析、区域水土保持理论与技术、土壤重金属污染及修复理论与技术。</p> <p>Focusing on the theory and technology of efficient utilization of agricultural soil and water resources, soil and water conservation, soil pollution and remediation, including safe and efficient brackish water irrigation technology, theory and technology of medium and severe saline-alkali soil improvement in the Yellow River Delta, agricultural water monitoring and precision irrigation, soil environment and quality analysis of agricultural products under poor water irrigation, and regions. Soil and water conservation theory and technology, soil heavy metal pollution and remediation theory and technology.</p>	<p>水土资源评价、灌溉优化理论与技术、水力学基础、工程水文学、农田水力学、水资源规划与流域管理</p> <p>Water and Soil Resources Evaluation、Theory and Technology of Irrigation and Drainage Optimization、Hydraulic Basis、Engineering Hydrology、Farmland Hydrology、Water Resources Planning and Watershed Management</p>
<p>农产品加工技术与 装备</p>	<p>综合应用机械、信息、生物、自动化等科学技术，以农业产前、产中、产后各个环节及农业资源综合利用等为主要研究内容，为提高劳动生产率、降低生产成本、改善土地产出率、提高资源利用率、促进农业持续性发展，开展农业生产机械化与自动化生产技术，以及农业机械化生产规划与管理的研究。</p> <p>Comprehensive application of science and technology, such as machinery, information, biology and automation, and comprehensive utilization of agricultural resources in various links before, during and after childbirth are the main research contents. In order to improve labor productivity, reduce production costs, improve land productivity, improve resource utilization and promote sustainable development of agriculture, we should carry out the research. Research on mechanization and automation technology of agricultural production and planning and management of agricultural mechanization production.</p>	<p>农业物料学、农产品快速无损检测技术、机器视觉技术及其应用、现代食品物流学、光谱分析技术及应用</p> <p>Rapid Nondestructive Testing Technology for Agricultural Products、Computer Vision Detection and Image Processing、Modern Food Logistics、Spectral Analysis Technology</p>



附表 2: 培养计划 (Training Plan)

学科名称	农业工程 Agricultural Engineering		学科代码	0828		
单位名称	农业工程与食品科学学院 School of Agricultural Engineering and food science		培养类型	学术硕士研究生 Foreign Postgraduates		
学分要求	总学分 Total Credits: 32, 必修课程学分 Credit for Compulsive Course: 16, 选修课程学分 Credit for optional course: 9。					
课程 设 置 ( 中 英 文 对 照 )						
课程类型	课程编码	课程名称	学 分	学 期	备注	
公共必修课程 ≥5 学分	130062	中国文化 Chinese Culture	2	1		
	130063	汉语 Chinese	2	1		
	G15001	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 ≥11 学分	G11001	数值分析 Numerical Analysis	3	1	三选 二门	
	G11005	数理方程 Equations of Mathematical Physics	2	1		
	G11002	矩阵理论 Matrix Theory	2.5	1		
	G15004	实验设计与分析 Design and Analysis of Experiments	2	1		
	300014	信息检索与利用 Information Retrieval And Utilization	2	1		
	030044	科学研究方法概论 Introduction to Scientific Research Methodology	2	1		
	030215	农业工程综合专题 ( 农机 ) Agricultural Engineering Comprehensive Topic ( Agricultural Machinery )	2	1		
	030217	农业工程专题 ( 能源 ) Agricultural Engineering Comprehensive Topic ( Energy )	2	1		
	030216	农业工程综合专题 ( 农水方向 ) Agricultural Engineering Comprehensive Topic ( Agricultural Water Resources Utilization )	2	1		



方向选修课程 ≥8 学分	030083	高等农业工程学 Advanced Agricultural Engineering	2	2	不低于9 学分
	030207	高等农业机械学 Advanced Agricultural Machinery	3	2	
	030078	高等农业机械化管理学 Advanced Agricultural Mechanization Management	2	2	
	030049	可靠性理论及应用 Reliability Theory and Application	2	2	
	030005	农业设施学 Agricultural Facilities	2	2	
	030010	现代设计方法 Modern Design Method	3	2	
	030056	农业机电一体化技术 Agricultural Mechatronics Technology	2	2	
	030238	动力机械实验与测试技术 Power Machinery Experiment and Testing Technology	2	2	
	030138	内燃机电子控制技术 Internal Combustion Engine Electronic Control Technology	3	2	
	030003	高等传热学 Advanced Heat Transfer	2	2	
	030141	燃烧物理学 Combustion physics	3	2	
	030011	农业生物环境工程 Agricultural Bioenvironmental Engineering	2	2	
	030077	生物质工程原理 Principles of Biomass Engineering	2	2	
	030007	工程热力学 Engineering Thermodynamics	2	2	
	030208	高等燃烧学 Advanced Combustion	2.5	2	
	030012	可再生能源工程 Renewable Energy Engineering	2	2	
	030134	热工参数测试技术 Thermal Parameter Testing Technology	2	2	
	030027	现代仪器分析技术 Modern Instrumental Analysis Technology	2	2	
	030140	生物质能热化学转化原理 Thermochemical Transformation Principle Of Biomass Energy	2	2	


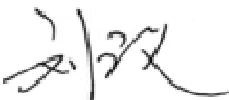
030209	多相流及其应用 Multiphase Flow and Its Application	2.5	2
030066	沼气技术理论与工程 Biogas Technology and Engineering	2	2
030067	生物质复合材料制备技术 Biomass Composite Preparation Technology	2	2
030047	自动控制理论 Automatic control theory	2	2
030139	热工过程数值计算方法 Numerical Calculation Method of Thermal Process	2	2
030042	能源技术经济与管理 Energy Technology Economy and Management	2	2
030043	粉体工程导论 Introduction to Powder Engineering	2	2
030079	农业信息系统工程 Agricultural Information System Engineering	2	2
030041	智能传感器与新型仪表技术 Intelligent Sensor and Instrument Technology	2	2
030136	数据采集技术 Data Acquisition Technology	2	2
030054	单片机原理与开发 Principle and Development of Single Chip Microcomputer	2	2
030135	人工智能及其应用 Artificial Intelligence and Its Application	2	2
030020	可视化编程语言 Visual Programming Language	2	2
030057	机器人设计与应用 Robot Design and Application	2	2
030142	数字信号处理 Digital Signal Processing	2	2
030037	虚拟仪器与技术 Virtual Instrumentation and Technology	2	2
030039	现场总线技术 Fieldbus Technology	2	2
030040	计算机视觉检测与图象处理 Computer Vision Detection and Image Processing	2	2
030137	控制系统分析设计与仿真 Analysis, Design and Simulation of Control System	2	2



030210	精准农业航空技术与应用 Precision Agriculture Aviation Technology and Application	2	2
030211	植保机械与施药技术概论 Plant protection machinery and application technology	2	2
030212	植保无人机飞防技术 Plant Protection Drone Flying Defense Technology	2	2
030032	食品干燥技术 Food Drying Technology	2	2
030006	农产品加工工程专论 Agricultural Product Processing Engineering	2	2
030022	农产品品质检测 Agricultural Product Quality Testing	2	2
030018	挤压蒸煮加工技术及应用 Extrusion Cooking Technology and Its Application	2	2
030231	现代食品物流学 Modern Food Logistics	2	2
030213	农产品快速无损检测技术 Rapid Nondestructive Testing Technology for Agricultural Products	2	2
030034	果品精深加工技术 Advanced Processing Technology of Fruits	2	2
030035	保鲜设施与设备 Fresh-keeping Facilities and Equipment	2	2
030214	光谱分析技术及应用 Spectral Analysis Technology	2	2
030052	农田水利学 Farmland Hydrology	2	2
030054	水资源规划与流域管理 Water Resources Planning and Watershed Management	2	2
030055	3S 技术及其应用 3S technology and Its Application	2	2
030053	灌排优化理论与技术 Theory and Technology of Irrigation and Drainage Optimization	2	2
030051	水土资源评价 Water and Soil Resources Evaluation	2	2

	030045	水力学基础 Hydraulic Basis	2	2	
	030046	工程水文学 Engineering Hydrology	2	2	
素养选修课程 ≥1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	任选 一门
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	G13043	中国古代韵文阅读与欣赏 Chinese Ancient Verse Reading and Appreciation	1	2	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出选题文献综述，由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。</p> <p>The research subject and contents should be selected based on reference survey and academic investigation. The inspect board is composed of more than 5 experts in this subject, who are responsible for reviewing the thesis proposal report submitted by the graduate students, making evaluation and putting forward modification suggestions. Those who fail in the evaluation shall be redone within a time limit, and the cultivation shall be terminated if the thesis proposal fails again. One year after the dissertation proposal is approved, the candidate can apply for the dissertation submission and defense.</p>				3
中期考核 (1 学分)	<p>中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。考核不合格的，延期半年，再不合格经学院学位评定分委会研究审核，报学校做肄业处理。</p> <p>A comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools.</p>				4-5
创新创业 (1 学分)	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次； 2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖； 3. 参加 6 次以上与本学科相关的学术报告，并提交总结； 每项记 1 学分，需完成 1 学分。</p> <p>1. Participate in academic conferences and presentation of papers, or do public academic reports for 2 times;</p>				1-5



	<p>2. Participate and win awards in high level science and technology competitions, creative design, innovation and entrepreneurship competitions;</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary.</p> <p>1 credit for each, the minimum credit is 1.</p>		
培养单位 教授委员会主任		培养单位 负责人	

# 食品科学与工程学科学术学位硕士研究生培养方案

学科代码：0832

## Training Program of Food Science and Engineering Discipline for Academic Master Candidates in Shandong University of Technology

Credit Code: 0832

### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学食品科学与工程系 2001 年建立，2002 年招收食品科学与工程专业本科生，2006 年获农产品加工及贮藏工程二级学科硕士学位授予权，2010 年获食品科学与工程一级学科硕士学位授予权，2016 年获食品工程专业硕士学位授予权。

食品科学与工程学科经过多年建设和发展，形成了以服务山东省农产品加工及贮藏技术与装备为特色的 4 个研究方向：果蔬贮藏与保鲜技术、农产品加工技术与装备、食品营养与功能性食品、食品质量安全与控制。是学校一级学科博士点和山东省一流学科重点培育学科。

学位点致力于培养食品科学与工程领域高级创新人才，持续提升科学研究水平、人才培养质量和服务社会能力。本学位点自 2007 年开始招收硕士研究生，目前共为社会培养硕士研究生 76 人，其中获省级优秀硕士学位论文 5 篇，校级优秀硕士学位论文 6 篇。每年都有多人考取中国农业大学、中国海洋大学、东北农业大学等名校博士研究生，毕业生普遍受到用人单位的好评。

The School of Food science and Engineering in Shandong University of Technology (SDUT) was established in 2001. In 2002, the first batch of undergraduate students was enrolled in the food science and engineering discipline. In 2006, the agricultural product processing and storage engineering was authorized as the second-level discipline of master degree program. In 2010, the food science and engineering was authorized as the first-level discipline of master degree program. in 2016, it was authorized the right to grant professional master's degree in food engineering.

After years of construction and development, the food science and engineering discipline has formed four research directions which serves agricultural products processing and storage



technology as well as agricultural equipment in Shandong Province. These directions are fruit and vegetable storage and preservation technology, agricultural product processing technology and equipment, food nutrition and functional food, food quality safety and control. The food science and engineering discipline is a first-level discipline of doctoral program in the University and a key discipline of the first-class disciplines for cultivation in Shandong province.

The degree site is dedicated to cultivating high-level innovative talents in the food science and engineering fields, and continuously improving the level of scientific research, the quality of personnel training, and the ability to serve the society. This degree site has been recruiting graduate students since 2007. At present, there are 76 graduate students, in whom they obtained 5 excellent provincial master's thesis and 6 excellent master's thesis. There are also many students get offer from China Agricultural University, Ocean University of China, Northeast Agricultural University, etc. for their doctoral degree, and all the graduates are generally praised by employers.

## 二、培养目标 ( Educational Objectives )

1. 面向食品科学与工程领域国际科技前沿，围绕发展中国家重大战略需求和区域发展需要，培养坚持对华有好的政治立场，拥护中国外交政策，积极促进中外友好合作与交流，遵守中国的法律法规，尊重中国的社会公德和风俗习惯，热爱中国文化、身心健康、品学兼优，具有实事求是、科学严谨的治学态度和工作作风，具有较强的事业心和献身精神。

2. 掌握本学科坚实的基础理论、系统的专门知识；熟悉本学科的发展方向及国际学术研究前沿，具有独立从事科学研究工作的能力，在所从事的研究方向上做出创造性成果。

3. 具有健康的体魄、良好的人文素养、科技道德、敬业创新精神和国际视野。

4. 能够从事食品科学与工程学科领域里的科学研究、高等院校的教学工作及大型企业的技术管理工作。

1. Facing the international science and technology frontier in the field of food science and engineering, focusing on the major strategic needs of developing countries and regional development, we aimed to cultivate high level specialists who adhere to a friendly political stance with China and promote cooperation and exchanges between China and foreign countries. Abide by the Chinese laws and regulations and respect Chinese social ethics and customs. Be in love with Chinese culture and keep physical and mental health. Keep rigorous, realistic and pragmatic attitude and work style with excellent academics and a strong sense of professionalism and dedication.

2. Systematically master the basic theory and professional knowledge in the discipline;



tightly follow the development direction of the discipline and the frontier of international academic research; Equip with the ability to independently engage in scientific research, and make creative achievements in their research direction.

3. Maintain healthy physique, good human qualities, good scientific and technological ethics, dedication and innovation and international perspective.

4. Capable of scientific research in the field of food science and engineering, teaching in colleges and universities, and technical management in large enterprises.

### 三、研究方向 ( Research Orientation )

本学科经过十几年的积累与发展，目前形成了紧密结合区域发展需要的 4 个稳定的研究方向。

1. 果蔬贮藏与保鲜技术
2. 农产品加工技术与设备
3. 食品营养与功能性食品
4. 食品质量安全与控制

详见附表 1。

After more than ten years of accumulation and development, this discipline has formed four stable research directions that closely combine the needs of regional development.

- Fruit and vegetable storage and preservation technology
- Agricultural product processing technology and equipment
- Food nutrition and functional foods
- Food quality safety and control
- See Attached Table 1 for details.

### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years ( can be adjusted in the range of 2-4 years ) . The scientific research and thesis writing time is not less than 1 year ( calculated from the date of opening statement ) . With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school is not counted as the number of years of study.

### 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 19 分的必修学分和 9 学



分的选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读2门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表2。

The course is divided into compulsory courses and elective courses. Students are required to complete 19 credits of compulsory and 9 credits of elective courses within the specified time. Interdisciplinary graduate students are required to take 2 or more courses according to the tutor's requirements. After passing the examination, they can participate in the thesis proposal defense, and the results are not included in the transcript.

The curriculum is shown in attached table 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出选题文献综述，完成预实验，在第三学期完成开题。由本学科专业5人以上专家组成评审小组对学生的课程成绩、文献阅读、学术调研和开题报告进行考核和评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。开题通过后即获得1学分。

### 2. 中期筛选

中期考核在第五学期进行。对研究生的思政、科研、实践及综合素质等进行考核，中期考核通过后即获得1学分。考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

### 3. 实习实践

#### (1) 教学实践

教学实践可采取多种方式进行，如本科课程教学、辅导工作或指导生产实习、课程设计及毕业设计等工作。教学实践时间累计不少于1个月的工作量，结束后由导师写出考核评语，考核通过即获得1学分。

#### (2) 专业实践

安排至少1个月的时间(一般可以利用寒、暑假)到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作或实验室等工作。导师考核合格即可获得1学分。

#### 4. 创新创业

达到以下条件之一，即获得创新创业 1 学分：

- (1) 进行 3 个月的出国访学研修或学术交流；
- (2) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等；
- (4) 参加 6 次以上与本学科相关的学术报告，并提交总结。

The cultivation of overseas graduate students with academic master's degree is carried out under the system of tutor responsibility. The implementation of a steering group ( team ) system under the management of the tutor is encouraged. The tutor is responsible for formulating the training program for graduate students, and has the responsibility of guiding, demonstrating and supervising the ideological, moral character and academic ethics of graduate students.

##### 1. Dissertation Proposals

In order to ensure the quality of the dissertation, the graduate students should determine the topic selection and research content of the dissertation by reading literatures and doing academic research, and submit the proposal report at the end of the third semester with the consent of the supervisor. An evaluation team composed of 5 or more experts from the discipline will review the proposal report made by the students, and put forward evaluation and modification suggestions. Those who fail to pass the proposal can re-do it within limit time, and those who still fail to pass the proposal will be terminated. The thesis proposal is completed in Chinese or English, and 1 credit will be awarded upon passing the thesis proposal.

##### 2. Metaphase Filtration

The mid-term assessment is conducted in the fifth semester. The postgraduate's ideological and political, academic research, practical and comprehensive quality are assessed. Those who can not pass the mid-term examination will be asked to terminate school roll after signing opinion by the department, graduate school and approving by the president's office.

##### 3. Internship practice

###### (1) Teaching practice

Teaching practice can be carried out in a variety of ways, such as giving courses to undergraduate students, tutoring, guiding production, course design and graduation design. The accumulated time of teaching practice is no less than one month's work load. After the end of the teaching practice, the tutor will give the assessment comments, and once the assessment is passed, 1 credit will be obtained.

###### (2) Professional practice

Arrange at least one month ( normally in winter or summer vacation ) for practical training in production or design research institutions, or participate in scientific research or undertake laboratory work related with their research direction. 1 credit will be awarded after passing the assessment of the tutor.



#### 4. Innovation and Entrepreneurship

If the students complete one of the following three items, they will get 1 credit for innovation and entrepreneurship.

- (1) Conducting a three-month study or academic exchange abroad;
- (2) Attend academic conferences and read papers at the conference, or make public academic reports twice.
- (3) Participate in high-level science and technology competition, creative design, innovation and entrepreneurship competition and win some awards.
- (4) Participate in academic reports related to the discipline for more than 6 times and submit the summaries on the reports.

### 七、学位论文 ( Academic Dissertation )

学位论文的要求按照《山东理工大学关于研究生学位论文工作的有关规定》、《山东理工大学硕士学位授予工作实施细则》等相关文件执行。

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：

1. 论文应在导师的指导下由硕士研究生独立完成，论文应有较强的系统性和创造性成果，对食品科学与工程学科的发展具有较大的理论意义或应用价值。
2. 硕士研究生在校期间应把主要精力投入与硕士论文有关的科学研究和论文的撰写上，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。
3. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节，论文答辩要做到严格要求、公正、公开。

The requirements of the dissertation are implemented in accordance with 《Regulations of Shandong University of Technology on the work of graduate students' dissertation》 and 《The Implementation of Master's Degree Granting in Shandong University of Technology》.

The master's thesis is a comprehensive summary of the master's scientific research work, an important academic document describing its research results and reflecting its research level, and is the basic basis for applying for and granting a master's degree. Thesis writing is the key and core of the postgraduate cultivation. It must be carried out in strict accordance with the standard. The dissertation of the master's degree in this discipline should meet the following basic requirements:

1. The thesis should be completed independently by master students under the guidance of

the supervisor, and should have strong systematic and creative results, which have great theoretical significance or application value for the development of food science and engineering discipline.

2. Graduate students should put their main energy into the scientific research and writing of the master's thesis, and the content of the thesis must be based on the first-hand experiment, observation or investigation materials completed by the graduate students themselves.

3. The time for a master's degree student to complete a dissertation is generally no less than 2 years.

4. Organize the thesis proposal defense, the mid-term assessment, the pre-defense and formal defense of the dissertation according to the requirement of 《The Implementation of Master's Degree Granting in Shandong University of Technology》. The dissertation defense should be strict, fair and open.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 热爱中国文化,具有社会责任感和历史使命感,遵纪守法,身心健康;
2. 具有良好的品德修养和学术道德,实事求是、勇于创新;
3. 修读完培养方案规定课程和其他培养环节,成绩考核合格;
4. 完成论文答辩,成绩合格;
5. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》以及农业工程与食品科学学院学位授予有关规定。

If graduation requirements are achieved, the postgraduate diploma will be obtained; On the basis of obtaining the graduation certificate, if meeting the degree conferring standard, the degree conferring certificate can also be granted.

#### 1. Graduation Requirements

(1) Love Chinese culture, have a sense of social responsibility and historical mission, obey the law, and keep physical and mental health;

(2) Have good moral character and academic ethics, seek truth from facts, have the courage to innovate.

(3) Complete the required courses and other training links, and complete the required



credits.

- (4) Complete the thesis defense and pass the examination.
- (5) Comply with other requirements stipulated by the school.

2. Degree requirements:

It shall strictly implement the interim implementation measures of the academic degree regulations of the People's Republic of China, the evaluation measures of master's degree theses of SDUT, the implementation rules of the master's degree awarding of SDUT and some other relevant provisions of the academic degree awarding of mechanical engineering department.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	热爱中国文化、身心健康、品学兼优、基础理论扎实、专业知识宽广、勇于创新。 Love Chinese culture, keep physical and mental health, and maintain excellent academics. Master solid basic theory and broad professional knowledge and have strong courage to innovate.	中国历史与文化、自然辩证法 Chinese history and culture, Dialectics of nature ( nature )
综合能力	具有创新精神、创新能力和国际竞争能力、能从事食品科学与工程学科领域教学、科研以及技术管理工作。 With innovative spirit, innovative ability and international competitiveness. Capable of engagement in teaching, scientific research and technical management in the fields of food science and engineering.	数值分析、数理统计、高级食品化学、现代食品营养学 Numerical Analysis、Mathematical Statistics、Advanced Food Chemistry、Modern Food Nutrition
研究方向	<p>本学科方向针对果蔬采后生理活性强、极易腐烂变质和发生病害的特点,在食用菌、果品和蔬菜的贮藏保鲜和病害控制技术和机理方面开展了系统研究。重点研究果蔬采后气调保鲜新技术及机制、生理性病害发生机理及预警和调控技术,以及采前采后因子影响果蔬耐贮性和抗病性的分子机制,开发新型果蔬安全物流及保鲜技术体系。</p> <p>In view of the characteristics of fruits and vegetables with strong physiological activity, perishable deterioration and diseases, this discipline has carried out systematic research on the storage and preservation technology and disease control mechanism of edible fungi, fruits and vegetables. The research focuses on the new technology and mechanism of air-regulated fresh preservation of fruits and vegetables after harvest, the mechanism of physiological diseases and the early warning and regulation technology, and the molecular mechanism of factors before and after harvest affecting storage resistance and disease resistance of fruits and vegetables, and the development of new safety logistics and fresh preservation technology system of fruits and vegetables.</p>	<p>食品科学专题、高级食品生物化学、果品精深加工技术、果蔬采后生理学、保鲜设施与设备、食品废料综合利用专题、食品干燥技术、现代食品物流学</p> <p>Special topics of food science、advanced food biochemistry、intensive processing technology of fruits and vegetables、postharvest physiology of fruits and vegetables、preservation facilities and equipment、special topics of comprehensive utilization of food wastes、food drying technology、modern food logistics</p>



<p>农产品加工技术与装备</p>	<p>本学科方向致力于农产品低温挤压膨化工艺、设备及其应用，研究农产品干燥的基本原理及干制品加工及贮运过程中品质优化模型，探讨获得“节能、高效、优质”农产品的新途径。在农产品低温稳态化挤压与成型技术、挤压催化与生物转化技术、农产品热泵干燥技术等方面形成了特色与优势。</p> <p>The direction of this discipline is devoted to the low-temperature extrusion technology, equipment and application of agricultural products, studying the basic principle of agricultural products drying and the quality optimization model in the process of dry products processing, storage and transportation, and exploring new ways to obtain "energy saving, high efficiency and high quality" agricultural products. It has formed characteristics and advantages in low-temperature steady-state extrusion and molding technology, extrusion catalysis and biological conversion technology, and heat pump drying technology of agricultural products.</p>	<p>农产品加工及贮藏工程专题、挤压蒸煮技术及应用、SAS 在食品工程中的应用、食品物性学、现代食品发酵工程、食品酶学</p> <p>Special topics of processing and storage engineering of agricultural products、Extrusion cooking technology and application、Application of SAS in food engineering、Food property science、Modern food fermentation engineering, food enzymology</p>
<p>食品营养与功能性食品</p>	<p>本学科方向致力于活性天然产物的生物合成、提取、分离纯化、结构与功能研究、功能食品研究开发。主要研究功能脂质生物合成、生物化学与分子生物学，抗癌功能食品（包括药食同源植物天然产物、益生菌）及其作用分子机制，抗糖尿病天然产物分离提取及其作用机制，抗心血管疾病、肥胖病天然产物分离提取及其作用机制，抗氧化、抗衰老天然产物分离提取及其作用机制。功能因子的结构改造及功能开发。</p> <p>This discipline is devoted to biosynthesis, extraction, separation and purification of active natural products, and their structural and functional research, as well as research and development of functional foods. The main research directions include function lipid biosynthesis, biochemistry and molecular biology; Anti-cancer function food (including medicine edible plant natural products, probiotics) and its role in molecular mechanism; Extraction of natural products for anti diabetes, cardiovascular disease, obesity as well as anti-oxidation, anti-aging products and their mechanism of action. Structural modification and functional development of functional factors.</p>	<p>食品生物技术专题、功能性食品学、天然活性物质分离与评价、脂质生物化学、细胞与动物实验技术</p> <p>Topics in food biotechnology、Functional food science、Isolation and evaluation of natural active substances、Lipid biochemistry、Cell and animal experimental techniques</p>



	<p>食品质量安全与控制</p>	<p>本学科方向致力于基于生物传感器的农产品安全快速检测技术研究及仪器的研发，主要研究基于微流控电化学免疫芯片、免疫传感微阵列芯片和酶生物传感器的农药残留快速、高效检测方法及基于物联网的农产品溯源体系的建立。</p> <p>The subject is dedicated to the research and development of biosafety-based agricultural product safety and rapid detection technology, and researches on rapid and efficient detection of pesticide residues based on microfluidic electrochemical immunochips, immunosensor microarray chips and enzyme biosensors. The establishment of an agricultural product traceability system based on the Internet of Things.</p>	<p>食品安全专题、水产品加工及贮藏工程专题、食品科技论文写作、食品原料安全控制技术、现代食品分析技术、食品安全风险评估、食品安全传感检测技术</p> <p>Special topics of food safety、Aquatic product processing and storage engineering、Writing of scientific and technological papers、Food raw material safety control technology、Modern food analysis technology、Food safety risk assessment、Food safety sensing and testing technology</p>
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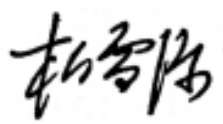
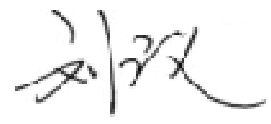
**附表 2: 培养计划 ( Training Plan )**

学科名称	食品科学与工程 School of Food Science and Engineering		学科代码	0832	
单位名称	农业工程与食品科学学院 School of Agricultural Engineering and food science		培养类型	硕士研究生 Foreign Postgraduates	
学分要求	总学分 Total Credits: 34 , 必修课程学分 Credit for Compulsive Course: 19, 选修课程学分 Credit for optional course: 9				
课程 设 置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 ≥8 学分	G16002	中国历史与文化 Chinese History and Culture	2	1	
	G16003	自然辩证法 Dialectics of Nature	1	1	
	G14001	研究生英语 English for Graduate Students	3	1	
	G14003	口语 Oral Language	1	1	
	G15001	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科平台课程 ≥11 学分	110001	数值分析 Numerical Analysis	2	1	必选 1 门
	110002	数理统计 Mathematical Statistics	2	1	
	030221	高级食品化学 Advanced Food Chemistry	2	1	
	030222	现代食品微生物学 Modern Food Microbiology	2	1	
	030224	现代食品营养学 Modern Food Nutrition	2	1	
	030030	科研方法与实验设计 Scientific Research and Experimental Design	2	1	
	030220	食品科学与工程研究进展 Research Progress in Food Science and Technology	1	1	
030226	食品科学专题 Currents Issues in Food Science	2	2		

方向选修课程 ≥8 学分	030228	农产品加工及贮藏工程专题 Currents Issues In Processing And Storage of Agriculture Products	2	2	选修 1-2 门
	030229	水产品加工及贮藏工程专题 Currents Issues in Processing And Storage of Aquatic Products	2	2	
	030230	食品生物技术专题 Currents Issues in Food Biotechnology	2	2	
	030073	食品安全专题 Currents Issues in Food Safety	2	2	
	030232	功能性食品学 Functional Food	2	2	选修 2-3 门
	030084	食物物性学 Food Physical Property	2	2	
	030029	现代食品高新技术 Modern Food Innovative and High Technology	2	2	
	030068	高级食品生物化学 Advanced Food Biochemistry	2	2	
	030231	现代食品物流学 Modern Food Logistics	2	2	
	030032	食品干燥技术 Food Drying Technology	2	2	
	030018	挤压蒸煮技术及应用 Extrusion Cooking Technology and Its Application	2	2	
	030033	天然活性物质分离与评价 Isolation and Evaluation of Natural Active Materials	2	2	
	030034	果品精深加工技术 Fruit Deep-processing Technology	2	2	
	030069	SAS 在食品工程中的应用 Application of SAS in Food Engineering	2	2	
	030008	果蔬采后生理学 Fruits Postharvest Physiology	2	2	
	030071	现代食品发酵工程 Modern Food Fermentation Engineering	2	2	
	030035	保鲜设施与设备 Facility and Equipment of Preservation	2	2	
	030072	食品酶学 Food Enzymology	2	2	



	030075	食品废料综合利用专题 Comprehensive Utilization of Food Waste	2	2	
	030082	脂质生物化学 Lipid Biochemistry	2	2	
	030074	现代食品分析技术 Modern Food Analysis Technology	2	2	
	030070	食品科技论文写作 Academic Writing for Food Science	2	2	
	030233	食品原料安全控制技术 Control Technology of Food Raw Materials Safety	2	2	
	030234	细胞与动物实验技术 Cell and Animal Experimental Technology	2	2	
	030235	食品安全风险评估 Risk Assessment of Food Safety	2	2	
	030236	食品安全传感检测技术 Detecting Technology of Food Safety Sensor	2	2	
素养选修课程 ≥1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	任选 1 门
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	G13043	中国古代韵文阅读与欣赏 Reading and Appreciation of Chinese Ancient Verse	1	2	
补修课程 不计学分					导师 确定
其他培养环节（6 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出选题文献综述，由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。</p> <p>Under the guidance of the tutor, graduate students identify the research topics and compose a review on their selected topics by consulting the literature, collecting data and doing academic research. An evaluation panel consisting of more than 5 experts in the discipline will evaluate and put forward evaluation and modification suggestions on their proposal. Those who fail to pass the proposal can re-do it within limit time, and those who still fail to pass the proposal will be terminated.</p>				3

中期考核 (1 学分)	<p>中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。</p> <p>The mid-term assessment is a necessary step to check the progress of graduate degree thesis, help students grasp the direction of the thesis, and improve the quality of the thesis.</p>	4-5	
实习实践 (2 学分)	<p>教学实践：教学实践可采取多种方式进行，如本科课程教学、辅导工作或指导生产实习、课程设计及毕业设计等工作。教学实践时间累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。</p> <p>Teaching practice</p> <p>Teaching practice can be carried out in a variety of ways, such as giving courses to undergraduate students, tutoring, guiding production, course design and graduation design. The accumulated time of teaching practice is no less than one month's work load. After the end of the teaching practice, the tutor will give the assessment comments, and once the assessment is passed, 1 credit will be obtained.</p> <p>专业实践：应安排至少 1 个月的时间（一般可以利用寒、暑假）到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作或实验室等工作。完成专业实践环节且经考核通过后，即获得 1 学分。</p> <p>Professional practice</p> <p>Arrange at least one month (normally in winter or summer vacation) for practical training in production or design research institutions, or participate in scientific research or undertake laboratory work related with their research direction. 1 credit will be awarded after passing the assessment of the tutor.</p>	2-5	
创新创业 (2 学分)	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</li> <li>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</li> </ol> <p>每项记 1 学分，需完成 2 学分。</p> <ol style="list-style-type: none"> <li>1. Attend academic conferences and read papers at the conference, or make public academic reports twice.</li> <li>2. Participate in high-level science and technology competition, creative design, innovation and entrepreneurship competition and win some awards.</li> <li>3. Participate in academic reports related to the discipline for more than 6 times and submit the summaries on the reports.</li> </ol>	1-5	
培养单位 教授委员会主任		培养单位 负责人	



## 电气工程学科

电气工程学科自 1977 年招收本科生，2003 年招收硕士研究生，2013 年起依托农业工程博士点培养农业电气化方向博士研究生，2018 年获电气工程一级学科博士学位授予权。

现有教学科研人员 51 人，其中具有教授职称 13 人，具有博士学位 37 人，具有博士生导师资格的导师 12 人；有国家突出贡献专家 1 人，国家百千万人才工程一、二层次人选 1 人，国家千人计划专家 1 人，山东省突出贡献专家 3 人，中科院百人计划专家 1 人，泰山产业领军人才 2 人，山东省教学名师 1 人。

近五年，学院承担 863 计划重大专项 2 项、国家重点研发计划课题 4 项，以及国家自然科学基金、国家电网重大科技项目、山东省重大科技工程等纵横向科技项目 100 余项；发表学术论文 322 篇，其中 SCI、EI 收录 130 余篇，出版著作 7 部。获国家技术发明二等奖 2 项、山东省科技进步一等奖 1 项、教育部科技进步二等奖 1 项以及其他省部级科技奖励 10 余项。建有省级（示范）工程研究中心 2 个、省工程实验室 1 个、省级协同创新中心 1 个、校级研究院 1 个、省级研究生联合培养基地 2 个、校级联合培养基地 11 个。

本学科在电力系统故障监测、配电自动化、特种电机及其控制、电气信息测量等方面形成了鲜明特色和突出优势。学科将进一步凝练特色，强化优势，不断提升科研水平，提高人才培养质量，争取“十三五”末进入山东省一流学科建设行列。

College of electrical and electronic engineering can recruit the bachelor students and master students in the electrical engineering discipline from 1977 and 2003, respectively. From 2013, it can recruit the doctorate students majoring in agricultural electrification from the agricultural engineering PhD-awarding branch. From 2018, it can recruit the doctorate students from PhD-awarding branch where electrical engineering is the first-level discipline.

There are 51 teaching and scientific researchers, concluding 13 professors, 37 doctors, 12 doctoral supervisors, 1 expert with the national outstanding contribution, 1 talented person selected in the first and second level of the National Millions of Talents Project, 1 expert selected in the National Thousand-Person Plan, 3 experts with the Shandong Province outstanding contribution, 1 expert selected in the Hundred Talents Program of Chinese Academy of Sciences, 2 experts selected as the leading talents in Taishan industry.

In the past five years, this college has undertaken 2 major projects of the 863 program, 4 subjects of national key research and development program, and more than 100 items of vertical

and horizontal technology projects which includes national natural science foundation, major science and technology projects from the state grid, and major science and technology projects from Shandong Province. This college has published 322 academic papers, in which more than 130 papers were recorded by the SCI and EI journals. It has also published 7 books. It has received the second-prize for national technology inventions twice, first-prize for Shandong Province science and technology progress once, second-prize for science and technology progress for ministry of education once, and more than ten prizes for science and technology in the provincial level. There are 2 provincial (demonstration) engineering research centers, 1 provincial engineering laboratory, 1 provincial collaborative innovation center, 1 school-level research institute, 2 provincial joint-cultivating bases for the graduate students, and 11 school-level joint-cultivating bases in the college.

This discipline has the distinctive characteristics and outstanding advantages in the aspects of fault monitoring of power system, automation of distribution power system, special motor and its control, and measurement of electrical information. To enter the ranks of first-level discipline construction in Shandong Province at the end of the thirteenth five-year, the characteristics will be further condensed, the advantages will be further strengthened, the research level will be enhanced and the talent cultivating quality will be improved.



## 学术学位博士研究生培养方案

学科代码：0808

### Training Scheme for Doctoral Degree

Credit Code: 0808

#### 一、培养目标 ( Educational Objectives )

立足国家和区域能源发展战略，面向电气工程领域科技前沿，培养德、智、体、美全面发展的高层次创新专门技术人才。

1. 掌握本学科坚实宽广的基础理论、系统深入的专门知识；熟悉本学科的发展方向及国际学术研究前沿，具有独立从事科学研究工作的能力，在所从事的研究方向上做出创造性成果。至少掌握一门外国语，能运用该门外国语熟练地阅读本专业的外文资料，并具有一定的写作能力和国际交流能力。

2. 具有健康的身心，良好的人文素养、职业道德、敬业精神、创新意识和国际视野。

3. 能够从事电气工程领域以及信息、能源等交叉领域里的科学研究、高等院校的教学工作及大型企业的技术管理工作。

The students are expected to be the high-level innovative and specialized technicians with a comprehensive development of virtue, intelligence, body and beauty, in the leading edge of the electrical engineering area on the basis of national and regional energy development strategy.

1. Students should have a comprehensive grasp of basic theories and systematic specialized knowledge in the discipline concerned. They should be familiar with the development direction of this discipline and the frontier of international academic research, have the ability to independently engage in scientific research, and make creative achievements in the research direction. They should master at least a foreign language, be able to use the foreign language to read the foreign language materials of the major, and have certain writing ability and international communication ability.

2. Students should have a healthy body and mind, good humanism, professional ethics, professionalism, innovation and international vision.

3. Students should be able to work in the field of electrical engineering and scientific research in the intersection of information and energy, teaching in higher education institutions, and technical management in large enterprises.



## 二、研究方向 ( Research Orientation )

电气工程培养方案按一级学科设置，设以下 4 个研究方向：

1. 智能配电网保护与自动化
2. 电力电子与分布式电源并网技术
3. 特种电机及其控制技术（跨学科交叉方向）
4. 电气测量技术

详见附表 1。

Cultivating plan of electrical engineering is formulated as the first-level discipline, there are the following four research directions:

1. Protection and automation of intelligent distribution network.
2. Power electronics and grid-connection technology of distributed power supply.
3. Special motor and its control ( cross-disciplinary direction ) .
4. Measurement technology of electrical information.

The detail information is shown in Table 1 in the appendix.

## 三、学习年限 ( Length of Schooling )

学制 4 年，学习年限 3-6 年，科学研究和论文撰写时间不少于 2 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The general duration of 4 years is suggested, and the length of study time should be longer than 3 years and shorter than 6 years. Time length for scientific research and essay writing should be at least 2 years, and the first day is the day the subject is approved.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成必修课 6 学分和选修课 4 学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 3 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The courses can be divided into the necessary courses and optional courses. Students should complete the study task of 6 credits of the necessary courses and 4 credits of the optional courses in ascertain time-length. The graduate students from a cross-disciplinary research direction should study at least 3 courses according to their supervisors' suggestion, and can participate in the discussion for the dissertation proposal only when they qualify the examination. The score will not be recorded in the report card.

Detail information of the curriculum is shown in Table 2 in the appendix.



## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订研究生培养计划，组织开题、中期、答辩，指导科学研究和学位论文等工作，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

(1) 博士学位论文开题报告是开展学位论文工作的基础，一般应于第三学期完成，最迟应于第四学期末完成。

(2) 博士研究生需在导师指导下，查阅文献资料，经过充分调研与论证，确定具体课题，独立地做出开题报告。博士论文开题报告应包括选题的科学依据、国内外发展动态、主要研究内容、研究方案、课题所需条件、预期成果及创新点等。

(3) 论文开题报告经导师审阅后，由本学科或相关学科 5 人以上的博导、教授组成开题报告评审小组，对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。

(4) 专家组根据博士生论文选题的合理性、可行性、创新性、博士生对课题的理解程度和专业基础知识、博士生的工作能力等方面对学生做出“合格”或“不合格”的明确评定。

(5) 对通过的开题报告，博士生应根据评审小组的意见进行修改。未通过者必须在三个月内再次进行开题报告。第二次学位论文开题报告仍未通过者，将终止培养。因出国、外出合作研究或其他原因确实不能参加的博士生，经导师同意后，向学院提出申请，并商定开题报告时间。无故不参加的，视为开题报告不合格。

### 2. 中期筛选

(1) 博士研究生的中期考核在其开题以后 6 个月以上进行。

(2) 中期考核内容主要包括博士研究生的政治思想和道德品质、综合知识的掌握程度、博士论文研究工作的进展等。

(3) 学院组织考察小组（5 人以上的博导、教授组成）对博士生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。

(4) 中期考核结果分为合格与不合格，合格者可继续进行博士论文工作，并根据专家组意见进行改进。不合格或未参加中期考核的博士生，不得进入学位论文撰写，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

### 3. 创新创业

- (1) 博士研究生进行 6 个月以上的出国访学研修（为必修学分）；
- (2) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (4) 参加 6 次以上与本学科相关的学术报告，并提交总结。

以上每项计 1 学分，需完成 3 学分。

Cultivating overseas students in doctor' s program is based on the mentor responsibility system, or a mentor-based responsibility of the instructing team. The mentor is responsible for making cultivating program, organizing dissertation proposal, mid-term assessment and dissertation defense, and for instructing in research work and in dissertation. The mentor is also responsible for guiding, demonstrating and supervising the moral and academic ethics of graduate students

### 1. Dissertation Proposal

(1) The dissertation proposal of the doctor' s program is the base of dissertation work; it is designed to be finished in the third semester and no later than the end of the fourth semester.

(2) Students shall read literature works, and select topic based on full investigation and demonstration under the guidance of their mentors, and write proposal independently. The proposal shall include scientific basis of selected topic, status and development tendency, contents of research, research methodology, premises of research and expected results and innovations, etc.

(3) After the proposal report was reviewed by the mentors, reviewing panels composed of no less than 5 doctoral supervisors or professors in relevant disciplines shall be established. The reviewing panels evaluate the proposals strictly and make decisions. The mentor or at least one member of the instructing team shall attend the dissertation proposal.

(4) The reviewing panels shall make a clear assessment of “qualified” or “unqualified” for the doctoral students, according to the rationality, feasibility and innovation of topic selection, the level of understanding of the discipline and specialized knowledge, and the capability of making scientific research.

(5) For the overseas students in the doctor' s program who pass the assessment shall modify their proposal based on the decisions of the reviewing panels. For those who fail, a second proposal shall be made within three months. If they still fail, their doctor' s degree shall be terminated. For the students who really could not attend the proposal because of going abroad, of outing for collaborative research or of other reasons, application to the college should be made under the agreement of mentor to appoint the proposal time. Assessment of “unqualified” shall be made for those students who was absent for no reason.

### 2. Mid-term Assessment

(1) The mid-term assessment for overseas students in doctor' s program will be carried out six months or more after the approval of proposal.

(2) The content of the mid-term assessment shall include the following aspects: ideology



and moral character, mastery of comprehensive knowledge, and progress of doctoral dissertation research work, etc.

(3) The college shall establish an assessment team for the mid-term assessment. The team shall consist of five doctoral supervisors or professors at least. The assessment team shall evaluate the comprehensive ability of the students, the progress of the dissertation, and the working attitude and efforts, etc.

(4) The result of mid-term assessment is “qualified” or “unqualified”. The overseas students in the doctor’s program who pass the assessment shall be permitted to continue and to modify their doctoral dissertation work according to the advice from the assessment team.

### 3. Innovation and Entrepreneurship

(1) Overseas students in the doctor’s program study abroad for more than six months (that is compulsory);

(2) Attend academic conference and present a paper, or make open academic reports twice.

(3) Participate in national competitions of science and technology, of creative design or of innovation and entrepreneurship, and win prizes;

(4) Attend more than six academic reports in relevant disciplines, and submit summary reports.

One credit for each of the above items and three credits are required for this section.

## 六、学位论文 (Academic Dissertation)

博士学位论文是博士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予博士学位的基本依据。学位论文撰写是博士研究生培养的关键和核心，必须严格按照规范执行，本学科博士研究生的学位论文应满足以下基本要求：

1. 博士学位论文应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以博士研究生本人完成的第一手实验、观测或调查的材料为主。

Doctoral dissertation is a comprehensive summary of the scientific research work of doctoral students, an important academic document describing their research results and reflecting their research level, and a basic basis for applying for and awarding doctoral degrees. Dissertation writing is the key and core of doctoral training, which must be strictly carried out in accordance with the norms. The dissertation of doctoral students in this discipline should meet the following basic requirements:

1. Doctoral dissertation should have systematic and complete research ideas and plans, and has great theoretical significance or practical value for technology progress and the construction

of national economy. The dissertation should highlight innovation, frontier and scientificity.

2. Main work of the dissertation must be done independently by the author. The research work must adhere to the principle of experimentation. The dissertation's content must be primarily the first-hand experiment, observation or investigation materials completed by the doctoral candidate himself or herself.

## 七、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 学位要求

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节, 成绩考核合格;
3. 完成论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学博士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》、《山东理工大学博士学位授予工作实施细则》以及电气与电子工程学院学位授予有关规定。

Meet the requirements of graduation, can obtain a diploma; On the basis of obtaining the graduation certificate, if the degree awarding criteria are met, the degree certificate can be granted.

#### 1. Requirement for Graduation

(1) With good moral cultivation and academic ethics, seeking truth from facts and having the courage to innovate;

(2) Completed the courses and other training links stipulated in the training program, and completed the required credits;

(3) Complete thesis defense and pass the examination;

(4) Other requirements in accordance with the relevant regulations of the school.

#### 2. Degree Requirement

Strictly enforce 《 Provisional Measures for the Implementation of the Regulations of the People's Republic of China on Academic Degrees 》, 《 Appraisal and Examination Rules for Master's Degree dissertation of Shandong University of Technology 》, 《 Specific implementation rules of Master's Degree Granting in Shandong University of Technology 》, 《 Specific implementation rules of Doctoral Degree Granting in Shandong University of Technology 》 and relevant regulations on degree granting of the college of electrical and electronic engineering.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>培养德、智、体全面发展，能围绕所从事的研究方向，对相关科学问题和工程技术问题进行深入系统研究，胜任机械工程领域内的教学、科研以及管理工作的高层次专门人才。</p> <p>To cultivate high-level professional talents with comprehensive moral, intellectual and physical development, who can conduct in-depth and systematic research on relevant scientific problems and engineering technical questions based on the research orientation that they are engaged in, and those persons who are competent for teaching, scientific research and management in the field of mechanical engineering</p>	<p>中国文化、汉语、科研素养与创新能力、科技英语写作，科学道德与学术规范</p> <p>Chinese culture、Chinese language、scientific literacy and innovation ability、scientific English writing, scientific ethics and academic norms</p>
综合能力	<p>掌握坚实宽广的基础理论和系统深入的专门知识，了解学科的发展方向及国内外研究前沿，并熟练掌握一门外语；具有国际学术视野和学术原创精神，能够独立地、创造性地从事科学研究工作，具有主持较大型科研、技术开发及工程项目的能力，或解决和探索我国经济和社会发展问题的能力，能够胜任高等院校、科研院所等的教学、科研或技术管理等工作。</p> <p>Master firm and comprehensive basic theories and profound and systematic specialized knowledge, Understand the direction of discipline development and research frontiers at home and abroad, and master a foreign language proficiently; Possess international academic vision and academic originality, be able to conduct scientific research independently and creatively, Have the ability to host large-scale scientific researches, technological developments and engineering projects, or have the ability to solve and explore the problems of economic and social development in our country. Be competent for teaching, scientific research or technical management of the universities and research institutes, etc.</p>	<p>第一外国语、电气工程学科前沿、口语</p> <p>First Foreign Language, Frontier of Electrical Engineering, Oral language</p>
研究方向	<p>智能配电网保护与自动化</p> <p>配电网故障分析理论；配电网故障保护方法与技术；智能配电网自动化理论与技术；配电网通信与信息技术；配电网电压无功控制理论与方法；智能配电网分布式控制技术；变压器安全经济运行与智能控制技术。</p>	<p>电力系统故障分析、现代输变电技术、电力系统动态建模与计算、电力系统前沿专题、智能配电网专题</p>

	<p>Fault analysis theory of distribution network, method and technology of fault protection in distribution network, theory and technology of automation in intelligent distribution network; technology of communication and information in distribution network, theory and method of voltage reactive power control in distribution network, technology of distributed control in intelligent distribution network, safety economy operation and intelligent control technology of transformer.</p>	<p>Fault Analysis of Power System, Modern Electricity Transmission and Distribution Technology, Dynamic Modeling and Calculation of Power System, Topics on Power System Frontier, Topics on Intelligent Distribution Network</p>
<p>电力电子与分布式电源并网技术</p>	<p>新型功率变换理论与技术；多逆变器并联运行协调控制策略；分布式发电并网及运行控制技术；微电网运行控制技术；综合能源系统分析与运行；高密度分布式电源接入的智能配电网多能协调控制技术。</p> <p>Theory and technology of new power transform, coordinated control strategy for parallel operation of multiple inverters, technology of power generation and operation control in distributed power, technology of microgrid operation control, analysis and operation of integrated energy systems, technology of multi-energy coordinated control of intelligent distribution network with high density distributed power access.</p>	<p>新型功率变换技术、电力电子系统建模与控制、微电网技术、现代电力电子技术专题、智能配电网专题</p> <p>New Power Conversion Technology、Modeling and Control of Power Electronics System, Microgrid Technology, Topics on Modern Power Electronics Technology, Topics on Intelligent Distribution Network</p>
<p>特种电机及其控制技术</p>	<p>电机的电磁计算与建模；特种电机设计方法及驱动控制技术；混合励磁发电系统的电磁耦合稳压控制技术；电机负载特性匹配和系统节能控制技术；机器人伺服驱动控制技术。</p> <p>Electromagnetic calculation and modeling of motor, design method and driving control technology of special motor, electromagnetic coupling based voltage stabilizing control technology of hybrid excitation power generation system, matching of motor load characteristics and energy saving control technology, robot servo drive control technology.</p>	<p>交流电机动态分析与控制、特种电机设计与控制、电磁场数值计算方法、电气控制前沿专题、新型功率变换技术</p> <p>Dynamic Analysis and Control of AC Motor, Design and Control of Special Motor, Numerical Calculation Method of Electromagnetic Field</p>
<p>电气测量技术</p>	<p>基于光、机、电结合的电气材料精密测量和电气设备参数在线监测技术；基于光模拟信号传输的电子式互感器技术；微弱信号检测和动态光散射纳米颗粒测量技术；结构光三维测量技术。</p> <p>Precision measurement of electrical materials and on-line monitoring of electrical equipment parameters based on the combination of optics, machinery and electricity; electronic transformer technology based on optical analog signal transmission; technology of weak signal detection and dynamic light scattering nanoparticle measurement; 3D measurement technology of structured light.</p>	<p>现代信号处理、现代传感技术、现代电气信息检测技术专题、高电压与绝缘前沿技术专题</p> <p>Modern Signal Processing, Modern Sensor Technology, Topics on Detection Technology of Modern Electrical Information, Topics on Frontier Technology of High Voltage and Insulation</p>





附表 2: 培养计划 (Training Plan)

学科名称	电气工程 Electronic Engineering		学科代码	0808		
单位名称	电气与电子工程学院 College of Electrical and Electronic Engineering		培养类型	学术型博士研究生 Academic Ph.D. Postgraduates		
学分要求	总学分 Total Credits: $\geq 15$ , 必修课程学分 Credit for Compulsive Course: $\geq \geq$ , 选修课程学分 Credit for optional course: $\geq 4$					
课程设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 $\geq 4$ 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
学科平台课程 $\geq 4$ 学分	B11004	应用泛函分析 Applied Functional Analysis	2	1	必选	
	B04015	电气工程学科前沿课 Frontier Course of Electrical Engineering	1	1	选修 4 学分	
	B04019	配电网继电保护与自动化 Relay Protection and Automation of the Distribution Network (Characteristic Advantage Course)	2	1		
方向选修课程 $\geq 2$ 学分	B04010	电机控制专题 Topics on the Frontier of Motor Control	1	1		
	B04012	电力电子系统建模与控制 Modeling and Control of Power Electronics System	2	1		
	B04013	电力系统动态计算与建模 Dynamic Computing and Modeling of Power System	2	1		
	B04014	电力系统故障分析 Power System Faults Analysis	2	1		
	B04017	高电压与绝缘技术专题 Topics on Frontier Technology of High Voltage and Insulation	1	1		
	B04018	交流电机动态分析与控制 Dynamic Analysis and Control of AC Motor	2	1		
	B04020	微电网技术 Microgrid Technology	2	1		
B04021	现代电力电子技术专题 Topics on Modern Power Electronics Technology	1	1			



	B04022	现代电气信息检测技术专题 Topics on Detection Technology of Modern Electrical Information	1	1	
	B04023	现代输变电技术 Modern Electricity Transmission and Distribution Technology	2	1	
	B04024	现代优化计算方法 Modern Optimization Calculation Method	2	1	
	B04025	智能配电网专题 Topics on Intelligent Distribution Network	1	1	
	B04002	最优控制及算法 Optimal Control and Algorithm	2	1	
	B04027	电力系统前沿专题 Topics on Power System Frontier	1	1	
	B04028	电介质材料的破坏机理 Failure mechanism of dielectric materials	1	1	
	B04029	电气材料分析高级实验 Advanced test of electrical material analysis	1	1	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G15001	东方哲学与现代化 Oriental philosophy and Modernization	1	2	
	G13043	中国古代韵文阅读与欣赏 Reading and Appreciation of Ancient Chinese Rhymes	1	2	
补修课程 不计学分	040029	现代电力系统分析 Modern Power System Analysis			导师 确定
	040028	现代电力电子技术 Modern Power Electronic Technology			
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>博士学位论文开题报告是开展学位论文工作的基础，一般应于第三学期完成，最迟应于第四学期末完成。博士论文开题采取正规答辩的方式进行，并提交书面开题报告。论文开题报告经导师审阅后，由本学科或相关学科 5 人以上的博导、教授组成开题报告评审小组，对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。对通过的开题报告，博士生应根据评审小组的意见进行修改。未通过者必须在三个月内再次进行开题报告。第二次学位论文开题报告仍未通过者，将终止培养。因出国、外出合作研究或其他原因确实不能参加的博士生，经导师同意后，向学院提出申请，并商定开题报告时间。无故</p>				3



	<p>不参加，视为开题报告不合格。</p> <p>The opening report of the doctoral dissertation is the basis for the work of the dissertation. It should be completed in the third semester and should be completed by the end of the fourth semester at the latest. The doctoral dissertation is started in the form of a regular defense and a written opening report is submitted. After the essay opening report is reviewed by the tutor, a group of five or more mentors and professors from this discipline or related disciplines shall form an opening report review team to evaluate and revise the opening report made by the students. The student tutor or at least one member of the tutor group must attend the student's presentation. For the approved opening report, the doctoral student shall revise it according to the opinions of the evaluation team. Those who fail to pass must conduct another opening report within three months. If the opening report of the second dissertation is still not passed, the training will be terminated. Doctoral students who are indeed unable to participate due to going abroad, going out for cooperative research, or other reasons, apply to the college with the consent of the tutor and agree on the time for the report. Those who do not participate for no reason are regarded as unqualified in the opening report.</p>		
<p>中期考核 (1 学分)</p>	<p>博士研究生的中期考核在其开题以后 6 个月以上。中期考核内容主要包括博士研究生的政治思想和道德品质、综合知识的掌握程度、博士论文研究工作的进展等。学院组织考察小组（5 人以上的博导、教授组成）对博士生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。</p> <p>中期考核结果分为合格与不合格</p> <p>The mid-term assessment for overseas students in doctor's program will be carried out six months or more after the approval of proposal.</p> <p>The content of the mid-term assessment shall include the following aspects: ideology and moral character, mastery of comprehensive knowledge, and progress of doctoral dissertation research work, etc.</p> <p>The school shall establish an assessment team for the mid-term assessment. The team shall consist of five doctoral supervisors or professors at least. The assessment team shall evaluate the comprehensive ability of the students, the progress of the dissertation, and the working attitude and efforts, etc.</p> <p>The result of mid-term assessment is "qualified" or "unqualified".</p>	<p>5</p>	
<p>创新创业 (1 学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>2. 参加高水平科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>3. 参加 6 次以上与本学科相关的学术报告，并提交总结。</p> <p>每项记 1 学分，需完成 1 学分。</p> <p>1. Attend academic conference and present a paper, or make open academic reports twice;</p> <p>2. Participate in national competitions of science and technology, of creative design or of innovation and entrepreneurship, and win prizes;</p> <p>3. Attend more than six academic reports in relevant disciplines, and submit summary reports.</p> <p>One credit for each of the above items and one credit are required for this section.</p>	<p>2-7</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	

## 学术学位硕士研究生培养方案

学科代码：0808

### Academic Master Program—in—Electrical—Engineering

Credit Code: 0808

#### 一、培养目标 ( Educational Objectives )

立足国家和区域能源发展战略，面向电气工程领域科技前沿，培养德、智、体、美全面发展，具备高水平综合素质的电气工程领域的高层次创新专门技术人才。

1. 掌握本学科坚实的基础理论、系统的专门知识；熟悉本学科的发展方向及国际学术研究前沿，具有独立从事科学研究工作的能力，在所从事的研究方向上做出创造性成果。至少掌握一门外国语，能运用该门外国语熟练地阅读本专业的外文资料，并具有一定的写作能力和国际交流能力。

2. 具有健康的体魄、良好的人文素养、科技道德、敬业创新精神和国际视野。

3. 能够从事电气工程以及信息、能源、材料等交叉领域里的科学研究、高等院校的教学工作及大型企业的技术管理工作。

The students are expected to be the high-level innovative and specialized technicians with a comprehensive development of virtue, intelligence, body and beauty, in the leading edge of the electrical engineering area on the basis of national and regional energy development strategy.

1. Students should have a comprehensive grasp of basic theories and systematic specialized knowledge in the discipline concerned. They should be familiar with the development direction of this discipline and the frontier of international academic research, have the ability to independently engage in scientific research, and make creative achievements in the research direction. They should master at least a foreign language, be able to use the foreign language to read the foreign language materials of the major, and have certain writing ability and international communication ability.

2. Students should have a healthy body and mind, good humanism, professional ethics, professionalism, innovation and international vision.

3. Students should be able to work in the field of electrical engineering and scientific research in the intersection of information and energy, teaching in higher education institutions, and technical management in large enterprises.



## 二、研究方向 ( Research Orientation )

电气工程培养方案按一级学科设置，设以下 4 个研究方向：

1. 智能配电网保护与自动化
2. 电力电子与分布式电源并网技术
3. 特种电机及其控制技术（交叉方向）
4. 电气测量技术

详见附表 1。

Cultivating plan of electrical engineering is formulated as the first-level discipline, there are the following four research directions, and their introduction is shown in Table 1 in the appendix.

1. Protection and automation of intelligent distribution network.
2. Power electronics and grid-connection technology of distributed power supply.
3. Special motor and its control ( cross-disciplinary direction ) .
4. Measurement technology of electrical information.

The detail information is shown in Table 1 in the appendix.

## 三、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The general duration of 3 years is suggested, and the length of study time should be longer than 2 years and shorter than 4 years. Time length for scientific research and essay writing should be at least 1 year, and the first day is the day the subject is approved. Students can apply for early graduation with the approve of their supervisors, but the requirement of time length for scientific research and essay writing will not change. The time of suspension of school will not counted as the length of study time.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 19 必修学分和 9 选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The courses can be divided into the necessary courses and optional courses. Students should complete the study task of 19 credits of the necessary courses and 9 credits of the optional courses in a certain time-length. The graduate students from a cross-disciplinary

research direction should study at least 2 courses according to their supervisors' suggestion, and can participate in the discussion for the dissertation proposal only when they qualify the examination. The score will not be recorded in the report card.

Detail information of the curriculum is shown in Table 2 in the appendix.

## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制,鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划,且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

硕士学位论文开题报告是开展学位论文工作的基础,一般应于第三学期完成,最迟应于第四学期末完成。

研究生需在导师指导下,查阅文献资料,经过充分调研与论证,确定具体课题,独立地做出开题报告。论文开题报告应包括选题的科学依据、国内外发展动态、主要研究内容、研究方案、课题所需条件、预期成果及创新点等。

论文开题采取正规答辩的方式进行,并提交书面开题报告。论文开题报告经导师审阅后,由本学科或相关学科 5 人以上的导师组成开题报告评审小组,对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。

专家组根据论文选题的合理性、可行性、创新性、对课题的理解程度和专业基础知识、工作能力等方面对学生做出“合格”或“不合格”的明确评定。

对通过的开题报告,研究生应根据评审小组的意见进行修改。未通过者必须在三个月内再次进行开题报告。第二次学位论文开题报告仍未通过者,将终止培养。因出国、外出合作研究或其他原因确实不能参加的研究生,经导师同意后,向学院提出申请,并商定开题报告时间。无故不参加的,视为开题报告不合格。

### 2. 中期筛选

研究生的中期考核在其开题以后 6 个月以上。

中期考核内容主要包括研究生的政治思想和道德品质、综合知识的掌握程度、论文研究工作的进展等。

学院组织考察小组(5 人以上的导师组成)对研究生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。

中期考核结果分为合格与不合格,合格者可继续进行论文工作,并根据专家组意见



进行改进。不合格或未参加中期考核的研究生，不得进入学位论文撰写，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

### 3. 实习实践

教学实践：参与本科课程教学，或协助指导毕业设计、课程设计和实习等；累计不少于1个月的工作量，结束后由导师写出考核评语，考核通过即可获得1学分。

专业实践：专业实践内容包括到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作或实验室等工作。专业实践时间累计不少于1个月的时间（一般可以利用寒、暑假），结束后由导师考核，合格即可获得1学分。

### 4. 创新创业

达到以下条件之一，即获得创新创业1学分：

研究生进行3个月出国学习或学术交流；

参加学术会议并宣读论文，或做公开学术报告2次；

参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；

参加6次以上与本学科相关的学术报告，并提交总结。

本环节需至少完成2学分。

Cultivating overseas students in academic master's program is based on the mentor responsibility system, or a mentor-based responsibility of the instructing team. The mentor is responsible for making cultivating program and for guiding, demonstrating and supervising the moral and academic ethics of graduate students.

#### 1. Dissertation Proposal

(1) The dissertation proposal of the academic master's program is the base of dissertation work; it is designed to be finished in the third semester and no later than the end of the fourth semester.

(2) Students shall read literature works, and select topic based on full investigation and demonstration under the guidance of their mentors, and write proposal independently. The proposal shall include scientific basis of selected topic, status and development tendency, contents of research, research methodology, premises of research and expected results and innovations, etc.

(3) Dissertation proposal shall adopt the form of defense, before which a written proposal report should be submitted. After the proposal report was reviewed by the mentors, reviewing panels composed of no less than 5 doctoral supervisors or professors in relevant disciplines shall be established. The reviewing panels evaluate the proposals strictly and make decisions. The mentor or at least one member of the instructing team shall attend the dissertation proposal.

(4) The reviewing panels shall make a clear assessment of "qualified" or "unqualified" for the overseas students in the master's program, according to the rationality, feasibility and

innovation of topic selection, the level of understanding of the discipline and specialized knowledge, and the capability of making scientific research.

(5) For the overseas students in the master's program who pass the assessment shall modify their proposal based on the decisions of the reviewing panels. For those who fail, a second proposal shall be made within three months. If they still fail, their master's degree shall be terminated. For the students who really could not attend the proposal because of going abroad, of outing for collaborative research or of other reasons, application to the college should be made under the agreement of mentor to appoint the proposal time. Assessment of "unqualified" shall be made for those students who was absent for no reason.

## 2. Mid-term Assessment

(1) The mid-term assessment for overseas students in academic master's program will be carried out six months or more after the approval of proposal.

(2) The content of the mid-term assessment shall include the following aspects: ideology and moral character, mastery of comprehensive knowledge, and progress of dissertation research work, etc.

(3) The college shall establish an assessment team for the mid-term assessment. The team shall consist of five supervisors at least. The assessment team shall evaluate the comprehensive ability of the students, the progress of the dissertation, and the working attitude and efforts, etc.

(4) The result of mid-term assessment is "qualified" or "unqualified". The overseas students in academic master's program who pass the assessment shall be permitted to continue and to modify their dissertation work according to the advice from the assessment team. For those who fail the assessment or be absent from the assessment, the dissertation writing shall be terminated, and shall be recognized as undergraduates after verified by the cultivating department and graduate school and after approved by the principal's office.

## 3. Internship and Practice

**Teaching Practice:** Participate in undergraduate teaching, or assist in guiding graduation design, curriculum and practice teaching, etc. The cumulative time of teaching practice should be no less than one month. After the practice, the mentor shall give assessment comments. One credit for the pass of the assessment.

**Major Practice:** Major practice includes practical cultivating in production and design research units, or scientific research and laboratory work that combines research field, etc. The cumulative time for major practice should be no less than one month (Practice during winter or summer vacation is suggested). After the practice, the mentor shall give assessment comments. One credit for the pass of the assessment.

## 4. Innovation and Entrepreneurship

One credit for each of the following items:

(1) Overseas students in the master's program participate in study or academic exchange abroad for more than three months;

(2) Attend academic conference and present a paper, or make open academic reports



twice.

(3) Participate in national competitions of science and technology, of creative design or of innovation and entrepreneurship, and win prizes;

(4) Attend more than six academic reports in relevant disciplines, and submit summary reports.

Two credits are required for this section.

## 六、学位论文 (Academic Dissertation)

硕士学位论文是硕士研究生科学研究工作的全面总结,是描述其研究成果、反映其研究水平的重要学术文献,是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心,必须严格按照规范执行,本学科硕士研究生的学位论文应满足以下基本要求:

1. 硕士学位论文应具有系统的、完整的研究思路和计划,应对科技进步和国民经济建设具有较大的理论意义或实用价值,学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作,必须由作者独立完成。研究工作必须坚持实验性原则,论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

1. Master dissertation should have systematic and complete research ideas and plans, and has great theoretical significance or practical value for technology progress and the construction of national economy. The dissertation should highlight innovation, frontier and scientificity.

2. Main work of the dissertation must be done independently by the author. The research work must adhere to the principle of experimentation. The dissertation's content must be primarily the first-hand experiment, observation or investigation materials completed by the graduate student himself or herself.

## 七、毕业与学位要求 (Graduate and Degree Requirements)

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 学位要求

1. 具有良好的品德修养和学术道德,实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节,成绩考核合格;
3. 完成论文答辩,成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文



评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及电气与电子工程学院学位授予有关规定。

Graduate students who meet the requirements for graduation will receive a diploma. On the basis of a diploma, graduate students who meet the criteria for awarding a degree can be awarded a degree certificate.

#### 1. Graduation requirements

(1) Have good moral character cultivation and academic morality, seeking truth from facts, courage to innovate;

(2) Complete the training plan including courses and other training links, and the results are qualified;

(3) Pass the thesis defense, and the results are qualified;

(4) Meet other requirements of Shandong University of Technology.

#### 2. Degree Requirement

Strictly enforce 《Provisional Measures for the Implementation of the Regulations of the People's Republic of China on Academic Degrees 》, 《Appraisal and Examination Rules for Master's Degree dissertation of Shandong University of Technology 》, 《Specific implementation rules of Master's Degree Granting in Shandong University of Technology 》, 《Specific implementation rules of Doctoral Degree Granting in Shandong University of Technology 》 and relevant regulations on degree granting of electrical and electronic engineering college.



附表 1：研究方向简介（Brief Introduction on Research Orientation）

类别	培养目标	支撑课程
综合素质	<p>热爱祖国，拥护中国共产党的领导，具有社会责任感和历史使命感，维护国家和人民的根本利益，遵纪守法，品德良好，身心健康。</p> <p>Love the motherland, support the leadership of the Communist Party of China, have a sense of social responsibility and historical mission, safeguard the fundamental interests of the country and the people, observe discipline and abide by the law, moral good, physical and mental health.</p>	<p>中国特色社会主义理论与实践研究、自然辩证法</p> <p>Research on the Theory and Practice of Socialism with Chinese Characteristics, Dialectics of Nature</p>
综合能力	<p>掌握坚实宽广的基础理论和系统深入的专门知识，了解学科的发展方向及国内外研究前沿，并熟练掌握一门外语；具有国际学术视野和学术原创精神，能够独立地、创造性地从事科学研究工作，具有主持较大型科研、技术开发及工程项目的能力，或解决和探索我国经济和社会发展问题的能力，能够胜任高等院校、科研院所等的教学、科研或技术管理等工作。</p> <p>Master firm and comprehensive basic theories and profound and systematic specialized knowledge, Understand the direction of discipline development and research frontiers at home and abroad, and master a foreign language proficiently; Possess international academic vision and academic originality, be able to conduct scientific research independently and creatively. Have the ability to host large-scale scientific researches, technological developments and engineering projects, or have the ability to solve and explore the problems of economic and social development in our country, Be competent for teaching, scientific research or technical management of the universities and research institutes, etc.</p>	<p>研究生英语、工程数学、信息检索与论文写作、工程伦理、知识产权与学术规范</p> <p>English for Graduate Students, Engineering mathematics, Information retrieval and thesis writing, Engineering ethics, Intellectual property rights and academic norms</p>

研究 方向	智能配电网保护与自动化	<p>配电网故障分析理论；配电网故障保护方法与技术；智能配电网自动化理论与技术；配电网通信与信息技术；配电网电压无功控制理论与方法；智能配电网分布式控制技术；变压器安全经济运行与智能控制技术。</p> <p>Fault analysis theory of distribution network, method and technology of fault protection in distribution network, theory and technology of automation in intelligent distribution network; technology of communication and information in distribution network, theory and method of voltage reactive power control in distribution network, technology of distributed control in intelligent distribution network, safety economy operation and intelligent control technology of transformer.</p>	<p>电力设备状态监测与故障诊断、电力系统安全分析、电力系统信息及通信技术、电力系统自动化新技术、电能质量分析与控制、现代电力系统分析、现代电网继电保护技术</p> <p>Regulations of Conditions Based Maintenance, Power System Security Analysis, Power System Information and Communication Technology, New Technology of Power System Automation, Power Quality Analysis and Control, Analysis of Modern Power System, Modern Power Network Protective Relaying Technology</p>
	电力电子与分布式电源并网技术	<p>新型功率变换理论与技术；多逆变器并联运行协调控制策略；分布式发电并网及运行控制技术；微电网运行控制技术；综合能源系统分析与运行；高密度分布式电源接入的智能配电网多能协调控制技术。</p> <p>Theory and technology of new power transform, coordinated control strategy for parallel operation of multiple inverters, technology of power generation and operation control in distributed power, technology of microgrid operation control, analysis and operation of integrated energy systems, technology of multi-energy coordinated control of intelligent distribution network with high density distributed power access.</p>	<p>电力系统自动化新技术、电能质量分析与控制、电网络分析与综合、雷电放电及防雷技术、柔性输配电技术、现代电力电子技术、现代信号处理技术、新能源发电及其并网控制技术</p> <p>New Technology of Power System Automation、Power Quality Analysis and Control、Analysis and synthesis of electric network、Lightning Discharge and Lightning Protection Technology、Flexible Transmission and Distribution Technology、Modern Power Electronics Technology、Modern Signal Processing、New Energy Power Generation and Grid Connection Control</p>



<p>特种电机及其控制技术</p>	<p>电机的电磁计算与建模；特种电机设计方法及驱动控制技术；混合励磁发电系统的电磁耦合稳压控制技术；电机负载特性匹配和系统节能控制技术；机器人伺服驱动控制技术。</p> <p>Electromagnetic calculation and modeling of motor, design method and driving control technology of special motor, electromagnetic coupling based voltage stabilizing control technology of hybrid excitation power generation system, matching of motor load characteristics and energy saving control technology, robot servo drive control technology.</p>	<p>开关电源原理与设计、柔性输配电技术、特种电机及其控制、现代电力传动控制系统、现代电力电子技术、新能源发电及其并网控制技术</p> <p>Principle and Design of Switching Power Supply、Flexible Transmission and Distribution Technology、Non-conventional Machine and its Control、Modern Power Transmission Control System、Modern Power Electronics technology、New Energy Power Generation and Grid Connection Control</p>
<p>电气测量技术</p>	<p>基于光、机、电结合的电气材料精密测量和电气设备参数在线监测技术；基于光模拟信号传输的电子式互感器技术；微弱信号检测和动态光散射纳米颗粒测量技术；结构光三维测量技术。</p> <p>Precision measurement of electrical materials and on-line monitoring of electrical equipment parameters based on the combination of optics, machinery and electricity; electronic transformer technology based on optical analog signal transmission; technology of weak signal detection and dynamic light scattering nanoparticle measurement; 3D measurement technology of structured light.</p>	<p>现代电力电子技术、现代信号处理技术、最优化理论方法与智能算法</p> <p>Modern Power Electronics Technology、Modern Signal Processing、Theory, Computational Method and Intelligent Algorithm for Optimization</p>

附表 2: 培养计划 (Training Plan)

学科名称	电气工程 Electronic Engineering		学科代码	0808		
单位名称	电气与电子工程学院 College of Electrical and Electronic Engineering		培养类型	学术研究生 Academic Postgraduates		
学分要求	总学分 Total Credits: 32, 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq 9$ 。					
课程设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	2		
学科平台课程 $\geq 11$ 学分	G11001	数值分析 Numerical Analysis	3	1	必选	
	G11002	矩阵理论 Matrix theory	2.5	1		
	040011	电网络分析与综合 Analysis and synthesis of electric network	2	1		
	040029	现代电力系统分析 Modern Power System Analysis (全英语课程)	2	1	不低于5学分	
	040028	现代电力电子技术 Modern power electronics technology (全英语课程)	2	1		
	040043	电磁场数值计算方法 Numerical Calculation Method of Electromagnetic Field	2	1		
	040044	电磁兼容理论与技术 The theory and technology of electromagnetic compatibility	2	1		
方向选修课程 $\geq 9$ 学分	040002	MATLAB 电气工程应用 MATLAB and its Applications in Electrical Engineering	2	1	不低于9学分	
	040045	电力电子电机控制系统的建模与仿真 Modeling and simulation of power electronics and motor control system	2	2		





040005	电力设备状态监测与故障诊断 Regulations of conditions based maintenance	2	2
040006	电力系统安全分析 Power System Security Analysis	2	2
040007	电力系统信息及通信技术 Power system information and communication technology	2	2
040008	电力系统自动化新技术 New Technology for Power System Automation	2	2
040009	电能质量分析与控制 Power quality analysis and control	2	2
040046	高电压技术应用 Application of High Voltage Technology	2	2
040047	交流电机数字控制 Digital control of AC motor	2	2
040017	开关电源原理与设计 Principle and design of Switching power supply	2	2
040019	雷电放电及防雷技术 Lightning Discharge and Lightning Protection Technology	2	2
040022	柔性输配电技术 Flexible transmission and distribution technology	2	2
040024	特种电机及其控制 Non-conventional Machine and its Control	2	2
040027	现代电力传动控制系统 Modern power transmission control system	2	2
040030	现代电网继电保护技术 Modern power network protective relaying technology	2	2
040033	现代信号处理技术 Modern signal processing	2	2
040036	新能源发电及其并网控制技术 New Energy Power Generation and Grid Connection Control	2	2
040040	智能电网导论 Introduction of Smart Grid	1	2

	040042	最优化理论方法与智能算法 Theory, computational method and intelligent algorithm for optimization	2	2	
	040053	电介质物理 Dielectric Physics	1	2	
	040054	电气绝缘测试与分析技术 Electrical insulation testing and analysis technology	2	2	
素养选修课程 ≤1 学分	G17070	经济学基础 Foundations of Economics	1	2	
	G02060	科研素养与创新能力 Scientific Research Literacy and Innovation Ability	1	2	
	G31001	中国传统文化 Chinese Culture	1	2	
	G05024	计算机科学前沿技术应用系列讲座 The Lectures on the Frontier Technology and Application of the Computer Science	1	2	
	G09064	科研与人文修养 Scientific Research and Humanity Cultivation	1	2	
	G10014	实验设计与统计分析 Experimental design and statistical analysis	1	2	
	G10023	研究生科研能力训练与培养 Postgraduate Research Competence Training and Development	1	2	
	G13042	诗歌与审美艺术 Poetry and aesthetic art	1	2	
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	G04001	创新方法 Innovation Methodologies	1	2	
	G14010	科技英语写作 Scientific English Writing	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
补修课程 不计学分					导师 确定



其他培养环节（3 学分）		
培养环节	相关内容及要求	学期
开题报告 (1 学分)	<p>开题报告内容：硕士生学位论文的文献调研、研究方案和初步结果。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。学生导师或者至少一位导师组成员必须参加学生的开题报告。开题报告方式：参加开题报告的所有导师根据学生课题的创新性、学生对课题的理解程度和专业基础知识等方面对学生做出“合格”或“不合格”的明确评定</p> <p>The proposal shall include literature review, research methodology and preliminary results.</p> <p>Reviewing panels composed of no less than 5 supervisors in relevant disciplines shall be established to evaluate the proposals strictly and make decisions. The mentor or at least one member of the instructing team shall attend the dissertation proposal. Form of dissertation proposal: The reviewing panels shall make a clear assessment of “qualified” or “unqualified” for the overseas students in the master’s program, according to the innovation of topic selection, the level of understanding of the discipline and specialized knowledge.</p>	3
中期考核 (1 学分)	<p>中期考核内容：硕士论文研究工作的进展。学生导师或者至少一位导师组成员必须参加学生的开题报告，评审小组由 5 人以上专家组成。中期考核方式：学生必须先提交论文进展报告，经审查合格后才能参加中期进展报告考核。所有导师根据学生课题的创新性、学生对课题的理解程度、开展课题所需具备的专业基础知识，以及自开题报告以来的工作量和研究成果，对学生做出“合格”或“不合格”的评价。</p> <p>The content of the mid-term assessment shall include the following aspects: progress of dissertation research work.</p> <p>The mentor or at least one member of the instructing team shall attend the mid-term assessment. The team for the mid-term assessment shall consist of five supervisors at least.</p> <p>Form of the mid-term assessment: A written dissertation progress report should be submitted. Only after the report passed examination, the student could attend mid-term assessment. The assessment team shall make a clear assessment of “qualified” or “unqualified” according to the innovation of topic selection, the level of understanding of the discipline, the specialized knowledge and the work and obtained results after dissertation proposal.</p>	4-5
创新创业 (1 学分)	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；</li> <li>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</li> </ol> <p>每项记 1 学分，需完成 1 学分。</p> <ol style="list-style-type: none"> <li>1. Attend academic conference and present a paper, or make open academic reports twice;</li> <li>2. Participate in national competitions of science and technology, of creative</li> </ol>	1-5



	<p>design or of innovation and entrepreneurship, and win prizes;                  3. Attend more than six academic reports in relevant disciplines, and submit summary report;                  One credit for each of the above items, and one credit are required for this section.</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p> 



# 检测技术与自动化装置学科学术学位硕士研究生培养方案

学科代码：081102

## Academic Master Program in Detection Technology and Automatic Equipment

Credit Code: 081102

### 一、学科简介 ( Brief Introduction to Discipline )

1995 年设立本科工业自动化专业，1998 年调整为自动化专业，2006 年获得检测技术与自动化装置二级学科硕士学位权，2007 年招收硕士研究生。

现有教学科研人员 30 人，其中教授 8 人、中科院“百人计划”、博士 17 人，硕士生导师 16 人。

近五年，主持和参与国家自然科学基金 8 项，主持山东省自然科学基金 7 项、中国博士后基金 3 项，另有山东省高校科研计划项目、淄博市校城融合发展计划等纵横向课题 30 余项。科研经费总计 820 余万元，其中纵向科研经费 87 万元，专任教师年人均纵向科研经费 2.9 万元、人均主持省部级以上科研项目 1.18 项。出版专著 1 部、教材 3 部；发表学术论文 215 篇，其中 SCI、EI 检索 176 篇；授权国家发明专利 28 件；获山东理工大学科技进步奖 10 项。

近五年，招收硕士研究生 22 人，毕业 20 人。毕业生就业率 100%，其中 4 名毕业生到高等院校攻读博士学位，其余被职业学院、国家大型企业及研究机构录用。

本学科在智能信息处理、光电检测、测控理论与应用等方面形成了鲜明特色和突出优势。学科将进一步凝练特色，强化优势，不断提升科研水平，提高人才培养质量，力争 2020 年获批控制科学与工程一级硕士点。

The industrial automation discipline can recruit the bachelor students from 1995, which was adjusted to automation in 1998. In 2006, detection technology and automatic equipment is set as the second-level discipline of the master-awarding branch. From 2007, it can recruit the master students.

There are 30 teaching and scientific researchers, concluding 8 professors, 1 expert selected in the Hundred Talents Program of Chinese Academy of Sciences, 17 doctors, 16 master

supervisors.

Over the past five years, we have undertaken 8 subjects of national natural science foundation, 8 subjects of Shandong province natural science foundation, 3 subjects of China postdoctoral science foundation, and more than 30 items of vertical and horizontal technology projects which includes Shandong province higher educational science and technology program and Zibo city integration development project. The total amount of scientific research funds is more than 8200000 yuan, which includes 820000 yuan from vertical and horizontal technology projects. The per capita fund and subject of vertical technology projects are 29000 yuan and 1.18, respectively. One monograph and 3 books have been published. We have published 215 academic papers, in which 176 papers were recorded by the SCI and EI journals. We have won ten prizes of science and technology progress of Shandong University of Technology.

Over the past five years, 22 master students have been recruited and 20 students have graduated. Employment rate of the graduate is 100%, e.g., 4 students further study for a doctor's degree and other students are employed by vocational colleges, large national enterprises and research institutions.

This discipline has the distinctive characteristics and outstanding advantages in the aspects of intelligent information processing, photoelectric detection, measurement and control theory and application. To successfully apply for the first-level discipline of control science and engineering in 2020, the characteristics will be further condensed, the advantages will be further strengthened, the research level will be enhanced and the talent cultivating quality will be improved.

## 二、培养目标 ( Educational Objectives )

立足国家战略和区域经济发展, 面向自动化领域, 培养基础理论扎实、创新实践能力强, 具有良好的人文素养、职业道德和开阔的国际视野, 能够独立从事自动化领域基础理论研究、技术开发与管理的复合型高级专业人才。

1. 掌握扎实的数理基础知识, 具备良好的人文社科修养, 熟练掌握一门外语, 能查阅外文文献并具备一定的听、说和写作能力。

2. 掌握控制科学与工程学科扎实的基础理论和系统的专门知识, 培养能够综合运用控制理论、自动检测与仪表、信息处理、系统工程、计算机控制技术与应用、机电一体化等相关技术。

3. 了解自动化领域的前沿进展与动态, 具备科学研究和实践创新能力, 能够解决自动化工程领域中的实际问题。

On the basis of national and regional energy development strategy, the students are expected to be the compound senior specialized technicians who not only own solid basic theories, strong innovation and practice ability, good humanity accomplishment and professional



ethics, broad international vision, but also are able to independently engage in basic theory research, technology development and management in the field of automation.

1. Students should have a comprehensive grasp of basic mathematical theories and a good culture of humanities and social sciences. They should master at least a foreign language, be able to use the foreign language to read the foreign language materials of the major, and have certain writing ability and international communication ability.

2. Students should have a comprehensive grasp of basic theories and specialized knowledge of control science and engineering, and the capability of comprehensive application of control theory, automatic testing and instrumentation, information handling, computer control technology and application, mechatronics and other related technologies

3. Students should know the latest developments and trends in automation, the ability of scientific research and practical innovation, and deal with practical problems in the field of automation engineering.

### 三、研究方向 ( Research Orientation )

检测技术与自动化装置培养方案按二级学科设置，设以下四个研究方向：

1. 光电检测技术及仪器
2. 微弱信号检测
3. 智能化信息处理
4. 测量技术与控制装置

详见附表 1。

Cultivating plan of detection technology and automatic equipment is formulated as the second-level discipline, there are four research directions as follows, and their introductions are shown in Table 1 in the appendix.

1. Photoelectric detection technology and instrument.
2. Weak signal detection.
3. Intelligent information processing
4. Measurement technology and control device

The detail information is shown in Table 1 in the appendix.

### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The general duration of 3 years is suggested, and the length of study time should be longer than 2 years and shorter than 4 years. Time length for scientific research and essay writing

should be at least 1 year, and the first day is the day the subject is approved. Students can apply for early graduation with the approve of their supervisors, but the requirement of time length for scientific research and essay writing will not change. The time of suspension of school will not counted as the length of study time.

## 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 16 必修学分和 9 选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The courses can be divided into the necessary courses and optional courses. Students should complete the study task of 19 credits of the necessary courses and 9 credits of the optional courses in a certain time-length. The graduate students from a cross-disciplinary research direction should study at least 2 courses according to their supervisors' suggestion, and can participate in the discussion for the dissertation proposal only when they qualify the examination. The score will not be recorded in the report card.

Detail information of the curriculum is shown in Table 2 in the appendix.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

(1) 硕士学位论文开题报告是开展学位论文工作的基础，一般应于第三学期完成，最迟应于第四学期末完成。

(2) 研究生需在导师指导下，查阅文献资料，经过充分调研与论证，确定具体课题，独立地做出开题报告。论文开题报告应包括选题的科学依据、国内外发展动态、主要研究内容、研究方案、课题所需条件、预期成果及创新点等。

(3) 论文开题采取正规答辩的方式进行，并提交书面开题报告。论文开题报告经导师审阅后，由本学科或相关学科 5 人以上的导师组成开题报告评审小组，对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。

(4) 专家组根据论文选题的合理性、可行性、创新性、对课题的理解程度和专业



基础知识、工作能力等方面对学生做出“合格”或“不合格”的明确评定。

(5) 对通过的开题报告，研究生应根据评审小组的意见进行修改。未通过者必须在三个月内再次进行开题报告。第二次学位论文开题报告仍未通过者，将终止培养。因出国、外出合作研究或其他原因确实不能参加的研究生，经导师同意后，向学院提出申请，并商定开题报告时间。无故不参加的，视为开题报告不合格。

## 2. 中期筛选

(1) 研究生的中期考核在其开题以后 6 个月以上。

(2) 中期考核内容主要包括研究生的政治思想和道德品质、综合知识的掌握程度、论文研究工作的进展等。

(3) 学院组织考察小组（5 人以上的导师组成）对研究生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。

(4) 中期考核结果分为“合格”与“不合格”，合格者可继续进行论文工作，并根据专家组意见进行改进。不合格或未参加中期考核的研究生，不得进入学位论文撰写，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

## 3. 实习实践

教学实践：参与本科课程教学，或协助指导毕业设计、课程设计和实习等；累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即可获得 1 学分。

专业实践：专业实践内容包括到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作或实验室等工作。专业实践时间累计不少于 1 个月的时间（一般可以利用寒、暑假），结束后由导师考核，合格即可获得 1 学分。

## 4. 创新创业

达到以下条件之一，即获得创新创业 1 学分：

- (1) 研究生进行 3 个月出国学习或学术交流；
- (2) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (4) 参加 6 次以上与本学科相关的学术报告，并提交总结。

本环节需至少完成 2 学分。

Cultivating overseas students in academic master's program is based on the mentor responsibility system, or a mentor-based responsibility of the instructing team. The mentor is responsible for making cultivating program and for guiding, demonstrating and supervising the moral and academic ethics of graduate students.

## 1. Dissertation Proposal

(1) The dissertation proposal of the academic master's program is the base of dissertation work; it is designed to be finished in the third semester and no later than the end of the fourth semester.

(2) Students shall read literature works, and select topic based on full investigation and demonstration under the guidance of their mentors, and write proposal independently. The proposal shall include scientific basis of selected topic, status and development tendency, contents of research, research methodology, premises of research and expected results and innovations, etc.

(3) Dissertation proposal shall adopt the form of defense, before which a written proposal report should be submitted. After the proposal report was reviewed by the mentors, reviewing panels composed of no less than 5 doctoral supervisors or professors in relevant disciplines shall be established. The reviewing panels evaluate the proposals strictly and make decisions. The mentor or at least one member of the instructing team shall attend the dissertation proposal.

(4) The reviewing panels shall make a clear assessment of "qualified" or "unqualified" for the overseas students in the master's program, according to the rationality, feasibility and innovation of topic selection, the level of understanding of the discipline and specialized knowledge, and the capability of making scientific research.

(5) For the overseas students in the master's program who pass the assessment shall modify their proposal based on the decisions of the reviewing panels. For those who fail, a second proposal shall be made within three months. If they still fail, their master's degree shall be terminated. For the students who really could not attend the proposal because of going abroad, of outing for collaborative research or of other reasons, application to the college should be made under the agreement of mentor to appoint the proposal time. Assessment of "unqualified" shall be made for those students who was absent for no reason.

## 2. Mid-term Assessment

(1) The mid-term assessment for overseas students in academic master's program will be carried out six months or more after the approval of proposal.

(2) The content of the mid-term assessment shall include the following aspects: ideology and moral character, mastery of comprehensive knowledge, and progress of dissertation research work, etc.

(3) The college shall establish an assessment team for the mid-term assessment. The team shall consist of five supervisors at least. The assessment team shall evaluate the comprehensive ability of the students, the progress of the dissertation, and the working attitude and efforts, etc.

(4) The result of mid-term assessment is "qualified" or "unqualified". The overseas students in academic master's program who pass the assessment shall be permitted to continue and to modify their dissertation work according to the advice from the assessment team. For those who fail the assessment or be absent from the assessment, the dissertation writing shall be terminated, and shall be recognized as undergraduates after verified by the cultivating



department and graduate school and after approved by the principal's office.

### 3. Internship and Practice

**Teaching Practice:** Participate in undergraduate teaching, or assist in guiding graduation design, curriculum and practice teaching, etc. The cumulative time of teaching practice should be no less than one month. After the practice, the mentor shall give assessment comments. One credit for the pass of the assessment.

**Major Practice:** Major practice includes practical cultivating in production and design research units, or scientific research and laboratory work that combines research field, etc. The cumulative time for major practice should be no less than one month (Practice during winter or summer vacation is suggested). After the practice, the mentor shall give assessment comments. One credit for the pass of the assessment.

### 4. Innovation and Entrepreneurship

One credit for each of the following items:

(1) Overseas students in the master's program participate in study or academic exchange abroad for more than three months;

(2) Attend academic conference and present a paper, or make open academic reports twice.

(3) Participate in national competitions of science and technology, of creative design or of innovation and entrepreneurship, and win prizes;

(4) Attend more than six academic reports in relevant disciplines, and submit summary reports.

Two credits are required for this section.

## 七、学位论文 (Academic Dissertation)

硕士学位论文是硕士研究生科学研究工作的全面总结,是描述其研究成果、反映其研究水平的重要学术文献,是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心,必须严格按照规范执行,本学科硕士研究生的学位论文应满足以下基本要求:

1. 硕士学位论文应具有系统的、完整的研究思路和计划,应对科技进步和国民经济建设具有较大的理论意义或实用价值,学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作,必须由作者独立完成。研究工作必须坚持实验性原则,论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

1. Master dissertation should have systematic and complete research ideas and plans, and has great theoretical significance or practical value for technology progress and the construction of national economy. The dissertation should highlight innovation, frontier and scientificity.

2. Main work of the dissertation must be done independently by the author. The research work must adhere to the principle of experimentation. The dissertation's content must be



primarily the first-hand experiment, observation or investigation materials completed by the graduate student himself or herself.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 学位要求

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节, 成绩考核合格;
3. 完成论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及电气与电子工程学院学位授予有关规定。

Graduate students who meet the requirements for graduation will receive a diploma. On the basis of a diploma, graduate students who meet the criteria for awarding a degree can be awarded a degree certificate.

#### 1. Graduation requirements

(1) Have good moral character cultivation and academic morality, seeking truth from facts, courage to innovate;

(2) Complete the training plan including courses and other training links, and the results are qualified;

(3) Pass the thesis defense, and the results are qualified;

(4) Meet other requirements of Shandong University of Technology.

#### 2. Degree Requirement

Strictly enforce 《Provisional Measures for the Implementation of the Regulations of the People's Republic of China on Academic Degrees》, 《Appraisal and Examination Rules for Master's Degree dissertation of Shandong University of Technology》, 《Specific implementation rules of Master's Degree Granting in Shandong University of Technology》, 《Specific implementation rules of Doctoral Degree Granting in Shandong University of Technology》 and relevant regulations on degree granting of electrical and electronic engineering college.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>具有社会责任感和历史使命感, 维护国家和人民的根本利益, 遵纪守法, 品德良好, 身心健康。</p> <p>Have a sense of social responsibility and historical mission, safeguard the fundamental interests of the country and the people, observe discipline and abide by the law, moral good, physical and mental health.</p>	<p>中国文化、汉语</p> <p>Chinese Culture, Chinese</p>
综合能力		<p>掌握坚实宽广的基础理论和系统深入的专门知识, 了解学科的发展方向及国内外研究前沿, 并熟练掌握一门外语; 具有国际学术视野和学术原创精神, 能够独立地、创造性地从事科学研究工作, 具有主持较大型科研、技术开发及工程项目的的能力, 或解决和探索我国经济和社会发展问题的能力, 能够胜任高等院校、科研院所等的教学、科研或技术管理等工作。</p> <p>Master firm and comprehensive basic theories and profound and systematic specialized knowledge, Understand the direction of discipline development and research frontiers at home and abroad, and master a foreign language proficiently; Possess international academic vision and academic originality, be able to conduct scientific research independently and creatively. Have the ability to host large-scale scientific researches, technological developments and engineering projects, or have the ability to solve and explore the problems of economic and social development in our country, Be competent for teaching, scientific research or technical management of the universities and research institutes, etc.</p>	<p>汉语、论文写作与学术规范、矩阵理论、数值分析、应用随机过程、现代信号处理技术、现代检测理论、控制科学与工程导论</p> <p>Chinese、Thesis Writing and Academic, Matrix Theory, Numerical Analysis、Applied Stochastic Process、Modern Signal Processing Technology、Modern Detection Theory、Introduction to Control Science and Engineering</p>
研究方向	光电检测技术及仪器	<p>以光、机、电为基础, 研究信息采集、处理、存储和传输的新方法、新技术, 重点是新型干涉测试系统信号的获取、序列采样、光电信息变换、光信号的探测和判别技术、瞬态干涉图的记录方式、层析干涉测试技术、层析再现反演算法与再现技术、干涉图像的计算机处理技术以及瞬态光电检测技术及仪器的设计与应用。</p>	<p>现代信号处理技术、现代检测理论、模式识别与系统辨识、小波分析与应用、传感器技术、光散射理论及其测量技术、光电图像处理</p> <p>Modern Signal Processing Technology, Modern</p>

		Based on light, machine and electricity, focus on studying new methods and technologies for information collection, processing, storage and transmission, signal acquisition of a new type of interference test system, e.g. sequence sampling, photoelectric information transformation, optical signal detecting and identifying technology, the transient interference figure record method, chromatography interference testing technology and tomographic inversion algorithm and reproduction technology, interference image computer processing technology, and the transient photoelectric detection technology and equipment design and application.	Detection Theory, Pattern Recognition and System Identification, Wavelet Analysis and Application, Transducer Technology, Light Scattering Theory and Its Measurement Technology, Photoelectric Image Processing
	微弱信号检测	<p>研究在强背景噪声提取和恢复有用微弱信号的理论和方法，其中包括锁相放大、采样积分、相关检测、自适应降噪等应用技术。特别是采用自相关等技术研究溶液中纳米颗粒散射光波动特征，进而测量纳米颗粒的粒径及其分布，以及相应的颗粒粒径分布反演算法研究等。</p> <p>The theory and method of extracting and recovering useful weak signal from strong background noise, including phase-locked amplification, sampling integral, correlation detection, adaptive noise reduction and other applied technologies. In particular, the scattering light wave characteristics of nanoparticles in solution by using autocorrelation technology, the particle size and distribution of nanoparticles, and the corresponding particle size distribution inversion algorithm.</p>	现代信号处理技术、现代检测理论、模式识别与系统辨识、小波分析与应用、传感器技术、光散射理论及其测量技术、光电图像处理 Modern Signal Processing Technology、Modern Detection Theory、Pattern Recognition and System Identification, Wavelet Analysis and Application、Transducer Technology、Light Scattering Theory and Its Measurement Technology、Photoelectric Image Processing
	智能化信息处理	<p>研究包括人工智能及其应用技术，重点研究模式识别、图像处理、机器学习、计算机视觉、人工神经网络、可视化计算、建模与仿真技术、虚拟现实技术、增强现实技术、虚拟仪器技术、自然语言处理、数据挖掘、智能感知、智能辅助决策、智能系统等。</p> <p>Artificial intelligence and its application technology, and more focuses on pattern recognition, image processing, machine learning, computer vision, artificial neural network, visual calculation, modeling and simulation technology, virtual reality technology, augmented reality technology, virtual instrument technology, natural language processing, data mining, intellisense, intelligent aided decision-making, intelligent system, etc.</p>	现代信号处理技术、现代检测理论、模式识别与系统辨识、小波分析与应用、传感器技术、光散射理论及其测量技术、光电图像处理、VC语言及其应用、机器学习基础 Modern Signal Processing Technology、Modern Detection Theory、Pattern Recognition and System Identification、Wavelet Analysis and Application、Transducer Technology、Light Scattering Theory and Its Measurement



			Technology、Photoelectric Image Processing、VC language and its application、 Foundations of Machine Learning
	测量技术与控制装置	<p>以自动控制理论、系统仿真技术、自动检测技术等知识为基础，以微型计算机和嵌入式控制器为主要控制手段，研究探索自动化测量控制领域的新理论、新技术、新方法，仪器仪表的传感、数据采集、处理、传输和控制等功能的自动控制装置。</p> <p>Based on the theory of automatic control and system simulation technology, automatic detection technology knowledge, and by using microcomputer and embedded controller as the main control means, to explore new theories, new technologies, new methods in the field of automation measurement control, instruments and meters of sensing, automatic control device having the function of data acquisition, processing, transmission and control functions.</p>	<p>非线性系统控制、线性系统理论、微弱信号检测、激光测量技术、最优化理论方法与智能算法、人工智能、机器人学、嵌入式系统原理与应用、DSP 原理与应用</p> <p>Nonlinear System Control, Linear System Theory、Detection of Weak Signals、Laser Measurement Technology、 Theory, Computational Method and Intelligent Algorithm for Optimization、Artificial Intelligence、Robotics、Principle and Application of Embedded Systems、 Digital signal Processor: principle and application,</p>

附表 2: 培养计划 (Training Plan)


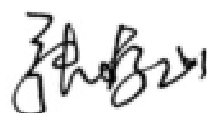
学科名称	检测技术与自动化装置 detection technology and automatic equipment		学科代码	081102		
单位名称	电气与电子工程学院 College of Electrical and Electronic Engineering		培养类型	学术学位留学生 Academic Postgraduates		
学分要求	总学分 Total Credits: 32, 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq 9$ 。					
课程 设 置						
课程类型	课程编码	课程名称	学 分	学 期	备注	
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	2		
学科平台课程 $\geq 11$ 学分	G11002	矩阵理论 Matrix theory	2.5	1	必选	
	G11001	数值分析 Numerical Analysis	3	1		
	040033	现代信号处理技术 Modern Signal Processing Technology	2	2		
	040038	应用随机过程 Applied Stochastic Process	2	1	不低 于 4 学分	
	040031	现代检测理论 Modern Detection Theory	2	1		
	040018	控制科学与工程导论 (前沿课) Introduction to Control Science and Engineering	2	1		
方向选修课程 $\geq 9$ 学分	040002	MATLAB 电气工程应用 MATLAB Application in Electrical Engineering	2	1	不低 于 9 学分	
	040048	非线性系统控制 Nonlinear System Control	2	1		
	040049	光电图像处理 Photoelectric Image Processing	2	1		
	040013	光散射理论及其测量技术 Light Scattering Theory and Its Measurement Technology	2	1		



040014	机器人学 Robotics	2	1
040050	机器学习基础 Foundations of Machine Learning	2	1
040051	人工智能（全英语课程） Artificial Intelligence	2	1
040034	线性系统理论（全英语课程） Linear System Theory	2	1
040037	应用泛函分析 Applied Functional Analysis	2	1
040001	DSP 原理与应用 Digital signal Processor : principle and application	2	2
040003	VC 语言及其应用 VC language and its application	2	2
110010	不适定问题的数值解法 Numerical Solution of Ill-posed Problems	2	2
040004	传感器技术 Transducer Technology	2	2
040015	激光测量技术 Laser Measurement Technology	2	2
040016	计算机控制技术 Computer Control Technology	2	2
040047	交流电机数字控制 Digital control of AC motor	2	2
040020	模式识别与系统辨识 Pattern Recognition and System Identification	2	2
040021	嵌入式系统原理与应用 Principle and Application of Embedded Systems	2	2
040026	微弱信号检测 Detection of Weak Signals	2	2
040035	小波分析与应用 Wavelet Analysis and Application	2	2
040041	智能控制技术 Intelligent Control Technique	2	2
040042	最优化理论方法与智能算法 Theory, Computational Method and Intelligent Algorithm for Optimization	2	2

	040052	颗粒测量技术 Particle measurement technology	2	2	
素养选修课程 ≤1 学分	G17070	经济学基础 Foundations of Economics	1	2	
	G02060	科研素养与创新能力 Scientific Research Literacy and Innovation Ability	1	2	
	G31001	中国传统文化 Chinese Culture	1	2	
	G05024	计算机科学前沿技术应用系列讲座 The Lectures on the Frontier Technology and Application of the Computer Science	1	2	
	G09064	科研与人文修养 Scientific Research and Humanity Cultivation	1	2	
	G10014	实验设计与统计分析 Experimental design and statistical analysis	1	2	
	G10023	研究生科研能力训练与培养 Postgraduate Research Competence Training and Development	1	2	
	G13042	诗歌与审美艺术 Poetry and aesthetic art	1	2	
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	G04001	创新方法 Innovation Methodologies	1	2	
	G14010	科技英语写作 Scientific English Writing	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	补修课程 不计学分				
其他培养环节（3 学分）					
培养环节	相关内容及要求 t				学期
开题报告 (1 学分)	<p>开题报告内容：硕士生学位论文的文献调研、研究方案和初步结果。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。学生导师或者至少一位导师组成员必须参加学生的开题报告。开题报告方式：参加开题报告的所有导师根据学生课题的创新性、学生对课题的理解程度和专业基础知</p>				3



	<p>识等方面对学生做出“合格”或“不合格”的明确评定</p> <p>The proposal shall include literature review, research methodology and preliminary results. Reviewing panels composed of no less than 5 supervisors in relevant disciplines shall be established to evaluate the proposals strictly and make decisions. The mentor or at least one member of the instructing team shall attend the dissertation proposal. Form of dissertation proposal: The reviewing panels shall make a clear assessment of “qualified” or “unqualified” for the overseas students in the master’s program, according to the innovation of topic selection, the level of understanding of the discipline and specialized knowledge.</p>	
<p>中期考核 (1 学分)</p>	<p>中期考核内容：硕士论文研究工作的进展。 学生导师或者至少一位导师组成员必须参加学生的开题报告，评审小组由 5 人以上专家组成。 中期考核方式：学生必须先提交论文进展报告，经审查合格后才能参加中期进展报告考核。所有导师根据学生课题的创新性、学生对课题的理解程度、开展课题所需具备的专业基础知识，以及自开题报告以来的工作量和研究成果，对学生做出“合格”或“不合格”的评价。</p> <p>The content of the mid-term assessment shall include the following aspects: progress of dissertation research work. The mentor or at least one member of the instructing team shall attend the mid-term assessment. The team for the mid-term assessment shall consist of five supervisors at least. Form of the mid-term assessment: A written dissertation progress report should be submitted. Only after the report passed examination, the student could attend mid-term assessment. The assessment team shall make a clear assessment of “qualified” or “unqualified” according to the innovation of topic selection, the level of understanding of the discipline, the specialized knowledge and the work and obtained results after dissertation proposal.</p>	<p>4-5</p>
<p>创新创业 (1 学分)</p>	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；</li> <li>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</li> </ol> <p>每项记 1 学分，需完成 1 学分。</p> <ol style="list-style-type: none"> <li>1. Attend academic conference and present a paper, or make open academic reports twice;</li> <li>2. Participate in national competitions of science and technology, of creative design or of innovation and entrepreneurship, and win prizes;</li> <li>3. Attend more than six academic reports in relevant disciplines, and submit summary report;</li> </ol> <p>One credit for each of the above items, and one credit are required for this section.</p>	<p>1-5</p>
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p> 



# 计算机科学与技术学科学术学位硕士研究生培养方案

学科代码：0812

## Overseas academic master program of computer science and technology

Credit Code: 0812

### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学计算机科学与技术学科创建于 1986 年，是山东省最早设立的信息技术类学科之一；2000 年获得计算机应用技术二级学科硕士学位授予权，2006 年获得计算机技术专业硕士学位授予权，2011 年获得计算机科学与技术一级学科（学术型）硕士学位授予权。

学科现有本学科拥有全职教师 52 名，其中，教授 9 人、副教授 18 人、博士学位教师 40 人、海外学术背景教师 11 人；共有学术硕士研究生导师 19 人。近五年来，学科先后承担国家级和省部级项目 20 余项，厅局级及与地方合作项目 150 余项，科研经费总计 2000 余万元；发表高水平学术论文 300 余篇，获得发明专利 70 余项，软件著作权 200 余项。

学科与美国、英国、爱尔兰等国外高校建立了长期科研教学合作关系；并与惠与软件、东软集团、青岛软件园、大唐电信和中兴通讯等单位合作建立了十多处教学、科研和实训基地，与浪潮集团共建“国家级工程实践教育中心”。

学科将以国家和行业信息化建设重大战略需求为导向，以服务区域经济社会创新发展为使命，以培养高水平应用研究型人才为目标，坚持多元化办学特色，力争建成特色鲜明、省内一流、国内知名的高水平学科。

The computer science and technology specialty of Shandong University of Technology was founded in 1986. In 2000, it was granted the master's degree of Computer Application Technology. In 2006, it was granted the right to grant master's degree in computer technology. In 2011, he received the right to confer master's degree in computer science and technology.

There are more than 52 full-time teachers, including 9 professors and 18 associate professors, 40 doctoral teachers and 11 teachers with overseas academic background, 5 returned



overseas doctors and postdoctoral students, 19 academic graduate instructors. Over the past five years, the degree center has undertaken more than 20 projects at the national, provincial and ministerial levels, 150 projects at the bureau level and in cooperation with local governments, with a total research fund of more than 20 million yuan, and published more than 300 high-level academic papers, obtained more than 70 invention patents and 200 software copyrights.

This degree has established a long-term cooperative relationship in scientific research and teaching with foreign universities such as the United States, Ireland, New Zealand, South Korea and India, and has cooperated with domestic Huiyu Software Group, Eastern Soft Group, China Soft Group, Insuper Group, Shandong Shichuang, Qingdao Software Park, Datang Telecom and ZTE to establish more than 10 teaching, scientific research and training bases, and build "national engineering practice education center".

Directed by the major strategic needs of national and industrial informatization construction, serving the innovation and development of regional economy and society, aiming at cultivating high-level applied talents, the degree centers adhere to the diversified characteristics of running schools, constantly promote the connotative development of disciplines, and strive to build high-level disciplines with distinctive characteristics, first-class in the province and well-known in China.

## 二、培养目标 ( Educational Objectives )

立足国家和区域信息产业发展战略,面向计算机科学与技术领域科技前沿,培养德、智、体、美全面发展,具有创新精神和实践能力的高层次应用研究型人才。

1. 熟悉中国文化与语言,掌握计算机学科坚实的理论基础理论和系统的专门知识,获得必要的科研常识与实践技能,具备从事计算机科学与技术方面的科学研究和担负专门技术工作的能力。

2. 树立终身学习的理念,能够不断地自我更新知识和调整知识结构;具有健康的体魄、良好的心理素质和健全的人格;较熟练地掌握一门外国语,能够顺利阅读本学科领域的外文文献资料,并具备良好的外文交流与写作能力。

3. 向人工智能、大数据分析、“互联网+”等计算机及信息科学研究领域,培养能够从事科学研究或承担专门技术工作的高层次应用研究型人才。

Based on the national and regional information industry development strategy, and facing the frontier of science and technology in the field of computer science and technology, it aims to cultivate high-level applied research talents with innovative spirit and practical ability, who have all-round development in moral, intellectual, physical and aesthetic fields.

1. Be familiar with Chinese culture and language, master solid theoretical basis and systematic expertise of computer science, acquire necessary scientific research knowledge and practical skills, and have the ability to engage in scientific research in computer science and

technology and to undertake specialized technical work.

2. Establish the concept of lifelong learning, and constantly update knowledge and adjust knowledge structure; A healthy body, good psychological quality and sound personality; I have a good command of a foreign language, can read foreign literature in this field, and have good communication and writing skills in foreign language.

3. Cultivate high-level applied research talents who can engage in scientific research or undertake specialized technical work in the fields of artificial intelligence, big data analysis, Internet plus and other computer and information science research.

### 三、研究方向 ( Research Orientation )

计算机科学与技术一级学科学术硕士学位研究生培养方案设以下 4 个研究方向：

1. 人工智能与智能系统
2. 网络服务与信息安全
3. 云计算与大数据分析
4. 图像处理与信号分析

详见附表 1。

There are four research directions in the postgraduate training program of the academic master's degree in computer science and technology:

1. Artificial intelligence and intelligent system
2. Network service and information security
3. Cloud computing and big data analysis
4. Image processing and signal analysis

See schedule 1 for details.

### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The length of schooling shall be 3 years, the length of schooling shall be 2-4 years, and the length of scientific research and thesis writing shall be no less than 1 year ( counting from the day the proposal is passed ) . Under the consent of the tutor, you can apply for early graduation, but the time requirement for scientific research and paper writing remains unchanged. Suspension of schooling is not counted as years of study.

### 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程教学实行学分制。课程分为必修课和选修课。学生需在规定的时间内完成不少



于 16 必修学分和 9 选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上本学科本科专业课程，考核合格后（不计学分），方可申请开题答辩。

课程设置情况见附表 2。

Credit system is implemented in the course teaching. Students should complete not less than 16 compulsory credits and 9 elective credits within the prescribed time. Interdisciplinary graduate students should take two or more courses according to their tutors' requirements. Only after passing the examination (without credit counting), can they apply for capstone presentation.

The curriculum is shown in Schedule 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

除课程学习外，其它培养环节主要包括：1. 开题报告；2. 中期考核；3. 创新创业活动。

### 1. 开题报告

(1) 硕士学位论文开题报告是开展学位论文工作的基础，一般应于第三学期完成，最迟应于第四学期末完成。

(2) 研究生需在导师指导下，查阅文献资料，经过充分调研与论证，确定具体课题，独立地做出开题报告。论文开题报告应包括选题的科学依据、国内外发展动态、主要研究内容、研究方案、课题所需条件、预期成果及创新点等。

(3) 论文开题采取正规答辩的方式进行，并提交书面开题报告。论文开题报告经导师审阅后，由本学科或相关学科 5 人以上的导师组成开题报告评审小组，对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。

(4) 每个研究生做不少于 10 分钟的开题报告和 10 分钟的提问。专家组根据论文选题的合理性、可行性、创新性、对课题的理解程度和专业基础知识、工作能力等方面对学生做出“合格”或“不合格”的明确评定。

(5) 对通过的开题报告，研究生应根据评审小组的意见进行修改。未通过者必须在三个月内再次进行开题报告。第二次学位论文开题报告仍未通过者，将终止培养。因出国、外出合作研究或其他原因确实不能参加的研究生，经导师同意后，向学院提出申

请，并商定开题报告时间。无故不参加的，视为开题报告不合格。

## 2. 中期筛选

(1) 研究生的中期考核在其开题以后 6 个月以上。

(2) 中期考核内容主要包括研究生的政治思想和道德品质、综合知识的掌握程度、论文研究工作的进展等。

(3) 学院组织考察小组（5 人以上的导师组成）对研究生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。

(4) 每个研究生做不少于 10 分钟的中期答辩+10 分钟的提问。

(5) 中期考核结果分为合格与不合格，合格者可继续进行论文工作，并根据专家组意见进行改进。不合格或未参加中期考核的研究生，不得进入学位论文撰写，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

## 3. 创新创业

达到以下条件之一，即获得创新创业 1 学分：

(1) 参加学术会议并宣读论文，或做公开学术报告 2 次；

(2) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；

(3) 参加 6 次以上与本学科相关的学术报告，并提交总结。

The tutorial responsibility system is adopted in the training of academic postgraduates, and the tutorial team (team) system is encouraged. The tutor is responsible for formulating postgraduate training plan, and has the responsibility of guiding, demonstrating and supervising the ideological and academic morality of postgraduates.

In addition to course learning, other training links mainly include: proposal report; mid-term assessment; innovation and entrepreneurship activities. The information and requirements are shown in appendix 2.

### The Proposal Report

(1) The proposal report is the basis of the final dissertation. Usually, it should be completed in the third semester and the deadline is the end of the fourth semester.

(2) Under the guidance of the tutor, after thorough investigation and demonstration, the graduate students should independently make the proposal report by consulting the literature, and then determine the specific topics of their dissertation. The proposal report should include the scientific basis for choosing the topic, the development trends at home and abroad, the main research contents, the research scheme, the requirements of the subject, the expected results and the innovation points.

(3) The first step of the dissertation begins with a formal defense and a written report should be submitted. The submitted report should be firstly reviewed by the tutor and then



revised according to the suggestions of the review groups, which is composed by more than five tutors in the same subject or the related disciplines. The student' tutor or at least one of the tutor groups should attend the student's proposal report.

(4) The time for each graduate student to do the proposal report and answering the questions is no less than 10 minutes, respectively. The experts will give the student a clear assessment: "qualified" or "unqualified" according to the rationality, feasibility, innovation, understanding of the subject, professional basic knowledge and work ability, etc.

(5) Once the proposal report is passed, the graduate student should make revisions according to the suggestions from the review group. Those who fail have to submit the report within three months. If it still failed, the training will be terminated. The graduate student who is unable to participate due to study abroad, out-of-town cooperation research or other reasons, with the agree of his tutor, he should apply for another time to the college. If he does not participate the proposal report without any reason, his proposal report will be assigned to be unqualified.

## 2. The Mid-term Assessment

(1) After more than six months when the proposal is finished, the mid-term assessment will be held.

(2) The content of the mid-term assessment mainly includes the political ideology and the moral quality of graduate students, the mastery of comprehensive knowledge, and the progress of the thesis.

(3) The college will organization an inspection group ( composed of more than 5 tutors ) to conduct an examination to check the comprehensive ability of the graduate students, the progress of the thesis, the work attitudes, and the inputting energy, etc.

(4) Each graduate student should do a defense in the mid-term assessment with no less than 10 minutes, and the time of answering the question is no less than 10 minutes.

(5) The results of the mid-term assessment are divided into qualified and unqualified. Those who pass the examination can continue to work on the thesis and improve it according to the suggestions of the expert group. The unqualified students or the students who do not participate in the mid-term assessment cannot continue the dissertation and will be undergraduate after reviewed by the training school and the graduate school, and approved by the president's office.

## 3. The Innovation and Entrepreneurship

The students will get 1 credit once the following conditions is achieved:

(1) Participate in academic conferences and read papers, or make two public academic reports;

(2) Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;

(3) Participate in more than 6 academic reports in the related subject and submit a summary.

## 七、学位论文 ( Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结, 是描述其研究成果、反映其研究水平的重要学术文献, 是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心, 必须严格按照规范执行, 本学科硕士研究生的学位论文应满足以下基本要求:

1. 硕士学位论文应具有系统的、完整的研究思路和计划, 应对科技进步和国民经济建设具有较大的理论意义或实用价值, 学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作, 必须由作者独立完成。研究工作必须坚持实验性原则, 论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

Master's degree thesis is a comprehensive summary of the scientific research work of master's students, is an important academic document describing their research results and reflecting their research level, and is the basic basis for applying of master's degree. The writing of dissertation is the key and core of the cultivation of master's students, and it must be carried out in strict accordance with the standard. The dissertation of master's students in this discipline should meet the following basic requirements:

1. The master's thesis should have systematic and complete research ideas and plans, and should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should be of highlight innovation, cutting-edge and scientific.

2. The main work of the dissertation should be finished independently by the author. The research work should comply with the experimental principle. The content of the thesis must be based on the first-hand experiments, observations or investigations completed by the graduate students themselves.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求, 可获得毕业证书; 在获得毕业证书的基础上, 如满足学位授予标准, 可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德, 实事求是、身心健康、勇于创新;
2. 修读完培养方案规定课程和其他培养环节, 成绩考核合格;
3. 完成论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求



严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》、《山东理工大学博士学位授予工作实施细则》以及计算机科学与技术学院学位授予有关规定。

The students will get their graduation diploma if the graduation requirements are met; on this basis, the degree certificate can be awarded if all the criterion for conferring a degree are met.

#### 1. Graduation Requirements

- (1) Have good moral cultivation and academic ethics, maintain physical and mental health, seek truth from facts and be brave in innovation;
- (2) After completing the courses prescribed in the training program and other training links, the results are qualified;
- (3) Completion of the thesis defense, the results are qualified;
- (4) Meet other requirements of the school's relevant regulations.

#### 2. Degree Requirements

The requirements of conferring a degree will Strictly implemented according to the 《Provisional Implementation Measures for the Degree Regulations of the People's Republic of China》, 《The Methods for the Evaluation of Master's Thesis of Shandong University of Technology》, 《The Implementation Rules for the Grant of Master's Degrees in Shandong University of Technology》, 《The Implementation Rules for the Grant of Doctoral Degrees in Shandong University of Technology》 and the relevant rules in the school of Computer Science and Technology of Shandong University of Technology.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>熟悉中国文化与语言，遵纪守法，具有良好的职业道德和敬业精神，身心健康，德、智、体全面发展，能适应经济、科技、教育发展需要的高层次计算机科学与技术专门人才。</p> <p>To cultivate high-level computer science and technology professionals who is familiar with Chinese culture and language, abide by discipline and law, have good professional ethics and professional spirit, and have a sound physical and mental health.</p>	<p>自然辩证法、论文写作与学术规范、中国传统文化、社会研究方法</p> <p>Dialectics of nature、essay writing and academic norms、Chinese traditional culture、social research methods.</p>
综合能力		<p>培养具有良好的综合素质，核心知识结构复合化、学术素养优良，掌握坚实的理论基础和系统的专门知识的创新型、应用研究型高级人才。能够熟练掌握计算机科学与技术学科的前沿和动态，具有较强的理论研究和实践应用能力，掌握中文，具有从事科学研究工作具有或独立承担专门技术工作的能力。</p> <p>Cultivate innovative, applied and research-oriented senior talents with good comprehensive quality, compound core knowledge structure, excellent academic quality, solid theoretical foundation and systematic specialized knowledge. Able to master the frontier and dynamic of computer science and technology, have strong theoretical research and practical application ability, master Chinese language, and have the ability to engage in scientific research or independently undertake specialized technical work.</p>	<p>计算机科学前沿技术概述、科研素养与创新能力、数值分析、数理统计、矩阵理论、随机过程、算法设计与分析、机器学习与人工智能、模式识别、大数据分析云计算、实验设计与统计分析</p> <p>Overview of cutting-edge technologies in computer science、Scientific research literacy and innovation ability、Numerical analysis、Mathematical statistics、matrix theory、Random process、Algorithm design and analysis、Machine learning and artificial intelligence、pattern recognition、Big data analysis and cloud computing、Experimental design and statistical analysis.</p>
研究方向	人工智能与智能系统	<p>掌握智能感知与信息处理、智能系统设计与制造、云服务与机器学习等技术，能够利用各类传感器或敏感元件、多源信息融合与数据分析方法、智能检测、控制和机器人技术，结合人工智能理论达到系统的知觉、推理、学习、交流和在复杂环境中的自主控制功能。</p> <p>Master intelligence and intelligent information processing, system design and manufacturing, cloud services, and machine learning techniques, able to take advantage of all</p>	<p>深度学习、物联网技术、信号处理与分析、强化学习理论与应用、智能仪器技术</p> <p>Machine Learning and Artificial Intelligence、Internet of things technology、Signal processing and analysis、Reinforcement learning theory and application、Deep Learning</p>



		<p>kinds of sensors or sensitive element, multi-source information fusion and data analysis method, intelligent detection, control and robotics, combining the theory of artificial intelligence to achieve system of perception, reasoning, learning, communication and control functions in complex environment.</p>	
网络服务与信息安全	<p>掌握传统、下一代网络系统安全与服务质量技术，熟悉访问控制模型、可信计算、软件定义网络、负载均衡，网络服务组合与形式化统一建模，基于范畴论的验证面向进程的并发系统设计与实现一致性方法等技术，促进传统网络安全、高效通信，下一代互联网技术发展，提升网络服务质量与可信性。</p> <p>Master the tradition, the next generation network system security and quality of service technology, familiar with the access control model, trusted computing, software defined network, load balancing, network service composition and formal unified modeling, based on category theory validation process oriented concurrent systems design and implementation methods for consistency, promote the traditional network security, efficient communication, development of next generation Internet technology, network service quality and creditability.</p>	<p>信息安全、高级计算机网络、Web 服务与标准、软件定义网络与安全</p> <p>Information security, Advanced computer networks, Web services and standards, Software-defined networks and security.</p>	
云计算与大数据分析	<p>掌握多源数据处理、信息挖掘、大数据计算等技术，熟悉海量复杂异构数据建模、知识表达、感知、融合管理，大数据计算框架与智能分析、推荐，软件建模与项目敏捷开发等技术，面向医疗、养老、健康、交通、城市、电子商务等行业领域，具备提供可靠、可行系统解决方案设计能力。</p> <p>Mastery of multi-source data processing, information mining, large data calculation, such as technology, familiar with massive complex heterogeneous data modeling, knowledge representation and management awareness, fusion, big data computing framework and intelligent analysis, recommend, software modeling and project technology, such as agile development for health care, pension, health, traffic, city, e-commerce and other industries, to provide reliable, feasible system solution design ability.</p>	<p>大数据分析云计算、数据分析与可视化、随机过程、自然语言处理、搜索引擎理论与技术</p> <p>Big data analysis and cloud computing, data mining, Data analysis and visualization, Stochastic processes, Natural language processing, Search engine theory and technology.</p>	

	<p>图像处理与信号分析</p>	<p>掌握图像处理与模式识别、计算机视觉、信号处理、未来通信系统等技术，熟悉图像内容获取、运动跟踪、运动识别，信号处理、时频分析与特征提取，智能仪器仪表的设计、开发与应用，未来移动通信系统架构理论、物理层传输技术、编解码理论、基于移动通信系统的定位等技术，聚焦于医学影像、遥感影像、光谱分析，语音信号、视频信号，物联网感知等应用领域，具备科研分析、创新应用的能力。</p> <p>Master image processing and pattern recognition, computer vision, signal processing, the future communication systems, such as technology, familiar with the image content, motion tracking, motion recognition, signal processing, time-frequency analysis and feature extraction, design, development and application of intelligent instrument and meter, the future mobile communication system architecture theory, the physical layer transmission technology, codec theory, based on the positioning technology of mobile communication system, focusing on medical imaging, remote sensing image and spectrum analysis, speech signal, video signal, Internet of things application fields such as perception, have the ability to research analysis and innovative applications.</p>	<p>数字图像处理、计算机图形学、信号处理与分析、计算机视觉、物联网技术</p> <p>Digital image processing、Computer graphics、Signal processing and analysis、Computer vision、Internet of things technology.</p>
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**附表 2： 培养计划 ( Training Plan )**

学科名称	计算机科学与技术 computer science and technology		学科代码	0812		
单位名称	计算机科学与技术学院 School of Computer Science and Technology		培养类型	学术学位硕士 Master of Academic Degree		
学分要求	总学分 Total Credits: $\geq 32$ , 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq 9$ 。					
课程 设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	130062	中国文化 Chinese Culture	2	1		
	130063	汉语 Chinese	2	1		
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 $\geq 11$ 学分	050032	计算机科学前沿技术概述 The Lectures on the Frontier Technology and Application of the Computer Science	1	1	必选	
	G11001	数值分析 Numerical Analysis	3	1	至少 选修 一门	
	G11003	数理统计 Mathematical statistics	2	1		
	G11002	矩阵理论 Matrix theory	2.5	1		
	040038	应用随机过程 Applied stochastic process	2	1		
	050004	算法设计与分析 Design and Analysis of Algorithms	2	1		
	050031	机器学习与人工智能 Machine Learning and Artificial Intelligence	3	1		
	050028	大数据分析 with 云计算 Big Data Analysis and cloud computing	3	1		
方向选修课程 $\geq 8$ 学分	050036	深度学习 ( Python ) Deep Learning	2	2		
	050037	数据分析与可视化 ( Matlab ) Data Analysis and Visualization	2	2		

	050038	物联网技术 Internet of things technology	2	2	
	050034	强化学习理论与应用 Theory and Application of Reinforcement Learning	2	2	
	050002	模式识别 Pattern Recognition	2	2	
	050040	信息安全 Information Security	2	2	
	050030	高级计算机网络 Advanced Computer Network	2	2	
	050043	Web 服务与标准 Web Services and Standards	2	2	
	050035	软件定义网络与安全 Software Defined Network and Security	2	2	
	050042	自然语言处理 Natural Language Processing	2	2	
	050013	搜索引擎理论与技术 Search engine theory and technology	2	2	
	050023	高性能计算 High performance computing	2	2	
	050005	数字图像处理 Digital Image Processing	2	2	
	050017	计算机图形学 Computer Graphics	2	2	
	050033	计算机视觉 Computer Vision	2	2	
	050039	信号处理与分析 Signal processing and analysis	2	2	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	G13043	中国古代韵文阅读与欣赏 Reading and appreciating of ancient Chinese rhymes	1	2	
	G17070	经济学基础 Foundations of Economics	1	2	
	G02060	科研素养与创新能力 Scientific Research Literacy and Innovation Ability	1	2	



	G13042	诗歌与审美艺术 Poetry and aesthetic art	1	2	
	G10014	实验设计与统计分析 Experimental design and statistical analysis	1	2	
	G14010	科技英语写作 Scientific English Writing	1	2	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出选题文献综述。开题通过后即获得 1 学分。</p> <p>Under the guidance of the tutor, the graduate student determines the research topic through literature review, data collection and investigation and research, and writes the literature review of the selected topic.</p> <p>After passing the proposal, I will get 1 credit.</p>				3
中期考核 (1 学分)	<p>检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量。中期考核通过后即获得 1 学分。</p> <p>English: To check the progress of the graduate thesis, help students grasp the direction of the dissertation, improve the quality of the dissertation.</p> <p>After passing the mid-term examination, I will get 1 credit.</p>				4-5
创新创业 (1 学分)	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</p> <p>每项记 1 学分，需完成 1 学分。</p> <p>1. Attend academic conferences and read out papers, or make public academic reports twice;</p> <p>2. Participated in national science and technology competition, creative design, innovation and entrepreneurship competition and won awards;</p> <p>3. Participated in more than 6 academic reports related to the discipline and submitted summaries;</p> <p>1 credit for each item and 1 credit for completion.</p>				1-5
培养单位 教授委员会主任			培养单位 负责人		

## 化学工程与技术学科

山东理工大学化学工程与技术学科于 2009 年获一级学科硕士学位授予权，2013 年获一级学科博士学位授予权，2017 年在全国第四轮学科评估中获评 B- 等级，2018 年获山东省一流学科立项建设。

本学科现有国家工程技术研究中心 1 个、山东工程技术研究院 1 个、山东省重点学科 1 个、山东省特色品牌专业 1 个、山东省工程技术研究中心 2 个，共建山东省工程技术研究中心、山东省协同创新中心等省级创新平台 6 个。

本学科现有专职教师 110 人，其中教授 27 人、副教授 30 人，国家千人计划专家 2 人，国家百千万工程人才 1 人，山东省泰山学者特聘专家等省部级人才 8 人，教育部化工类教学指导委员会委员 1 人，中国化工学会等国家级学会理事或委员 10 人次。近 5 年，获山东省自然科学一等奖等省部级科技奖励 9 项；承担国家重点研发项目等国家级重点项目 4 项、国家自然科学基金 55 项、省部级课题 59 项、军工项目 5 项、企业委托课题 160 余项，科研经费总计 1.7 亿元；发表论文 430 余篇，其中 SCI 检索 286 篇、EI 检索 214 篇；获授权发明专利 84 项。

本学科聚焦国家经济和社会发展的重大需求，积极探索服务于山东省新旧动能转换重大工程中高端化工、新能源新材料产业的技术和人才需求，加强博士点内涵建设，不断提升人才培养质量，建设有特色、高水平、国内一流的化学工程与技术一级学科博士学位授权点。

Shandong University of Technology was authorized to award the Master degree of Applied Chemistry in the major of Chemical Engineering and Technology in 2003, the first level discipline Master degree in 2009, the first level discipline degree of Doctor of Philosophy in 2013. It obtained a B- level in the four round National Discipline Assessment. And it gained the “Top Disciplines” project of Shandong Province in 2018.

This discipline has one National Engineering Technology center, 1 Engineering Technology Institute of Shandong Province, 1 key discipline of Shandong Province, 2 special brand majors of Shandong Province, 2 engineering technology research institutes of Shandong Province, and 6 provincial innovation platforms such as joint engineering technology research institute and coordination innovation center of Shandong Province.

There are 110 full time fellows including 27 professors and 30 associate professors. Among them there are 2 “thousands of people plan” professors, 1 “National Hundred-Thousand-Ten Thousand Talent Project” professor et al., 1 Steering Committee member of the Teaching



Committee for Chemical Engineering of Ministry of Education, and council or committee members of China Chemical Engineering Society for ten times. In the past five years, we have won 9 provincial and ministerial level awards such as the first prize of natural science of Shandong Province, 4 national level key projects such as national key R & D project, 55 National Natural Science Funds, 59 provincial and ministerial projects, 5 military projects, and 160 enterprise projects. The total research fund reaches up to 1.7 trillion yuan. So far, there are more than 430 papers published which includes 286 SCI and 214 EI papers. 84 patents have been approved.

The main purpose for this discipline is based on the requirements for the local economy and the development of the society, and devote to exploring the mode for training the excellent chemical engineering talents for the upgrade and the development of the chemical engineering industry for Shandong especially the central Shandong district. It will focus on the building up of the PhD candidate award branch and continuously promote the education quality, and construct the academic and engineering training platform with the local characteristic. It aims to lead to a distinctive and coordinated PhD candidate award branch for chemical engineering and technology.



# 学术学位博士研究生培养方案

学科代码：0817

## Training Program for International PhD Candidates

Credit Code: 0817

### 一、培养目标 ( Educational Objectives )

本学科培养德、智、体、美全面发展，具备高水平综合素质的化学工程与技术领域的高层次创新专门技术人才。具体要求：

1. 遵守中国法律和学校规章制度，热爱中国文化，积极促进中外友好合作与交流；比较熟练的掌握中文；具有实事求是、科学严谨的治学态度和勇于开拓创新的工作作风。

2. 掌握本专业坚实宽广的基础理论和系统深入的专门知识以及扎实的实践技能，熟悉本学科的发展方向和最新动态；具有独立从事科学研究、技术开发、创新设计、过程诊断与优化等创新与实践的能力。具备熟练的计算机应用技能，能熟练阅读本专业的外文资料，具备良好的科技写作和国际学术交流能力。

3. 具有健康的体魄、良好的科技道德、敬业创新精神和社会责任感。

4. 能够运用化学工程与技术的基本理论和研究方法在化工、环境、能源、材料等领域独立从事科学研究、技术开发、生产管理及高等教育等工作。

This discipline is to train the experts with an all-round development of morality, intelligence, physics and arts and high level comprehensive quality innovation experts of chemical engineering and technology. The specific requirements are as the follows.

1. They must abide by the laws of China and like Chinese culture, and be active in involving the cooperation and communication between China and overseas. They must demonstrate proficiency in Chinese language.

2. They must acquire the solid and broad theoretical and professional knowledge as well as the solid practice skills, and be familiar with the direction and the trend of the discipline. The abilities for the innovation and the practice in the independent scientific research, technology exploration, process diagnose, and optimization are required to be built up. The candidates are required to be proficient in the computer manipulation, and a first foreign language for skillful reading, writing, and international communication.

3. A practical and realistic style of work and a spirit of innovation are required.

4. Have the ability to be engaged to the work in chemical engineering and technology &



environment, energy, and materials, the teaching work in a college, and the technology management work in large chemical enterprises.

## 二、研究方向 ( Research Orientation )

化学工程与技术 (一级学科) 学术博士学位研究生培养方案设以下 5 个研究方向:

1. 电化学工程 (交叉方向)
2. 催化反应与分离工程
3. 精细化学品清洁生产过程工程
4. 材料化学工程
5. 生物化学工程

详见附表 1。

There are five research directions in the graduate training program of Ph.D. in chemical engineering and technology ( first-level discipline ):

1. Electrochemical engineering ( interdisciplinary and cross connection direction )
2. Catalytic reactions and separation engineering
3. Clean produce process engineering for fine chemicals
4. Materials chemistry engineering
5. Biochemical engineering

## 三、学习年限 ( Length of Schooling )

基本学制 4 年, 学习年限 3-6 年, 科学研究和论文撰写时间不少于 2 年 (从开题通过之日起计算)。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

Basically 4 years is required for the education system and the length of schooling is 3~6 years. The time for scientific research and thesis drafting must be more than 2 years ( Since the approve date of the thesis proposal ) . The candidates can graduate after the approval by the supervisor but the time for scientific research and thesis drafting cannot be changed. The school suspending is not counted in the length of schooling.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程, 学生需在规定时间内完成必修课 6 学分和选修课不少于 4 学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程, 考核合格后方可参与开题答辩, 成绩不计入成绩单。

课程设置情况见附表 2。

The courses include the compulsory courses and the selective courses, and the candidates

must obtain 6 credits for the compulsory courses and no less than 4 credits for the selective courses in the schedule time. The candidates studying in an interdisciplinary way are required to take no less than 2 non-credit courses in chemical engineering of master graduate students and the thesis proposal can be approved only after they pass these courses.

The curriculum schedule is presented in the Appendix Table 2.

## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订研究生培养计划，组织开题、中期、答辩，指导科学研究和学位论文等工作，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

(1) 博士学位论文开题报告是开展学位论文工作的基础，博士研究生需在导师指导下，查阅文献资料，经过充分调研与论证，确定具体课题，独立地做出开题报告。博士论文开题报告应包括选题的科学依据、国内外发展动态、主要研究内容、研究方案、课题所需条件、预期成果及创新点等。

(2) 博士论文开题采取答辩的方式进行，并提交书面开题报告。论文开题报告经导师审阅后，由本学科或相关学科 5 人以上的博导、教授组成开题报告评审小组，对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。

(3) 每个博士生做 20 分钟左右的开题报告+10 分钟左右的提问。专家组根据博士生论文选题的合理性、可行性、创新性、博士生对课题的理解程度和专业基础知识、博士生的工作能力等方面对学生做出“合格”或“不合格”的明确评定。

(4) 对通过的开题报告，博士生应根据评审小组的意见进行修改。未通过者在三个月后才能再次申请开题。第二次学位论文开题报告仍未通过者，将终止培养。

### 2. 中期筛选

(1) 博士研究生的中期考核在其开题以后 6 个月以上。

(2) 中期考核内容主要包括博士研究生的政治思想和道德品质、综合知识的掌握程度、博士论文研究工作的进展等。

(3) 学院组织考察小组（5 人以上的博导、教授组成）对博士生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。

(4) 每个博士生做 30 分钟左右的中期答辩+15 分钟左右的提问。

(5) 中期考核结果分为合格与不合格，合格者可继续进行博士论文工作，并根据



专家组意见进行改进。不合格或未参加中期考核的博士生，根据学校相关研究培养管理文件规定做肄业处理。

### 3. 创新创业

- (1) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (2) 参加高水平科技竞赛、创意设计、创新创业竞赛等；
- (3) 参加 12 次以上与本学科相关的学术报告，并提交总结。

以上每项计 1 学分，需完成 2 学分。

The training for the candidates is under the tutorial system and it encourages to be processed in the mode of team guidance supervised by the supervisors. The supervisors draw up the training program, organize the thesis proposal, middle-term report, and thesis answer, guide the scientific research and the thesis writing, be responsible for the ideology and academic morality of the candidates.

#### 1. Thesis Proposal

(1) The thesis proposal is the premise for the candidates commence their thesis research work. Under the guidance of the supervisor, PhD candidates search the literatures, fully investigate and survey the items, and finally finish the thesis proposal independently. The PhD thesis proposal must include scientific basis, international and national research progress, research content, research program, conditions, and the expected results and innovations, etc.

(2) The PhD thesis proposal must be proceeded via an official reply and the written proposal must be submitted. After the proposal has been approved by supervisor, it must be assessed and evaluated by a team by other more than 5 PhD supervisors or professors in the same research area. At least one of the PhD candidate's supervisors should attend the proposal report meeting.

(3) Each PhD candidate should give about 20 minutes presentation and 10 minutes defense for the proposal. The experts will give "pass" or "failed" for the proposal according to the rationality, the feasibility, and the innovation of the topic selection, the understanding to the topic, their basic knowledge, and the experiment skills.

(4) The PhD candidates must revised the approved proposal according to the comments raised by the assessment panel. The PhD candidate failed to pass the thesis proposal could attend the re-assessment againafter three months, otherwise, the training will be terminated.

#### 2. Mid-Term Filtering

(1) The mid-term assessment for the PhD candidate will be proceeded after 6 months since the thesis proposal report.

(2) The assessment items include moral character, the level how the candidate master, and the progress for their PhD thesis research.

(3) The school will organize an assessment panel of 5 PhD supervisors or professors to assess the comprehensive ability, the progress of thesis, the working attitude, and the devoted

effort.

(4) Each PhD candidate must give about 30 minutes mid-term defense presentation with a 15 minutes question answer.

(5) The results for the mid-term assessment are “pass” and “failed”, who pass the assessment can continue his PhD thesis research and revise it according to the comments raised. Those failed in the assessment or absent from the assessment are not allowed to continue the thesis drafting. It will be regarded as a dropout according to the related rules.

### 3. Innovation & Entrepreneurship

(1) Attend academic conferences and give oral presentation, or give open academic presentation for 2 times;

(2) Attend the high level science and technology competition, creative design, and innovation and entrepreneurship competition, etc.

(3) Attend the discipline related academic conferences for at least 12 times and submit the summary.

Each item above is worth 1 credit, and 2 credits are required.

## 六、学位论文 Academic Dissertation )

学位论文的要求按照《山东理工大学关于研究生学位论文工作的有关规定》《山东理工大学博士学位授予工作实施细则》等相关文件执行。

1. 博士学位论文应是系统的、完整的学术论文，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 博士学位论文应表明作者具有独立从事科学研究工作的能力，在科学或专门技术上做出创造性的成果，并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门知识。

3. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以博士生本人完成的第一手实验、观测或调查的材料为主。

4. 博士研究生用于做学位论文的时间，应不少于2年（自博士论文开题报告考核通过起至博士论文答辩前）。

The requirements much apply for the corresponding rules about postgraduate thesis and the detailed rules about the PhD degree award of Shandong University of Technology.

(1) The PhD thesis must integrate systematic and complete research ideas and plans, and should be creative, forefront, and scientific.

(2) The doctoral dissertation should show that the author has the ability to engage in scientific research independently, make creative achievements in science or special technology, and reflect that the author has a solid and broad basic theory and systematic and deep special knowledge in the discipline.



(3) The main research work for the PhD thesis must be independently finalized by the candidate. The work should be consistent with the experiment results, and the content of the thesis must origin from the first-hand experiment, monitor, and investigation.

(4) The period length for the thesis construction must be at least 2 years (since the approval of the thesis proposal).

## 七、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 应能系统性地掌握本学科坚实宽广的基础理论知识,深入了解学科的进展、动向和最新发展前沿。具有独立从事科学研究的能力,并在本学科领域取得理论或实践上的创造性研究成果。

2. 具有良好的品德修养和学术道德,实事求是、勇于创新;

3. 修读完培养计划规定课程、其他培养环节,完成论文答辩,成绩考核合格; 4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学博士学位授予工作实施细则》以及化学化工学院学位授予有关规定。

The graduate certificate can be authorized if the related requirements are met. Based on this condition, the degree can be awarded if the standard is satisfied.

#### 1. Graduation Requirements

(1) The PhD degree applicant should be able to systematically master the subject of a solid broad theoretical knowledge, in-depth understanding of the discipline of progress, trends and the latest development front. Have the ability to engage in scientific research independently, and in the field of the theory or practice of creative research results.

(2) Must be in good moral cultivation, realistic character, and innovation.

(3) Fulfil all the courses in the program and other training links, and must pass all the examinations. Pass the thesis examination.

(4) Meet all other requirements of the University.

#### 2. Degree Requirements

It must be carried out strictly according to <Interim measures for implementation of the regulations of the People's Republic of China on academic degrees about postgraduate thesis> and the detailed rules about the PhD degree award of Shandong University of Technology and School of Chemistry and Chemical Engineering.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>具有高度社会责任感、良好道德修养和学术品德, 具备优良的创新能力和团队合作精神及较宽的国际视野, 身心健康, 能在现代化工及相关领域和行业中从事高水平研究开发、教育和管理等工作。</p> <p>With a high level social responsibility, Good moral training and academic character, with excellent innovation ability, team spirit and a wide range of international vision, physical and mental health, in modern chemical industry and related fields and industry engaged in high level research and development, education and management work.</p>	<p>汉语、中国文化</p> <p>Chinese、Chinese Culture</p>
综合能力		<p>能系统性地掌握本学科坚实宽广的基础理论知识, 深入了解学科的进展、动向和最新发展前沿。具有独立从事科学研究的能力, 并在本学科领域取得理论或实践上的创造性研究成果。能熟练阅读本专业的外文资料, 具有一定的写作能力和进行国际学术交流的能力, 适应化学工程与技术等相关学科领域的发展与现代化工经济建设和国际化工高端人才需求。</p> <p>Should be able to systematically master the subject of a solid broad theoretical knowledge, in-depth understanding of the discipline of progress, trends and the latest development front. Have the ability to engage in scientific research independently, and in the field of the theory or practice of creative research results. Can be proficient in reading the professional foreign language information, has a certain writing ability and the ability of international academic exchanges, to adapt to the development of chemical engineering and technology and other related disciplines and modern chemical industry and international chemical industry high-end talent needs</p>	<p>英语、化学工程学科前沿</p> <p>English、The Frontier in Chemical Engineering</p>
研究方向	电化学工程	<p>从事用燃料电池、二次电池、储能电池、太阳能电池和超级电容器等化学与物理电源的关键材料、电极反应、器件组装及系统集成等方面的研究工作; 从事电解、电镀、电化学沉积、电渗析、电化学传感器等领域关键材料开发、电极反应动力学、电化学理论研究及工业化方面的化学工程和化工工艺领域的问题。</p> <p>Focusing on the research of key materials, electrode reaction, device-assembly and system integration in chemical and physical power sources such as fuel cells, secondary batteries, storage batteries, solar</p>	<p>现代化学电源、现代电化学、表面化学与物理、电极过程动力学</p> <p>Modern Chemical Energy、Modern Electrochemistry、Surface Chemistry and Physics、The</p>



		batteries and supercapacitors. Working on the projects in chemical engineering and chemical process fields related to the development of key materials, electrode reaction dynamics, electrochemical theory and industrialization in electrolysis, electroplating, electrodeposition, electro dialysis and electrochemical sensors.	Dynamics of Electrode process.
	催化反应与分离工程	<p>开展新型催化反应和化工分离过程方面的基础理论与应用技术研究。重点研究膜催化、膜反应、膜分离、超临界反应、超临界萃取等单元过程技术及理论；开发新型高效多相催化剂，研制性能稳定的反应器结构，探索过程耦合技术。</p> <p>This research area includes the fundamental theory and applied technologies for the novel catalytic reactions and chemical separation engineering. Mainly engaging in the technology and theory of unit process on membrane catalysis, membrane reaction, membrane separation and supercritical extraction. Developing novel highly effective heterogeneous catalyst, researching on reactor structure with stable performance and exploring process coupling technology.</p>	<p>催化原理与反应器理论、膜与膜过程理论、高等传质分离理论、催化研究进展</p> <p>The Theory of Catalysis Principle and Reactors、The Theory of Membrane and Membrane Process、The Theory of Advanced Mass Transfer Separation、The Advances of the Research on Catalysis</p>
	精细化学品清洁生产工程	<p>从事绿色新型化学品的设计、合成和应用以及现有精细化学品生产的新工艺、新技术方面的基础理论和应用技术研究。以环境友好、节能减排和降低生产成本为研究目标，开发功能化的精细化学品新产品、新技术；从事精细化工生产过程中的催化剂、反应机理、分离过程理论研究，开发从整个工程链中减少或消除污染的绿色化学工程单元技术。</p> <p>This research field mainly focuses on the design, synthesis and application of the novel green chemicals, and the fundamental theories and the applied technologies for the new technologies of the current fine chemicals. With the goals of environmental-friendly, energy conservation and emission reduction, and reducing production cost, develop functional fine chemicals and new technology. Working on the catalyst, reaction mechanism and theoretical research in the production process of fine chemical engineering, developing new technology of green chemical engineering unit to reduce or eliminate pollution from the whole engineering chain.</p>	<p>功能化合物设计与合成、纳米材料与纳米技术、精细有机合成中的高新技术、功能材料研究进展</p> <p>The Design and Synthesis of Functional Compound、Nanoscience and Nanotechnology、The Novel Technologies of Fine Organic Synthesis; The Advances of the Research on Functional Materials.</p>



	<p>材料化学工程</p>	<p>从事化工新型分离、催化及功能材料的合成与应用、材料制备过程中的化工过程与放大、材料化学工程反应器的技术研究。重点开展膜材料、电化学材料、高分子材料、防腐材料、能源材料、阻燃材料、光电材料等在制备、分离、催化及工程化方面的研究。</p> <p>Novel chemical engineering separation, and synthesis and application of the materials for catalysis and functional materials. Chemical engineering and magnification in materials preparation, and technology development of engineering reactor for material chemistry. Focus on the synthesis, separation, catalysis, and engineering for membrane materials, electrochemical materials, polymers, anti-corrosion materials, energy materials, flame inhibition materials, and solar electric materials.</p>	<p>纳米材料与纳米技术、界面与催化、功能材料研究进展、现代科学分析与技术</p> <p>Nanomaterials and Nanotechnology 、 Interface and Catalysis、Advances in Functional Materials 、 Advanced Science Analysis and Technology</p>
	<p>生物化学工程</p>	<p>从事化学合成药物、生物催化与生物转化、生物传感研究疾病的发病机制和先导性药物分子的研发。解决利用生物催化剂进行产品加工及生产过程中的工程技术问题；进行计算机辅助设计和药物的筛选，探索神经再生、免疫分子的作用机制及治疗策略，开发新型作用机理的药物化合物；研究天然抗氧化剂清除自由基的分子机理和构效关系。</p> <p>This field includes the research on chemical synthetic drugs, biocatalysis and bioconversion, pathophysiology studied by biosensor, and development of pilot drug molecules. Solving the engineering problem in production manufacturing and production process using biocatalysts. Computer aided designing and drug screening, exploring the nerve regeneration, mechanism of immune molecules and treatment strategies, developing drug compounds with new action mechanism. Investigation of molecule mechanism and structure-activity relationship of free radical eliminated by natural antioxidants.</p>	<p>生物反应工程、现代生物技术、分子设计与模型、生物信息学导论</p> <p>Biology Reaction Engineering、Modern Biology Technologies 、Molecule Design and Model、The Introduction of Biology Information</p>


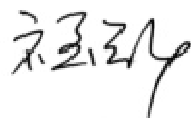

**附表 2: 培养计划 (Training Plan)**

学科名称	化学工程与技术 chemical engineering and technology		学科代码	0817		
单位名称	化学化工学院 School of Chemistry and Chemical Engineering		培养类型	学术博士研究生 Academic Ph.D. Postgraduates		
学分要求	总学分: 15, 必修课程学分: 6, 选修课程学分: 5, 其他培养环节: 4。Total credits: 15, The credits for compulsory courses: 6, The credits for selective courses: 5, others: 4					
课程 设置 (中英文对照)						
课程类型	课程编码	课程名称	学 分	学 期	备注	
公共必修课程 4 学分	G13100	中国文化 Chinese Culture	2	1		
	B14001	汉语 Chinese	2	1		
学科平台课程 4 学分	B06024	化学学科前沿 (II) Frontier in Chemical Science	2	1	必选	
	B06022	化学工程学科前沿 (II) The frontier of chemical engineering discipline	2	1		
	G11003	数理统计 Mathematical Physical Equation	2	1		
方向选修课程 ≥5 学分	B06025	高等化工热力学 Advanced Chemical Engineering Thermodynamics	1	1	选修 4 学 分	
	B06026	高等反应工程 Advanced Chemical Engineering	1	1		
	B06027	高等分离工程 Advanced Separation Engineering	1	1		
	B06028	传递过程原理 Principle of Transport Processes	1	1		
	B06029	催化原理与反应器理论 Catalytic Mechanism and Reactor Theory	1	1		
	B06030	膜与膜过程理论 Membrane and Membrane Process Theory	1	1		
	B06020	催化研究进展 Progress in Catalytic Research	1	1		
	B06032	生物反应工程 Biological Reaction Engineering	1	1		
B06033	现代电化学工程 Modern Electrochemistry Engineering	1	2			

	B06035	现代化学电源 Advanced Chemical Power	1	1
	B06039	界面与催化 Interface and Catalysis	1	1
	B06034	电极过程动力学 Kinetics of Electrode Process	1	2
	B06033	现代生物学技术 Modern Biological Technology	1	2
	B06044	分子设计与模型 Molecular Design and Modeling	1	1
	B06037	生物信息学导论 Introduction of Bioinformatics	1	1
	B06031	纳米材料与纳米技术 Nnao Materials and Nano Technology	1	2
	B06036	功能化合物设计与合成 Design and Preparation of Functional Materials	1	1
	B06046	精细化工进展 Progress in Fine Chemistry Industry	1	1
	B06045	药物化学 Pharmaceutical Chemistry	1	1
	B06021	生物制药工程进展 Progress in Biopharmaceutical Engineering	1	1
	B06041	配位催化 Coordination Catalysis	1	2
	B06019	功能材料研究进展 Progress in Functional Materials	1	1
	B06042	高等有机化学 Advanced Organic Chemistry	1	1
	B06043	现代科学分析与技术 Modern science analysis and technologies	1	1
素养选修课程 ≤1 学分	G09064	科研与人文修养 Scientific Research and Humanistic Cultivation	1	2
	G02060	科研素养与创新能力 Research Literacy and Innovation Ability	1	2
	G13043	中国古代韵文阅读与欣赏 Chinese Ancient Verse Reading and Appreciation	1	2
	G15001	东方哲学与现代化 Eastern Philosophy and Modernization	1	2



	G17070	经济学基础 Basic of Economics	1	2	
补修课程 不计学分		化学工程与技术学科硕士学位核心课程 Core master course of chemical engineering and technology			导师确定
其他培养环节（4 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>1. 博士学位论文开题报告是开展学位论文工作的基础,博士研究生需在导师指导下,查阅文献资料,经过充分调研与论证,确定具体课题,独立地做出开题报告。博士论文开题报告应包括选题的科学依据、国内外发展动态、主要研究内容、研究方案、课题所需条件、预期成果及创新点等。</p> <p>2. 博士论文开题采取答辩的方式进行,并提交书面开题报告。论文开题报告经导师审阅后,由本学科或相关学科 5 人以上的博导、教授组成开题报告评审小组,对学生所做开题报告提出评价和修改意见。学生导师或者至少一位导师组成员必须参加学生的开题报告。</p> <p>3. 每个博士生做 20 分钟左右的开题报告+10 分钟左右的提问。专家组根据博士生论文选题的合理性、可行性、创新性、博士生对课题的理解程度和专业基础知识、博士生的工作能力等方面对学生做出“合格”或“不合格”的明确评定。</p> <p>4. 对通过的开题报告,博士生应根据评审小组的意见进行修改。未通过者在三个月后才能再次申请开题。第二次学位论文开题报告仍未通过者,将终止培养。</p> <p>1. The thesis proposal is the premise for the candidates commence their thesis research work. Under the guidance of the supervisor, PhD candidates search the literatures, fully investigate and survey the items, and finally finish the thesis proposal independently. The PhD thesis proposal must include scientific basis, international and national research progress, research content, research program, conditions, and the expected results and innovations, etc.</p> <p>2. The PhD thesis proposal must be proceeded via an official reply and the written proposal must be submitted. After the proposal has been approved by supervisor, it must be assessed and evaluated by a team by other more than 5 PhD supervisors or professors in the same research area. At least one of the PhD candidate' s supervisors should attend the proposal report meeting.</p> <p>3. Each PhD candidate should give about 20 minutes presentation and 10 minutes defense for the proposal. The experts will give “pass” or “failed” for the proposal according to the rationality, the feasibility, and the innovation of the topic selection, the understanding to the topic, their basic knowledge, and the experiment skills.</p> <p>4. The PhD candidates must revised the approved proposal according to the</p>				3-4

	<p>comments raised by the assessment panel. The PhD candidate failed to pass the thesis proposal could attend the re-assessment again after three months, otherwise, the training will be terminated.</p>		
<p>中期考核 (1 学分)</p>	<p>1. 博士研究生的中期考核在其开题以后 6 个月以上。 2. 中期考核内容主要包括博士研究生的政治思想和道德品质、综合知识的掌握程度、博士论文研究工作的进展等。 3. 学院组织考察小组（5 人以上的博导、教授组成）对博士生的综合能力、论文工作进展以及工作态度、精力投入等进行全面考查。 4. 每个博士生做 30 分钟左右的中期答辩+15 分钟左右的提问。 5. 中期考核结果分为合格与不合格，合格者可继续进行博士论文工作，并根据专家组意见进行改进。不合格或未参加中期考核的博士生，根据学校相关研究培养管理文件规定做肄业处理。</p> <p>1. The mid-term assessment for the PhD candidate will be proceeded after 6 months since the thesis proposal report. 2. The assessment items include moral character, the level how the candidate master, and the progress for their PhD thesis research. 3. The school will organize an assessment panel of 5 PhD supervisors or professors to assess the comprehensive ability, the progress of thesis, the working attitude, and the devoted effort. 4. Each PhD candidate must give about 30 minutes mid-term defense presentation with a 15 minutes question answer. 5. The results for the mid-term assessment are “pass” and “failed”, who pass the assessment can continue his PhD thesis research and revise it according to the comments raised. Those failed in the assessment or absent from the assessment are not allowed to continue the thesis drafting. It will be regarded as a dropout according to the related rules.</p>	3-5	
<p>创新创业 (2 学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次； 2. 参加高水平科技竞赛、创意设计、创新创业竞赛等； 3. 参加 12 次以上与本学科相关的学术报告，并提交总结。 以上每项 high level science and technology competition, creative 计 1 学分，需完成 2 学分。</p> <p>1. Attend academic conferences and give oral presentation, or give open academic presentation for 2 times; 2. Attend the design, and innovation and entrepreneurship competition, etc. 3. Attend the discipline related academic conferences for at least 12 times and submit the summary. Each item above is worth 1 credit, and 2 credits are required.</p>	1-8	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



## 学术学位硕士研究生培养方案

学科代码：0817

### Training Program for International Master Students

Credit Code: 0817

#### 一、培养目标 (Educational Objectives)

本学科旨在培养德、智、体全面发展的化工高级专门人才。具体要求为：

1. 遵守中国法律和学校规章制度，热爱中国文化，积极促进中外友好合作与交流；比较熟练的掌握中文；具有实事求是、科学严谨的治学态度和勇于开拓创新的工作作风。
2. 具备化学工程与技术学科坚实的基础理论、系统的专业知识及必要的实验技能，具有勇于创新的科学精神和从事科学研究的能力，能紧跟化学工程与技术等相关学科领域的发展，能够在化学工程与技术和其它相关领域中从事较高水平科学研究、技术开发、教学和管理等工作的高层次人才。
3. 具有能够使用计算机等现代科研手段快速获取科研信息的能力和使用英语进行学术交流、撰写学术论文的能力；
4. 具有健康的体魄、良好的学术道德、敬业精神以及科学严谨、求真务实的治学态度和工作作风。

This discipline aims to cultivate senior chemical professional experts with comprehensive development in moral, intellectual and physical development. The specific requirements are:

1. Comply with Chinese laws and school rules and regulations, love Chinese culture, actively promote friendly cooperation and exchanges between China and foreign countries; master Chinese in a more proficient manner; have a realistic and rigorous academic attitude and a courageous pioneering and innovative work style.
2. They must acquire the solid theoretical and professional knowledges as well as the necessary practice skills, and be familiar with the direction and the trend of the discipline. The abilities for the innovation and the practice in the independent scientific research, technology exploration, process diagnose, and optimization are required to be built up. Have the ability to be engaged to the work in chemical engineering and technology & environment, energy, and materials, the teaching work, and the technology management work in large chemical enterprises.

3. Have the ability to use computer and other modern scientific research means to quickly obtain scientific research information and use English to conduct academic communication and write academic papers;

4. Have a healthy body, good science and technology ethics, dedication and innovation and social responsibility.

## 二、研究方向 ( Research Orientation )

化学工程与技术 ( 一级学科 ) 学术硕士学位研究生培养方案设以下 4 个研究方向:

1. 传质与分离工程
2. 精细化工
3. 催化与反应工程
4. 能源化工与资源利用

详见附表 1。

There are four research directions in the postgraduate training program for master's degree in chemical engineering and technology ( first-level discipline ):

1. Mass transfer and separation engineering
2. Fine chemicals
3. Catalysis and reaction engineering
4. Energy chemical engineering and resource utilization

See Schedule 1 for details.

## 三、学习年限 ( Length of Schooling )

基本学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

Basically 3 years for the education system and the length of schooling is 2~4 years. The time for scientific research and thesis drafting must be more than 1 years ( Since the approve date of the thesis proposal ). The candidates can graduate after the approval by the supervisor but the time for scientific research and thesis drafting cannot be changed. The school suspending is not counted in the length of schooling.

## 四、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程, 学生需在规定时间内完成 16 必修学分和 10 选修学分的学习任务。其他环节 6 学分, 包括开题报告、中期筛选、学习实践和创新创业。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程, 考核合格后方可参与开题答



辩，成绩不计入成绩单。

课程设置情况见附表 2。

The course is divided into compulsory ones and elective ones. Students are required to complete 16 compulsory credits and 10 elective credits within the specified time. 6 credits should be obtained in other sessions, including proposal, mid-term screening, learning practices, and innovative entrepreneurship. Interdisciplinary graduate students are required to take 2 or more courses according to the tutor's requirements. After passing the examination, they can participate in the defense of thesis proposal.

The curriculum is shown in Schedule 2.

## 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

(1) 开题报告内容：硕士生学位论文的文献调研、研究方案和初步结果。

(2) 由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。学生导师或者至少一位导师组成员必须参加学生的开题报告。

(3) 开题报告方式：每个硕士生做 10 分钟左右的开题报告+10 分钟左右的提问。参加开题报告的所有导师根据学生课题的创新性、学生对课题的理解程度和专业基础知识等方面对学生做出“合格”或“不合格”的明确评定。

(4) 对通过的开题报告，硕士生应根据评审小组的意见进行修改。未通过者在两个月后才能再次申请开题。第二次学位论文开题报告仍未通过者，将终止培养。

### 2. 中期筛选

(1) 中期考核内容：硕士论文研究工作的进展。

(2) 学生导师或者至少一位导师组成员必须参加学生的中期考核，评审小组由 5 人以上专家组成。

(3) 中期考核方式：学生必须先提交论文进展报告，经审查合格后才能参加中期进展报告考核。每位研究生报告 15 分钟左右+ 10 分钟提问。所有导师根据学生课题的创新性、学生对课题的理解程度、开展课题所需具备的专业基础知识，以及自开题报告以来的工作量和研究成果，对学生做出“合格”或“不合格”的评价。

(4) 考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。



### 3. 实习实践

教学实践：参与本科课程教学，或协助指导毕业设计、课程设计和实习等；累计不少于1个月的工作量，结束后由导师写出考核评语，考核通过即可获得1学分。

专业实践：专业实践内容包括到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作，专业实践时间累计不少于1个月的时间（一般可以利用寒、暑假），结束后由导师考核，合格即可获得1学分。

### 4. 创新创业

- (1) 进行3个月的出国访学研修或学术交流；
- (2) 参加学术会议并宣读论文，或做公开学术报告2次以上；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等；
- (4) 参加10次以上与本学科相关的学术报告，并提交总结。

以上每项计1学分，需完成2学分。

The master's degree program implements tutor responsibility system, and a guidance group (team) based on the tutor is encouraged. The instructor is responsible for formulating the postgraduate training program and guiding, demonstrating and supervising the moral character and academic ethics of graduate students.

#### 1. Thesis Proposal

(1) Content of the opening report: literature research, research plan and preliminary results of master's degree thesis.

(2) An expert group including more than 5 experts in this discipline will monitor the opening report of the students. The student tutor or at least one tutor group member must attend the student's opening report.

(3) Opening report mode: Each master student will do about 10 minutes of the opening report and 10 minutes of question and answer. All the instructors who participated in the opening report made a clear assessment of the students' "qualified" or "unqualified" according to the innovation of the student's subject, the students' understanding of the subject and the professional basic knowledge. For unqualified students, their scholarships will be reduced or even cancelled, and they must be reopened after two months.

(4) Process management: Master students who do not participate in the unified organization opening report, will be canceled the qualifications for participating in the scholarship, and may not participate in the graduation thesis defense. Master students who are unable to participate due to study abroad, out for cooperation research or other reasons, could apply to the college and agree on the new opening report time with the consent of the tutor.

#### 2. Mid-Term Filtering

- (1) Mid-term assessment content: progress in the research work of master's thesis.



(2) The student tutor or at least one tutor group member must participate in the mid-term assessment of the student. The assessment panel consists of more than 5 experts.

(3) Mid-term assessment mode: Students must submit the progress report of the paper first, and then participate in the mid-term progressing report assessment after passing the examination. Each graduate student report is about 15 minutes and about 10 minutes to ask questions, and the whole process is recorded and archived. All the instructors made a clear assessment of the students' "qualified" or "unqualified" according to the innovation of the student's subject, the level of understanding of the student's knowledge of the subject, the professional basic knowledge required to carry out the project, and the workload and research results since the opening of the report.

(4) If the assessment is unqualified, it will be reviewed by the college or graduate school, and report to chancellor committee to approve as a dropout after verified by the school and postgraduate office.

### 3. Practice

Teaching practice: Participate in the undergraduate course teaching, or assist in guiding graduation design, course design and internship. Accumulate no less than one month of work, and the instructor will write the appraisal comments after finished, and the passed students will earn 1 credit.

Professional practice: professional practice includes training in production, design and research units, as well as scientific research work in the corresponding research directions. The professional practice time is not less than one month ( usually using winter, summer vacation ). After the assessment by the instructor, the qualified students will get 1 credit.

The students require 2 credits for this session.

### 4. Innovation & Entrepreneurship

(1) Attending academic conferences and presenting paper, or giving open academic presentation for 2 times.

(2) Attending and being awarded the national scientific and technological competition, creative design, and innovation and entrepreneurship competition, etc.

(3) Attending the discipline related academic reports for at least 10 times and submit the summary.

Each item above is worth 1 credit, and 2 credit is required.

## 六、学位论文 ( Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：

1. 学位论文应在导师指导下由研究生独立完成；

2. 学位论文要求理论联系实际,内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括:题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等;

3. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性,提出一定的新见解;

4. 学位论文应具有一定的深度和先进性,应反映出作者对基础理论和专门知识的掌握情况,反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力;

5. 学位论文的要求按照《山东理工大学关于研究生学位论文工作的有关规定》《山东理工大学硕士学位授予工作实施细则》等相关文件执行。

1. The thesis should be completed independently by the graduate students under the guidance of the supervisor.

2. The thesis requires the combination of theory with practice, substantial content, advanced technology, correct conclusion, standard format, clear organization and accurate expression. The thesis should be consisted of title, Chinese and English abstract, contents, text, references, acknowledgements, research results, appendices, etc.

3. The thesis should be innovative in theoretical analysis, scientific experiment, engineering application and guiding practice, or put forward some new ideas.

4. The degree thesis should have certain depth and advancement, which should reflect the author's mastery of basic theory and special knowledge, and reflect the author's ability to solve theoretical and practical problems by comprehensive application of relevant theories, methods and means.

5. The requirements for the academic dissertation are executed according to The relevant provisions for the academic dissertation of master degree of Shandong University of Technology and The detailed rules about master degree award of Shandong University of Technology.

## 七、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### 1. 毕业要求

(1) 应能系统性地掌握本学科坚实宽广的基础理论知识,深入了解学科的进展、动向和最新发展前沿。具有独立从事科学研究的能力,并在本学科领域取得理论或实践上的创造性研究成果;

(2) 具有良好的品德修养和学术道德,实事求是、勇于创新;

(3) 修读完培养方案规定课程和其他培养环节,成绩考核合格;



- (4) 完成论文答辩，成绩合格；
- (5) 符合学校有关规定的其他要求。

## 2. 学位要求：

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位授予工作实施细则》以及化学化工学院学位授予有关规定。

The graduate certificate can be authorized if the related requirements are met. Based on this condition, the degree can be awarded if the standard is satisfied.

### 1. Graduation Requirements

(1) The applicant should be able to systematically master the subject of a solid broad theoretical knowledge, in-depth understanding of the discipline of progress, trends and the latest development front. Have the ability to engage in scientific research independently, and in the field of the theory or practice of creative research results.

(2) Must be in good moral cultivation, realistic character, and innovation.

(3) Fulfil all the courses in the program and other training links, and must pass all the examinations.

(4) Pass the thesis examination.

(5) Meet all other requirements of the University.

### 2. Degree Requirements

It must be carried out strictly according to <Interim measures for implementation of the regulations of the People's Republic of China on academic degrees about postgraduate thesis> and the detailed rules about the Master degree award of Shandong University of Technology and School of Chemistry and Chemical Engineering.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>具有高度社会责任感、良好道德修养和学术品德, 具备优良的创新能力和团队合作精神及较宽的国际视野, 身心健康, 能在现代化工及相关领域和行业中从事高水平研究开发、教育和管理等工作。</p> <p>With a high level social responsibility, Good moral training and academic character, with excellent innovation ability, team spirit and a wide range of international vision, physical and mental health, in modern chemical industry and related fields and industry engaged in high level research and development, education and management work.</p>	汉语、中国文化 Chinese, Chinese Culture
综合能力		<p>1. 具备化学学科坚实的理论基础、系统的专业知识和熟练的实验技能, 深入了解化学的科学前沿与发展动态, 能独立从事本科学及相关领域的科学研究、教学、工程、技术及管理等方面的工作;</p> <p>2. 具有能够使用计算机等现代科研手段快速获取科研信息的能力和使用英语进行学术交流、撰写学术论文的能力;</p> <p>1. Have a solid theoretical foundation, systematic expertise and proficiency in chemistry, and have a deep understanding of the frontiers and developments of chemistry. They can independently engage in scientific research, teaching, engineering, technology and management in the undergraduate and related fields.</p> <p>2. Have the ability to quickly acquire scientific research information using modern scientific research methods such as computers and the ability to use English for academic exchanges and writing academic papers;</p>	数值分析、化学工程前沿、反应工程 ( II ) , Numerical Analysis, he Frontier of Chemical Engineering Discipline, Reaction Engineering ( II )
研究方向	传质与分离工程	<p>掌握传质与分离工程基本原理, 掌握化学工程领域的传质与分离研究内容与研究方法, 了解化工分离过程中传质与分离新理论、新分离技术及其工程化分离过程的研究进展。利用化学工程原理, 开展分离过程、流体流动、相平衡关系、传递机理、设备优化与数学建模等方面的研究, 研究重点开发新型无机膜材料, 开展陶瓷纤维膜制备与应用研究, 开发精细化工分子蒸馏、化工过程强化、超临界萃取技术。</p> <p>Master the basic principles of mass transfer and separation engineering, master the mass transfer and separation research content and research methods in the field of chemical engineering, and understand the research progress of new mass transfer and separation theory, new separation technology and engineering separation process in chemical separation process. Using chemical engineering principles, research on separation</p>	化工分离工程 ( II )、化工传递 ( II )、化工热力学 ( II ) , 膜反应与膜反应器, 现代分离技术 Chemical Separation Engineering ( II ) , Chemical Transmission ( II ) , Chemical Thermodynamics ( II ) , Membrane Reaction and



		process, fluid flow, phase equilibrium relationship, transfer mechanism, equipment optimization and mathematical modeling, research on key development of new inorganic membrane materials, research on preparation and application of ceramic fiber membranes, and development of fine chemicals Molecular distillation, chemical process strengthening, supercritical extraction technology.	Membrane Reactor, Modern Separation Technology
	精细化工	<p>掌握有机精细化学品的合成设计、结构鉴定、成分分析等方面的相关理论知识，掌握精细化工清洁生产关键技术和精细化工新材料开发；采用催化反应新技术和分离精制新工艺，设计、合成或复配精细化学品；研究精细化学品结构、配方与专用功能的关系。面向精细与专用化学品研发及工业化生产，开展医药中间体、纺织品整理与染色专用化学品、绿色化学工程与工艺等方面的研究。</p> <p>Master the relevant theoretical knowledge of synthetic design, structural identification and composition analysis of organic fine chemicals; master the key technologies of fine chemical clean production and the development of new materials for fine chemicals; adopt new technologies of catalytic reaction and new processes of separation and refinement, design, synthesis or compounding fine chemicals; study the relationship between fine chemical structure, formulation and special functions. For the research and development of fine and special chemicals and industrial production, research on pharmaceutical intermediates, textile finishing and dyeing chemicals, green chemical engineering and technology.</p>	<p>高等精细有机合成、高等有机化学、精细合成设计精细合成设计、精细化工进展</p> <p>Advanced Fine Organic Synthesis, Advanced Organic Chemistry, Fine Synthetic Design, Progress in Fine Chemicals</p>
	催化与反应工程	<p>掌握催化反应过程、催化剂工程、催化研究方法等方面的理论知识及相关技术，利用催化原理，设计制备新型催化材料，研究其结构与催化性能的关系，开发高效环境友好催化技术，主要从事面向工业催化剂载体制备、非均相工业催化剂、中空纤维膜的制备及性能、不饱和烃类选择加氢用的贵金属催化剂、多孔陶瓷载体和催化剂制备等方面的研究。</p> <p>Master the theoretical knowledge and related technologies in catalytic reaction process, catalyst engineering, catalytic research methods, etc., use the catalytic principle to design and prepare new catalytic materials, study the relationship between structure and catalytic performance, develop efficient and environmentally friendly catalytic technology, mainly engaged in industrial catalyst carrier preparation, heterogeneous industrial catalysts, preparation and properties of hollow fiber membranes, noble metal catalysts for selective hydrogenation of unsaturated hydrocarbons, preparation of porous ceramic supports and catalysts.</p>	<p>反应工程(II)、化工传递(II)、化工热力学(II)、催化反应过程分析、催化研究实验方法、催化剂表征与测试</p> <p>Reaction engineering (II), Chemical transmission (II), Chemical Thermodynamics (II), Analysis of Catalytic Reaction Process, Catalytic Research experimental Method, Catalyst Characterization and Testing</p>

	<p>能源化工与资源利用</p>	<p>掌握能源存储与转换、新能源与可再生资源的开发与利用、电化学储能等能源化工过程的理论知识及相关技术，利用化学与化工的理论与技术来解决能量转换、能量储存及能量传输基础理论和过程工程关键技术，指导材料制备与加工过程。研究内容包括：燃料电池、染料敏化太阳能电池、先进二次电池新体系（锂离子电池、锂硫电池和锂空气电池等）及超级电容器等新型化学电源的关键材料、能量转换或存储机制、器件组装与性能调控技术等研究；生物质催化转化及生物质油提质等的研究；电池材料和有色金属矿渣中有效成分的回收与利用。研究材料结构、性能与应用间关系等科学问题；</p> <p>Master the theoretical knowledge and related technologies of energy storage and chemical energy storage and conversion, development and utilization of new energy and renewable resources, electrochemical energy storage, etc. Use chemical and chemical theories and technologies to solve the basic theory and key technologies of process engineering of energy conversion, energy storage and energy transfer, and guide material preparation and processing. The research contents include: Key materials, energy conversion or storage mechanisms, device assembly and performance control techniques for fuel cell, dye-sensitized solar cells, advanced secondary battery system (Lithium-ion battery, lithium-sulfur battery, lithium-air battery, etc.), and supercapacitors. Study on biomass catalytic conversion and biomass oil purification. Recycling and utilization of useful components in battery materials and non-ferrous metal slag. Study scientific issues such as the relationship between material structure, performance and application.</p>	<p>电化学研究方法、电极过程动力学、新能源材料、电化学工程、高分子材料工程、功能材料科学</p> <p>Electrochemical Research Method, Electrode Process Dynamics, New Energy Materials, Electrochemical Engineering, Polymer Material Engineering, Functional Materials Science</p>
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**附表 2: 培养计划 (Training Plan)**

学科名称	化学工程与技术 chemical engineering and technology		学科代码	0817		
单位名称	化学化工学院 School of Chemistry and Chemical Engineering		培养类型	学术型硕士研究生 Academic Graduate Student		
学分要求	总学分 Total Credits: 34, 必修课程学分 Credit for Compulsive Course: 19, 选修课程学分 Credit for optional course: 9。其他培养环节 Other training sessions: 6					
课程 设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 8 学分	G13100	中国文化 Chinese	2	1		
	G13101	汉语 Primacy Foreign Language	2	1		
	G15003	论文写作与学术规范 Thesis Writing and Academic	3	1		
	G11001	数值分析 Numerical Analysis	1	1		
	060070	化工分离工程 (II) Chemical separation engineering (II)	1	1		
学科平台课程 11 学分	060071	化工传递 (II) Chemical transmission (II)	2	1	必选	
	060002	化工热力学 (II) Chemical thermodynamics (II)	2	1		
	060003	反应工程 (II) Reaction engineering (II)	2	2		
	G11005	数理方程 Mathematical Physics Equations	2	1		
	060105	化学工程学科前沿 (I) Frontier of Chemical Engineering	2	2		
	060016	催化反应过程分析 Analysis of Catalytic Reaction Process	1	2		
方向选修课程 8 学分	060091	科技论文写作 (全英文) Scientific English Writing	2	1		
	060072	化工系统工程 chemical System Engineering	2	1		
	060073	膜反应与膜反应器 Membrane Reaction and Membrane Reactor	2	2		



060004	高等有机化学 Advanced Organic Chemistry	2	2
060005	高等物理化学 Advanced Physical Chemistry	2	2
060006	电极过程动力学 Electrode Process Dynamics	2	1
060007	电化学研究方法 Electrochemical Research Method	2	1
060009	催化研究实验方法 Catalytic Research Experimental Method	2	1
060010	环境化学分析 Environmental Chemical Analysis	2	2
060074	现代分离技术 Modern Separation Technology	2	2
060032	现代仪器分析 Modern Instrument Analysis	2	2
060075	应用表面化学 Applied Surface Chemistry	2	2
060076	催化剂表征与测试 Catalyst Characterization and Testing	2	1
060077	计算化学与分子模拟 Computational Chemistry and Molecular Simulation	2	2
060078	新能源材料 New Energy Materials	2	2
060079	实验研究方法与数据处理 Experimental Research Methods and Data Processing	2	2
060080	精细合成设计 Fine Synthetic Design	2	2
060081	高分子材料工程 Polymer Material Engineering	2	2
060020	能源电化学 Energy Electrochemical	2	2
060021	电化学工程 Electrochemical Engineering	2	2
060024	功能材料科学 Functional Materials Science	2	2


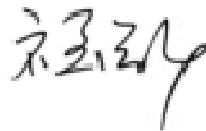


	060049	现代测试技术 Modern Testing Technology	2	2
	060093	绿色化学 Green Chemistry	2	1
	060103	高等精细有机合成 Advanced Fine Organic Synthesis	2	2
	060087	化工过程模拟方法及原理 Chemical Process Simulation Method and Principle	2	2
	060082	高分子化学 High Polymer Chemistry	2	2
	060095	精细化工进展 Progress in Fine Chemicals	2	1
	060086	超分子化学与自组装 Supramolecular Chemistry and Self-assembly	2	2
	060090	高等无机化学 Advanced Inorganic Chemistry	1	1
	060085	催化化学 Catalytic Chemistry	2	1
	060056	生物分析化学 Bioanalytical Chemistry	2	2
	060102	应用电化学 Applied Electrochemistry	2	2
	060036	新材料及其应用 New Materials and Their Applications	2	2
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	2	2
	G13043	中国古代韵文阅读与欣赏 Chinese Ancient Verse Reading and Appreciation	2	1
	素养选修课程 1 学分	G17070	经济学基础 Basic of Economics	1
G05024		计算机科学前沿技术应用系列讲座 Computer Science Frontier Technology Application Series Lecture	1	2
G02060		科研素养与创新能力 Research Literacy and Innovation Ability	1	2
G13042		诗歌与审美艺术 Poetry and Aesthetic Art	1	2

	G10014	实验设计与统计分析 Experimental Design and Statistical Analysis	1	2	
补修课程 不计学分					导师 确定
其他培养环节（6 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>1. 开题报告内容：硕士生学位论文的文献调研、研究方案和初步结果。</p> <p>2. 由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。学生导师或者至少一位导师组成员必须参加学生的开题报告。</p> <p>3. 开题报告方式：每个硕士生做 10 分钟左右的开题报告+10 分钟左右的提问。参加开题报告的所有导师根据学生课题的创新性、学生对课题的理解程度和专业基础知识等方面对学生做出“合格”或“不合格”的明确评定。</p> <p>4. 对通过的开题报告，硕士生应根据评审小组的意见进行修改。未通过者在两个月后才能再次申请开题。第二次学位论文开题报告仍未通过者，将终止培养。</p> <p>1. Content of the opening report: literature research, research plan and preliminary results of master's degree thesis.</p> <p>2. An expert group including more than 5 experts in this discipline will monitor the opening report of the students. The student tutor or at least one tutor group member must attend the student's opening report.</p> <p>3. Opening report mode: Each master student will do about 10 minutes of the opening report and 10 minutes of question and answer. All the instructors who participated in the opening report made a clear assessment of the students' "qualified" or "unqualified" according to the innovation of the student's subject, the students' understanding of the subject and the professional basic knowledge. For unqualified students, their scholarships will be reduced or even cancelled, and they must be reopened after two months.</p> <p>4. Process management: Master students who do not participate in the unified organization opening report, will be canceled the qualifications for participating in the scholarship, and may not participate in the graduation thesis defense. Master students who are unable to participate due to study abroad, out for cooperation research or other reasons, could apply to the college and agree on the new opening report time with the consent of the tutor. and agree on the new opening report time with the consent of the tutor.</p>				3
中期考核 (1 学分)	<p>1. 中期考核内容：硕士论文研究工作的进展。</p> <p>2. 学生导师或者至少一位导师组成员必须参加学生的中期考核，评审小组由 5 人以上专家组成。</p> <p>3. 中期考核方式：学生必须先提交论文进展报告，经审查合格后才能参加中期进展报告考核。每位研究生报告 15 分钟左右+ 10 分钟提问。所有导师根据学生课题的创新性、学生对课题的理解程度、开展课题所需具备的专业</p>				4-5



	<p>基础知识，以及自开题报告以来的工作量和研究成果，对学生做出“合格”或“不合格”的评价。</p> <p>4. 考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。</p> <p>1. Mid-term assessment content: progress in the research work of master's thesis.</p> <p>2. The student tutor or at least one tutor group member must participate in the mid-term assessment of the student. The assessment panel consists of more than 5 experts.</p> <p>3. Mid-term assessment mode: Students must submit the progress report of the paper first, and then participate in the mid-term progressing report assessment after passing the examination. Each graduate student report is about 15 minutes and about 10 minutes to ask questions, and the whole process is recorded and archived. All the instructors made a clear assessment of the students' "qualified" or "unqualified" according to the innovation of the student's subject, the level of understanding of the student's knowledge of the subject, the professional basic knowledge required to carry out the project, and the workload and research results since the opening of the report.</p> <p>4. If the assessment is unqualified, it will be reviewed by the college or graduate school, and report to chancellor committee to approve as a dropout after verified by the school and postgraduate office.</p>	
<p>实习实践 (2 学分)</p>	<p>教学实践：参与本科课程教学，或协助指导毕业设计、课程设计和实习等；累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即可获得 1 学分。</p> <p>专业实践：专业实践内容包括到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作，专业实践时间累计不少于 1 个月的时间（一般可以利用寒、暑假），结束后由导师考核，合格即可获得 1 学分。</p> <p>Teaching practice: Participate in the undergraduate course teaching, or assist in guiding graduation design, course design and internship. Accumulate no less than one month of work, and the instructor will write the appraisal comments after finished, and the passed students will earn 1 credit.</p> <p>Professional practice: professional practice includes training in production, design and research units, as well as scientific research work in the corresponding research directions. The professional practice time is not less than one month (usually using winter, summer vacation). After the assessment by the instructor, the qualified students will get 1 credit.</p> <p>The students require 2 credits for this session.</p>	<p>2-5</p>
<p>创新创业 (2 学分)</p>	<p>1. 进行 3 个月的出国访学研修或学术交流；</p> <p>2. 参加学术会议并宣读论文，或做公开学术报告 2 次以上；</p> <p>3. 参加全国性的科技竞赛、创意设计、创新创业竞赛等；</p> <p>4. 参加 10 次以上与本学科相关的学术报告，并提交总结。</p> <p>以上每项计 1 学分，需完成 2 学分。</p> <p>1. Attending academic conferences and presenting paper, or giving open</p>	<p>1-6</p>

	<p>academic presentation for 2 times.</p> <p>2. Attending and being awarded the national scientific and technological competition, creative design, and innovation and entrepreneurship competition, etc.</p> <p>3. Attending the discipline related academic reports for at least 10 times and submit the summary.</p> <p>Each item above is worth 1 credit, and 2 credit is required.</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p> 



# 物理化学学科学术学位硕士研究生培养方案

学科代码：070304

## Training Program for International Master Students

### Majored in Physical Chemistry

Credit Code: 070304

#### 一、学科简介 ( Brief Introduction to Discipline )

我校化学一级学科拥有应用化学山东省重点学科和物理化学二级学科硕士学位授权点，已经进入科睿唯安 ESI 全球排名前 1%。物理化学二级学科于 2006 年获批硕士学位授权点，2007 年起连续招生至今。

本学科目前拥有一支年龄结构合理、学术水平较高的师资队伍，现有国家千人计划专家 1 人、山东省泰山学者青年专家 1 人、山东“省优青” 2 人，40 岁以下人员比例稳定在 60% 左右，具有高级职称的人员比例稳定在 50% 左右，具有博士学位的人员比例超过 85%，具有海外留学经历的人员比例超过 50%，很好地满足了本学科研究生教育和科研发展需要。

近年来，本学科承担了国家自然科学基金、山东省重点研发项目等国家级、省部级项目，年均科研经费 500 万元以上，获山东省自然科学一等奖、教育部高等学校科学研究优秀成果二等奖等多项省部级科技奖励，人均 SCI 论文数量与质量均居于学校前列，多篇论文发表在 Chemical Society Reviews、Journal of American Chemical Society、Angewandte Chemie International Edition、Advanced Functional Materials 等国际权威期刊上。

本学位点立足物理化学“交叉融合”的学科特征，形成了能源材料化学、催化与有机功能材料化学、光电磁功能材料、电化学与光谱传感等具有鲜明特色的研究方向，取得了一系列创新性研究成果。与美国、法国、澳大利亚、新加坡等国家的知名高校或科研机构建立了密切的合作关系，为研究生的国际交流构建了广阔的平台。

未来的发展目标是进一步提升化学学科的 ESI 排名，入选山东省一流学科建设项目，获批化学一级学科硕士点。

The Chemistry discipline in SDUT relying on a key discipline in Shandong province

( Applied Chemistry ) and sub-discipline graduate program ( Physical Chemistry ) has ranked top 1% on ESI. Physical Chemistry was authorized to offer master degree in 2006 and begun to continuously enroll students ever since 2007.

The Chemistry discipline possesses high-level academic faculty with reasonable age distribution. There is 1 National Thousand People Plan Expert, 1 Young Expert of Taishan Scholar of Shandong province and 2 Excellent Young Scholars of Shandong province. 60% of faculty are below 40 years old, 50% of faculty have senior professional titles, more than 85% of faculty have PhD degree and 50% have overseas experience. The faculty could meet the needs of graduate education and research development.

National or provincial/ministerial level projects such as NSFCs and Shandong provincial Key R&D Programs were chaired in recent years. The average fund per year reaches up to 5 Million CNY. Several provincial/ministerial level awards including Shandong Natural Science Award ( First Prize ) and Outstanding Achievements of Scientific Research from Ministry of Education ( Second Prize ) were rewarded. Many research papers are published on top journals such as Chemical Society Reviews, Journal of American Chemical Society, Angewandte Chemie International Edition, Advanced Functional Materials. The quality and average number of SCI-indexed papers per faculty ranks forefront in SDUT.

The graduate program focusing on the characteristics of inter-disciplines and multi-disciplines for physical chemistry is divided into four research fields with distinct features: Energy Materials Chemistry, Chemistry of Catalysis and Organic Functional Materials, Photoelectromagnetic Functional Materials and Electrochemical and Spectral Sensing. A series of innovative research findings have been achieved. The close cooperation with institutions and universities in USA, France, Australia and Singapore has been established to facilitate the international communications for graduate students.

The development target aims at further promoting ESI ranking of chemistry discipline, laying the foundation for the authorization of first-class discipline of Shandong province and graduate program of Chemistry discipline

## 二、培养目标 ( Educational Objectives )

为适应经济建设和社会发展的需要，培养德、智、体全面发展，能从事本学科领域内的教学、科研以及管理工作的高层次专门人才，具体要求：

1. 了解中国的基本国情，熟悉中国文化，遵守中国法律法规，对华友好，积极促进中外友好合作与交流；比较熟练的掌握中文；

2. 具备化学学科坚实的理论基础、系统的专业知识和熟练的实验技能，深入了解化学的科学前沿与发展动态，能独立从事本学科及相关领域的科学研究、教学、工程、技术及管理等方面的工作；

3. 身心健康，具有良好的职业道德、敬业精神以及科学严谨、求真务实的治学态度



和的工作作风。

1. Fully recognizing the basic reality and culture of China, complying Chinese laws and regulations, friendly to China, actively promoting friendly cooperation and communication between China and foreign countries. Having a good command of Chinese.

2. Possessing a strong background on Chemistry discipline, systematic professional knowledge and skilled in experiment. Deeply understanding the scientific frontier and development trend of Chemistry. Having the ability to independently carry out the work such as researching, teaching, engineering, technology and managing on Chemistry discipline and related fields.

3. Physical and mental health, having a good professional ethics, professional dedication, pursuing the truth having a scientifically rigorous and pragmatic scholastic attitude and style of work.

### 三、研究方向 ( Research Orientation )

物理化学 ( 一级学科 ) 学术硕士学位研究生培养方案设以下 4 个研究方向:

1. 能源材料化学
2. 催化与有机功能材料化学
3. 光电磁功能材料
4. 电化学与光谱传感

详见附表 1。

Physical Chemistry ( First-level Discipline ) Academic Master's Degree Postgraduate Training Program has the following four research directions:

1. Energy Materials Chemistry
2. Chemistry of Catalysis and Organic Functional Materials
3. Photoelectromagnetic Functional Materials
4. Electrochemical and Spectral Sensing

See Schedule 1 for details.

### 四、学习年限 ( Length of Schooling )

基本学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

Basically 3 years for the education system and the length of schooling is 2~4 years. The duration for the scientific research and thesis drafting must be more than 1 year ( since the approval date of the thesis proposal ) . The candidates can graduate in advance after the approval by the supervisor with the same duration for scientific research and thesis drafting. The school



suspending is not counted in the duration of schooling.

## 五、课程设置与学分要求 (Curriculum and Credit Requirements)

本专业留学生学位要求 $\geq 33$  学分，其中课程 $\geq 27$  学分，其他培养环节 6 学分。课程分为必修课程和选修课程，学生需在规定时间内完成必修课程 16 学分、选修课程 $\geq 11$  学分的学习任务。跨学科攻读学位研究生需根据导师要求修读至少 2 门本学校本专业的本科课程，考核合格后方可参与开题答辩，不计入学分。

课程设置情况见附表 2。

33 credits including 27 credits for courses and 6 credits for other training segments are required for the master degree. The courses include the compulsory and the selective ones, and the candidates must obtain 16 credits for the compulsory courses and 11 credits for the selective courses in the schedule time. The candidates studying in an interdisciplinary way are required to take no less than 2 non-credit courses in physicochemistry of undergraduate students and the thesis proposal can be approved only after they pass these courses.

The curriculum schedule is presented in the Appendix Table 2.

## 六、培养方式与培养环节 (Training Mode and Cultivating Process)

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

(1) 开题报告内容：硕士生课程成绩，学位论文的文献调研、研究方案和初步结果。

(2) 由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。学生导师或者至少一位导师组成员必须参加学生的开题报告。

(3) 开题报告方式：每位硕士生的开题报告 10 分钟左右，专家提问 10 分钟左右。评审组根据学生课题的创新性、学生对课题的理解程度及其专业基础知识等方面对学生做出“合格”或“不合格”的明确评定。

(4) 不合格的学生，必须在两个月后才能重新申请开题，仍不通过者终止培养。

### 2. 中期筛选

(1) 中期考核内容：硕士生的学位论文研究工作进展。

(2) 学生导师或者至少一位导师组成员必须参加学生的中期考核，评审组由本学科专业 5 人以上专家组成。



(3) 中期考核方式：学生必须先提交论文进展报告，经审查合格后才能参加中期考核。每位研究生作 15 分钟左右的中期考核报告，评审组提问 10 分钟左右。根据学生课题的创新性、学生对课题的理解程度、开展课题所需具备的专业基础知识，特别是自开题报告以来的工作进展和研究成果，评审组对学生做出“合格”或“不合格”的评价，并进行排序。

(4) 中期考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。

### 3. 实习实践

教学实践：参与本科课程教学，或协助导师指导毕业设计、课程设计和实习等，累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。

专业实践：参与导师科研项目、实习基地或协作单位的研究和实践活动，时间累计不少于 1 个月。经导师考核合格即可获得 1 学分。

### 4. 创新创业

- (1) 参加学术会议并宣读论文，或作公开学术报告 2 次及以上；
- (2) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (3) 参加 10 次及以上与本学科相关的学术报告，并提交总结。

以上每项计 1 学分，需完成 2 学分。

The training for the candidates is under the tutorial system and it is encouraged to carry out with the mode of team guidance charged by the supervisors. The supervisors draw up the training program and are responsible for the ideology and academic morality of the candidates.

#### 1. Thesis Proposal

(1) The thesis proposal contains course grades, literature review, research program and preliminary results.

(2) The proposal will be evaluated by a team composed of more than 5 experts in the same research area. The supervisor or at least one member of guidance team should attend the proposal report meeting.

(3) The procedure of proposal: Each candidate should give about 10 minutes presentation and about 10 minutes defense for the proposal, and the process will be recorded and filed. The experts will give “pass” or “failed” for the proposal according to the innovation of the topic selection, the understanding to the topic and their basic knowledge. The results of proposal for all candidates will be sorted without showing the exact score.

(4) The candidate failed to pass the thesis proposal must attend the re-assessment in two months, and the training will be terminated if the candidate failed again.

#### 2. Mid-Term Filtering

(1) The content of mid-term filtering is research progress of thesis for candidates.

(2) The supervisor or at least one member of guidance team should attend the mid-term assessment, which will be evaluated by a team composed of more than 5 experts in the same research area.

(3) The procedure of mid-term assessment: The candidates should submit progress report of thesis and they are permitted to participate the assessment only if their reports pass the evaluation. Each candidate should give about 15 minutes presentation and about 10 minutes defense for the proposal, and the process will be recorded and filed. The experts will give “pass” or “failed” for the assessment according to the innovation of the topic selection, the understanding to the topic and their basic knowledge, especially the work progress and research results since proposal report. The results of proposal for all candidates will be sorted without showing the exact score.

(4) The candidate failed to pass the mid-term assessment will be reviewed by school and graduate school and then processed as “study in school” with the approval of President’s Council.

### 3. Practice

(1) Teaching practice: Involved in teaching on the course of undergraduate student, or guiding the undergraduate students on graduation, course design and practice. The total duration should be more than 1 month. The supervisor will provide the assessment comment and the candidate will obtain 1 credit when they pass the assessment.

(2) Professional practice: Involved in the research and practical activities of supervisor’s project, practice base or cooperative organization. The total duration should be more than 1 month. The supervisor will provide the assessment comment and the candidate will obtain 1 credit when they pass the assessment.

### 4. Innovation & Entrepreneurship

(1) Attending academic conferences and presenting paper, or giving open academic presentation for 2 times.

(2) Attending and being awarded the national scientific and technological competition, creative design, and innovation and entrepreneurship competition, etc.

(3) Attending the discipline related academic reports for at least 10 times and submit the summary.

Each item above is worth 1 credit, and 2 credit is required.

## 七、学位论文 (Academic Dissertation)

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：



1. 学位论文应在导师指导下由研究生独立完成。
2. 学位论文要求理论联系实际，内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括：题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。
3. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性，提出一定的新见解。
4. 学位论文应具有一定的深度和先进性，应反映出作者对基础理论和专门知识的掌握情况，反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。
5. 学位论文的要求按照《山东理工大学关于研究生学位论文工作的有关规定》《山东理工大学硕士学位授予工作实施细则》等相关文件执行。

1. The thesis should be completed independently by the graduate students under the guidance of the supervisor.

2. The thesis requires the combination of theory with practice, substantial content, advanced technology, correct conclusion, standard format, clear organization and accurate expression. The thesis should be consisted of title, Chinese and English abstract, contents, text, references, acknowledgements, research results, appendices, etc.

3. The thesis should be innovative in theoretical analysis, scientific experiment, engineering application and guiding practice, or put forward some new ideas.

4. The degree thesis should have certain depth and advancement, which should reflect the author's mastery of basic theory and special knowledge, and reflect the author's ability to solve theoretical and practical problems by comprehensive application of relevant theories, methods and means.

5. The requirements for the academic dissertation are executed according to The relevant provisions for the academic dissertation of master degree of Shandong University of Technology and The detailed rules about master degree award of Shandong University of Technology.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求，可获得毕业证书；在获得毕业证书的基础上，如满足学位授予标准，可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 完成培养方案规定课程和其他培养环节，成绩考核合格；
3. 通过论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

## (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位授予工作实施细则》以及化学化工学院学位授予有关规定。

The graduate certificate can be authorized if the related requirements are met. Based on this condition, the degree can be awarded if the standard is satisfied.

### 1. Graduation Requirements

(1) Must be in good moral cultivation, realistic character, and innovation.

(2) Fulfil all the courses in the program and other training links, and must pass all the examinations.

(3) Pass the thesis examination.

(4) Meet all other requirements of the University.

### 2. Degree Requirements

It must be carried out strictly according to <Interim measures for implementation of the regulations of the People's Republic of China on academic degrees about postgraduate thesis> and the detailed rules about the Master degree award of Shandong University of Technology and School of Chemistry and Chemical Engineering.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>了解中国的基本国情, 熟悉中国文化, 遵守中国法律法规, 对华友好, 积极促进中外友好合作与交流; 比较熟练的掌握中文。身心健康, 具有良好的职业道德、敬业精神以及科学严谨、求真务实的治学态度和工作作风。</p> <p>Fully recognizing the basic reality and culture of China, complying Chinese laws and regulations, friendly to China, actively promoting friendly cooperation and communication between China and foreign countries. Having a good command of Chinese. Physical and mental health, having a good professional ethics, professional dedication, pursuing the truth having a scientifically rigorous and pragmatic scholastic attitude and style of work.</p>	<p>中国文化、汉语、论文写作与学术规范 Chinese Culture、Chinese、Thesis Writing and Academic Norm</p>
综合能力	<p>具备化学学科坚实的理论基础、系统的专业知识和熟练的实验技能、深入了解化学的科学前沿与发展动态、能独立从事本学科及相关领域的科学研究、教学、工程、技术及管理等方面的工作。</p> <p>Possessing a strong background on Chemistry discipline, systematic professional knowledge and skilled in experiment. Deeply understanding the scientific frontier and development trend of Chemistry. Having the ability to independently carry out the work such as researching, teaching, engineering, technology and managing on Chemistry discipline and related fields.</p>	<p>数值分析、数理统计、固体物理学、数理方程、高等物理化学、量子化学基础、化学学科前沿、科技英语写作 Numerical Analysis, Mathematical Statistics、Solid State Physics、Equations of Mathematical Physics、Advanced Physical Chemistry, Elementary Quantum Chemistry、Frontier in Chemical Science、Scientific Writing</p>
研究方向	<p>主要开展能源材料的结构设计、可控制备、界面调控及其应用研究。具体包括: 1. 纳米材料的结构与界面调控; 2. 燃料电池、二次电池和超级电容器等电化学能源体系的关键材料、器件及相关过程的物理化学机制; 3. 光(电)催化与光电转化材料; 4. 离子-电子混合导体陶瓷膜材料及其制氢制氧应用。</p> <p>Mainly focusing on structural design, controllable preparation, interfacial regulation and application of energy materials. Specifically, this research field covers: 1. Structural and interfacial regulation of nanomaterials; 2. the physicochemical mechanisms of key materials,</p>	<p>吸附作用应用原理、纳米材料制备与表征、电化学研究方法、电极过程动力学、催化反应过程分析、催化化学、现代测试技术、计算化学 Principle of Application in Adsorption、Preparation and Characterization of Nanomaterials、Research Method of</p>

		<p>devices and related processes in the electrochemical energy systems such as fuel cells, secondary batteries and supercapacitors; 3. photocatalytic/electrocatalytic and photoelectric conversion materials; 4. ion-electron hybrid conductor ceramic membrane materials and their applications in production of hydrogen and oxygen.</p>	<p>Electrochemistry 、 Dynamic of Electrode Process, Analysis of Catalytic Reaction Process 、 Catalytic Chemistry 、 Modern Testing Techniques 、 Computational Chemistry</p>
	催化与有机功能材料化学	<p>主要从事高效催化剂和新型催化反应的开发、光催化与光捕获体系研究。具体包括： 1. 新催化反应的开发及其催化反应机理研究；2. 超分子聚集体与超分子光化学；3. 光催化；4. 电催化与电合成</p> <p>Mainly engaging in development of highly efficient catalysts and new catalytic reactions, photocatalysis and light capture system research. Specifically, this research field covers: The development of new catalytic reactions and the study of catalytic reaction mechanism; studies on the design, synthesis, aggregation behavior and supramolecular photochemistry property of the platinum (II) complexes; photocatalytic reduction of CO<sub>2</sub> and degradation of organic dyes as well as photocatalytic reaction mechanism.</p>	<p>催化反应过程分析、催化化学、超分子化学与自组装、有机光电材料、高等有机化学、现代测试技术、计算化学、精细化学品化学 Analysis of Catalytic Reaction Process, Catalytic Chemistry、Supramolecular Chemistry and Self-assembly 、 Organic Optoelectronic Materials, Advanced Organic Chemistry、 Modern Testing Techniques 、 Computational Chemistry、 Fine Chemical Chemistry</p>
	光电磁功能材料	<p>以物理无机化学为专业基础、致力于无机有机杂化型固体分子功能材料的设计合成、微观结构及光、电、磁等物理化学性质研究。具体包括：1. 功能金属配合物分子磁体；2. 光、热、压力诱导的双稳态多自旋分子磁性材料；3. 金属有机骨架（MOF）质子导电材料和光电催化材料；4. 电、磁导向的石墨烯材料；5. 功能化光敏性凝胶材料。</p> <p>Mainly based on physico-inorganic chemistry, dedicating to the design and synthesis of hybrid inorganic-organic solid state molecular functional materials, study of their microstructure as well as physicochemical properties of light, electricity and magnetism. Specifically, this research field covers: 1. Molecular magnets of functional metal complex; 2. bistable multi-spin molecular magnetic materials induced by light, heat and pressure; 3. metal organic framework (MOF) proton-conductive materials and photo- or electro-catalytic materials; 4. electrically and magnetically oriented graphene materials; 5. functional photosensitive gel materials.</p>	<p>配位化学、统计热力学、现代仪器分析、计算化学、高等无机化学、功能材料科学 Coordination Chemistry 、 Statistical Thermodynamics、 Computational Chemistry、 Advanced Inorganic Chemistry、 Functional Materials Science</p>



	电化学与光谱传感	<p>主要开展电化学及光谱传感方面的作用机制与应用研究。具体包括：基于纳米材料的电化学传感器的设计合成、机理研究及其应用；用于活性分子检测的生物传感器设计合成及其应用；电化学传感器件的研制及在环境分析、食品分析中的应用</p> <p>Mainly focusing on the mechanism and application of electrochemical and spectral sensing. Specifically, this research field covers: the design, synthesis, mechanism research and application of nanomaterial-based electrochemical sensors; the design, synthesis and application of biosensor for active molecules detection; the development of electrochemical sensors and their applications in environmental and food analysis.</p>	<p>纳米材料制备与表征、电化学研究方法、电极过程动力学、现代仪器分析</p> <p>Preparation and Characterization of Nanomaterials 、 Research Method of Electrochemistry 、 Dynamic of Electrode Process, Modern Instrumental Analysis</p>
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附表 2: 培养计划 (Training Plan)

学科名称	物理化学 physical chemistry		学科代码	070304		
单位名称	化学化工学院 School of Chemistry and Chemical Engineering		培养类型	学术型硕士研究生 Academic Graduate Student		
学分要求	总学分: $\geq 33$ , 必修课程学分: 16, 选修课程学分: $\geq 11$ , 其他培养环节 6。Total credits: $\geq 33$ , credits for compulsory courses: 16, credits for selective courses: $\geq 11$ , others: 6.					
课程 设 置						
课程类型	课程编码	课程名称	学 分	学 期	备注	
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1		
	130063	汉语 Chinese	2	1		
	G15001	论文写作与学术规范 Thesis Writing and Academic Norm	1	1		
学科平台课程 11 学分	G11001	数值分析 Numerical Analysis	2	1	4 选 1	
	G11003	数理统计 Mathematical Statistics	2	1		
	090042	固体物理学 Solid State Physics	2	1		
	G11005	数理方程 Equations of Mathematical Physics	2	1		
	060005	高等物理化学 Advanced Physical Chemistry	2	1	必修	
	060096	表面物理化学 Surface Physical Chemistry	2	1		
	060027	量子化学基础 Elementary Quantum Chemistry	2	2		
	060094	化学学科前沿 (I) Frontier in Chemical Science	2	2		
	060091	科技论文写作 Scientific Writing	2	2		
方向选修课程 $\geq 11$ 学分	060033	计算化学 Computational Chemistry	2	1	选修	
	060084	吸附作用应用原理 Principle of Application in Adsorption	2	1		


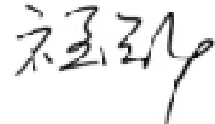


	060032	现代仪器分析 Modern Instrumental Analysis	2	1
	060006	电极过程动力学 Dynamic of Electrode Process	2	1
	060016	催化反应过程分析 Analysis of Catalytic Reaction Process	2	1
	060086	超分子化学与自组装 Supramolecular Chemistry and Self-assembly	2	1
	060024	功能材料科学 Functional Materials Science	2	1
	060085	催化化学 Catalytic Chemistry	2	2
	060054	有机光电材料 Organic Optoelectronic Materials	2	2
	060104	配位化学 Coordination Chemistry	2	2
	060004	高等有机化学 Advanced Organic Chemistry	2	2
	060090	高等无机化学 Advanced Inorganic Chemistry	2	2
	060034	纳米材料制备与表征 Preparation and Characterization of Nanomaterials	2	2
	060007	电化学研究方法 Research Method of Electrochemistry	2	2
	060001	精细化学品化学 Fine Chemical Chemistry	2	2
	060049	现代测试技术 Modern Testing Techniques	2	2
	060029	统计热力学 Statistical Thermodynamics	2	2
素养选修课程 ≤1 学分	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2
	G13043	中国古代韵文阅读与欣赏 Reading and Appreciation of Ancient Chinese Verses	1	2
	G17070	经济学基础 Fundamentals for Economics	1	2

	G05024	计算机科学前沿技术应用系列讲座 Lecture Series on Advanced Technology Applications in Computer Science	1	2	
	G02060	科研素养与创新能力 Research Literacy and Innovation	1	2	
	G13042	诗歌与审美艺术 Poetry and Aesthetic Art	1	2	
	G10014	实验设计与统计分析 Test Design and Statistical Analysis	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
补修课程 不计学分					导师 确定
其他培养环节（6 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>1. 开题报告内容：硕士生课程成绩，学位论文的文献调研、研究方案和初步结果。</p> <p>2. 由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。学生导师或者至少一位导师组成员必须参加学生的开题报告。</p> <p>3. 开题报告方式：每位硕士生的开题报告 10 分钟左右，专家提问 10 分钟左右。评审组根据学生课题的创新性、学生对课题的理解程度及其专业基础知识等方面对学生做出“合格”或“不合格”的明确评定。</p> <p>4. 不合格的学生，必须在两个月后才能重新申请开题，仍不通过者终止培养。</p> <p>1. The thesis proposal contains course grades, literature review, research program and preliminary results.</p> <p>2. The proposal will be evaluated by a team composed of more than 5 experts in the same research area. The supervisor or at least one member of guidance team should attend the proposal report meeting.</p> <p>3. The procedure of proposal: Each candidate should give about 10 minutes presentation and about 10 minutes defense for the proposal, and the process will be recorded and filed. The experts will give “pass” or “failed” for the proposal according to the innovation of the topic selection, the understanding to the topic and their basic knowledge. The results of proposal for all candidates will be sorted without showing the exact score.</p> <p>4. The candidate failed to pass the thesis proposal must attend the re-assessment in two months, and the training will be terminated if the candidate failed again.</p>				3



<p>中期考核 (1 学分)</p>	<p>1. 中期考核内容：硕士生的学位论文研究工作进展。</p> <p>2. 学生导师或者至少一位导师组成员必须参加学生的中期考核，评审组由本学科专业 5 人以上专家组成。</p> <p>3. 中期考核方式：学生必须先提交论文进展报告，经审查合格后才能参加中期考核。每位研究生作 15 分钟左右的中期考核报告，评审组提问 10 分钟左右。根据学生课题的创新性、学生对课题的理解程度、开展课题所需具备的专业基础知识，特别是自开题报告以来的工作进展和研究成果，评审组对学生做出“合格”或“不合格”的评价，并进行排序。</p> <p>4. 中期考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。</p> <p>1. The content of mid-term filtering is research progress of thesis for candidates.</p> <p>2. The supervisor or at least one member of guidance team should attend the mid-term assessment, which will be evaluated by a team composed of more than 5 experts in the same research area.</p> <p>3. The procedure of mid-term assessment: The candidates should submit progress report of thesis and they are permitted to participate the assessment only if their reports pass the evaluation. Each candidate should give about 15 minutes presentation and about 10 minutes defense for the proposal, and the process will be recorded and filed. The experts will give “pass” or “failed” for the assessment according to the innovation of the topic selection, the understanding to the topic and their basic knowledge, especially the work progress and research results since proposal report. The results of proposal for all candidates will be sorted without showing the exact score.</p> <p>4. The candidate failed to pass the mid-term assessment will be reviewed by school and graduate school and then processed as “study in school” with the approval of President’ s Council.</p>	<p>4-5</p>
<p>实习实践 (2 学分)</p>	<p>教学实践：参与本科课程教学，或协助导师指导毕业设计、课程设计和实习等，累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。</p> <p>专业实践：参与导师科研项目、实习基地或协作单位的研究和实践活动，时间累计不少于 1 个月。经导师考核合格即可获得 1 学分。</p> <p>Teaching practice: Involved in teaching on the course of undergraduate student, or guiding the undergraduate students on graduation, course design and practice. The total duration should be more than 1 month. The supervisor will provide the assessment comment and the candidate will obtain 1 credit when they pass the assessment.</p> <p>Professional practice: Involved in the research and practical activities of supervisor’ s project, practice base or cooperative organization. The total duration should be more than 1 month. The supervisor will provide the assessment comment and the candidate will obtain 1 credit when they pass the assessment.</p>	<p>1-5</p>

创新创业 (2 学分)	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文, 或作公开学术报告 2 次及以上;</li> <li>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖;</li> <li>3. 参加 10 次及以上与本学科相关的学术报告, 并提交总结。</li> </ol> 以上每项计 1 学分, 需完成 2 学分。 <ol style="list-style-type: none"> <li>1. Attending academic conferences and presenting paper, or giving open academic presentation for 2 times.</li> <li>2. Attending and being awarded the national scientific and technological competition, creative design, and innovation and entrepreneurship competition, etc.</li> <li>3. Attending the discipline related academic reports for at least 10 times and submit the summary.</li> </ol> Each item above is worth 1 credit, and 2 credit is required.	1-6	
培养单位 教授委员会主任		培养单位 负责人	



## 测绘科学与技术学科学术学位硕士研究生培养方案

学科代码：0816

### Science and technology of surveying and mapping

### Training program for academic master's degree students

Credit Code: 0816

#### 一、学科简介 ( Brief Introduction to Discipline )

测绘工程专业始建于 1960 年，2006 年获得大地测量学与测量工程二级学科硕士学位授予权，2010 年获得测绘科学与技术一级学科硕士学位授予权，2014 年获得测绘工程领域专业硕士学位授予权。

现有教师 32 人，教授 5 人，副教授 10 人，高级职称占比 46.9%，拥有博士学位占比 76.5%，45 岁以下硕导占比 52.9%，3 人有国外留学经历。校内硕士生导师 17 人，校外兼职导师 17 人。中科院许厚泽院士为测绘学科特聘教授，并有中国测绘学会教学指导委员会、中国测绘学会大地测量专业委员会委员各 1 人。

近五年，获国家级项目 8 项，省部级项目 17 项，地厅级 15 项，横向项目 70 项，纵向项目经费 458.4 万，横向项目总经费 1121.6 万元。发表学术论文 122 篇，其中 SCI、EI、ISTP 检索论文 46 篇、核心期刊论文 58 篇，出版专著教材 4 部，授权专利 7 项，获得校级以上科研成果奖 2 项。拥有山东省基础地理空间信息工程技术研究中心等省级科研平台 2 个，校级科研机构 2 个，校企联合的研究生培养基地 9 个。

毕业研究生年度一次就业率均为 100%，其中考博率 30%，从事本专业或相关专业工作率 95.6%。其中，数人已获得中科院“百人计划”和研究员（教授）职称。国际合作交流方面，与澳大利亚 ADELAIDE 大学、UNSW Sydney 大学以及美国 George Mason 大学在基于遥感与 GIS 的低碳城市规划设计、微波遥感与光学遥感融合等方向进行了合作交流。

学位点教师致力于现代大地测量与数据处理、数字摄影测量、资源环境遥感、GIS 理论与应用等领域的研究，其中在低空摄影测量和高性能 GIS 计算方面形成了特色与优势。立足国家“一带一路”和山东省“新旧动能转换”发展战略，未来 5-10 年争取将

本学科建设成为山东省一流学科。

In 2006, Shandong University of Technology was awarded the Master's Degree in Geodesy and Surveying Engineering, the Master's Degree in Surveying and Mapping Science and Technology in 2010, and the Master's Degree in Surveying and Mapping Engineering in 2014.

There are 32 teachers, 5 professors, 10 associate professors, 46.9% of senior titles, 76.5% of doctorates, 52.9% of senior supervisors under 45 years of age, and 3 of them have overseas study experience. There are 17 in-school master's tutors and 17 out-of-school part-time tutors. Academician Xu Houze of the Chinese Academy of Sciences is a specially appointed professor of Surveying and mapping. He is also a member of the Teaching Steering Committee of the Chinese Society of Surveying and Mapping and the Geodetic Professional Committee of the Chinese Society of Surveying and Mapping.

In the past five years, it has won 8 national projects, 17 provincial and ministerial projects, 15 prefectural and office-level projects, 70 horizontal projects, 4.584 million vertical projects and 11.216 million lateral projects. He has published 122 academic papers, including 46 SCI, EI, ISTP retrieval papers, 58 core journal papers, 4 monographs and textbooks, 7 authorized patents and 2 awards for scientific research achievements at or above the University level. There are 2 provincial research platforms such as Shandong Basic Geospatial Information Engineering and Technology Research Center, 2 research institutions at school level and 9 postgraduate training bases jointly organized by schools and enterprises.

The annual employment rate of graduate students is 100%, of which the rate of Bo entrance examination is 30%, and the rate of working in this major or related specialty is 95.6%. Several of them have been awarded the titles of "Hundred Persons Program" and researcher (professor) of the Chinese Academy of Sciences. In terms of international cooperation and exchanges, cooperation and exchanges were conducted with ADELAIDE University in Australia, UNSW Sydney University and George Mason University in the United States in the fields of low-carbon urban planning and design based on remote sensing and GIS, and the integration of microwave remote sensing and optical remote sensing.

Degree teachers devote themselves to the study of modern geodesy and data processing, digital photogrammetry, remote sensing of resources and environment, theory and application of GIS, among which features and advantages have been formed in low-altitude photogrammetry and high-performance GIS computing. Based on the national "one belt and one way" and the development strategy of "new and old energy conversion" in Shandong Province, we will strive to build this discipline into a first-class discipline in Shandong in the next 5-10 years.

## 二、培养目标 (Educational Objectives)

为适应经济建设和社会发展的需要,培养德、智、体全面发展,能从事本学科领域的教学、科研以及管理工作的高层次专门人才,具体要求:

1. 了解中国的文化、政治、经济与历史,掌握一定程度的汉语。在测绘科学与技术



领域掌握坚实的专业理论基础知识和技能，具备从事科学研究的基本素质及独立承担专业技术工作的能力，具有综合运用所学理论独立解决实际技术课题的能力。

2. 具有良好的职业道德和敬业精神，具有科学严谨和求真务实的学习态度、工作作风、身心健康，具有较高的综合素质和较强的创新能力和适应能力。

3. 面向生产第一线，为国际测绘行业及相关工程部门培养高层次应用型、复合型人才。

In order to meet the satisfaction of economic construction and society development, this discipline cultivate all-round development and high-level specialists who can engage in teaching, scientific research and management. The specific requirements are listed below.

1. Understand Chinese culture, politics, economy and history, and master Chinese to a certain extent. In the field of Surveying and Mapping Science and technology, we should master solid professional theoretical knowledge and skills, possess the basic quality of scientific research and the ability to undertake professional and technical work independently, and have the ability to solve practical technical problems independently by using the theory we have learned comprehensively.

2. With good professional ethics and dedication, scientific and rigorous and pragmatic learning attitude, work style, physical and mental health, with high comprehensive quality and strong innovation and adaptability.

3. Facing the production front line, we will train high-level applied and compound talents for international surveying and mapping industry and related engineering departments.

### 三、研究方向 ( Research Orientation )

测绘科学与技术（一级学科）学术硕士学位研究生培养方案设以下 4 个研究方向：

1. 现代大地测量与数据处理
2. 数字摄影测量
3. “3S” 技术及其在精准农业上的应用研究（交叉方向）
4. 地理信息系统理论与应用

详见附表 1。

There are four research directions in the postgraduate training program for master's degree in surveying and Mapping Science and technology ( first-level discipline ):

1. Modern Geodesy and Data Processing
2. Digital Photogrammetry
3. "3S" Technology and Its Application in Precision Agriculture
4. Theory and Application of Geographic Information System

See Schedule 1 for Details.



#### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

3 years of schooling, 2-4 years of study, scientific research and paper writing time of not less than 1 year (calculated from the date of opening the title) are required. With the consent of the instructor, you can apply for graduation in advance, but the time required for scientific research and paper writing remains unchanged. The time of suspension is not counted in the length of study.

#### 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 17 个必修学分和 8 个选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The course is divided into compulsory courses and elective courses. Students are required to complete 17 compulsory credits and 8 elective credits within the specified time. Interdisciplinary graduate students are required to take 2 or more courses according to the tutor's requirements. After passing the examination, they can participate in the opening of the defense, and the results are not included in the transcript.

The curriculum is shown in Schedule 2.

#### 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术学位硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

##### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。

##### 2. 中期筛选

研究生课程学习基本结束后，以研究生培养方案为依据，在第四学期对研究生的政



治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期筛选考核小组确定考核成绩为“合格”者，可以继续完成学位论文；考核成绩为“不合格”者，经所在单位签署意见，研究生院审核，报分管校长批准，终止学籍，做研究生肄业处理。

### 3. 实习实践

教学实践：助课，协助指导毕业设计、课程设计和实习等，由导师安排并考核。考核通过即获得 1 学分。

专业实践：参与导师科研项目、实习基地和协作单位的研究和实践活动，由导师安排并考核。实践时间不少于 2 个月，导师考核合格即可获得 1 学分。

### 4. 创新创业

参加学术会议并宣读论文，或做公开学术报告 2 次；参加全国性的科技竞赛、创意设计、创新创业竞赛等；参加 6 次以上与本学科相关的学术报告，并提交总结。

The master's degree program is taught by a mentor system, and a guidance group (team) system based on the mentor is encouraged. The instructor is responsible for formulating the postgraduate training program and has the responsibility for guiding, demonstrating and supervising the moral character and academic ethics of graduate students.

#### 1. Opening Report

In order to ensure the quality of the dissertation, graduate students should determine the topic selection and research content through literature reading and academic research, and submit the opening report at the end of the third semester with the consent of the instructor. A panel of experts from more than 5 students in this discipline will review the opening report of the students, and provide evaluation and revision opinions. If they do not pass, they can be redone within a time limit.

#### 2. Medium-term screening

After the basic study of postgraduate courses, based on the postgraduate training program, in the fourth semester, the graduates' political thoughts and moral qualities, basic theories and professional knowledge, scientific research innovation, practical ability and health status will be comprehensively evaluated. The purpose is to summarize the evaluation of postgraduate study and research since enrollment, to find out the problems in the process of postgraduate training, to explore ways to solve problems, and to clarify the direction of future efforts. The mid-term screening assessment team determines that the assessment results are “qualified” and can continue to complete the dissertation; if the assessment results are “unqualified”, the applicants will sign the opinions, the graduate school will review, report to the principal to approve, terminate the student status, and do the postgraduate treatment. .

#### 3. Practice

Teaching practice: assisting classes, assisting in guiding graduation design, course design

and internships, etc., arranged and assessed by the instructor. 1 credit is awarded upon passing the assessment.

**Professional practice:** Participate in the research and practice activities of the tutor's research projects, practice bases and collaborative units, which are arranged and assessed by the tutor. The practice time is no less than 2 months, and the instructor can get 1 credit by passing the examination.

#### 4. Innovation and Entrepreneurship

Participate in academic conferences and read papers, or make public academic reports twice; participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions; participate in more than 6 academic reports related to the subject, and submit a summary.

### 七、学位论文 ( Academic Dissertation )

学位论文的要求按照《山东理工大学关于研究生学位论文工作的有关规定》《山东理工大学硕士学位授予工作实施细则》等相关文件执行。

1. 学位论文应在导师指导下由研究生独立完成；
2. 学位论文一般程序为：文献阅读和调研、初步写出研究课题综述、撰写开题报告、理论分析与研究、科学实验、论文撰写、论文送审和论文答辩等环节；
3. 学位论文要求理论联系实际，内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括：题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等；
4. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性，提出一定的新见解；
5. 学位论文应具有一定的深度和先进性，应反映出作者对基础理论和专门知识的掌握情况，反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。

The requirements of the dissertation are implemented in accordance with the relevant regulations of Shandong University of Technology on the work of postgraduate dissertations, the implementation rules for the granting of doctoral degrees of Shandong University of Technology, and the implementation rules for the granting of master's degrees of Shandong University of Technology.

1. The dissertation should be completed independently by the graduate student under the guidance of the tutor.
2. The general procedures of the dissertation are: literature reading and research, preliminary writing of research topics, writing of opening reports, theoretical analysis and research, scientific experiments, paper writing, paper submission and essay defense.
3. The dissertation requires theory to be linked to practice, with substantial content, advanced technology, correct conclusions, standardized formats, clear organization, and accurate



expression. The structure of the thesis includes: topics, Chinese and English abstracts, catalogues, texts, references, acknowledgments, research results, appendices, etc.

4. The dissertation should have certain innovations in the theoretical analysis, scientific experiment, engineering application and guiding practice, and put forward certain new insights.

5. The dissertation should have a certain depth and advanced nature, which should reflect the author's mastery of the basic theory and expertise, reflecting the author's ability to comprehensively apply theories, methods and means to solve theoretical and practical problems.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养计划规定课程和其他培养环节, 成绩考核合格;
3. 通过论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》以及建筑工程学院硕士学位授予有关规定。

Graduation certificate can be obtained if the graduation requirements are met; on the basis of the graduation certificate, if the degree is awarded, the degree certificate can be awarded.

#### 1. Graduation requirements:

(1) Have good moral cultivation and academic ethics, seek truth from facts and be brave in innovation;

(2) After completing the courses prescribed in the training plan and other training links, the results are qualified;

(3) Pass the thesis defense and pass the test;

(4) Meet other requirements of the school's relevant regulations.

#### 2. Degree requirements:

Strictly implement the Provisional Implementation Measures of the Regulations of the People's Republic of China on Academic Degrees, the Evaluation Measures for Master's Degree Dissertations of Shandong University of Technology, the Implementation Rules for Master's Degree Granting of Shandong University of Technology and the relevant provisions for Master's Degree Granting of Architectural Engineering College.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>拥护中国的法律法规，遵纪守法，具有良好的职业道德和敬业精神，具有科学严谨和求真务实的学习态度和工作作风，身心健康。</p> <p>The students should support China's laws and regulations, abide by laws and regulations, have good professional ethics and dedication, scientific and rigorous and realistic learning attitude and work style, and have good physical and mental health.</p>	<p>自然辩证法、中国特色社会主义理论与实践研究、东方哲学与现代化、科研素养与创新能力</p> <p>Dialectics of Nature、Theory and Practice of Socialism with Chinese Characteristics、Oriental Philosophy and Modernization、Scientific Research Literacy and Innovative Ability</p>
综合能力	<p>具有测绘领域坚实的基础理论和系统的专门知识，了解本领域的发展动向，掌握解决问题的先进技术方法和现代技术手段，具有独立从事测绘地理信息工程设计、工程实施，工程研究、工程开发、工程管理等能力。</p> <p>The graduates have solid basic theory and systematic expertise in surveying and mapping field, understand the development trend of this field, master advanced technical methods and modern technical means to solve problems, and have the ability to independently engage in surveying and mapping Geographic Information Engineering design, engineering implementation, engineering research, engineering development, engineering management, etc.</p>	<p>数值分析、计算机科学前沿技术应用系列讲座、科技英语写作</p> <p>Series of Lectures on Numerical Analysis、Application of Advanced Technology in Computer Science、Scientific and Technological English Writing</p>
研究方向	<p>现代大地测量与数据处理</p> <p>掌握小波分析、非线性规划、验后方差分估计等基础知识，从事现代大地测量与数据处理理论、方法与应用等方面的研究。</p> <p>The graduates should master the basic knowledge of wavelet analysis, non-linear programming, posterior variance component estimation, and engage in modern geodesy and data processing theory, methods and applications.</p>	<p>现代大地测量技术理论与技术、现代测量数据处理理论、变形监测数据处理、时间序列分析、小波理论及其应用、组合导航系统原理与应用、物理大地测量学、神经网络技术及其应用。</p> <p>Modern geodetic theory and technology、Modern survey data processing theory、Deformation monitoring data processing、Time series analysis, Wavelet theory and its application、Principle and application of integrated navigation system、Physical geodesy、Neural network technology and its application</p>



<p>数字摄影 测量</p>	<p>掌握摄影测量、计算机视觉、数字图像处理、模式识别等理论方法，从事无人机低空摄影、三维激光扫描数据等处理方法及管件技术等方面的研究与开发。</p> <p>The graduates should Master photogrammetry, computer vision, digital image processing, pattern recognition and other theoretical methods, engaged in UAV low-altitude photography, three-dimensional laser scanning data processing methods and pipe technology research and development.</p>	<p>低空摄影测量原理与应用、数字摄影测量、遥感数字图像处理、可视化编程语言（C++）、三维激光扫描测量与建模</p> <p>Principle and application of low altitude photogrammetry、Digital photogrammetry、Remote sensing digital image processing、Visual programming language（C++）、Three-dimensional laser scanning measurement and modeling</p>
<p>“3S”技术 及其在精准 农业上的应 用研究</p>	<p>以掌握“3S”理论知识为基础，从事生态环境评价、灾害遥感以及农业减灾防灾等方面研究。利用“3S”技术进行农业水资源管理决策支持、区域水资源管理与保护系统开发、田间时空变化信息获取、土壤和作物变化监测等，用现代化信息技术指导农业生产。</p> <p>On the basis of mastering the theory of "3S", we are engaged in the research of ecological environment assessment, disaster remote sensing and agricultural disaster reduction and prevention. Using "3S" technology to support decision-making of agricultural water resources management, development of regional water resources management and protection system, information acquisition of spatial and temporal changes in the field, monitoring of soil and crop changes, etc., and using modern information technology to guide agricultural production.</p>	<p>遥感数字图像处理、高光谱遥感、海洋测绘技术与应用、微波遥感、遥感地学分析与应用、IDL在图像处理中的应用。</p> <p>Remote sensing digital image processing、Hyperspectral remote sensing、Marine surveying and mapping technology and application、Microwave remote sensing、Remote sensing geoscience analysis and application、IDL application in image processing.</p>
<p>GIS 理论及 应用</p>	<p>掌握空间分析、面向对象语言、空间数据库等知识，从事地理进空间数据融合、时空大数据分析与应用、高性能计算等研究与开发。</p> <p>The graduates should master the knowledge of spatial analysis, object-oriented language, spatial database and so on, and can be engaged in research and development of geographic data integration, spatial-temporal data analysis and application, high-performance computing, etc.</p>	<p>WebGIS 开发、地理信息系统开发、海洋测绘技术与应用、地理空间数据挖掘、空间分析原理与方法、空间信息模式识别、面向对象的 GIS 程序设计、Java 程序设计。</p> <p>WebGIS Development、Geographic Information System Development、Marine Surveying and Mapping Technology and Application、Geospatial Data Mining, Spatial Analysis Principles and Methods、Spatial Information Pattern Recognition、Object-Oriented GIS Programming, Java Programming</p>

附表 2: 培养计划 (Training Plan)

学科名称	测绘科学与技术 Survey and Mapping		学科代码	0816		
单位名称	建筑工程学院 College of Architectural Engineering		培养类型	学术学位硕士研究生 Overseas Academic Master		
学分要求	总学分 Total Credits: 29 , 必修课程学分 Credit for Compulsive Course: 17, 选修课程学分 Credit for optional course: 8					
课程 设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 12 学分	G11002	矩阵理论 Matrix theory	2	2		
	070042	GNSS 数据处理 GNSS Data Processing	2	2		
	070043	遥感应用分析原理与方法 Principle and Method of Remote Sensing Applied Analysis	2	2		
	070012	空间数据库 Spatial database	2	2		
	070047	低空摄影测量原理与应用 Photogrammetry Principle and Application of Low Altitude	2	2		
	070044	数字摄影测量 Digital Photogrammetry	2	1		
方向选修课程 ≥8 学分	070045	WebGIS 开发 WebGIS development	2	2		
	070046	遥感数字图像处理 Remote sensing digital image processing	2	2		
	070004	现代大地测量理论与技术 Modern geodesy theory and technology	2	2		
	070001	现代测量数据处理理论 Modern theory of measurement data processing	2.5	1		





070020	高光谱遥感 Hyperspectral remote sensing	2	2
070015	地理信息系统开发 Geographic information system development	2.5	2
070021	变形监测数据处理 Deformation monitoring data processing	2	2
110001	数值分析 Numerical analysis	3	1
070007	时间序列分析 Time series analysis	2	2
070008	小波理论及其应用 Wavelet theory and its application	2	2
070011	组合导航系统原理及应用 Principle and application of integrated navigation system	2	2
070048	物理大地测量学 Physical geodesy	2	2
070049	海洋测绘技术与应用 Marine surveying and mapping technology and application	2	2
070050	地理空间数据挖掘 Geospatial data mining	2	2
070053	神经网络技术及其应用 Neural network technology and its application	2	2
070051	空间分析原理与方法 Principles and methods of spatial analysis	2	2
070035	微波遥感 Microwave remote sensing	2	2
070032	遥感地学分析与应用 Remote sensing analysis and application	2	2
070026	可视化编程语言 (C++) Visual programming language (C++)	2	1
070041	空间信息模式识别 Spatial information pattern recognition	2	2
070052	面向对象的 GIS 程序设计 Object-oriented GIS programming	2	1
070018	IDL 在图像处理中的应用 Application of IDL in image processing	2	2



	070054	Java 程序设计 JAVA programming	2	1	
	070032	移动 GIS Mobile GIS			
	070033	3S 技术前沿 (英语授课) 3S Technology Frontier			
	070019	三维激光扫描测量与建模 3d laser scanning measurement and modeling	2	2	
素养选修课程 ≥1 学分	150084	东方哲学与现代化 Eastern philosophy and modernization	1	2	
	050058	计算机科学前沿技术应用系列讲座 Computer science advanced technology applications lecture series	1	2	
	020112	科研素养与创新能力 Scientific research accomplishment and innovation ability	1	2	
	140004	科技英语写作 Scientific English writing	1	2	
补修课程 不计学分					导师 确定
其他培养环节 (3 学分)					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	研究生在导师的指导下, 通过查阅文献、收集资料和调查研究后确定研究课题, 写出选题文献综述, 在第三学期完成开题。开题通过后即获得 1 学分。 Under the guidance of the tutor, graduate students identify research topics by consulting the literature, collecting data and investigating research, writing a review of the selected topics, and completing the opening in the third semester. 1 credit will be awarded upon opening.				3
中期考核 (1 学分)	中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。硕士研究生中期考核在第五学期进行。中期考核通过后即获得 1 学分。 The mid-term assessment is a necessary link to check the progress of graduate degree thesis, help students grasp the direction of the thesis, and improve the quality of the thesis. The midterm assessment of the master's degree is conducted in the fifth semester. After passing the mid-term assessment, you will receive 1 credit.				4-6
创新创业 (1 学分)	1. 参加学术会议并宣读论文, 或做公开学术报告 2 次; 2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖; 3. 参加 6 次以上与本学科相关的学术报告, 并且每次提交总结; 每项记 1 学分, 需完成 1 学分。				1-6



	<p>1. Participate in academic conferences and read papers, or make public academic reports 2 times;</p> <p>2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary each time;</p> <p>1 credit for each credit, 1 credit is required.</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p> 

# 矿业工程学科学术学位硕士研究生培养方案

学科代码：0819

## Master Degree Program of Mining Engineering for International Postgraduate

Credit Code: 0819

### 一、学科简介 ( Brief Introduction to Discipline )

本学科始建于1954年，2007年获矿物加工工程学科硕士学位授予权，2011年获矿业工程一级学科硕士学位授予权。学科目前有专任教师46人，其中教授10人，副教授15人，讲师21人，外聘兼职教授6人，具有博士学位的教师30人，教师的年龄、职称和学缘结构较为合理。师资中拥有“长江学者”、省级“百千万人才工程”百层次人才等高层次人才各1人。

本学科近5年来共承担国家级项目8项，省部级项目15项，企业委托项目80余项；获省部级科技奖励6项；授权专利和软件著作权17项，其中2项发明专利已实现转化；发表学术论文109篇，其中SCI/EI收录34篇；出版学术专著（教材）2部；拥有山东省矿山尾矿资源化处理工程技术研究中心、中央与地方共建高校优势特色学科实验室和山东省高等学校实验教学示范中心。

本学科一直奉行面向行业、服务社会的发展理念，累计为我国矿山输送各类技术人才5000余名，硕士研究生30多名，毕业生已成为矿山企业、科研院所等单位的技术骨干和中坚力量。

围绕绿色矿山建设，学科在难采矿体高效开采、残矿回收与空区处理、胶结充填、动力灾害防控、高纯镁盐产品的制备及开发、尾矿综合利用等方面取得突破，获中国黄金协会科学技术奖一等奖、中国有色金属工业科学技术奖二等奖等十余项科研奖励，形成了矿物资源安全高效开发、综合利用和矿山环境保护技术研发一体化的学科特色。

本学科将进一步强化平台建设和凸显学科特色，并融合绿色开发、智能采矿的新理念、新模式和新技术，以绿色开采、深部开采的热难点问题为研究主线，加强特色优势学科建设，不断提高学科建设和科研水平，力争建成省内独具特色、国内有重要影响的



矿业类学科。

Founded in 1954, the discipline was authorized to grant master's degree in mineral processing engineering in 2007 and master's degree in mining engineering in 2011. At present, there are 46 faculty members, including 10 professors, 15 associate professors, 21 lecturers and 6 adjunct professors. There are 30 teachers with doctoral degrees, and the age, title and academic structure of teachers are more reasonable. Two faculty members was awarded high-level talents such as “Yangtze Scholar” and provincial “100 Million Talent Project”, respectively.

In the past five years, the discipline has undertaken 8 National projects, 15 provincial and ministerial projects and more than 80 entrusted projects by enterprises. It won 6 provincial and ministerial awards for science and technology and was awarded 17 authorized patents and software copyrights, of which 2 invention patents have been transformed. 109 academic papers including 34 SCI/EI papers and 2 academic monographs (textbooks) have been published. It houses Shandong Research center for technology of mine tailings recycle engineering, the Central and Local Governments co-constructed Laboratory of Advantageous Subjects and the Experimental Teaching Demonstration Center of Shandong Higher Education Institutions.

The discipline has been pursuing the development concept of serving the industry and society. More than 5,000 undergraduates and 30 postgraduates have become the technical backbone in the mining enterprises and research institutes.

In the field of green mines construction, the discipline has made breakthroughs in efficiency mining of difficult-to-mine bodies, recovery of residual ore and goaf treatment, cement filling, prevention and control of geological dynamic disasters, preparation and development of high-purity magnesium salt products, and comprehensive utilization of tailings waste. More than ten awards has been conferred to the discipline, such as the Science and Technology Awards from the China Gold Association (first prize) and China Nonferrous Metals Industry Association (second prize). The integration of safe and efficient exploitation, comprehensive utilization and environmental protection of mineral resources is the discipline characteristics.

The discipline will further strengthen the platform construction and highlight its characteristics. With the integration of the new concepts, new models and new technologies of green development and intelligent mining, the construction of the distinctive and advantageous discipline has been strengthened on the main research line of green mining and deep mining and the scientific research level has improved continuously, and is striving to form a mining discipline with unique characteristics and significant influence in Shandong Province and China.

## 二、培养目标 ( Educational Objectives )

立足国家和区域绿色矿山建设需要，面向矿业工程领域科技前沿，培养德、智、体、美全面发展，具备高水平综合素质的矿业工程领域高层次创新专门技术人才。

1. 熟悉中国文化与语言,掌握矿业工程及相关学科坚实的基础理论和系统的专门知识,熟悉现代矿业工程技术、测试试验技术和信息技术。

2. 遵纪守法,具有良好的职业道德和敬业精神,以及科学严谨、求真务实的治学态度和工作作风。

3. 具有从事矿业学科领域科学研究和解决工程实际问题的能力,可在科研机构、厂矿企业、高等院校从事矿业工程或相近学科的科学研究、技术服务、工程管理以及教学等工作

Based on the needs of national and regional green mine construction, facing the frontier of science and technology in the field of mining engineering, cultivate high-level innovative and specialized technical personnel in the field of mining engineering with high-level comprehensive quality and all-round development of morality, intelligence, physique and beauty.

1. Be familiar with Chinese culture and language; master the basic theory and expertise of mining engineering and related disciplines; be familiar with modern engineering technology of mining, testing technology and information technology.

2. Comply with laws and regulations. Be Full of good professional ethics and dedication as well as academic attitude and work style of scientific and rigorous, realistic and pragmatic attitude and work style.

3. The graduates should have the ability to engage in scientific research and to solve practical engineering problems in the field of mining and related disciplines and could undertake the responsibility of research, technical services, engineering management and teaching in research institutions, factories, mines and universities.

### 三、研究方向 ( Research Orientation )

矿业工程 ( 一级学科 ) 学术学位硕士研究生培养方案设以下 4 个研究方向:

1. 采矿工程
2. 矿物加工工程
3. 数字矿山
4. 矿业三废治理及污染控制 ( 交叉方向 )

详见附表 1。

There are 4 research fields in the master degree program of mining engineering ( first class discipline ):

1. Mining Engineering
2. Mineral Processing Engineering
3. Digital Mine



#### 4. Wastes Treatment and Pollution Control in Mining Industry ( Interdisciplinary )

Details can be seen in appendix 1.

### 四、学习年限 ( Length of Schooling )

全日制学术型硕士研究生学制为 3 年，学习年限为 2~4 年（含学位论文答辩时间），科学研究和撰写论文时间不少于一年（从开题报告通过之日起计算）。在满足论文工作时间要求的前提下，品学兼优的学生提前完成学业，经指导教师同意，可申请提前毕业。

The standard duration of the full-time academic mater degree is 3 years. Candidates can finish their degree from 2 to 4 years ( including dissertation defense time ) and the time for research and dissertation writing is no less than 1 year since pass of thesis proposal. On the premise of meeting the studying time requirement, candidates with good academic performance and moral quality could apply for early graduation with the consent of their supervisor.

### 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

教学课程实行学分制，课程分为必修课程和选修课程，研究生需在规定的时间内完成不少于 16 个必修学分和 13 个选修学分的学习任务。同等学历或跨学科攻读全日制学术型硕士学位研究生，需根据导师要求补修 2 门及以上我校本学科的本科主干课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置详细情况见附表 2。

Credit system is employed and the courses are divided into compulsory courses and elective courses. Candidates are required to complete no less than 16 compulsory credits and 13 elective credits within the prescribed time. Candidates for full-time academic mater degree with the equivalent education or interdisciplinary background are required to complete and pass two or more undergraduate core courses according to their supervisor' s requirement ( the results are not included in the transcript ) before the defense of their research proposal.

Details can be seen in appendix 2.

### 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

#### 1. 开题报告

研究生在所有课程考核合格后，通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后最迟于第三学期末提交开题报告。由本学科 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，开题报告评审通过即可获得 1

学分，不通过者可限一年内重做，仍不通过者将终止培养。

## 2. 中期筛选

研究生在课程学习结束及开题报告审核通过后，最迟于第五学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期筛选考核成绩为“合格”者，可得1学分，并可继续进行学位论文工作；考核成绩为“不合格”者，经所在单位签署意见，研究生院审核，报校长办公会批准，终止学籍，做研究生肄业处理。

## 3. 创新创业

达到下列条件之一，可获得1学分：参加学术会议并宣读论文，或做公开学术报告2次；参加全国性的科技竞赛、创意设计、创新创业竞赛并获奖；参加6次以上与本学科相关的学术报告，并提交总结。

Supervisor responsibility system is employed in the training of candidates for the academic mater degree and tutorial group or team with supervisor in charge is encouraged. Supervisor is responsible for formulating training plan and has responsibility of guiding, demonstrating and supervising the moral character and academic ethics of candidates.

### 1. Research proposal

After all the courses have been passed, candidates determine their thesis topic and research content through literature review and academic investigation, and submit their research proposal no later than the end of third semester with the consent of their supervisor. An assessment panel consisting of more than five experts in the discipline will review the research proposal and provide comments and revision suggestions. 1 credit can be obtained after the pass of research proposal. If it is failed, candidates have to redo it in one year, and t those who still fail in the second assessment will be terminated training.

### 2. Mid-term assessment

After the completion of course study and approval of research proposal, candidates will be comprehensively assessed in political ideology and moral quality, basic theory and professional knowledge, scientific research innovation, practical ability and health status in no later than the fifth semester. The purpose is to evaluate the study and research situation of the candidates since their enrollment, to find and solve the problems in the training process, and to clarify the direction of future efforts. Candidates who are ‘qualified’ in the mid-term assessment can gain 1 credit and continue their study while those who are ‘unqualified’ will terminate their registration with the process of application from school, verification of graduate schools and approval of principal’ s office.

### 3. Innovation and entrepreneurship



One credit can be obtained by achieving one of the following conditions: (1) attend an academic conference and give presentation or present public report twice; (2) win a prize in national science and technology competitions, creative design, and innovation & entrepreneurship competitions; (3) participate in more than six related academic talks and submit summaries.

## 七、学位论文 (Academic Dissertation)

硕士学位论文是硕士研究生科学研究工作的全面总结,是描述其研究成果、反映其研究水平的重要学术文献,是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心,必须严格按照规范执行,本学科硕士研究生的学位论文应满足以下基本要求:

1. 学位论文应在导师指导下由研究生独立完成。
2. 学位论文一般程序为:文献阅读和调研、初步写出研究课题综述、撰写开题报告、理论分析与研究、科学实验、论文撰写、论文送审和论文答辩等环节。
3. 论文要求理论联系实际,内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括:题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。
4. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性,提出一定的新见解。
5. 学位论文应具有一定的深度和先进性,应反映出作者对基础理论和专门知识的掌握情况,反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。
6. 学位论文严格按照《中华人民共和国学位条例暂行实施办法》、《山东理工大学关于研究生学位论文工作的有关规定》和《山东理工大学硕士学位授予实施细则》等文件相关规定组织评阅、答辩与授予学位。

Master's dissertation is a comprehensive summary of master's scientific research work, an important academic document describing its research results and reflecting its research level, and a basic basis for applying for and awarding master's degree. The writing of dissertations is the key and core of the cultivation of postgraduates. It must be strictly carried out in accordance with the norms. The dissertations of postgraduates in this discipline should meet the following basic requirements:

1. The dissertation should be completed independently by candidate under the guidance of supervisor.
2. The general procedures of the dissertation are: literature reading and research, preliminary summary of research topics, research proposal writing, theoretical analysis and



research, scientific experiments, dissertation writing, dissertation submission and dissertation defense.

3. Theory integrated with practice, substantial content, advanced technology, correct conclusion, standard format, clear organization and accurate expression are the requirements for the dissertation. The structure of the dissertation includes title, abstract in Chinese and English, catalogue, main text, reference, acknowledgment, research results, appendix, etc.

4. The dissertation should be innovative in theoretical analysis, scientific experiment, engineering application and guiding practice, and put forward new insights.

5. The dissertation should have a certain depth and advancement to reflect the candidate's mastery of basic theory and expertise, and the ability to solve theoretical and practical problems comprehensively using relevant theories, methods and means.

6. The procedure of dissertation evaluation, defense and award of degree is in strict accordance with ‘Provisional Implementation Measures for Academic Degree Regulations of the People's Republic of China’, ‘Regulations of Postgraduate Degree Dissertations of Shandong University of Technology’ and ‘Regulations on the Grant of Master Degree of Shandong University of Technology’.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求, 可获得毕业证书; 在获得毕业证书的基础上, 如满足学位授予标准, 可授予学位证书。

### (一) 毕业要求

1. 熟悉中国文化与语言, 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节, 考核成绩合格;
3. 完成论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》, 以及资源与环境工程学院学位授予有关规定。

Graduation certificate can be obtained if the graduation requirements are met. Master degree certificate can be awarded if the criteria for conferring master degree are met.

#### 1. Graduation requirements

(1) Be familiar with Chinese culture and language, be of good moral character and academic ethics, truth-seeking and realistic spirits and innovation.

(2) Complete and pass the required courses and other training programs.

(3) Pass dissertation defense.



(4) Meet the other requirements of the University.

## 2. Criteria for conferring Master degree

The Master degree is conferred in strict accordance with ‘Provisional Implementation Measures for Academic Degree Regulations of the People's Republic of China’, ‘Evaluation Method for Master's Degree Dissertation of Shandong University of Technology’, ‘Regulations on the Grant of Master Degree of Shandong University of Technology’ and related regulations on the grant of master degree of school of resources and environmental engineering.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>遵纪守法，品德良好，身心健康，熟悉中国文化与语言，具有良好的职业道德和敬业精神，以及科学严谨、求真务实的治学态度和工作作风。</p> <p>Graduates comply with laws and regulations, are familiar with Chinese culture and language, and have good moral character, good physical and mental health, good professional ethics and dedication, as well as scientific rigor, truth-seeking and pragmatic attitude and work style.</p>	<p>中国文化、汉语、东方哲学与现代化、中国古代韵文阅读与欣赏、诗歌与审美艺术、论文写作与学术规范</p> <p>Chinese Culture、 Chinese、 Oriental Philosophy and Modernization、 Reading and Appreciation of Ancient Chinese Verse、 Poetry and Aesthetic Art、 Thesis writing and academic norms</p>
综合能力		<p>了解本学科的进展、动向和发展前沿，掌握本学科的基础理论和系统的专门知识，能适应科学研究和技术发展的需要，具有创新能力、实践能力和积极向上的精神面貌。</p> <p>On basis of understanding the progress, trends and development frontiers of the discipline, and mastering the basic theory and systematic expertise of the discipline, graduates are enabled to meet the needs of scientific research and technological development, and have the ability of innovation, practice and positive spiritual outlook</p>	<p>绿色矿山理论与实践、数理统计、数据分析与处理方法、实验设计与统计分析、科研素养与创新能力</p> <p>Theory and Practice of Green Mine、 Mathematical Statistics、 Data Analysis and Processing Method、 Experimental Design and Statistical Analysis、 Scientific Research Literacy and Innovation Ability</p>
研究方向	采矿工程	<p>掌握工程岩石力学原理与研究方法、绿色矿山理论、现代矿床开采、矿山优化设计理论与方法、采动灾害机理与防治等知识，熟悉矿山安全监测监控、工程模拟和智能矿山建设等技术，紧跟矿山开采前沿和安全技术发展趋势开展研究，并将以上知识和技术应用于绿色矿山和智慧矿山领域，提高采矿理论、技术和装备水平，实现矿山的安全、绿色和高效开采。</p> <p>Graduates master the principles and methods of engineering rock mechanics, green mine theory, modern mining, mining optimization design theory and methods, mining disaster mechanism and prevention. Be familiar with mine safety monitoring and control, engineering simulation and intelligent mine construction technologies. Be capable of carrying out research closely following the development</p>	<p>岩石工程原理与研究方法、智慧矿山、矿床开采理论与实践、工程灾害与控制</p> <p>The Principle and Technique of Rock Engineering、 Smart Mine、 Theory and Practice of Deposits Mining、 Engineering Disaster and Control Technology</p>



		<p>trend of mining frontier and safety technology. Apply the above knowledge and technology to green and intelligent mines, and improve mining theory, technology and equipment level, and achieve safe, green and efficient mining of resources.</p>	
矿物加工工程	<p>能够综合运用物理、化学、物理化学、生物化学等原理和方法对各种矿物资源进行综合回收和高效加工利用。掌握非金属材料提纯深加工、微细粒矿物分选、复杂硫化矿分选、难选铁矿石加工分选、尾矿及固体废弃物综合回收利用等矿物分选领域的理论与方法，能够对复杂、难选矿石开展选矿试验和理论研究，并得到试验和理论研究结果。</p> <p>Graduates can comprehensively utilize the principles and methods of physics, chemistry, physical chemistry and biochemistry to comprehensively recycle and efficiently process various mineral resources. Master the theories and methods of mineral separation in the fields of purification and deep processing of non-metallic materials, fine-grain mineral sorting, complex sulfide ore sorting, processing and separation of refractory iron ores, comprehensive recovery and utilization of tailings and solid wastes. Graduates are enabled to carry out beneficiation experiments and theoretical studies on complex and refractory ores, and obtain experimental and theoretical results.</p>	<p>计算流体力学理论与实践、资源综合利用、现代分析测试技术、矿物加工新技术</p> <p>Theory and Practice of Computational Fluid Dynamics 、 Comprehensive Utilization of Resources 、 Modern Technology of Test and Analysis 、 New Technology of Mineral Processing</p>	
数字矿山	<p>能够利用多种信息技术及勘探技术手段、运用数学地质原理及数字矿山技术方法，解决数字矿山建设、运行、维护相关问题。掌握矿山生产勘探增储、矿山地质灾害和环境治理、矿山三维建模与信息化管理、矿山深部找矿与远景预测的方法。具备深入贯彻国家绿色矿山发展理念，结合深地计划国家战略提升矿产资源管理与服务能力，推动矿山相关工作的信息化、智能化，不断提高服务矿业开发的能力与水平。</p> <p>Graduates are able to solve the problems related to the construction, operation and maintenance of digital mines by utilizing various information technology and exploration technology, mathematical geology principle and digital mine technology. Master the methods of production exploration and accumulation, mine geological hazards and environmental management, mine three-dimensional modeling and information management, deep mine prospecting and prediction methods. Graduates also have the ability to put the national green mine development concept into practice, to enhance the management and service ability of mineral resources, to promote the informationization and intellectualization of mine-related work, and continuously improve the ability and level of serving the development of mining industry.</p>	<p>岩石工程原理与研究方法、智慧矿山、矿床开采理论与实践、三维地质建模及应用</p> <p>The Principle and Technique of Rock Engineering、 Smart Mine、 Theory and Practice of Deposits Mining 、 3D Geological Modeling and Its Application</p>	

	<p>矿业三 废治理 及污染 控制</p>	<p>能够综合运用污染控制理论与技术，解决矿业、农业节能减排、污染治理与环境修复等问题。突出学科交叉，注重技术研发和工程实践。掌握矿业水污染控制理论与污水资源化利用、矿山水环境生态系统恢复与重建、工矿及农田场地土壤污染修复与安全开发利用、矿山及农田生态修复等理论与方法，能将科技创新融入矿山和农田环境污染与生态风险防控领域，实现矿业、农业领域生态环境的可持续发展。</p> <p>Graduates can comprehensively apply pollution control theory and technology to solve problems such as mining, agricultural energy conservation and emission reduction, pollution control and environmental restoration. Interdisciplinary training and technology development and engineering practices are emphasized to equip students with the theories and methods of water pollution control in mining industry, wastewater resource utilization, restoration and reconstruction of mine water environment ecosystem, soil pollution remediation and safe development and utilization of industrial and mining and farmland sites, and ecological remediation of mines and farmland. Graduates are able to integrate scientific and technological innovation into the field of environmental pollution and ecological risk prevention and control in mining and farmland so as to realize sustainable development of ecological environment in mining and agricultural fields.</p>	<p>计算流体力学理论与实践、资源综合利用、现代分析测试技术、污染环境生物修复进展</p> <p>Theory and Practice of Computational Fluid Dynamics 、 Comprehensive Utilization of Resources 、 Modern Technology of Test and Analysis 、 Progress in Contaminated Environment Bioremediation</p>
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附表 2: 培养计划 (Training Plan)



学科名称	矿业工程 Mining Engineering		学科代码	0819		
单位名称	资源与环境工程学院 School of Resources and Environmental Engineering		培养类型	学术学位硕士研究生 Academic Master Degree		
学分要求	总学分 Total Credits: 32 , 必修课程学分 Credit for Compulsive Course: 16, 选修课程学分 Credit for optional course: 3					
课程设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G30033	论文写作与学术规范 Thesis Writing and Academic norms	1	1		
学科平台课程 11 学分	110038	数理统计 Mathematical Statistics	2	1		
	080027	数据分析与处理方法 Data Analysis and Processing Method	2	2		
	080029	绿色矿山理论与实践 Theory and Practice of Green Mine	1	1		
	080030	岩石工程原理与研究方法 The Principle and Technique of Rock Engineering	2	2	研究方向 1、3 必修	
	080031	智慧矿山 Smart Mine	2	2		
	080032	矿床开采理论与实践 Theory and Practice of Deposits Mining	2	2		
	080033	计算流体力学理论与实践 Theory and Practice of Computational Fluid Dynamics	2	2	研究方向 2、4 必修	
	080017	资源综合利用 Comprehensive Utilization of Resources	2	2		
080034	现代分析测试技术 Modern Technology of Test and Analysis	2	2			
方向选修课程 ≥程选学分	080005	工程灾害与控制 Engineering Disaster and Control Technology	2	2	不低于 13 学分	
	080007	矿山优化技术 Mine Optimization Technology	2	2		

	080008	矿业工程软件与技术 Mining Engineering Software and Technology	2	2
	080012	非金属矿物材料 Non-metallic Mineral Materials	2	1
	080016	矿物加工新技术 New Technology of Mineral Processing	2	2
	080014	浮选药剂作用原理 Mechanism of Flotation Reagents	2	1
	080015	矿物加工理论与实践 Theory and Practice of Mineral Processing	2	2
	080025	矿产勘查理论与技术 Theory and Technology of Mineral Exploration	2	1
	080035	区域地质调查技术与方法 Regional Geological Survey Technology and Method	2	2
	080036	成矿理论前沿 Frontier of Metallogenic Theory	2	2
	080037	三维地质建模及应用 3D Geological Modeling and Its Application	2	2
	080038	环境污染化学 Environmental Pollution Chemistry	2	2
	080039	生化反应工程原理 Elements of Biochemical Reaction Engineering	2	1
	080040	污染环境生物修复进展 Progress in Contaminated Environment Bioremediation	2	2
	080041	当代给水与废水处理原理 Contemporary Principles of Water and Wastewater Treatment	2	2
	060004	高等有机化学 Advanced Organic Chemistry	2	1
	060005	高等物理化学 Advanced Physical Chemistry	2	1
	060032	现代仪器分析 Modern Instrumental Analysis	2	1
	090025	功能矿物材料学 Functional Mineral Materials	2	2
素养选修课程 ≤1 学分	150084	东方哲学与现代化 Oriental Philosophy and Modernization	1	2



	G13043	中国古代韵文阅读与欣赏 Reading and Appreciation of Ancient Chinese Rhymes	1	2	
	G17070	经济学基础 Economic Basis	1	2	
	G05024	计算机科学前沿技术应用系列讲座 Lectures on the Frontier Technology and Application of the Computer Science	1	2	
	G02060	科研素养与创新能力 Scientific Research Literacy and Innovation Ability	1	2	
	G13042	诗歌与审美艺术 Poetry and Aesthetic Art	1	2	
	G10014	实验设计与统计分析 Experimental Design and Statistical Analysis	1	2	
	G14010	科技英语写作 Scientific English Writing	1	2	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下，通过查阅文献、收集资料和调查研究后，在充分了解本学科的学术研究前沿动态和生产实践的基础上确定研究课题，写出选题文献综述及工作安排。选题具备合理性、先进性和创新性。开题通过后即获得 1 学分。</p> <p>Under the guidance of the supervisor, the postgraduate student determines the research topic and writes the literature review and work schedule on the basis of fully understanding the research frontier and production practice of the subject after the literature review and preliminary investigation. The topic should be reasonable, advanced and innovative. One credit will be awarded after the thesis proposal is passed.</p>				3
中期考核 (1 学分)	<p>检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量，主要从政治思想和道德品质、基础理论和专业知识、科研创新、实践能力等方面进行考核。中期考核通过后即获得 1 学分。</p> <p>Students will be checked on the progress of postgraduate dissertation, and be provided advices in terms of improving the quality of dissertations. The assessment are made mainly from the aspects of political thought and moral quality, basic theory and professional knowledge, scientific research innovation and practical ability. After passing the mid-term assessment, students will receive 1 credit.</p>				4-5



<p>创新创业 (1 学分)</p>	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次； 2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖； 3. 参加 6 次以上与本学科相关的学术报告，并提交总结。 每项记 1 学分，需完成至少 1 学分。</p> <p>1. Participate in academic conferences and present papers, or make public academic presentation twice; 2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions and win awards; 3. Participate in more than 6 academic presentations related to the subject and submit a summary. 1 credit for each item, no less than 1 credit is required.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



# 材料科学与工程学科学术学位硕士研究生培养方案

学科代码：0805

## Academic Master's Training programs of Materials

## Science and Engineering Discipline for Foreign

## Postgraduates

Credit Code: 0805

### 一、学科简介 ( Brief Introduction to Discipline )

材料科学与工程是山东理工大学重点建设的优势特色学科之一。2004 年开始培养硕士研究生，2010 年获得材料科学与工程一级学科硕士学位授权点。现有博士生导师 4 人、硕士生导师 39 人，其中正高 20 人，副高 17 人，具有博士学位 32 人。导师队伍中入选国家“百千万人才工程”、国家有突出贡献中青年专家、山东省“泰山学者”特聘专家 1 人，入选教育部“新世纪优秀人才支持计划”1 人，山东省高校材料科学与工程专业教学指导委员会委员 1 人。聘有中国工程院院士 1 人、教育部长江学者特聘教授 1 人。

近五年，学科共承担和完成各类项目 110 项，其中省部级以上 30 项，包括国家级项目 11 项。发表学术论文 278 篇，其中 SCI、EI 检索收录 160 篇，获得各类专利 128 项。拥有 2 个国家级工程技术研究中心和 5 个省级研究平台。实验室面积近 10000 平方米，拥有用于材料制备和分析的大、中型设备 168 台套，资产总额 8078 万元。

学科坚持以不断深化研究生教育教学改革为导向，以提高研究生培养质量为核心，突出创新和实践能力的培养，初步建立起以提升创新能力为导向的学术学位研究生培养模式，培养质量和竞争力逐年提高。近五年，共授予硕士学位 77 人，目前在读硕士研究生 81 人。

学科紧密围绕淄博陶瓷品牌建设、国家新材料高新技术产业化基地建设，以及国防武器装备发展的需要，在先进陶瓷及陶瓷基复合材料、先进高分子与复合材料、纳米结构和超显微分析、先进金属材料与低碳制造、生态环境材料 5 个研究方向形成了自己的

特色和优势。

Material science and engineering is one of the most important disciplines of Shandong University of Technology. In 2004, the first batch of postgraduates were enrolled to material science discipline. In 2010, the material science discipline was changed to materials science and engineering discipline. There are 39 master supervisors (including 5 doctoral supervisors) in this discipline, among which there are 20 professors and 17 associate-professors (32 of them have doctoral degrees). The supervisor team has lots of high-level experts, including Academician of the Chinese Academy of Engineering (1 person), Yangtze river scholars Distinguished Professor (1 person), National "Billions of Talents Project" (1 person), Young and middle-aged experts with outstanding national contributions (1 person), Shandong Province "Taishan Scholar" (1 person), Ministry of Education "New Century Outstanding Talent Support Program" (1 person), Member of the Teaching Steering Committee of Material Science and Engineering Specialty in Shandong University (1 person).

In the past five years, the discipline has undertaken and completed a total of 110 projects of various types, including 30 provincial level projects and 11 national level ones. Meanwhile, it published 278 papers (160 of them were indexed by SCI and EI) and obtained 128 patents. Today, we have 2 national research centers and 5 provincial research platforms with nearly 10,000 square meters and 168 experimental instruments (total assets of 80.78 million yuan), providing an excellent scientific research condition.

Aiming to improve the quality of postgraduate training, several reforms of postgraduate education were implemented. In the past five years, 77 postgraduates were awarded master's degrees. At present, there are 81 postgraduates are studying in the discipline.

In order to provide services for the construction of Zibo ceramic brands, the construction of national new materials and high-tech industrialization bases, and the development of national defense weapons and equipment, the discipline has formed 5 research features, including advanced ceramics and ceramic matrix composites, functional polymer materials, nano-structure and ultramicroscopic analysis, advanced metal materials and low-carbon manufacturing, ecological environmental materials.

## 二、培养目标 (Educational Objectives)

面向材料科学与工程领域科技前沿, 培养德、智、体、美全面发展, 具备高水平综合素质的高层次创新创业型人才。

1. 熟悉并热爱中国文化与语言; 具备扎实的材料科学与工程基础理论知识和系统的专业知识, 了解本学科的发展动向, 能够掌握相关材料研究领域先进的工艺设备、测试手段及评价技术; 能做出具有学术价值或应用价值的研究成果。

2. 具有良好的创新意识、实践能力及较强的适应能力; 具有从事科学研究工作和技术工作的能力; 掌握一门外语, 能熟练地阅读专业文献资料和撰写论文。积极参加体育



锻炼和社会活动，具有良好的心理素质和健康的体魄。

3. 能够从事材料及相关领域的教学、科研、工程技术与管理。

Facing the frontier of science and technology in materials science and engineering, the discipline will cultivate all-round development and high-level innovative and entrepreneurial talents with high level and comprehensive quality.

1. Be familiar with and love Chinese culture and language; have the basic theory and systematic expertise in materials science and engineering, understand the development trend of the subject, and be able to master advanced process equipment, testing methods and evaluation techniques; be able to achieve research products with academic or applied values.

2. Have good sense of innovation, practical ability and adaptability; have the ability to engage in scientific research and technical work; be able to master in a foreign language, and read professional literatures and write papers using the foreign language. Obtaining good psychological quality and healthy body through physical exercise and social activities.

3. Be able to engage in teaching, research, engineering technology, management or related engineering techniques in materials.

### 三、研究方向 ( Research Orientation )

材料科学与工程 ( 一级学科 ) 学术硕士学位研究生培养方案设以下 5 个研究方向:

1. 先进陶瓷及陶瓷基复合材料
2. 先进高分子与复合材料
3. 纳米结构和超显微分析 ( 交叉方向 )
4. 先进金属材料与低碳制造
5. 生态环境材料

详见附表 1。

There are 5 research orientations for foreign postgraduates materials science and engineering discipline.

1. Advanced ceramics and ceramic matrix composites
2. Advanced polymers and composites
3. Nano-structure and ultramicroscopic analysis ( interdisciplinary research )
4. Advanced metal materials and low-carbon manufacturing
5. Ecological environmental materials

Details are shown in attached table 1.

### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休

学时间不计入学习年限。

3 years ( can be adjusted in the range of 2-4 years ) . The scientific research and thesis writing time is not less than 1 year ( calculated from the date of opening statement ) . With the consent of the supervisor, the postgraduate can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school is not counted as the number of years of study.

## 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 19 必修学分和 9 选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The course is divided into compulsory courses and elective courses, and the minimum of compulsory courses and elective courses are 19 credits and 9 credits, respectively. Interdisciplinary graduate students need to take 2 or more courses according to the requirements of the supervisor. After passing the examination, they can participate in the opening and defense. The results are not included in the report card.

Details are shown in attached table 2.

## 七、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期初提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。

### 2. 中期筛选

研究生课程学习基本结束后，以研究生培养方案为依据，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期筛选考核小组确定



考核成绩为“不合格”的研究生，经学院、研究生院审核，报校长办公会批准，终止学籍，做研究生肄业处理。

### 3. 创新创业

参加学术会议并宣读论文或张贴墙报，或做公开学术报告 2 次；参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；参加 6 次以上与本学科相关的学术报告，并提交总结。

The supervisor or steering group is responsible for the training of academic master's degree applicants, including the formulation of training programs and the guidance of ideological morality, academic morality.

#### 1. Opening statement

In order to ensure the quality of the dissertation, graduate students should determine the topics and research contents of the dissertation through literature reading and academic research, and submit the opening report at the end of the third semester with the consent of the supervisor. The assessment panel composed of more than 5 experts review the student's opening report and put forward comments and amendments. Those who do not pass the program can re-do it within the time limit, and those who do not pass the program will terminate the training.

#### 2. Midterm inspection

In order to sum up and evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed in the fourth semester. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools.

#### 3. Innovation and entrepreneurship

Study abroad or academic exchange for at least 3 months; participate in academic conferences and show the papers in the form of presentation or poster, or do public academic reports for 2 times; participate and win awards in national science and technology competitions, creative design, innovation and entrepreneurship competitions, or win provincial second prize (including) or above; participate in more than 6 academic reports related to the subject and submit a summary.

## 七、学位论文 Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：

1. 硕士学位论文应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

Master's dissertation is a comprehensive summary of the scientific research work of postgraduates. It is an important academic document that describes the research results and reflects the research level. It is also the basis for awarding master's degrees.

1. The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

2. The main work of the dissertation must be performed independently by the author. Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求，可获得毕业证书；在获得毕业证书的基础上，如满足学位授予标准，可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养计划规定课程和其他培养环节，成绩考核合格；
3. 通过论文答辩，成绩合格；
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》、《山东理工大学博士学位授予工作实施细则》以及材料科学与工程学院学位授予有关规定。

Graduate students who meet the requirements for graduation will receive a diploma. On the basis of a diploma, graduate students who meet the criteria for awarding a degree can be awarded a degree certificate.

#### 1. Graduation requirements

(1) Have good moral character cultivation and academic morality, seeking truth from facts, courage to innovate;

(2) Complete the training plan including courses and other training links, and the results



are qualified;

(3) Pass the thesis defense, and the results are qualified;

(4) Meet other requirements of Shandong University of Technology.

## 2. Degree requirements

Observe the "Provisional Measures for the Implementation of the Regulations of the People's Republic of China", "Measures for the Evaluation of Master's Degree Papers of Shandong University of Technology", "Administrative Rules for the Granting of Master's Degree by Shandong University of Technology", "Administrative Rules for the Granting of Doctoral Degrees by Shandong University of Technology" and relevant regulations for the granting of degrees by the School of Materials Science and Engineering.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>具备坚实的材料科学与工程基础理论知识和系统的专业知识, 了解本学科的发展动向, 能够掌握相关材料研究领域先进的工艺设备、测试手段及评价技术。</p> <p>Have the basic theory and systematic expertise in materials science and engineering, understand the development trend of the discipline, and be able to master advanced process equipment, testing methods and evaluation techniques.</p>	<p>工程数学、材料科学进展 (全英文)、材料现代研究方法、材料物理与化学、材料设计学</p> <p>Engineering Mathematics、Development of Advanced Materials Science、Modern Materials Research Methods、Material Physics and Chemistry、Material Design</p>
综合能力	<p>具有良好的创新意识、实践能力及较强的适应能力; 具有从事科学研究工作和技术工作的能力; 能做出具有学术价值或应用价值的研究成果。</p> <p>Have the ability to engage in scientific research and technical work; be able to achieve research products with academic or applied values.</p>	<p>中国文化、汉语、论文写作与学术规范、创业创新</p> <p>Chinese Culture、Chinese、Thesis Writing and Academic、Innovation and entrepreneurship</p>
研究方向	<p>先进陶瓷及陶瓷基复合材料</p> <p>掌握先进陶瓷及陶瓷基复合材料的数值模拟、计算和材料设计方法, 材料合成、制备工艺与加工技术, 材料显微结构与性能分析测试方法, 熟悉材料制备与分析设备的使用和开发, 具备开展学术前沿课题研究或根据市场和社会需要设计开发新型先进陶瓷及陶瓷基复合材料的能力。</p> <p>Master the methods of numerical simulation, calculation and material design of advanced ceramics and ceramic matrix composites, materials synthesis, preparation techniques and processing techniques, materials microstructure and properties analysis and testing methods, and be familiar with the use and development of materials preparation and analysis equipment. Have the ability to carry out research on advanced academic topics or design and develop novel advanced ceramics and ceramic matrix composites according to market and social needs.</p>	<p>陶瓷材料学、计算材料学、材料热力学与动力学、电子陶瓷材料学、特种陶瓷材料与工艺、缺陷化学 (全英文), 缺陷、扩散与烧结</p> <p>Ceramic Materials、Computational Materials Science、Thermodynamics and Kinetics of Materials、Electronic Ceramic Materials、Special Ceramic Materials and Processes、Defect Chemistry、Defects, Diffusion and Sintering</p>



<p>先进高分子与复合材料</p>	<p>以高分子化学与高分子物理的相关理论为基础，进行功能高分子材料的设计、合成、结构形态及性能优化等方面的研究，具体涉及：聚合反应、聚合方法、聚合热力学与聚合物的化学转变；高分子凝聚态物理、高分子材料表面与界面；功能高分子材料的设计与合成，高分子材料的组成，结构形态与性能优化以及与高分子材料相关的理论计算等。</p> <p>Based on the related theories of polymer chemistry and polymer physics, this orientation carries out the study of the design, synthesis, structural morphology, and performance optimization of functional polymer materials. Specifically, it involves: polymerization, polymerization methods, polymerization thermodynamics, and chemical transformation of polymers; Polymer condensed matter physics, polymer material surface and interface; The design and synthesis of functional polymer materials, the composition of polymer materials, structural morphology and performance optimization, and theoretical calculations related to polymer materials.</p>	<p>高分子材料流变学、高聚物结构与性能、高聚物成型加工技术、功能及特种高分子材料、材料断裂力学、复合材料的结构与性能 2、高分子合成技术（全英文）</p> <p>Polymer Material Rheology、Structure and Properties of Polymer、Polymer Forming and Processing Technology、Functional and special polymer materials、Material Fracture Mechanics、Structure and Properties of Composite Materials、Polymer synthesis technology</p>
<p>纳米结构和超显微分析</p>	<p>掌握纳米材料及纳米结构的合成、表征及性能研究的基础知识，并能运用材料、化学及物理等基础理论对材料的特征和特性进行一定的分析和解释。掌握各种显微分析手段的基本原理，对于不同的纳米材料能有针对性的选择显微分析手段，对纳米材料及纳米结构进行合理的表征分析。把握材料科学与工程学科发展的前沿和动态，具有较高的英语水平，具有独立思考问题和解决问题的能力。</p> <p>Master the basic knowledge of the synthesis, characterization and performance of nanomaterials, and can analyze and explain the characteristics of materials using the basic theory of materials, chemistry, and physics. Grasp the basic principle of various microscopic analysis methods, have the ability to select microscopic analysis methods for different nanomaterials, and make reasonable characterization analysis of nanomaterials. Grasp the frontier and dynamic of the development of materials science and engineering, have a high level of English, and have the ability to think independently and solve problems.</p>	<p>功能材料、纳米催化技术、新能源技术、先进碳材料、胶体与界面化学、纳米材料（全英文）、计算材料学</p> <p>Functional Materials、Nanocatalyst technology、New energy technology、Advanced carbon material、Colloid And Surface Chemistry、Nanomaterials、Computational Materials Science</p>

先进金属材料与低碳制造	<p>掌握金属学、金属热处理、金属材料成形、复合材料、金属腐蚀与防护、材料分析与检测及冶金工艺与装备等基础理论知识,面向先进材料的成分、组织、结构及各种使用性能之间的关系研究,进行低能耗、高性价比的新型材料(金属材料、复合材料)的成形工艺与性能研究及其应用(结构与功能)设计。</p> <p>Master basic theories of metallography, metal heat treatment, metal material forming, composite materials, metal corrosion and protection, material analysis and testing, and metallurgical processes and equipment. Study the relationship among the composition, organization, structure, and various properties of advanced materials. Study the forming technology, performance and application of new materials (metal materials, composite materials) with low energy consumption and high cost.</p>	<p>固体物理学、凝固原理、先进金属材料及制备技术、金属热处理原理、金属腐蚀与防护、粉末冶金基础、缺陷化学(全英文)</p> <p>Solid-state Physics、Solidification Principle、Advanced Metal Materials and Preparation Technology、Metal Heat Treatment Principle、Metal corrosion and protection、Powder metallurgy、Defect Chemistry</p>
生态环境材料	<p>掌握无机非金属材料工程领域基础知识,兼具无机非金属材料产业可持续发展的循环经济理念,重点掌握工业固体废弃物资源化利用的理论与技术,以及绿色建材产品的设计、制备、表征等方面的理论知识;了解材料科学与工程领域的相关专业知识,能在固体废弃物资源化利用,无机非金属材料及绿色建材的设计制备、结构与性能表征、应用研究等领域从事工艺设计、技术开发、科学研究、生产、经营管理等方面工作。</p> <p>Master the basic knowledge in the field of inorganic non-metallic materials engineering, combine the concept of recycling economy of the sustainable development of the inorganic non-metallic materials industry, and focus on the theory and technology of the utilization of industrial solid waste resources, as well as the design, preparation, and characterization of green building materials products. Understand the relevant expertise in materials science and engineering, and be able to utilize solid waste resources. Have the ability to engage in the work of process design, technology development, scientific research, production, and management of inorganic non-metallic materials and green building materials.</p>	<p>分子筛与多孔材料、功能矿物材料学、功能材料、生态环境材料(全英文)、计算材料学、资源循环科学与工程概论、环境工程材料及制备技术</p> <p>Molecular Sieves and Porous Materials、Functional Mineral Materials、Functional Materials、Ecological environmental materials、Computational Materials Science、Introduction to Resource Circulation Science and Engineering、Environmental Engineering Materials and Preparation Technology</p>



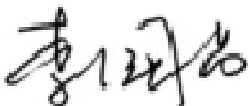

附表 2: 培养计划 (Training Plan)

学科名称	材料科学与工程 Materials Science and Engineering		学科代码	0805	
单位名称	材料科学与工程学院 School of Materials Science and Engineering		培养类型	硕士留学研究生 Foreign Postgraduates	
学分要求	总学分 Total Credits: 32 , 必修课程学分 Credit for Compulsive Course: 16, 选修课程学分 Credit for optional course: 9				
课程 设置					
课程类型	课程编码	课程名称	学分	学期	备注
公共必修课程 ≥5 学分	G13100	中国文化 Chinese Culture	2	1	
	G13101	汉语 Chinese	2	1	
	150120	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科平台课程 ≥11 学分	G11004	工程数学 Engineering Mathematics	2	2	必选
	090041	材料科学进展 Advances in Materials Science	2	1	不低于 9 学分
	090003	材料现代研究方法 Modern Research Methods of Materials	2	2	
	090020	材料物理与化学 Material Physics and Chemistry	3	1	
	090050	材料设计学 Material Design	2	1	
方向选修课程 ≥9 学分	090042	固体物理学 Solid-state Physics	2	1	不低于 9 学分
	090005	陶瓷材料学 Science of Ceramic Materials	2	2	
	090006	功能材料 Functional Materials	2	2	
	090008	凝固原理 Fundamentals of solidification	2	1	
	090012	高分子材料流变学 Polymer Rheology	2	1	

090013	分子筛与多孔材料 Molecular Sieves and Porous Materials	2	2
090014	高聚物结构与性能 Structure and Properties of Polymer	2	2
090061	高聚物成型加工技术 Polymer Forming and Processing Technology	2	1
090062	高分子合成技术 Polymer synthesis technology	2	2
090063	功能及特种高分子材料 Functional and special polymer materials	2	2
090024	材料断裂力学 Fracture mechanics of materials	2	2
090025	功能矿物材料学 Functional Mineral Materials	2	2
090026	缺陷、扩散与烧结 Defects, Diffusion and Sintering	2	2
090043	先进金属材料及制备技术 Advanced Metal Materials and Preparation Technology	2	2
090039	金属热处理原理 Principle of Metal Heat Treatment	2	2
090040	复合材料的结构与性能 The structure and properties of composite materials	2	2
090059	金属腐蚀与防护 Metal corrosion and protection	2	2
090060	粉末冶金基础 Powder metallurgy	2	2
090051	缺陷化学（全英文） Defect Chemistry	2	2
090055	生态环境材料（全英文） Ecological environmental materials	2	1
090049	电子陶瓷材料学 Electronic Ceramic Materials	2	2
090056	计算材料学 Computational Materials Science	2	1
090057	特种陶瓷材料与工艺 Special Ceramic Materials and Processes	2	2
090058	材料热力学与动力学 Thermodynamics and Kinetics of Materials	2	1



	090044	纳米催化技术 Nanocatalyst technology	2	2	
	090047	先进碳材料 Advanced carbon material	2	1	
	090045	胶体与界面化学 Colloid And Surface Chemistry	2	2	
	090046	新能源技术 New energy technology	2	2	
	090048	纳米材料（全英文） Nanomaterials	2	1	
	090052	资源循环科学与工程概论 Introduction to Resource Circulation Science and Engineering	2	2	
	090053	环境工程材料及制备技术 Environmental Engineering Materials and Preparation Technology	2	1	
素养选修课程 ≤1 学分	150084	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	130001	中国古代韵文阅读与欣赏 Reading and Appreciation of Ancient Chinese Rhymes	1	2	
	090064	科研与人文修养 Scientific Research and Humanity Cultivation	1	2	
补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 （1 学分）	<p>第三学期初提交开题报告，由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，不通过者可限期重做，仍不通过者终止培养。</p> <p>The assessment panel composed of more than 5 experts review the student's opening report and put forward comments and amendments at the begin of the third semester. Those who do not pass the program can re-do it within the time limit, and those who do not pass the program will terminate the training.</p>				3
中期考核 （1 学分）	<p>由本学科专业 5 人以上专家组成中期筛选考核小组在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核，考核成绩为“不合格”的研究生，经学院、研究生院审核，报分管校长批准，终止学籍，做研究生肄业处理。</p> <p>In order to sum up and evaluate the study and research situation, find out the problems in the training process, discuss the ways to solve the problem, and clarify</p>				4-5

	the direction of future efforts, a comprehensive assessment of political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and state of health is performed in the fourth semester. The education of "unqualified" graduate students will be terminated after the approval of colleges and graduate schools.		
创新创业 (1 学分)	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>3. 参加 6 次以上与本学科相关的学术报告，并提交总结； 每项记 1 学分，需完成 1 学分。</p> <p>1. Participate in academic conferences and presentation of papers, or do public academic reports for 2 times;</p> <p>2. Participate and win awards in high level science and technology competitions, creative design, innovation and entrepreneurship competitions;</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary.</p> <p>1 credit for each, the minimum credit is 1.</p>		1-5
培养单位 教授委员会主任		培养单位 负责人	



## 生物学学科学术学位硕士研究生培养方案

学科代码：0710

### Academic Master's Training program of Biology for Foreign Postgraduates

Credit Code: 0710

#### 一、学科简介 ( Brief Introduction to Discipline )

生命科学学院设立于 1988 年，是学校具有鲜明办学特色和较强办学实力的理工科学院之一。学院现设有生物科学与技术系、生物工程系、制药工程系 3 个系和 1 个实验管理中心。有山东省生物信息工程技术研究中心、淄博市神经退行性疾病新药研发重点实验室、生物医药研究院、发育与进化研究所、抗衰老与再生医学研究所等科研机构。本学位点学科于 2003 年获生物化学与分子生物学二级学科硕士学位点授权，2011 年获生物学一级学科硕士学位点授权。学院现有 1 个生物化学工程博士研究生培养方向，1 个生物学一级学科硕士学位点，有生物科学、生物工程、制药工程 3 个本科专业，共有全日制在校本科生约 900 人，研究生约 50 人。

学院大力实施“人才优先战略”，把师资队伍建设作为“首要工程”，加大高层次人才引进培养力度，汇聚了一批国内外有一定影响的学术带头人和学术骨干，形成了一支具有较强创新能力的高水平师资队伍。现有教职工 61 人，其中专任教师 57 人，90%以上具有博士学位，40%以上具有海外高校科研院所学习经历。拥有教授 10 人，副教授 20 人；博士生导师 4 人，硕士生导师 39 人，另聘有兼职教授 4 人。学院按照“出人才、出成果、出效益”的方针，不断加强科研工作。本学科近年来，主持国家自然科学基金等课题 28 项，省部级科研课题 29 项；发表学术论文 500 余篇，其中 SCI 收录 289 篇；获山东省自然科学二等奖、教育部自然科学二等奖、山东省高等学校优秀科研成果一等奖等科研奖励。

School of life sciences was established in 1988. It is one of the best science and engineering colleges in Shandong university of technology. The college now has three departments of biological science and technology, biological engineering, pharmaceutical engineering, and an experimental management center. There are some research institutes such as Shandong



Provincial Biotechnology Engineering Technology Research Center, Zibo Key Laboratory of Research and Development of New Neurodegenerative Diseases, Institute of Biomedical Research, Institute of Development and Evolution, and Institute of Anti-Aging and Regenerative Medicine. The master's degree program in biochemistry and molecular biology was authorized in 2003, and the master's degree program in biology was authorized in 2011. The college currently has 1 doctoral candidate in biochemical engineering, 1 master's degree in biology, 3 undergraduate majors in biological sciences, biological engineering, and pharmaceutical engineering. There are about 900 full-time undergraduate students and about 50 graduate students.

The college vigorously implemented the "talent priority strategy", made the construction of teachers a "primary project", increased the introduction and training of high-level talents, and brought together a group of academic leaders and academic cadres at home and abroad. It has formed a high-level teaching staff with young and middle-aged teachers as the main body, active academic thinking, and strong innovation ability. There are 61 faculty members, including 57 full-time teachers, more than 90 % with a doctorate, and more than 40 % with overseas university research institutes. There are 10 professors, 20 associate professors, 4 doctoral supervisors, 39 master supervisors, and 4 adjunct professors. The college continues to strengthen its scientific research work in accordance with the principle of "producing talents, producing results, and producing benefits." In recent years, the college presided over 28 the National Natural Science Foundation and 29 provincial and ministerial research projects, published more than 500 academic papers, of which 289 were collected by SCI and won the second prize of natural sciences in Shandong Province, the second prize of natural sciences in the Ministry of Education, and the first prize of outstanding scientific research achievements in Shandong Province.

## 二、培养目标 ( Educational Objectives )

1. 掌握生物学扎实的基础理论和系统深入的专门知识和实验技能,具有一定的相关学科的知识; 深入了解本学科发展方向和国内外研究动态;

2. 能顺利阅读本学科领域的科技资料及文献,并具备一定的写作能力和进行国际学术交流能力;

3. 具有独立从事科学研究工作的能力; 在科学或专门技术上做出创造性的成果;

4. 为高等学校、科研单位、行业管理部门以及生物医药企业培养高层次的创新型专门技术人才, 从事生物学相关领域的教学、科研、生产及管理等工作。

1. Master the solid basic theory of biology and deep system expertise and experimental skills, with a certain degree of knowledge of related disciplines. In-depth understanding of the development direction of the subject and domestic and foreign research developments;

2. Ability to read scientific and technical materials and literature in the field, and to write



and communicate internationally.

3. Ability to conduct scientific research independently; To produce creative results in science or technology.

4. Have high-level innovative specialized technology for institutions of higher learning, scientific research institutions, industry management departments, and biomedical enterprises, and engages in teaching, scientific research, production, and management in biology-related fields.

### 三、研究方向 ( Research Orientation )

1. 神经生物学
2. 细胞生物学
3. 植物生物学 ( 交叉方向 )
4. 生物化学与分子生物学

详见附表 1。

1. Neurobiology
2. Cell Biology
3. Plant Biology
4. Biochemistry and Molecular Biology

Details are shown in attached table 1.

### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The school system is 3 years, the number of years of study is 2-4 years, and the time for scientific research and thesis writing is not less than 1 year ( calculated from the date of adoption of the title ) . With the consent of the tutor, you can apply for early graduation, but the time requirements for scientific research and thesis writing remain unchanged. The time off from school is not counted as the number of years of study.

### 五、课程设置与学分要求 ( Curriculum settings and credit requirements )

课程分为必修课程和选修课程，学生需在规定时间内完成 16 必修学分和  $\geq$  修选修学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The course is divided into compulsory courses and elective courses. Students need to complete 16 compulsory credits and  $\geq 9$  elective credits within a specified time. Interdisciplinary graduate students need to take 2 or more courses according to the requirements of the tutor. After passing the examination, they can participate in the thesis proposal and defense. The results are not included in the report card.

The courses are shown in attached table 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制,鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划,且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量,研究生应通过课程学习、文献阅读、学术调研,确定论文选题和研究内容,经导师同意后于第三学期前提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审,提出评价和修改意见,不通过者可限期重做,仍未通过将终止培养。通过即获得 1 学分。

### 2. 中期筛选

研究生课程学习基本结束后,在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及综合素质等方面进行考核。其目的是总结评价研究生入学以来的学习科研情况,及时发现研究生培养过程中存在的问题,探讨解决问题的途径,明确今后努力的方向。中期筛选考核小组确定考核成绩为“不合格”的研究生,经学院、研究生院审核,报校长办公会批准,做肄业处理。通过即获得 1 学分。

### 3. 创新创业

硕士研究生在学期间,应进行 3 个月的出国访学研修或学术交流,或参加学术会议并宣读论文,或做公开学术报告 2 次;应参加省级及以上全国性的科技竞赛、创意设计、创新创业竞赛等,或每年参加 6 次以上与本学科相关的学术报告,并提交总结。未达到要求的研究生不能参加论文答辩。通过即获得 1 学分。

Academic master's degree training implements a tutor responsibility system and encourages the implementation of a steering group ( team ) system based on mentor responsibility. The tutor is responsible for formulating graduate student training plans and has the responsibility of demonstrating, and supervising graduate students 'ideological and moral integrity.

#### 1. Thesis Proposal

In order to ensure the quality of the dissertation, graduate students should determine the



topics and research contents of the dissertation through course studies, literature reading, and academic research, and submit the thesis proposal before the third semester with the consent of the tutor. The review team composed of more than 5 experts from the subject will review the student's thesis proposal and put forward comments and amendments. Those who do not pass can re-do it within a time limit, and they will not pass the training. After passing, you can get 1 credit.

## 2. Midterm evaluation

After the basic completion of the postgraduate course, in the fourth semester, the graduate students' political ideology and moral qualities, basic theory and professional knowledge, scientific research innovation, practical ability and comprehensive quality were assessed. Its purpose is to sum up and evaluate the study and research situation since the graduate students entered the school, find out the problems in the graduate student training process in time, discuss the ways to solve the problem, and clarify the direction of future efforts. The mid-term screening assessment team determined that the graduate students with "unqualified" performance were reviewed by the college and graduate school and reported to the president's office for approval. After passing, you can get 1 credit.

## 3. Innovation and entrepreneurship

During the studies, master's students should conduct 3 months of overseas study or academic exchanges, or participate in academic conferences and read papers, or make public academic reports twice; Should participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc., or participate in more than 6 academic reports related to the subject each year, and submit a summary. Graduate students who fail to meet the requirements can not participate in the thesis defense. After passing, you can get 1 credit.

## 七、学位论文 Academic Dissertation )

1. 硕士学位论文应具有系统的、完整的研究思路 and 计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持实验性原则，论文内容必须以硕士研究生本人完成的第一手实验、观测或调查的材料为主。

3. 硕士研究生用于做学位论文的时间，应不少于1年（自硕士论文开题报告考核通过起至硕士论文答辩前）。

The master's thesis should have systematic and complete research ideas and plans. It should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should emphasize innovation, frontier and science.

The main work of the dissertation must be performed independently by the author.

Research work must adhere to the principle of experimentation. The content of the thesis must be based on the materials of first-hand experiments, observations, or surveys completed by master students themselves.

The time used by master's students to do dissertation should be not less than 1 year ( from the examination of the master's thesis opening report to the master's thesis defense ) .

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养方案规定课程和其他培养环节, 成绩考核合格;
3. 完成论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及生命科学学院学位授予有关规定。

The graduation requirements are met and a diploma is obtained; A degree certificate may be awarded on the basis of a diploma, if the criteria for granting a degree are met.

#### 1. Graduation requirements:

(1) Have good moral cultivation and academic ethics, seek truth from facts, and dare to innovate;

(2) After completing the training program prescribed courses and other training links, the results are qualified;

(3) Complete the thesis defense and pass the grade;

(4) Meet other requirements of the school.

#### 2. the degree requirements:

Strict implementation of the "Provisional Measures for the Implementation of the Regulations of the People's Republic of China", "Measures for the Evaluation of Master's Degree Papers of Shandong University of Technology", "Implementation Rules for the Granting of Master's Degree by Shandong University of Technology", "Implementation Rules for the Granting of Doctoral Degrees by Shandong University of Technology" and relevant regulations for the granting of degrees by the School of Life Sciences.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>培养研究生优良的科学精神，遵纪守法，品德高尚，学风严谨，具有较强的事业心和团结协作精神及为科学勇于献身的精神，积极为现代化建设事业服务。</p> <p>To cultivate the fine scientific spirit of graduate students, abide by the law and discipline, high moral character, rigorous style of study, strong spirit of enterprise and unity and cooperation, and the spirit of dedication to science, and actively serve the cause of modernization.</p>	<p>中国文化、汉语、论文写作与学术规范 Chinese Culture、Chinese、Thesis Writing and Academic</p>
综合能力	<p>培养研究生具有生物学基础理论、专门知识和实验技能，深入了解本学科发展方向和国内外研究动态；具有独立从事科学研究工作的能力；比较熟练地掌握一门外国语，能顺利阅读本学科领域的科技资料及文献，并具备一定的写作能力和进行国际学术交流能力。</p> <p>Master the solid basic theory of biology and deep system expertise and experimental skills, with a certain degree of knowledge of related disciplines. In-depth understanding of the development direction of the subject and domestic and foreign research developments; Ability to read scientific and technical materials and literature in the field, and to write and communicate internationally. Ability to conduct scientific research independently; To produce creative results in science or technology.</p>	<p>实验数据处理与高级生物统计学、生命科学研究前沿、现代生物学理论、高级生物学实验研究技术、高级生物学英文文献研讨与论文写作、现代仪器分析 Experimental Data Processing and Advanced Biostatistic、Frontiers of Life Science Research、Modern Biological Theory, Advanced Biological Experimental Research Techniques、Advanced Biology English Literature Research and Thesis Writing、Modern Instrument Analysis</p>
研究方向	<p>掌握生物信息学、基因组学、药物设计学、分子生物学、细胞生物学等理论知识及相关实验研究方法和技术，在基因水平、蛋白水平、细胞水平和动物水平开展神经退行性疾病（老年痴呆症、朊病毒病、帕金森氏症等）的发病机制研究，并进行该类疾病的精准分子检测探针，新型药物筛选设计、合成、活性与药理研发，为生物医药产业提供理论指导和技术支持。</p> <p>Master theoretical knowledge of bioinformatics, genomics, drug design, molecular biology, cell biology, and related experimental research methods and techniques. Study the pathogenesis of neurodegenerative diseases ( Alzheimer's disease, prion diseases, Parkinson's disease, etc. ) at genetic level, protein level, cell level, and animal level, and carry out molecular diagnostic probe development, novel drugs screen and pharmacology study for these diseases.</p>	<p>理论生物学、计算生物学研究进展和关键技术 Theoretical biology、Advances in computational biology and key techniques</p>

细胞生物学	<p>掌握发育生物学、细胞生物学、免疫学、分子生物学等研究方法的理论知识及相关技术，从基因、蛋白、细胞和整体多层次系统研究细胞变异，细胞信号传导，细胞代谢和模式发育、免疫、再生与抗衰老相关基因的进化、功能及其调控机制，分析相关基因作为药物靶点的可行性，研究天然产物对神经干细胞增殖和分化、肿瘤发生、抗衰老的调控机制，为药物筛选提供理论参考。</p> <p>Master the theoretical knowledge and related techniques of research methods such as developmental biology, cell biology, Immunology, and molecular biology, and systematically study cell mutations and cell signal transmission from genes, proteins, cells, and the whole multilevel system. The evolution, function and regulatory mechanism of genes related to cell metabolism and model kinetic development, immunity, regeneration and anti-aging, and the feasibility of related genes as drug targets are analyzed, and the regulatory mechanism of natural products for the proliferation and differentiation of neural stem cells, tumorigenesis, and anti-aging is studied. It provides theoretical reference for drug screening.</p>	<p>动物发育与再生理论和技术、动物细胞与免疫理论和技术</p> <p>Theory and Technology of Animal Development and Regeneration、Theory and Technology of Animal Cell and Immunity</p>
植物生物学	<p>研究植物生长、发育、生殖等各个阶段基因调控、生化变化、生理过程的分子机制和信号转导；逆境调控植物包括生物能源物质在内的各种次级代谢产物的机制；植物响应环境变化的生理、生化及遗传基础。重点掌握植物抗逆的分子调控机理、信号传导网络、植物基因功能研究、基因工程相关知识和技术，了解植物抗逆研究的前沿知识及植物基因工程在农业生产上的意义，为农、林、牧、医药、环境保护、轻工业等有密切联系的应用学科提供理论指导。</p> <p>To study gene regulation, biochemical changes, molecular mechanism and signal transduction in plant growth, development and reproduction. Mechanisms for regulating secondary metabolites in plants, including BioEnergy substances; Physiological, biochemical and genetic basis for responding to changes in environmental factors. We will focus on understanding the molecular control mechanism and signal transmission network for plant resistance, understanding plant genetic function research and knowledge and technology related to genetic engineering, and understanding the frontier knowledge of plant resistance research and the significance of plant genetic engineering in agricultural production. For agriculture, forestry, animal husbandry, medicine, environmental protection, light industry and other closely related applied science to provide theoretical guidance.</p>	<p>植物逆境生理和分子调控专题、植物抗逆分子调控机理和关键研究技术</p> <p>Plant Stress Physiology and Molecular Regulation、Mechanism and Key Research Techniques of Resistance to Inverse Molecular Control in Plants</p>



	生化与分子生物学	<p>研究生物有机体的分子组成、生命过程的化学变化, 以及机体信息传递分子途径, 在分子水平上研究生命现象的物质基础和生命过程基本活动规律, 特别是生物有机体的基因组结构、基因表达调控元件、基因表达调控规律、DNA 与蛋白质的相互作用和环境因子对基因表达与基因组结构的影响, 研究生物体的组成成分和代谢产生的药物的相关问题, 如药物的提取分离、药物的疗效、药物合成、药物的构效关系研究等, 为生物技术与医药产业提供理论指导。</p> <p>To study the molecular composition of biological organisms, chemical changes in life processes, and molecular pathways for the transmission of information to the body, and to study the material basis of life phenomena and the basic activity laws of life processes at the molecular level. In particular, the genomic structure of biological organisms, gene expression regulatory elements, gene expression regulatory rules, DNA and protein interactions, and the influence of environmental factors on gene expression and genomic structure, and the study of the composition of organisms and metabolically produced drugs. Related issues, For example, the extraction and separation of drugs, the efficacy of drugs, drug synthesis, and the study of the structure-activity relationship of drugs provide theoretical guidance for the biotechnology and pharmaceutical industries.</p>	<p>高级生物化学与分子生物学、药物的发现研究、微生物学理论与技术</p> <p>Advanced Biochemistry and Molecular Biology, Microbiological Theory and Technology, Drug Discovery Research</p>
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附表 2: 培养计划 (Training Plan)

学科名称	生物学 Biology		学科代码	0710		
单位名称	生命科学学院 School of life sciences		培养类型	学术硕士研究生 Academic graduate student		
学分要求	总学分 Total Credits: 28 , 必修课程学分 Credit for Compulsive Course: 16, 选修课程学分 Credit for optional course: $\geq 1$					
课程 设 置 (中英文对照) Curriculum						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 $\geq$ 共学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	150120	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 $\geq$ 科平学分	100016	实验数据处理与高级生物统计学 Experimental Data Processing and Advanced Biostatistics	2	2	必选	
	100017	生命科学研究前沿 Frontiers of Life Science Research	3	1-2	不低于9学分	
	100018	现代生物学理论 Modern Biological Theory	3	1		
	100002	高级生物学实验研究技术 Advanced Biological Experimental Research Techniques	3	1		
	100019	高级生物学英文文献研讨与论文写作 Advanced Biology English Literature Research and Thesis Writing	3	2		
方向选修课程 $\geq$ 向学分	100020	动物发育与再生理论和技术 Theory and Technology of Animal Development and Regeneration	3	2	不低于8学分	
	100021	动物细胞与免疫理论和技术 Theory and Technology of Animal Cell and Immunity	3	2		
	100024	植物逆境生理和分子调控专题 Plant Stress Physiology and Molecular Regulation	3	2		
	100007	植物抗逆分子调控机理和关键研究技术 Mechanism and Key Research Techniques of Resistance to Inverse Molecular Control in Plants	3	2		



	100008	理论生物学 Theoretical biology	3	2	
	100009	计算生物学研究进展和关键技术 Advances in computational biology and key techniques	3	2	
	100010	现代仪器分析 Modern Instrument Analysis	3	2	
	100013	药物的发现研究 Drug Discovery Research	3	2	
	100012	微生物学理论与技术 Microbiological Theory and Technology	3	2	
	100015	高级生物化学与分子生物学 Advanced Biochemistry and Molecular Biology	3	2	
素养选修课程 ≤1 学分	031001	中国传统文化 Chinese Traditional Culture	1	2	
	G10023	研究生科研能力训练与培养 Postgraduate Research Competence Training and Development	1	2	
补修课程 不计学分	跨专业报考研究生，需补修生物学专业核心课程。				导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>为确保学位论文的质量，研究生应通过课程学习、文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期前提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍未通过将终止培养。通过即获得 1 学分。</p> <p>In order to ensure the quality of the dissertation, graduate students should determine the topics and research contents of the dissertation through course studies, literature reading, and academic research, and submit the thesis proposal before the third semester with the consent of the tutor. The review team composed of more than 5 experts from the subject will review the student's thesis proposal and put forward comments and amendments. Those who do not pass can re-do it within a time limit, and they will not pass the training. After passing, you can get 1 credit.</p>				3
中期考核 (1 学分)	<p>研究生课程学习基本结束后，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及综合素质等方面进行考核。其目的是总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期筛选考核小组确定考核成绩为“不合格”的研究生，经学院、研究生院审核，报校</p>				4-5

	<p>长办公会批准，做肄业处理。通过即获得 1 学分。</p> <p>After the basic completion of the postgraduate course, in the fourth semester, the graduate students' political ideology and moral qualities, basic theory and professional knowledge, scientific research innovation, practical ability and comprehensive quality were assessed. Its purpose is to sum up and evaluate the study and research situation since the graduate students entered the school, find out the problems in the graduate student training process in time, discuss the ways to solve the problem, and clarify the direction of future efforts. The mid-term screening assessment team determined that the graduate students with "unqualified" performance were reviewed by the college and graduate school and reported to the president's office for approval. After passing, you can get 1 credit.</p>		
<p>创新创业 (1 学分)</p>	<p>硕士研究生在学期间，应进行 3 个月的出国访学研修或学术交流，或参加学术会议并宣读论文，或做公开学术报告 2 次；应参加省级及以上全国性的科技竞赛、创意设计、创新创业竞赛等，或每年参加 6 次以上与本学科相关的学术报告，并提交总结。未达到要求的研究生不能参加论文答辩。通过即获得 1 学分。</p> <p>During the studies, master's students should conduct 3 months of overseas study or academic exchanges, or participate in academic conferences and read papers, or make public academic reports twice; Should participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc., or participate in more than 6 academic reports related to the subject each year, and submit a summary. Graduate students who fail to meet the requirements can not participate in the thesis defense. After passing, you can get 1 credit.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



## 数学学科学术学位硕士研究生培养方案

学科代码：0701

### Academic Master's Training programs of Mathematics for International Students

Credit Code: 0701

#### 一、学科简介 ( Brief Introduction to Discipline )

本学科成立于 1978 年，2007 年招收应用数学硕士研究生，2011 年获批一级学科硕士点。现有专任教师 40 人，其中教授 13 人、博士 35 人，博导 2 人、硕导 22 人；拥有全国优秀教师、山东省教学名师、山东省青年泰山学者、山东省高校中青年学术骨干及青海省“昆仑英才”等各类人才 5 人；多人担任中国工业与应用数学学会理事、山东省大学数学教学研究会理事长、山东省数学会常务理事、山东省代数学会副理事长及常务理事等学术职务。中国科学院万哲先院士为我校特聘教授。

近 5 年来，本学科主持/完成国家自然科学基金 26 项，山东省自然科学基金重点项目 2 项，其它省部级项目 17 项，科研总经费 1000 多万元。发表 SCI 检索论文 200 余篇，其中 SCI 二区以上论文 60 余篇、ESI 高被引论文 5 篇；获山东省自然科学二等奖、山东省科技进步二等奖、湖南省自然科学三等奖、青海省科技进步三等奖各 1 项，山东省教育教学成果一、二等奖各 1 项。

本学科坚持立德树人，着力培养“五有人才”，80%以上的硕士毕业生到高校或职业院校工作或攻读博士学位，为国家培养了“洪堡学者”、双一流高校博导等大批数学人才，学科整体水平位居省属高校前列。

历经 40 余年发展，本学科在科学计算与反问题、系统优化与控制、代数与图论、偏微分方程与动力系统等研究方向形成了特色和优势。随着学科实力的增强，依托我校优势工科，本学科将着力培养基础理论扎实、综合素质高，具备较强的数学应用、科学计算和数据分析等能力的数学与交叉科学领域的高层次人才。

The discipline was established in 1978. In 2007, it enrolled a master's degree in applied mathematics. In 2011, it was awarded a master's degree in a first-level discipline. There are 40 full-time teachers, including 13 professors, 35 doctors, 2 doctoral supervisors and 22 masters.

They have excellent teachers in the country, famous teachers in Shandong Province, young Taishan scholars in Shandong Province, young and middle-aged academic backbones in Shandong Province, and Qinghai Province. "Kunlun Talents" and other talents of 5 people; many of them serve as directors of the China Society of Industrial and Applied Mathematics, director of the Shandong University Mathematics Teaching Research Association, executive director of the Shandong Provincial Mathematical Society, vice chairman and executive director of the Shandong Provincial Mathematical Society Academic position. Academician Wan Zhexian of the Chinese Academy of Sciences is a special professor at our school.

In the past five years, the discipline has presided over/completed 26 projects of the National Natural Science Foundation of China, 2 key projects of the Shandong Natural Science Foundation, 17 other provincial and ministerial projects, with a total funding of more than 10 million yuan. Published more than 200 SCI retrieval papers, including more than 60 papers from SCI 2 and 5 highly cited papers from ESI; won the second prize of Natural Science in Shandong Province, the second prize of scientific and technological progress in Shandong Province, the third prize of Natural Science in Hunan Province, the third prize of scientific and technological progress in Qinghai Province, and the first and second prize of educational and teaching achievements in Shandong Province.

The discipline adheres to the Lide Shuren and focuses on cultivating "five talents". More than 80% of master's graduates work in universities or vocational colleges or pursue doctoral degrees. It has trained a large number of mathematic talents such as "Humboldt Scholars" and "two-class University tutors" for the country. The overall level of the discipline is in the forefront of provincial universities.

After more than 40 years of development, the discipline has formed characteristics and advantages in scientific research and inverse problems, system optimization and control, algebra and graph theory, partial differential equations and dynamic systems. With the enhancement of the discipline's strength and relying on the superior engineering of our school, this discipline will focus on cultivating high-level talents in the fields of mathematics and cross-science with strong basic theory, high comprehensive quality, and strong mathematical application, scientific calculation and data analysis.

## 二、培养目标 ( Educational Objectives )

为适应经济建设和社会发展的需要,培养德、智、体全面发展,能从事本学科领域内的教学、科研以及管理工作的高层次专门人才,具体要求:

1. 具有高尚的职业道德和积极进取精神,具有良好的学术道德、创新能力和敬业精神,具有较高的科学素养和健康的身心。

2. 具有扎实宽广的数学理论基础和系统的专门知识,了解所从事研究领域国内外研究的最新进展和动态,具备独立从事数学研究和运用专业知识解决实际问题的能力。



3. 能熟练地应用外语阅读本学科领域的科技资料及文献,具有论文写作能力和进行国际学术交流的语言能力;具有运用网络信息技术的能力。

4. 能够综合运用数学的理论与方法、计算机技术、信息技术等,从事数学教学、科研以及工程、管理、金融等领域的技术开发、管理、咨询等工作的高层次人才,还可以在本领域或相近学科领域进入更高层次的学习。

In order to meet the needs of economic construction and social development, we should train high-level professionals who can develop morally, intellectually and physically in an all-round way and engage in teaching, scientific research and management in the field of their own disciplines.

#### Specific requirements

1. With noble professional ethics and positive enterprising spirit, good academic ethics, innovative ability and professionalism, with high scientific literacy and healthy body and mind.

2. Have a solid and broad theoretical basis and systematic expertise in mathematics, understand the latest progress and trends of research in the field of research at home and abroad, and have the ability to independently engage in mathematical research and apply professional knowledge to solve practical problems.

3. Skilled in reading scientific and technological materials and documents in the field of this subject in foreign languages, with the ability to write papers and conduct international academic exchanges, and the ability to use network information technology.

4. High-level talents who can use mathematics theory and methods, computer technology and information technology comprehensively, engage in mathematics teaching, scientific research, technology development, management and consulting in the fields of engineering, management and finance, and can also enter higher-level learning in this field or similar disciplines.

### 三、研究方向 ( Research Orientation )

数学 ( 一级学科 ) 学术硕士学位研究生培养方案设以下 4 个研究方向:

1. 科学计算与反问题
2. 系统优化与控制
3. 代数与图论
4. 偏微分方程与动力系统

研究方向简介见附表 1。

There are four research directions in the training program for postgraduates with master's degree in mathematics ( first-level discipline )

1. Scientific calculations and inverse problems
2. System optimization and control

3. Algebra and graph theory
4. Partial differential equations and dynamic systems

A brief introduction to the research direction is given in Schedule 1.

#### 四、学习年限 ( Length of Schooling )

学制 3 年，修业年限 2-4 年，科学研究和论文撰写时间不少于 1 年（从开题通过之日起计算）。在基本学制规定时间内，研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由，研究生在基本学制结束前两个月向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告，并经学位评定分委员会组织审查通过，报校学位评定委员会办公室审核批准后，可最多延长申请学位年限 1 年。

经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The school system is three years and the length of study is 2-4 years. The time for scientific research and thesis writing is not less than one year (calculated from the date of the adoption of the opening question). Within the time limit stipulated by the basic educational system, postgraduates should complete various tasks such as dissertation defense and degree award examination. If for academic justification, two months before the end of the basic education system, postgraduates submit a report on the progress of their dissertations and a report on the application for postponement of their dissertations to the academic degree evaluation Sub-Committee of the training unit, which has been examined and approved by the academic degree evaluation Sub-Committee and submitted to the office of the academic degree evaluation committee of the University for examination and approval, the period of application for academic degrees may be extended for up to one year.

With the consent of the instructor, you may apply for early graduation, but the time requirements for scientific research and paper writing remain unchanged. The period of suspension does not take into account the length of study.

#### 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程分为必修课程和选修课程。研究生课程每 16 学时计 1 学分，原则上只用于课内教学环节。学生需在规定时间内完成不低于 26 学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

The courses are divided into compulsory courses and elective courses. Postgraduate courses are credited 1 credits per 16 school hours, and in principle they are only used for teaching in



class. Students are required to complete a learning task of no less than 26 credits within the prescribed time. Interdisciplinary graduate students are required to take two or more courses according to their tutor's requirements. After passing the examination, they can participate in answering questions. The results are not included in the transcript.

The curriculum is shown in Schedule 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制,鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划,且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

研究生在导师的指导下,通过查阅文献、收集资料和调查研究后确定研究课题,写出选题文献综述,在第三学期完成开题。开题通过后即获得1学分。

### 2. 中期考核

中期考核是检查研究生学位论文进展状况,帮助学生把握学位论文方向,提高学位论文质量的必要环节。硕士研究生中期考核在第四或五学期进行。中期考核通过后即获得1学分。

### 3. 科研实践

研究生参加结合研究方向的科研工作或实验室等工作。导师考核合格即可获得1学分。

### 4. 创新创业

达到以下条件之一,即获得创新创业1学分:(1)参加学术会议并宣读论文,或做公开学术报告2次;(2)参加全国性的科技竞赛、创意设计、创新创业竞赛等;(3)参加6次以上与本学科相关的学术报告,并且每次提交总结。

The tutorial responsibility system is adopted in the training of academic postgraduates, and the tutorial team system is encouraged. The tutor is responsible for formulating postgraduate training plan, and has the responsibility of guiding, demonstrating and supervising the ideological and academic morality of postgraduates.

#### 1. Opening Report

Under the guidance of the tutor, the graduate students determine the research topic by consulting literature, collecting data and investigating research, and write a literature review of the selected topic, and complete the opening of the topic in the third semester. One credits will be awarded after the opening of the question is passed.

#### 2. Mid-term assessment



Mid-term assessment is a necessary link to check the progress of postgraduate dissertations, to help students grasp the direction of dissertations, and to improve the quality of dissertations. The mid-term assessment of postgraduates is conducted in the fourth or fifth semester. After the mid-term assessment is passed, one credit will be obtained.

### 3. Scientific Research Practice

Postgraduates should take part in scientific research or laboratory work in combination with research directions. Teachers can get one credit if they pass the examination.

### 4. Innovation and Entrepreneurship

Achieve one of the following conditions: 1 credit for innovation and entrepreneurship:

- (1) attend academic conferences and read papers, or make public academic reports twice;
- (2) participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions; and
- (3) participate in more than six academic reports related to the subject, and submit summaries each time.

## 七、学位论文 ( Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：

1. 学位论文应在导师指导下由研究生独立完成。
2. 学位论文一般程序为：文献阅读和调研、初步写出研究课题综述、撰写开题报告、理论分析与研究、科学实验、论文撰写、论文送审和论文答辩等环节。
3. 学位论文要求理论联系实际，内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括：题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。
4. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性，提出一定的新见解。
5. 学位论文应具有一定的深度和先进性，应反映出作者对基础理论和专门知识的掌握情况，反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。
6. 学位论文严格按照《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》和《山东理工大学硕士学位授予实施细则》的有关规定组织评阅与答辩，符合要求方可由校学位办受理答辩及学位申请事宜。

Master's dissertation is a comprehensive summary of master's scientific research work, an important academic document describing its research results and reflecting its research level,



and a basic basis for applying for and awarding master's degree. The writing of dissertations is the key and core of the cultivation of postgraduates. It must be strictly carried out in accordance with the norms. The dissertations of Postgraduates in this discipline should meet the following basic requirements.

1. Dissertations should be completed independently by graduate students under the guidance of tutors.

2. The general procedures of dissertation are: literature reading and research, preliminary summary of research topics, report writing, theoretical analysis and research, scientific experiment, dissertation writing, dissertation submission and dissertation defense.

3. The dissertation requires that theory be integrated with practice, with substantial content, advanced technology, correct conclusion, standard format, clear organization and accurate expression. The structure of the paper includes: title, abstract in Chinese and English, catalogue, text, reference, thanks, research results, appendix, etc.

4. The dissertation should be innovative in theoretical analysis, scientific experiment, engineering application and guiding practice, and put forward some new ideas.

5. Dissertations should be deep and advanced, reflecting the author's mastery of basic theories and expertise, and the author's ability to solve theoretical and practical problems comprehensively by using relevant theories, methods and means.

6. Degree dissertations shall be evaluated and answered strictly in accordance with the relevant provisions of the Interim Implementation Measures of the Regulations of the People's Republic of China on Academic Degrees, the Evaluation Measures for Master's Degree Dissertations of Shandong University of Technology and the Implementation Rules for Master's Degree Granting of Shandong University of Technology. Only when the requirements are met, can the university's degree office accept and accept the application for academic degree.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 遵纪守法,身心健康;
2. 具有良好的品德修养和学术道德,实事求是、勇于创新;
3. 修读完培养方案规定课程和其他培养环节,成绩考核合格;
4. 完成论文答辩,成绩合格;
5. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文

评审办法》、《山东理工大学硕士学位授予实施细则》以及数学与统计学院学位授予的有关规定。

A diploma can be obtained if the requirements of graduation are met, and a diploma can be awarded on the basis of a diploma if the criteria for conferring a degree are met.

#### 1. Graduation requirements

- (1) To abide by discipline and laws, and to be physically and mentally healthy;
- (2) Having good moral cultivation and academic morality, seeking truth from facts and daring to innovate;
- (3) After completing the courses and other training links stipulated in the training program, the students are qualified in the performance appraisal.
- (4) Complete the thesis defense and get qualified results.
- (5) Complying with other requirements of relevant school regulations.

#### 2. Degree requirements

Strictly abide by the relevant provisions of the Provisional Implementation Measures of the Regulations of the People's Republic of China on Academic Degrees, the Evaluation Measures for Master's Dissertations of Shandong University of Technology , the Implementation Rules for the Granting of Master's Degrees of Shandong University of Technology , and the relevant provisions on degree granting of the School of Mathematics and Statistics.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>适应科学进步及社会发展的需要, 具有良好的学术道德、创新能力和敬业精神, 具备良好的科学素质和数学素养、严谨的治学态度、较强的开拓精神, 善于接受新知识, 提出新思路, 探索新课题, 并具备良好的团队合作精神。</p> <p>Adapt to the needs of scientific progress and social development, have good academic ethics, innovative ability and professionalism, and have good scientific quality and mathematical literacy. Strict academic attitude, strong pioneering spirit, good at accepting new knowledge, proposing new ideas, exploring new topics, and having a good team spirit.</p>	<p>中国概况、论文写作与学术规范 Introduction to China、Essay writing and academic norms</p>
综合能力	<p>熟悉本学科研究的前沿领域和发展动态, 掌握扎实宽广的基础理论和系统的专门知识, 具有运用专业理论发现问题、分析问题和解决问题的能力, 初步具有独立开展数学及相关学科科学研究的能力。掌握一门外语, 能够熟练阅读本专业的英文资料, 具有使用外语撰写学术论文的能力。具有进行国际学术交流、表达学术思想、展示学术成果的专业能力。</p> <p>Familiar with the frontier fields and development of the subject research, master the solid and broad basic theory and system expertise, have the ability to use professional theory to discover problems, analyze problems and solve problems, and initially have the ability to independently carry out scientific research in mathematics and related disciplines. Master a foreign language, be able to read the foreign language materials of this major, and have the ability to write academic papers in foreign languages. Professional ability to conduct international academic exchanges, express academic ideas, and demonstrate academic achievements.</p>	<p>汉语、泛函分析、基础代数、最优化理论与方法、偏微分方程、代数拓扑、微分流形 Chinese、Functional Analysis、Basic Algebra、 Optimization theory and method、partial differential equation、algebraic topology、differential manifold</p>

研究 方向	科学计算 与反问题	<p>掌握大规模科学与工程问题的建模与计算方法，能够运用现代数学理论方法、借助计算机技术研究解决力学与材料科学、环境科学与水文地质学、图像与信号处理等领域出现的实际问题，分析和提高计算的稳定性、精确性与有效性。熟悉反问题与科学计算的基本理论，有限差分与边界元法，数理方程及其求解方法，正则化与参数反演算法，计算力学与材料力学，图像恢复与重建算法等知识，提升科学计算与反问题研究能力。</p> <p>Master the modeling and calculation methods of large-scale scientific and engineering problems, and use modern mathematical theory methods and computer technology to solve practical problems in the fields of mechanics and materials science, environmental science and hydrogeology, image and signal processing, etc. And improve the stability, accuracy and effectiveness of the calculation. Familiar with the basic theories of inverse problems and scientific calculations, finite difference and boundary element methods, mathematical equations and their solving methods, regularization and parameter inversion algorithms, computational mechanics and material mechanics, image restoration and reconstruction algorithms, etc., to improve scientific computing and Anti-issue research capabilities.</p>	<p>变分分析、数学物理中的反问题、不适定问题的数值解法、反问题前沿研究、图像恢复与重建算法</p> <p>Variational analysis, inverse problems in mathematical physics, numerical solutions to ill-posed problems, inverse problem frontier research, image restoration and reconstruction algorithms</p>
	系统优化 与控制	<p>掌握现代优化与控制的最优性理论、算法框架及收敛性分析、控制系统的状态空间描述、能控性以及李雅普诺夫稳定性分析等基本理论；具有较强的建模、算法编程以及对控制系统的状态和控制器的 MATLAB 仿真等能力；能够将相关知识和技术应用到大数据与人工智能、机器学习、信号压缩感知、非线性不确定系统的优化控制、鲁棒镇定和跟踪等问题。</p> <p>Master the optimal theory, algorithm framework and convergence analysis of modern optimization and control, state space description of control system, controllability and Lyapunov stability analysis; have strong modeling, algorithm programming and Control system status and controller MATLAB simulation capabilities; ability to apply relevant knowledge and techniques to big data and artificial intelligence, machine learning, signal compression sensing, optimal control of nonlinear uncertain systems, robust stabilization and tracking .</p>	<p>凸分析与优化、数值优化、最优化理论专题、非光滑分析、全局最优化、应用非线性控制、线性系统、机器人学、最优控制</p> <p>Convex analysis and optimization, numerical optimization, Global optimization, Optimization theory topics, Applied nonlinear control, Non-smooth analysis, Linear systems, robotics, Optimal control</p>



<p>代数与图论</p>	<p>掌握代数学、编码以及图论的基本理论与方法，特别是代数表示论、纠错码理论以及代数图论等研究方向。熟练地运用有限群、同调代数、有限域和矩阵分析等相关知识研究 Artin 代数及模范畴的结构与同调性质、线性码与量子纠错码的结构与构造、图的结构与代数性质等，并熟悉它们在数字通信、量子计算与通信、网络科学、大数据与人工智能等其它学科中应用，凸显学科间的交叉融通。</p> <p>Master the basic theories and methods of algebra, coding and graph theory, especially the research directions of algebraic representation theory, error correction code theory and algebraic graph theory. Proficiency in finite group, homology algebra, finite field and matrix analysis and other related knowledge to study the structure and homology properties of Artin algebra and modular categories, the structure and construction of linear codes and quantum error correcting codes, the structure and algebraic properties of graphs, etc. Familiar with their application in digital communications, quantum computing and communications, network science, big data and artificial intelligence, and other disciplines, highlighting the interdisciplinary integration.</p>	<p>有限域及应用、现代密码学、纠错码理论、交换代数及应用、代数数论、图论及应用、矩阵分析、组合数学、图的谱理论及其应用、图论专题选讲、代数图论</p> <p>Finite field and application、Modern cryptography、Error correction code theory、exchange algebra and application、Algebraic number theory、Graph theory and application、Combinational mathematics、algebraic graph theory、Graph spectrum Theory and its application、Graph theory topic selection</p>
<p>偏微分方程与动力系统</p>	<p>掌握现代偏微分方程和动力系统的基本知识、研究内容和基本的研究方法；熟悉 Sobolev 空间理论、调和分析方法、变分法等理论体系；运用经典分析工具，如现代调和分析理论和临界点理论研究几类具有实际应用背景的非线性偏微分方程解的适定性和动力学行为等数学问题，并为进一步从事偏微分方程和动力系统的研究打下坚实的基础。</p> <p>Master the basic knowledge, research content and basic research methods of modern partial differential equations and dynamic systems; familiar with Sobolev space theory, harmonic analysis method, variational method and other theoretical systems; use classical analysis tools such as modern harmonic analysis theory and critical point theory Several mathematical problems such as the well-posedness and dynamic behavior of nonlinear partial differential equations with practical application background are studied, and lay a solid foundation for further research on partial differential equations and dynamic systems.</p>	<p>微分方程数值解、现代调和分析理论及其应用、偏微分方程现代理论与方法、临界点理论及其应用、二阶椭圆偏微分方程、非线性动力系统与混沌、微分方程理论专题</p> <p>Numerical solutions of differential equations、Modern harmonic analysis theory and its applications、Modern theory and methods of partial differential equations、Critical point theory and its applications、Second-order elliptic partial differential equations、Nonlinear dynamic systems and chaotic、Differential equation theory</p>

附表 2: 培养计划 (Training Plan)

学科名称	数学 Mathematics		学科代码	0701		
单位名称	数学与统计学院 School of Mathematics and Statistics		培养类型	硕士研究生 Master's degree		
学分要求	总学分 Total Credits: $\geq 26$ , 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq r$					
课程 设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	G13100	中国概况 Introduction to China	2	1		
	G13101	汉语 Chinese Language	2	1		
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	3		
学科平台课程 $\geq 11$ 学分	110076	泛函分析 Functional Analysis	4	1		
	110002	最优化理论与方法 Optimization Theory and Methods	3	1		
	110077	基础代数 Basic Algebra	4	1		
	110063	代数拓扑 Algebraic Topology	3	2		
	110064	微分流形 Differential Manifolds	3	2		
	110006	偏微分方程 Partial Differential Equation	3	1		
方向选修课程 $\geq 8$ 学分	110003	微分方程数值解 Numerical Methods for Differential Equations	3	2		
	110004	凸分析与优化 Convex Analysis and Optimization	3	2		
	110005	有限域及应用 Finite Fields and Applications	3	1		
	110013	图论及应用 Graph Theory and Applications	3	1		
	110059	矩阵分析 Matrix Analysis	3	1		





110008	数学物理中的反问题 The Inverse Problem in Mathematical Physics	2	2
110010	不适定问题的数值解法 A Numerical Solution for the Problem of Discomfort	2	3
110012	现代密码学 Modern Cryptography	2	2
110015	纠错码理论 Error Correcting Code Theory	2	2
110016	数值优化 Numerical Optimization	2	2
110017	变分分析 Variational Analysis	2	2
110018	全局最优化 Global Optimization	2	2
110020	交换代数及应用 Exchange Algebra and Applications	2	2
110021	最优化理论专题 The Topic of Optimization Theory	2	3
110022	临界点理论及其应用 Critical Point Theory and its Applications	2	2
110023	二阶椭圆偏微分方程 Two Order Elliptic Partial Differential Equation	2	3
110024	非线性动力系统与混沌 Nonlinear Dynamical Systems and Chaos	2	2
110025	现代调和分析理论及其应用 Modern Harmonic Analysis Theory and its Applications	2	2
110026	偏微分方程现代理论与方法 Modern Theory and Method of Partial Differential Equation	2	2
110027	微分方程理论专题 The Theoretical Topic of Differential Equations	2	3
110032	组合数学 Combinatorial Mathematics	2	3
110033	应用非线性控制 Application of Nonlinear Control	2	3
110034	线性系统 Linear Systems	2	1
110035	机器人学 Robotics	2	2



	110036	最优控制 Optimal Control	2	2	
	110057	非光滑分析 Nonsmooth Analysis	2	2	
	110060	代数图论 Algebraic Graph Theory	2	2	
	110061	图的谱理论及其应用 The Spectral Theory of Graphs and its Applications	2	2	
	110062	图论专题选讲 Special Topics on Graph Theory	2	3	
	110065	反问题前沿研究 Frontier Research on Inverse Problems	2	3	
	110066	图像恢复与重建算法 Image Restoration and Reconstruction Algorithm	2	2	
	110067	代数数论 Algebraic Number Theory	2	3	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	G13043	中国古代韵文阅读与欣赏 Reading and Appreciation of Ancient Chinese Rhymes	1	2	
	G17070	经济学基础 Foundations of Economics	1	2	
	G05024	计算机科学前沿技术应用系列讲座 The Lectures on the Frontier Technology and Application of the Computer Science	1	2	
	150020	社会研究方法 Social research methods	1	2	
	G02060	科研素养与创新能力 Scientific research literacy and innovation ability	1	2	
	G13042	诗歌与审美艺术 Poetry and Aesthetic Art	1	2	
补修课程 不计学分	110068	数学分析选讲 Selective Lectures of Mathematic Analysis	2	1	导师 确定
	110069	高等代数选讲 Selective Lectures of Higher Algebra	2	1	



其他培养环节 (≥3 学分)			
培养环节	相关内容及要求		学期
开题报告 (1 学分)	<p>研究生在导师的指导下,通过查阅文献、收集资料和调查研究后确定研究课题,写出选题文献综述,在第三学期完成开题。开题通过后即获得 1 学分。</p> <p>Under the guidance of the tutor, graduate students identify research topics by consulting the literature, collecting data and investigating research, writing a review of the selected topics, and completing the opening in the third semester. 1 credit will be awarded upon opening.</p>		3
中期考核 (1 学分)	<p>中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。硕士研究生中期考核在第五学期进行。中期考核通过后即获得 1 学分。</p> <p>The mid-term assessment is a necessary link to check the progress of graduate degree thesis, help students grasp the direction of the thesis, and improve the quality of the thesis. The midterm assessment of the master's degree is conducted in the fifth semester. After passing the mid-term assessment, you will receive 1 credit.</p>		4-5
科研实践 (1 学分)	<p>研究生参加结合研究方向的科研工作或实验室等工作。完成专业实践环节且经考核通过后,即获得 1 学分。</p> <p>Postgraduates should take part in scientific research or laboratory work in combination with research directions. Teachers can get one credit if they pass the examination.</p>		2-5
创新创业 (1 学分)	<p>1. 参加学术会议并宣读论文,或做公开学术报告 2 次; 2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖; 3. 参加 6 次以上与本学科相关的学术报告,并且每次提交总结; 每项记 1 学分,需完成 1 学分。</p> <p>1. Participate in academic conferences and read papers, or make public academic reports 2 times; 2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards; 3. Participate in more than 6 academic reports related to the subject and submit a summary each time; 1 credit for each credit, 1 credit is required.</p>		1-5
培养单位 教授委员会主任			培养单位 负责人
			

# 统计学学科学术学位硕士研究生培养方案

学科代码：0714

## Academic Master's Training programs of Statistics for International Students

Credit Code: 0714

### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学是山东省省属重点理工科大学。学校现为国家人才培养模式创新实验区、山东省“应用型人才培养特色名校”立项建设单位、山东省首批高校科研体制改革试点单位。山东理工大学 2003 年开始招收统计学本科生，2007 年招收数理统计方向硕士研究生，2011 年获批统计学一级学科硕士点，并于 2012 年开始招生。

本学科现有专任教师 24 人，其中教授 2 人、副教授 11 人、讲师 12 人、博士 16 人、硕导 10 人，拥有一支教学科研水平较高的师资队伍。统计学学科历经十多年的发展，着力培养综合素质高、专业功底扎实，能在经济、金融领域从事大数据分析 with 人工智能的应用型和科研型高层次人才。

本学科坚持立德树人，历经 10 多年发展，在大数据分析 with 处理、数理统计、应用统计及金融统计等研究方向形成了特色和优势，为国家培养了一大批统计学人才，历届硕士毕业生走上了企事业单位急需的统计岗位。本学科整体水平位居省属高校前列。

Shandong University of Technology is a key university of science and Engineering in Shandong Province. The school is now an innovative experimental area for the National Talent Training model, a project construction unit for Shandong Province's "Applied Talent Training Characteristic School". Shandong University of Technology began to recruit undergraduate students in statistics in 2003. In 2007, it recruited master's degree students in mathematics and statistics. In 2011, it was approved as the first-level master's degree in statistics, and began to recruit students in 2012.

There are 24 full-time teachers in this subject, including 2 professors, 11 associate professors, 12 lecturers, 16 doctors and 10 master tutors. They have a high level of teaching and scientific research. After more than ten years of development, the subject of statistics has focused on training high-quality, solid professional foundation, high-level applied and scientific research talents who can engage in big data analysis and artificial intelligence in the economic



and financial fields; it has formed its own characteristics and advantages in the research directions of big data analysis and processing, mathematical statistics, applied statistics and financial statistics. Successive graduates of master's degree have entered the statistical posts urgently needed by enterprises and institutions. The overall level of this subject is in the forefront of provincial universities.

The discipline adheres to the development of Lide Shuren. After more than 10 years of development, it has formed characteristics and advantages in the research direction of big data analysis and processing, mathematical statistics, applied statistics and financial statistics. It has trained a large number of statistical talents for the country. Students have gone to the statistical posts that enterprises and institutions need urgently. The overall level of the discipline ranks among the top universities in the province.

## 二、培养目标 ( Educational Objectives )

为适应经济建设和社会发展的需要,培养德、智、体全面发展,能从事本学科领域内的教学、科研以及管理工作的高层次专门人才,具体要求:

1. 具有高尚的职业道德和积极进取精神,具有良好的学术道德、创新能力和敬业精神,具有较高的科学素养和健康的身心。

2. 具有坚实宽广的统计学、数学理论基础和必要的计算机科学知识,了解研究方向的国内外研究的最新进展和动态,初步具备独立从事统计学研究或运用专业知识解决实际问题的能力。

3. 能够熟练地运用一门外国语阅读与本专业相关的科技资料及文献,并具备一定的听、说和写作能力。培养学生运用统计思想和统计方法的能力。既提升学生的人文气质,又健全学生的内在修养。

4. 能够熟练地运用统计分析软件,具备从事数据收集、整理、分析、展示和解释的基本技能。具有继续学习、更新知识的能力。掌握科学研究的基本思路、方法和专业技能,具有一定的创新能力和独立从事教学、科研工作或独立担任专门技术工作的能力。

In order to meet the needs of economic construction and social development, we should train high-level professionals who can develop morally, intellectually and physically in an all-round way and engage in teaching, scientific research and management in the field of their own disciplines.

### Specific requirements

1. With a high professional ethics and enthusiasm, with a good academic ethics, innovative ability and professionalism, with a high scientific quality and healthy body and mind.

2. With a solid and broad statistical, mathematical theoretical basis and necessary computer science knowledge, the latest developments and developments of domestic and foreign

research to understand the research direction, initially have the ability to independently engage in statistical research or apply professional knowledge to solve practical problems.

3. Proficiency in the use of a foreign language to read scientific and technical materials and literature related to the profession, and have a certain ability to listen, speak and write. Develop students' ability to use statistical ideas and statistical methods. It not only enhances the students' human temperament, but also improves the students' internal cultivation.

4. Proficiency in statistical analysis software, with basic skills in data collection, organization, analysis, display and interpretation. Have the ability to continue learning and updating knowledge. Master the basic ideas, methods and professional skills of scientific research, have a certain ability to innovate and independently engage in teaching, scientific research or independent technical work.

### 三、研究方向 ( Research Orientation )

统计学 ( 一级学科 ) 硕士学位研究生培养方案设以下 4 个研究方向:

1. 大数据分析处理
2. 数理统计
3. 应用统计
4. 金融统计

各研究方向简介详见附表 1。

The statistics ( first-level discipline ) master's degree program is based on the following four research directions

1. Big data analysis and processing
2. Mathematical statistics
3. Applied Statistics
4. Financial statistics

See Table 1 for a brief introduction to each research direction.

### 四、学习年限 ( Length of Schooling )

学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。在基本学制规定时间内, 研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由, 研究生在基本学制结束前两个月向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告, 并经学位评定分委员会组织审查通过, 报校学位评定委员会办公室审核批准后, 可最多延长申请学位年限 1 年。

经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。



The school system is three years and the length of study is 2–4 years. The time for scientific research and thesis writing is not less than one year (calculated from the date of the adoption of the opening question). Within the time limit stipulated by the basic educational system, postgraduates should complete various tasks such as dissertation defense and degree award examination. If for academic justification, two months before the end of the basic education system, postgraduates submit a report on the progress of their dissertations and a report on the application for postponement of their dissertations to the academic degree evaluation Sub-Committee of the training unit, which has been examined and approved by the academic degree evaluation Sub-Committee and submitted to the office of the academic degree evaluation committee of the University for examination and approval, the period of application for academic degrees may be extended for up to one year.

With the consent of the instructor, you may apply for early graduation, but the time requirements for scientific research and paper writing remain unchanged. The period of suspension does not take into account the length of study.

## 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程教学实行学分制，课程分为公共必修课程、学科平台课程与选修课程。研究生课程每 16 学时计 1 学分，原则上只用于课内教学环节。研究生在规定的时间内至少应完成不少于 28 学分的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程，考核合格后方可参与开题答辩，成绩不计入成绩单。课程设置情况见附表 2。

The courses are divided into compulsory courses and elective courses. Postgraduate courses are credited 1 credits per 16 school hours, and in principle they are only used for teaching in class. Students are required to complete a learning task of no less than 26 credits within the prescribed time. Interdisciplinary graduate students are required to take two or more courses according to their tutor's requirements. After passing the examination, they can participate in answering questions. The results are not included in the transcript. The curriculum is shown in Schedule 2.

## 六、培养方式与培养环节 (Training Mode and Cultivating Process)

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出选题文献综述，在第三学期完成开题。开题通过后即获得 1 学分。

### 2. 中期考核

中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。硕士研究生中期考核在第五学期进行。中期考核通过后即获得 1 学分。

### 3. 科研实践

研究生参加结合研究方向的科研工作或实验室等工作。导师考核合格即可获得 1 学分。

### 4. 创新创业

达到以下条件之一，即获得创新创业 1 学分：（1）参加学术会议并宣读论文，或做公开学术报告 2 次；（2）参加全国性的科技竞赛、创意设计、创新创业竞赛等；（3）参加 6 次以上与本学科相关的学术报告，并且每次提交总结。

The tutorial responsibility system is adopted in the training of academic postgraduates, and the tutorial team system is encouraged. The tutor is responsible for formulating postgraduate training plan, and has the responsibility of guiding, demonstrating and supervising the ideological and academic morality of postgraduates.

#### 1. Opening Report

Under the guidance of the tutor, the graduate students determine the research topic by consulting literature, collecting data and investigating research, and write a literature review of the selected topic, and complete the opening of the topic in the third semester. One credits will be awarded after the opening of the question is passed.

#### 2. Mid-term Evaluation

Mid-term evaluation is a necessary link to check the progress of postgraduate dissertations, to help students grasp the direction of dissertations, and to improve the quality of dissertations. The mid-term evaluation of postgraduates is conducted in the fourth or fifth semester. After the mid-term evaluation is passed, one credit will be obtained.

#### 3. Scientific Research Practice

Postgraduates should take part in scientific research or laboratory work in combination with research directions. Teachers can get one credit if they pass the examination.

#### 4. Innovation and Entrepreneurship

Achieve one of the following conditions: 1 credit for innovation and entrepreneurship:  
 (1) attend academic conferences and read papers, or make public academic reports twice;  
 (2) participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions; and (3) participate in more than six academic reports related to the subject, and submit summaries each time.

## 七、学位论文 Academic Dissertation )

硕士学位论文是硕士研究生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献，是申请和授予硕士学位的基本依据。学位论文撰写是硕士研



研究生培养的关键和核心，必须严格按照规范执行，本学科硕士研究生的学位论文应满足以下基本要求：

1. 学位论文应在导师指导下由研究生独立完成。
2. 学位论文一般程序为：文献阅读和调研、初步写出研究课题综述、撰写开题报告、理论分析与研究、科学实验、论文撰写、论文送审和论文答辩等环节。
3. 学位论文要求理论联系实际，内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括：题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。
4. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性，提出一定的新见解。
5. 学位论文应具有一定的深度和先进性，应反映出作者对基础理论和专门知识的掌握情况，反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。
6. 学位论文严格按照《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》和《山东理工大学硕士学位授予实施细则》的有关规定组织评阅与答辩，符合要求方可由校学位办受理答辩及学位申请事宜。

Master's dissertation is a comprehensive summary of master's scientific research work, an important academic document describing its research results and reflecting its research level, and a basic basis for applying for and awarding master's degree. The writing of dissertations is the key and core of the cultivation of postgraduates. It must be strictly carried out in accordance with the norms. The dissertations of Postgraduates in this discipline should meet the following basic requirements.

1. Dissertations should be completed independently by graduate students under the guidance of tutors.
2. The general procedures of dissertation are: literature reading and research, preliminary summary of research topics, report writing, theoretical analysis and research, scientific experiment, dissertation writing, dissertation submission and dissertation defense.
3. The dissertation requires that theory be integrated with practice, with substantial content, advanced technology, correct conclusion, standard format, clear organization and accurate expression. The structure of the paper includes: title, abstract in Chinese and English, catalogue, text, reference, thanks, research results, appendix, etc.
4. The dissertation should be innovative in theoretical analysis, scientific experiment, engineering application and guiding practice, and put forward some new ideas.
5. Dissertations should be deep and advanced, reflecting the author's mastery of basic theories and expertise, and the author's ability to solve theoretical and practical problems comprehensively by using relevant theories, methods and means.
6. Degree dissertations shall be evaluated and answered strictly in accordance with the



relevant provisions of the Interim Implementation Measures of the Regulations of the People's Republic of China on Academic Degrees, the Evaluation Measures for Master's Degree Dissertations of Shandong University of Technology and the Implementation Rules for Master's Degree Granting of Shandong University of Technology. Only when the requirements are met, can the university's degree office accept and accept the application for academic degree.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 遵纪守法,身心健康;
2. 具有良好的品德修养和学术道德,实事求是、勇于创新;
3. 修读完培养方案规定课程和其他培养环节,成绩考核合格;
4. 完成论文答辩,成绩合格;
5. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》以及数学与统计学院学位授予的有关规定。

A diploma can be obtained if the requirements of graduation are met, and a diploma can be awarded on the basis of a diploma if the criteria for conferring a degree are met.

#### 1. Graduation requirements

- (1) To abide by discipline and laws, and to be physically and mentally healthy;
- (2) Having good moral cultivation and academic morality, seeking truth from facts and daring to innovate;
- (3) After completing the courses and other training links stipulated in the training program, the students are qualified in the performance appraisal.
- (4) Complete the thesis defense and get qualified results.
- (5) Complying with other requirements of relevant school regulations.

#### 2. Degree requirements

Strictly abide by the relevant provisions of the Provisional Implementation Measures of the Regulations of the People's Republic of China on Academic Degrees, the Evaluation Measures for Master's Dissertations of Shandong University of Technology, the Implementation Rules for the Granting of Master's Degrees of Shandong University of Technology, and the relevant provisions on degree granting of the School of Mathematics and Statistics.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>具有社会责任感和历史使命感，遵纪守法，身心健康；具有良好的品德修养和学术道德，实事求是，勇于创新。</p> <p>Have a sense of social responsibility and historical mission, abide by discipline and law, physical and mental health; have good moral cultivation and academic ethics, seeking truth from facts, courage to innovate.</p>	<p>中国概况、论文写作与学术规范</p> <p>Introduction to China 、 essay writing and academic norms</p>
综合能力	<p>具有坚实宽广的统计学、数学理论基础和必要的计算机科学知识，了解所从事研究方向国内外研究的最新进展和动态，初步具备独立从事统计学研究或运用专业知识解决实际问题的能力。</p> <p>With a solid and broad statistical, mathematical theoretical basis and necessary computer science knowledge, to understand the latest developments and developments of research at home and abroad, and to have the ability to independently engage in statistical research or apply professional knowledge to solve practical problems.</p>	<p>汉语、高等数理统计、应用随机过程、多元统计、数据分析及统计软件。</p> <p>Chinese、Advanced mathematical statistics、Application of stochastic processes 、Multivariate statistics 、Data analysis and statistical software.</p>
研究方向	<p>大数据分析处理</p> <p>掌握面向大数据应用的数学、应用统计学、计算机科学的基础理论和方法，熟练掌握大数据采集、处理、分析与应用的技术与工具，具备广泛的数据应用视野，能够胜任大数据分析挖掘、大数据系统开发、大数据系统管理与运维等领域相关工作，具有一定的大数据科研与实践能力。</p> <p>Master the basic theories and methods of mathematics, applied statistics, computer science for big data applications, master the techniques and tools for big data collection, processing, analysis and application, with extensive data Application vision, capable of engaging in big data analysis and mining, big data system development, big data system management and operation and maintenance, etc., with certain big data research and practical capabilities.</p>	<p>数据挖掘技术、分布式系统、云计算、大数据可视化、机器学习</p> <p>Data mining technology、Distributed systems、Cloud computing、Big data visualization、Machine learning.</p>

<p>数理统计</p>	<p>掌握现代统计理论与方法，针对复杂数据、海量数据和高维数据进行统计建模和数据分析。培养掌握数理统计基本理论和方法，熟练运用统计软件及数学软件解决经济、金融问题的高级专门人才。</p> <p>Master modern statistical theory and methods for statistical modeling and data analysis of complex data, massive data and high-dimensional data. Cultivate senior experts who master the basic theories and methods of mathematical statistics and skillfully use statistical software and mathematical software to solve economic and financial problems.</p>	<p>近代回归分析、模型选择方法、线性模型理论、统计计算</p> <p>Modern regression analysis、Model selection method、Linear model theory、Statistical calculation</p>
<p>应用统计</p>	<p>掌握统计模型及方法，针对管理、教育、经济、环境科学和社会发展的实际问题，从多学科交叉的角度进行研究，侧重于统计理论和方法的应用，以及对具体问题的阐述和分析。</p> <p>Master statistical models and methods, and focus on the practical issues of management, education, economics, environmental science and social development, from the perspective of multidisciplinary research, focusing on the application of statistical theory and methods, as well as the elaboration and analysis of specific problems.</p>	<p>国民经济核算、离散时间随机模型、随机排队基础、最优化理论与方法</p> <p>National economic accounting、Discrete-time stochastic model、Stochastic queuing basis、optimization theory and method</p>
<p>金融统计</p>	<p>掌握金融学、统计学综合的专业知识和技能，熟练运用统计软件处理数据，有效运用统计知识量化分析金融数据。培养学生既能胜任统计相关的实际应用工作，也能胜任统计学的科研工作。</p> <p>Master the comprehensive knowledge and skills of finance and statistics, skillfully use statistical software to process data, and effectively use statistical knowledge to quantitatively analyze financial data. Cultivating students is not only competent for statistically relevant practical applications, but also competent for statistical research.</p>	<p>金融统计分析、应用时间序列、现代非参数统计、经济计量模型</p> <p>Financial statistical analysis、Application time series、Modern nonparametric statistics、Econometric models</p>





**附表 2: 培养计划 (Training Plan)**

学科名称	统计学 statistics		学科代码	0714		
单位名称	数学与统计学院 School of Mathematics and Statistics		培养类型	硕士研究生 Master's degree		
学分要求	总学分 Total Credits: $\geq 26$ , 必修课程学分 Credit for Compulsive Course: $\geq 16$ , 选修课程学分 Credit for optional course: $\geq r$					
课程 设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	G13100	中国概况 Introduction to China	2	1		
	G13101	汉语 Chinese Language	2	1		
	G15001	论文写作与学术规范 Thesis Writing and Academic	1	3		
学科平台课程 $\geq 11$ 学分	110040	多元统计分析 Multivariate Statistics	3	2	必选	
	110037	现代概率论 Probability Theory	3	1		
	110038	高等数理统计 Advanced Mathematical Statistics	3	1		
	110039	数据分析及统计软件 Data Analysis and Statistics Software	2	2		
	110045	金融统计分析 Financial Statistics	2	3		
	110047	应用随机过程 Stochastic Process	3	2		
	110050	统计学习 Statistical Learning	2	2		
方向选修课程 $\geq 8$ 学分	110002	最优化理论与方法 Optimization Theory and Methods	3	1		
	110041	近代回归分析 Regression Analysis	2	1		
	110042	应用时间序列 Time Series	2	2		
	110043	线性模型理论 Linear Models	2	2		

	110044	现代统计专题 Modern Statistical Topic	2	3	
	110046	经济计量模型 Econometric Models	2	3	
	110048	现代非参数统计 Nonparametric Statistics	2	2	
	110049	数据挖掘技术 Data Mining Technology	2	1	
	110051	数据挖掘与统计学习专题 Data Mining and Statistical Learning	2	3	
	110052	国民经济核算 National Accounting	2	2	
	110053	离散时间随机模型 Discrete Time Stochastic Models	2	2	
	110054	随机排队基础 Foundations of Queuing Theory	2	1	
	110055	模型选择方法 Model Selection	2	2	
	110056	统计计算 Statistical Computing	2	3	
	110070	分布式系统 Distributed System	2	1	
	110071	云计算 Cloud Computing	2	2	
	110072	大数据可视化 Big Data Visualization	2	3	
	110073	机器学习 Machine Learning	2	2	
素养选修课程 ≤1 学分	G02060	科研素养与创新能力 Research Literacy and Innovation	1	1	
	G31001	中国传统文化 Chinese Traditional Culture	1	2	
	G05024	计算机科学前沿技术应用系列讲座 Lecture Series on Advanced Technology Applications in Computer Science	1	1	
	050023	高性能计算 High-performance Computing	1	3	
	G13042	诗歌与审美艺术 Poetry and Aesthetic Art	1	2	



	G13043	中国古代韵文阅读与欣赏 Reading and Appreciation of Ancient Chinese Rhymes	1	2	
	150020	社会研究方法 Methods of Social Research	1	2	
	G15001	东方哲学与现代化 Oriental Philosophy and Modernization	1	2	
	G17070	经济学基础 Economics Basis	1	2	
补修课程 不计学分	110074	Python 语言基础 Python Language Foundation	1	1	导师 确定
	110075	数学应用软件与数学实验 Math Application Software and Mathematical Experiment	1	2	
其他培养环节 (≥3 学分)					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下, 通过查阅文献、收集资料和调查研究后确定研究课题, 写出选题文献综述, 在第三学期完成开题。开题通过后即获得 1 学分。</p> <p>Under the guidance of the tutor, graduate students identify research topics by consulting the literature, collecting data and investigating research, writing a review of the selected topics, and completing the opening in the third semester. 1 credit will be awarded upon opening.</p>				3
中期考核 (1 学分)	<p>中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。硕士研究生中期考核在第五学期进行。中期考核通过后即获得 1 学分。</p> <p>The mid-term assessment is a necessary link to check the progress of graduate degree thesis, help students grasp the direction of the thesis, and improve the quality of the thesis. The midterm assessment of the master's degree is conducted in the fifth semester. After passing the mid-term assessment, you will receive 1 credit.</p>				5
科研实践 (1 学分)	<p>研究生参加结合研究方向的科研工作或实验室等工作。完成专业实践环节且经考核通过后, 即获得 1 学分。</p> <p>Postgraduates should take part in scientific research or laboratory work in combination with research directions. Teachers can get one credit if they pass the examination.</p>				2-5
创新创业 (1 学分)	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文, 或做公开学术报告 2 次;</li> <li>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖;</li> <li>3. 参加 6 次以上与本学科相关的学术报告, 并且每次提交总结; 每项记 1 学分, 需完成 1 学分。</li> </ol>				1-5

	<p>1. Participate in academic conferences and read papers, or make public academic reports 2 times;</p> <p>2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary each time;</p> <p>1 credit for each credit, 1 credit is required.</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p> 



## 应用经济学科学学术学位硕士研究生培养方案

学科代码：0202

### The Training Scheme of Overseas Academic Master of

### Applied Economics

Credit Code: 0202

#### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学应用经济学学科于 2004 年获得产业经济学硕士学位授予权，2012 年获得应用经济学一级学科硕士学位授予权。本学位点拥有山东省产业经济研究基地等 4 个省级科研创新平台。本学位点成立以来，共获得山东省社会科学优秀成果一等奖 4 项、二等奖 11 项；在《中国社会科学》、《管理世界》等国内外期刊发表论文 200 余篇；承担国家级重点项目 2 项、其他国家级项目 20 项；立足区域，面向行业，积极开展服务地方的应用性研究，1 篇建议报告获中央领导批示，并已推动实现成果专利许可转让 5 亿元；培养的研究生在 CSSCI 期刊发表论文 50 篇。学位点设立以来已毕业的 79 名硕士研究生中，有 21 人考取了复旦大学、南开大学、上海财经大学等著名高校和研究机构的博士生。还有许多研究生进入政府机关、教育机构、金融机构和大中型企业工作，在各自工作领域发挥了重要作用。

目前学科点围绕产业经济学、国际贸易学、区域经济学、金融学和农业经济与农业工程 5 个领域，形成了稳定的学科方向，特别是在农业经济学和产业经济学领域，高水平研究成果比较丰硕，科研项目承担能力比较突出，智库作用发挥出色。目前，学科点在科学研究、团队建设、平台建设、人才培养和社会服务等方面进一步提升，争取获得博士学位授予权，并进入山东省一流学科建设行列。

Applied Economics of Shandong University of Technology was awarded the Master's Degree in Industrial Economics in 2004 and the Master's Degree in Applied Economics in 2012. This degree has four provincial research and innovation platforms, such as Shandong Industrial Economic Research Base. Since the establishment of this degree center, it has won 4 first-class awards and 11 second-class awards for outstanding achievements in Social Sciences in Shandong Province; published more than 200 papers in domestic and foreign journals such as



Chinese Social Sciences and Managing the World; undertook 2 national key projects and 20 other national-level projects; actively carried out applied research in serving local areas based on region and industry, and 1 report of suggestions was awarded. The central leadership has approved and promoted the transfer of 500 million yuan in patent licensing for achievements; 50 papers have been published in CSSCI journals by trained graduate students. Of the 79 postgraduates who have graduated since the establishment of the degree, 21 have taken doctoral candidates from famous universities and research institutes such as Fudan University, Nankai University, Shanghai University of Finance and Economics. Many graduate students have entered government agencies, educational institutions, financial institutions and large and medium-sized enterprises, playing an important role in their respective fields of work.

## 二、培养目标 ( Educational Objectives )

立足经济全球化发展需要, 面向应用经济学科领域发展前沿, 培养德、智、体、美全面发展, 具备经济学知识扎实、科研能力较强和国际视野的高层次经济学专门人才。

1. 熟悉中国文化与语言, 掌握应用经济学基本理论、基础知识和技能, 了解学科领域的发展方向; 具备独立开展与本学科有关的科研和教学工作的能力。

2. 具有人文精神和科学严谨、求真务实的治学态度、良好的学术素养及学术道德。

3. 毕业后可从事本专业的教学、科研或到有关部门从事应用经济管理的实际工作。

Based on the development needs of economic globalization and facing the frontier of applied economics, we should cultivate high-level economic professionals with solid economic knowledge, strong scientific research ability and international vision, who can develop morally, intellectually, physically and aesthetically in an all-round way.

1. Familiar with Chinese culture and language, master the basic theories, basic knowledge and skills of applied economics, understand the development direction of the subject area; have the ability to independently carry out research and teaching related to the subject.

2. Have a humanistic spirit and scientific rigor, truth-seeking and pragmatic attitude, good academic quality and academic ethics.

3. After graduation, you can engage in the teaching, research, or practical work of applying economic management to relevant departments.

## 三、研究方向 ( Research Orientation )

本学科硕士学位研究生培养方案设以下 5 个研究方向:

1. 产业经济学
2. 国际贸易学
3. 区域经济学
4. 金融学



#### 5. 农业经济与农业工程

各研究方向简介详见附表 1。

The master's degree program in this subject has the following five research directions.

1. Industrial Economics
2. International Trade
3. Regional Economics
4. Finance
5. Agricultural Economy and Agricultural Engineering

The introduction of each research direction are shown in Schedule 1.

#### 四、学习年限 ( Length of Schooling )

全日制硕士研究生的基本学制为 3 年，学习年限为 2~4 年。科学研究和撰写论文时间不少于 1 年（从开题报告通过之日开始计算）。在满足论文工作时间要求的前提下，经指导教师同意，少数品学兼优的学生提前完成学业，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

在基本学制规定时间内，研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由，研究生在基本学制结束前两个月向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告，并经学位评定分委员会组织审查通过，报校学位评定委员会办公室审核批准后，可最多延长申请学位年限 1 年。

The basic academic system for full-time postgraduates is 3 years and the duration of study is 2 to 4 years. The time of scientific research and writing papers cannot be less than one year (calculated from the date of the opening of the report). Under the premise of meeting the requirements of the working hours of the thesis and get the faculty adviser's agreement, a small number of students with good academic performance finish their studies ahead of time, they can apply for graduation in advance. However, the time required for scientific research and paper writing remains unchanged. The time of suspension is not counted in the length of study.

Within the time limit set by the basic academic system, graduate students should complete the work of dissertation defense and degree review. For academically justified reasons, the graduate student submits the dissertation progress report and the dissertation extension application report to the degree evaluation subcommittee of the training unit two months before the end of the basic academic system, after review and approval by the sub-committee of the degree assessment committee and the Office of the Academic Degree Evaluation Committee, the application for a maximum of one year may be extended.

#### 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程包括必修课程和选修课程，学生需在规定时间内完成不低于 26 学分的课程学

分，其中，必修课不低于 16 学分，选修课不低于 9 学分。

补修课是针对跨专业研究生设置的本学科研究生所必修的专业基础课程，跨专业研究生应补修若干门本专业的本科生课程，由导师根据具体情况确定补修课门数。补修课程考试成绩合格方可申请学位答辩，不计学分。

课程设置详细情况见附表 2。

Courses include compulsory courses and elective courses. Students are required to complete no less than 26 credits of course credits within the specified time period, of which no less than 16 credits for compulsory courses and no less than 9 credits for elective courses.

The Make-up Courses is a professional foundation course for postgraduate students who are set up for interdisciplinary postgraduate students. Interdisciplinary postgraduate students should make up several undergraduate courses for the subject. The tutor will determine the number of Make-up courses according to the specific circumstances. You can apply for a degree defense if you pass the Make-up Courses exam, no credits.

Details of the course settings are shown in Schedule 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

研究生培养实行导师负责制或以导师负责为主的指导小组（团队）制。导师（或指导小组）不仅负责制订研究生培养计划，指导科学研究、专业实践、服务实习和学位论文等工作，而且对研究生的思想品德、学术道德有引导、示范和监督的责任。研究生须严格按照培养环节要求开展学习、研究和实践，导师（或指导小组）需加强对培养环节的管理和监控。

必修环节学分为研究生课程结束、进入学位论文阶段后所获得的各类学分，包括论文开题、中期考核、创新创业、实习实践等环节学分。

### 1. 论文开题学分

研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出开题报告。5 人以上的专家组对开题报告提出评价和修改意见，不通过可限期重做，重做后仍未通过者将终止培养。开题通过后即获得 1 学分。

### 2. 中期考核学分

对研究生的思政、科研、实践、综合素质以及学位论文进展情况等进行考核，考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过后即获得 1 学分。

### 3. 创新创业学分

(1) 进行 3 个月以上的出国访学研修或学术交流；



- (2) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (4) 参加 6 次以上与本学科相关的学术报告，并提交总结；

每项记 1 学分，需完成 2 学分。

#### 4. 实习实践学分

实习实践是培养研究生实际动手能力不可缺少的环节，包括教学实践、专业实践两个方面。

**教学实践：**为培养研究生的教学能力和沟通表达能力，研究生在学习期间应参加教学实践。教学实践可采取多种方式进行，如本科课程教学、辅导工作或指导生产实习、课程设计及毕业设计等工作。教学实践时间累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。

**专业实践：**为培养研究生的动手操作能力和实践创新能力，研究生在学习期间应参加专业实践。研究生应安排至少 1 个月的时间（一般可以利用寒、暑假）到生产、设计研究单位进行实践训练，也可以参加结合研究方向的科研工作或实验室等工作。导师考核合格即可获得 1 学分。

Postgraduate training is based on a mentoring system or a mentoring team (team). The tutor (or the steering group) is not only responsible for formulating postgraduate training programs, guiding scientific research, professional practice, service internships and dissertations, but also have the responsibility for guiding, demonstrating and supervising the ethics and academic ethics of graduate students. Graduate students must conduct study, research and practice strictly according to the requirements of the training process. The tutor (or steering group) needs to strengthen the management and monitoring of the training process.

##### 1. Papers open credits

Under the guidance of the instructor, the graduate student identifies the research topic by consulting the literature, collecting the data, and investigating the research, and writing the opening report. The expert group of more than 5 people will put forward evaluation and revision opinions on the opening report, and will not be able to redo within a limited time. Those who have not passed the redo will terminate the training. After passing the exam, you will get 1 credit.

##### 2. Mid-term assessment credits

The postgraduate's ideological and political, scientific research, practice, comprehensive quality and progress of the dissertation will be assessed. If the assessment is unqualified, it will be reviewed by the training unit and the graduate school, and reported to the president's office for approval to undergraduate study. After passing the mid-term assessment, you will receive 1 credit.

##### 3. Innovation and entrepreneurship credits

- (1) Conducting overseas study visits or academic exchanges for more than 3 months;
- (2) Participate in academic conferences and read papers, or make public academic reports twice;
- (3) Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;
- (4) Participate in more than 6 times academic reports related to the subject and submit a summary;

1 credit for each item, 2 credits required.

#### 4. Internship practice credits

Internship practice is an indispensable part of cultivating graduate students' practical ability, including teaching practice and professional practice.

**Teaching practice:** In order to develop the teaching ability and communication skills of graduate students, graduate students should participate in teaching practice during their studies. Teaching practice can be carried out in a variety of ways, such as undergraduate course teaching, mentoring or guiding production internships, course design and graduation design. The teaching practice time accumulates no less than one month's workload. At the end of the assessment, the supervisor writes out the assessment comments, and the assessment will get 1 credit.

**Professional practice:** In order to cultivate graduate students' hands-on ability and practical innovation ability, graduate students should participate in professional practice during their studies. Graduate students should arrange for at least one month (usually using cold and summer vacations) to go to production, design and research units for practical training, or to participate in research work or laboratories that combine research directions. One credit can be obtained after the tutor has passed the examination.

### 七、学位论文 (Academic Dissertation)

学位论文工作是研究生培养工作的重要组成部分,是对研究生进行科学研究或承担专门技术工作的全面训练,是培养研究生创新能力、综合运用所学知识发现问题、分析问题和解决问题能力的重要环节。

1. 学位论文应在导师指导下由研究生独立完成。
2. 学位论文一般程序为:文献阅读和调研、初步写出研究课题综述、撰写开题报告、理论分析与研究、科学实验、论文撰写、论文送审和论文答辩等环节。
3. 学位论文要求理论联系实际,内容充实、技术先进、结论正确、格式规范、条理清楚、表达准确。论文结构包括:题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。
4. 学位论文对所研究的课题应在理论分析、科学实验、工程应用与指导实践等环节具有一定的创新性,提出一定的新见解。



5. 学位论文应具有一定的深度和先进性,应反映出作者对基础理论和专门知识的掌握情况,反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。

6. 学位论文按照《山东理工大学关于研究生学位论文工作的有关规定》《山东理工大学硕士学位授予工作实施细则》《山东理工大学硕士学位授予工作实施细则》等相关文件的有关规定组织评阅与答辩。

The dissertation work is an important part of the postgraduate training work. It is a comprehensive training for graduate students in scientific research or undertaking specialized technical work. It is an important link in cultivating postgraduate innovation ability, comprehensively applying knowledge, discovering problems, analyzing problems and solving problems. .

1. The dissertation should be completed independently by the graduate student under the guidance of the instructor.

2. The general procedures of dissertations are: literature reading and research, preliminary writing of research topics, writing of opening reports, theoretical analysis and research, scientific experiments, paper writing, paper submission and essay defense.

3. The dissertation requires theory to be linked to practice, content is full, technology is advanced, conclusion is correct, format is standardized, organization is clear, and expression is accurate. The structure of the thesis includes: topics, Chinese and English abstracts, catalogues, texts, references, acknowledgments, research results, appendices, etc.

4. The dissertation should have certain innovations in the theoretical analysis, scientific experiment, engineering application and guiding practice, and put forward some new insights.

5. The dissertation should have a certain depth and advanced nature, which should reflect the author's mastery of the basic theory and expertise, reflecting the author's ability to comprehensively apply theories, methods and means to solve theoretical and practical problems.

6. The dissertation organizes the review and defense in accordance with the relevant provisions of the relevant regulations of Shandong University of Technology on the work of postgraduate thesis work, the implementation rules for the granting of master's degrees of Shandong University of Technology, and the implementation rules for the granting of master's degrees of Shandong University of Technology.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

### (一) 毕业要求

满足以下条件,可获得毕业证书。

1. 具有良好的品德修养和学术道德,实事求是、勇于创新;
2. 修读完培养计划规定课程和其他培养环节,成绩考核合格;
3. 通过论文答辩,成绩合格;

4. 符合学校有关规定的其他要求。

## (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及经济学院学位授予有关规定。

### 1. Graduation requirements

A diploma can be obtained if the following conditions are met.

(1) Have good moral cultivation and academic ethics, seek truth from facts and be brave in innovation;

(2) After completing the courses prescribed in the training plan and other training links, the results are qualified;

(3) Pass the thesis defense and pass the test;

(4) Meet other requirements of the school's relevant regulations.

### 2. Degree requirements

Strictly implement the Provisional Implementation Measures for the Degree Regulations of the People's Republic of China, the Evaluation Methods for Master's Thesis of Shandong University of Technology, the Implementation Rules for the Master's Degree of Shandong University of Technology, the Implementation Rules for the Grant of Master's Degrees of Shandong University of Technology, and the Relevant Provisions for Degrees of Economics.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>掌握社会科学基本理论与方法，了解经济学、社会学、法学、心理学等人文社科的基本知识和基础理论。具有人文精神，具有科学严谨、求真务实的治学态度、良好的学术素养及学术道德。</p> <p>Master the basic theories and methods of social science, and understand the basic knowledge and basic theories of humanities and social sciences such as economics, sociology, law, and psychology. With humanistic spirit, scientific rigorous, realistic and pragmatic attitude, good academic literacy and academic ethics.</p>	<p>中国文化、汉语、论文写作与学术规范、经济学研究方法论、经济哲学</p> <p>Chinese Culture、Chinese、Thesis Writing and Academic、Research Methodology in Applied Economics、Economic Philosophy</p>
综合能力		<p>能熟练阅读本学科外文文献和相关资料，具有一定的写译能力和基本的听、说能力；掌握专业领域研究所需的计算机工具；具有较强的自学能力、实践创新能力、写作能力和学术交流能力。</p> <p>Proficiency in reading foreign language literature and related materials in this subject, with a certain ability to write and basic listening and speaking skills; master the computer tools needed for professional field research; have strong self-learning ability, practical innovation ability, writing ability and academic Communication skills.</p>	<p>论文写作与学术规范、经济学研究方法论、经济哲学、国际经济理论前沿与文献选读、专业经典文献选读</p> <p>Thesis Writing and Academic、Research Methodology in Applied Economics、Economic Philosophy、The Frontier of International Economic Theory and the Reading of Literature, Selective Reading of Professional Classics</p>
研究方向	产业经济学	<p>掌握产业组织理论、创新经济学、计量经济学等基础知识，注重结合我国转型经济的背景，研究产业组织结构与调整、技术创新与扩散、产业发展与战略等领域，重视理论研究与企业实践相结合。</p> <p>Master the basic knowledge of industrial organization theory, innovation economics, econometrics, focus on the background of China's transitional economy, study industrial organization structure and adjustment, technological innovation and diffusion, industrial development and strategy, and attach importance to the combination of theoretical research and enterprise practice.</p>	<p>产业组织理论、高级微观经济学、高级宏观经济学、经济增长理论、专业经典文献选读</p> <p>Industrial Organization Theory、Advanced Microeconomics、Advanced Macroeconomics、Economic Growth Theory、Selective Reading of Professional Classics</p>



国际贸易学	<p>掌握国际经济学、国际贸易理论、跨国直接投资理论等基础知识，研究国际经贸理论与政策、国际直接投资与跨国经营、技术创新与技术扩散、开放条件下的产业发展与技术进步以及国际商务等问题。</p> <p>Master the basic knowledge of international economics, international trade theory and transnational direct investment theory, and to study such issues as international economic and trade theory and policy, international direct investment and transnational operation, technological innovation and technology diffusion, industrial development and technological progress under open conditions, and international business.</p>	<p>中级计量经济学、数理统计、中级国际贸易学、跨国投资理论、国际经济理论前沿与文献选读</p> <p>Intermediate Econometrics 、 Mathematical Statistics 、 Intermediate International Trade 、 The Theory of Transnational Investment 、 The Frontier of International Economic Theory and the Reading of Literature</p>
区域经济学	<p>掌握国际经济学、发展经济学、技术经济学、产业经济学、产业组织理论等基础知识，研究不同类型国家和地区产业结构调整的原因和趋势，并探讨发展中国家产业结构调整的基本对策和思路。</p> <p>Master the basic knowledge of international economics, development economics, technology economics, industrial economics, industrial organization theory, study the reasons and trends of industrial restructuring in different types of countries and regions, and explore the basic countermeasures and ideas of industrial restructuring in developing countries.</p>	<p>区域经济学、中级计量经济学、中级微观经济学、中级宏观经济学、数理统计、博弈论、资源与环境经济学</p> <p>Regional Economics 、 Intermediate Econometrics 、 Intermediate Microeconomics 、 Macroeconomics 、 Mathematical Statistics 、 Game Theory 、 Economics of Resources and Environment</p>
金融学	<p>掌握货币银行学、投资学、国际金融学等基础知识，研究公司金融与资本市场、信息不对称情况下的投融资行为、金融市场的羊群行为、上市公司投资价值分析、汇率市场决定、跨国投资理论与实践等问题。</p> <p>Master basic knowledge such as money banking, investment, and international finance, study corporate finance and capital markets, investment and financing behavior under asymmetric information, herd behavior in financial markets, analysis of investment value of listed companies, exchange rate market decisions, and cross-border Investment theory and practice issues.</p>	<p>现代金融经济学、金融计量学、国际金融学、中级计量经济学、中级微观经济学、数理统计</p> <p>Modern Financial Economics、Financial Econometrics、International Finance 、 Intermediate Econometrics 、 Mathematical Statistics</p>



	农业经济与农业工程	<p>掌握增长经济学、发展经济学、农业经济学等基础知识，研究不同类型国家和地区农业现代化与农业发展的经验和对策。</p> <p>Master the basic knowledge of growth economics, development economics, agricultural economics, and study the experiences and countermeasures of agricultural modernization and agricultural development in different types of countries and regions.</p>	<p>中级计量经济学、中级微观经济学、中级宏观经济学、博弈论、农业经济学、发展经济学</p> <p>Intermediate Econometrics、Intermediate Microeconomics、Macroeconomics、Game Theory、Agricultural Economics、Development Economics</p>
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附表 2: 培养计划 (Training Plan)

学科名称	应用经济学 practical economics	学科代码	0202		
单位名称	经济学院 School of Economics	培养类型	硕士留学研究生 Overseas Master Students		
学分要求	总学分 Total credits: $\geq 32$ , 必修课程学分 compulsory course credits: 16, 选修课程学分 elective course credits: $\geq 13$				
课程 设 置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1	必选
	G13101	汉语 Chinese	2	1	
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	2	
学科平台课程 11 学分	170104	中级计量经济学 Intermediate Econometrics	2	1	必选
	170105	中级微观经济学 (全英文) Intermediate Microeconomics (Full English)	2	1	
	170103	中级宏观经济学 Macroeconomics	2	2	
	G11003	数理统计 Mathematical Statistics	2	1	
	170001	博弈论 Game Theory	2	2	
	170096	经济学研究方法论 Research Methodology in Applied Economics	1	1	
方向选修课程 $\geq$ 向选学分	170023	产业组织理论 Industrial Organization Theory	2	2	
	170074	高级微观经济学 Advanced Microeconomics	2	2	
	170027	高级宏观经济学 Advanced Macroeconomics	2	2	
	170058	区域经济学 Regional Economics	2	2	
	170064	现代金融经济学 Modern Financial Economics	2	2	



	170076	投资学 (B) Investment Science	2	2	不低于13学分
	170097	中级国际贸易学 (全英文) Intermediate International Trade (Full English)	2	2	
	170050	农业经济学 Agricultural Economics	2	2	
	170040	金融计量学 Financial Econometrics	2	2	
	170030	国际金融学 International Finance	2	2	
	170046	跨国投资理论 The Theory of Transnational Investment	2	2	
	170037	技术创新理论 Theory of Technological Innovation	2	2	
	170026	发展经济学 Development Economics	2	2	
	170044	经济增长理论 Economic Growth Theory	2	2	
	170113	国际经济理论前沿与文献选读 (双语) The Frontier of International Economic Theory and the Reading of Literature (Bilingual)	2	2	
	170090	资源与环境经济学 (全英文) Economics of Resources and Environment	2	2	
	170115	专业经典文献选读 (双语) Selective Reading of Professional Classics (Bilingual)	2	2	
素养选修课程 ≤1 学分	170082	经济哲学 Economic Philosophy	1	1	
补修课程 不计学分					导师确定
其他培养环节 (3 学分)					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下, 通过查阅文献、收集资料和调查研究后确定研究课题, 写出开题报告。5 人以上的专家组对开题报告提出评价和修改意见, 不通过可限期重做, 重做后仍未通过者将终止培养。开题通过后即获得 1 学分。</p> <p>Under the guidance of the instructor, the graduate student identifies the research topic by consulting the literature, collecting the data, and investigating the research, and writing the opening report. The expert group of more than 5 people will put forward evaluation and revision opinions on the opening report, and will not be able to</p>				3

	redo within a limited time. Those who have not passed the redo will terminate the training. After passing the exam, you will get 1 credit.		
中期考核 (1 学分)	<p>对研究生的思政、科研、实践、综合素质以及学位论文进展情况等进行考核，考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过后即获得 1 学分。</p> <p>Examine the postgraduate's ideological and political, scientific research, practice, comprehensive quality and progress of the dissertation. Those who are confirmed to be "unqualified" by the mid-term screening and assessment team shall be examined by the graduate school and submitted to the president's office for approval, terminate their school status and undergraduate treatment.</p>	4-5	
创新创业 (1 学分)	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>2. 参加高水平的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</p> <p>每项记 1 学分，需完成 1 学分。</p> <p>1. Participate in academic conferences and read papers, or make public academic reports 2 times;</p> <p>2. Participate in high-level science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary;</p> <p>1 credit for each credit, 1 credit is required.</p>	1-5	
培养单位 教授委员会主任	王黎明	培养单位 负责人	张红霞



# 世界经济学科学术学位硕士研究生培养方案

学科代码：020105

## Master's Degree Training Program for Overseas Students in World Economy (Secondary Discipline)

Credit Code: 020105

### 一、学科简介 (Brief Introduction to Discipline)

山东理工大学世界经济（二级学科）学硕士学位授权点创建于 2006 年，是国务院学位委员会批准增设的第十批硕士学位授予单位。本学位点依托山东省产业经济研究基地等 4 个省级科研创新平台，在研究生科研能力培养、研究团队建设和研究平台搭建、服务地方经济等方面形成了自己的优势和特色。近 5 年，学校“双百人才”2 人，师资力量配置全面，具有较强的教学与科研能力，近五年学科点承担国家级课题 5 余项，省部级课题 20 余项，获得省级奖励 5 余项，发表 SCI、SSCI、CSSCI 高水平论文 30 余篇。前学科点已毕业研究生 40 余人，其中约 26 人考取中国人民大学、厦门大学、南开大学、上海财经大学等著名院校读博深造，近五年考博率达 65%，研究生一次就业率 100%，深受用人单位赞誉。

学科点与国内中国众多高校建立了研究生共同培养联系，与澳大利亚纽卡斯尔大学、西班牙 ESIC 商学院、英国格林威治大学、爱尔兰利莫瑞克大学、美国布卢姆斯堡大学等国外著名高校建立了长期交流合作关系，国内外学术影响力与日俱增。未来学科点将在科学研究、团队建设、平台建设、人才培养和社会服务等方面取得更大突破，力争获得“世界经济”二级学科博士学位授予的权利，进入山东省一流学科建设行列。

The Shandong University of Technology's World Economics (Secondary Discipline) Master's degree is established in 2006. It is the tenth batch of master's degree-granting units approved by the Academic Degrees Committee of the State Council. This degree point relies on four provincial-level scientific research and innovation platforms, including the Shandong Provincial Industrial Economic Research Base, and has formed its own advantages and characteristics in the aspects of graduate research capacity training, research team building and research platform construction, and serving local economy. In the past five years, there have

been two “double-hundred talents” in the school. The faculty has a comprehensive allocation of faculty and strong teaching and research capabilities. In the past five years, the subject has undertaken more than 5 national-level projects and more than 20 provincial-level projects. More than 5 awards were awarded, and more than 30 papers were published in SCI, SSCI and CSSCI. More than 40 graduate students have graduated from the pre-discipline, and about 26 of them have been admitted to Renmin University of China, Xiamen University, Nankai University, Shanghai University of Finance and Economics, etc., and they have achieved a high rate of 65% in the past five years and 100% in graduate students. It is highly praised by employers.

The subject points have established postgraduate co-cultivation links with many universities in China, and established long-term cooperative relationship with famous universities such as Newcastle University, ESEC Business School, Greenwich University, University of Ireland, Limerick University, and University of Bloomsburg. The academic influence at home and abroad is increasing day by day. The future disciplines will make greater breakthroughs in scientific research, team building, platform construction, personnel training and social services, and strive to obtain the right to confer doctoral degrees in the "world economy" secondary disciplines, and enter the ranks of first-class discipline construction in Shandong Province.

## 二、培养目标 ( Educational Objectives )

立足经济全球化发展需要，面向世界经济学科发展前沿，培养德、智、体、美全面发展，具备经济学知识扎实、科研能力较强和国际视野的高层次经济学专门人才。

1. 具有社会责任感和历史使命感，遵纪守法，品德良好，身心健康；具有良好的职业道德和敬业精神，以及科学严谨、求真务实的治学态度和工作作风。

2. 培养适应经济社会发展需要，严谨求实，德智体美劳全面发展的高层次经济专业人才。

3. 掌握扎实的经济学理论基础和国际经济发展的视野，能顺利地运用汉语进行研究和专业交流，并能熟练地使用计算机和网络开展研究工作。

4. 具有一定的独立科研能力，能对世界经济发展问题进行观察、调研、分析，提出有关政策建议，并根据要求实施与执行有关计划方案。

1. Have a sense of social responsibility and historical mission, obey the law, good moral character, physical and mental health; have a good professional ethics and professionalism, as well as scientific rigor, truth-seeking and pragmatic attitude and work style.

2. Cultivate high-level economic professionals who are accustomed to the needs of economic and social development, rigorous and realistic, and develop in a comprehensive manner.

3. Grasping a solid theoretical foundation of economics and a vision of international



economic development, can successfully use Chinese for research and professional exchanges, and be proficient in using computers and networks to carry out research work.

4. Have certain independent scientific research capabilities, be able to observe, investigate and analyze the world economic development issues, propose relevant policy recommendations, and implement relevant planning plans according to requirements.

After graduation, you can engage in the teaching, research, or practical work of the relevant departments in economic management.

### 三、研究方向 ( Research Orientation )

本学科密切关注学科前沿领域和研究发展趋势,大力提倡学科专业之间的相互渗透和交叉,基于世界经济学科特点和我校学科优势,本着研究内容和研究方法上相互独立、相互交叉和相互补充的原则,共设置四个研究方向:

1. 国际经济理论与政策
2. 国际贸易理论与实践
3. 国际金融与国际投资
4. 区域与国别经济

各研究方向简介详见附表 1。

The discipline pays close attention to its frontier fields and research trends, and strongly advocates the mutual penetration and intersection between disciplines. Based on the characteristics of the world economic and the advantages of our university disciplines, based on the principle that research content and research methods are independent, cross-cutting and complementary. Set up four research directions:

1. International economic theory and policy
2. International trade theory and practice
3. International Finance and International Investment
4. Regional and national economy

The introduction of each research direction are shown in Schedule 1.

### 四、学习年限及培养方式 ( Length of Schooling and Training method )

全日制硕士研究生的基本学制为 3 年,学习年限为 2-4 年。科学研究和撰写论文时间不少于 1 年(从开题报告通过之日开始计算)。在满足论文工作时间要求的前提下,经指导教师同意,品学兼优的学生提前完成学业,可以申请提前毕业。

在基本学制规定时间内,研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由,研究生在基本学制结束前两个月向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告,并经学位评定分委员会组织审查



通过，报校学位评定委员会办公室审核批准后，可最多延长申请学位年限 1 年。

The basic academic system for full-time postgraduates is 3 years and the duration of study is 2 to 4 years. The time of scientific research and writing papers cannot be less than one year (calculated from the date of the opening of the report). Under the premise of meeting the requirements of the working hours of the thesis and get the faculty adviser's agreement, the students with good academic performance finish their studies ahead of time, they can apply for graduation in advance.

Within the time limit set by the basic academic system, graduate students should complete the work of dissertation defense and degree review. For academically justified reasons, the graduate student submits the dissertation progress report and the dissertation extension application report to the degree evaluation subcommittee of the training unit two months before the end of the basic academic system, after review and approval by the sub-committee of the degree assessment committee and the Office of the Academic Degree Evaluation Committee, the application for a maximum of one year may be extended.

研究生培养实行导师负责制或以导师负责为主的指导小组（团队）制。导师（或指导小组）不仅负责制订研究生培养计划，指导科学研究、专业实践、服务实习和学位论文等工作，而且对研究生的思想品德、学术道德有引导、示范和监督的责任。

研究生须严格按照培养环节要求开展学习、研究和实践，导师（或指导小组）需加强对培养环节的管理和监控。

Postgraduate training is based on a mentoring system or a mentoring team (team). The tutor (or the steering group) is not only responsible for formulating postgraduate training programs, guiding scientific research, professional practice, service internships and dissertations, but also have the responsibility for guiding, demonstrating and supervising the ethics and academic ethics of graduate students.

Graduate students must conduct study, research and practice strictly according to the requirements of the training process. The tutor (or steering group) needs to strengthen the management and monitoring of the training process.

## 五、课程设置与学分 (Curriculum and Credit Requirements)

研究生学分分为课程学分和必修环节学分两部分。课程学分为研究生根据学科专业课程设置、通过课程学习和课程考核而获得的学分，包括公共必修课、学科平台必修课、选修课等课程学分。必修课不低于 16 学分，选修课不低于 9 学分。必修环节学分为研究生课程结束、进入学位论文阶段后所获得的各类学分，包括论文开题、中期考核、创新创业、实习实践等环节学分，必修环节不低于 3 学分。总学分不低于 32 学分，其中课程学分不低于 26 学分、不高于 30 学分。



补修课是针对跨专业研究生设置的本学科研究生所必修的专业基础课程，跨专业研究生应补修若干门本专业的本科生课程，由导师根据具体情况确定补修课门数。补修课程考试成绩合格方可申请学位答辩，不计学分。

课程设置详细情况见附表 2

Postgraduate credits are divided into two parts: course credits and compulsory credits. The course credits are earned by graduate students based on the curriculum of the subject, through course study and course assessment, including public compulsory courses, subject compulsory courses, elective courses and other credits. The required course is no less than 16 credits, and the elective course is no less than 9 credits. Compulsory credits are the various credits obtained after the end of the postgraduate course and after entering the dissertation stage, including thesis opening, mid-term assessment, innovation and entrepreneurship, internship practice and other links credits. The compulsory course is no less than 3 credits. The total credits are no less than 32 credits, and the course credits are no less than 26 credits and no more than 30 credits.

The Make-up Courses is a professional foundation course for postgraduate students who are set up for interdisciplinary postgraduate students. Interdisciplinary postgraduate students should make up several undergraduate courses for the subject. The tutor will determine the number of Make-up courses according to the specific circumstances. You can apply for a degree defense if you pass the Make-up Courses exam, no credits.

Details of the course settings are shown in Schedule 2.

## 六、必修环节及学分 ( Compulsory links and credits )

研究生在学期间必须参与的学术活动和培养环节同样采取学分制，统称为必修环节学分，至少 6 学分。必修环节学分和课程学分不得通用，两者分数总和不低于 34 学分方可进入学位论文送审答辩环节。

### 1. 论文开题 ( 1 学分 )

开题是研究生培养过程中开展学位论文工作的首要环节。研究生在撰写学位论文之前，必须经过认真的调查研究，查阅大量的文献资料尤其是外文文献，了解主攻研究方向的历史和现状，在此基础上确定学位论文研究题目，并作论文开题报告。开题报告应论述学位论文选题依据、研究方案、预期目标与科研成果、工作计划等关键问题。

研究生学位论文开题必须经导师审核同意方可进行。开题通过后获得 1 学分。

论文开题具体工作参照《山东理工大学关于研究生学位论文工作的有关规定》(鲁理工大办发[2017]5 号) 执行。

### 2. 中期筛选 ( 1 学分 )

中期筛选是在研究生课程学习基本结束之后，以研究生培养方案为依据，对研究生

的政治思想和道德品质、基础理论和专业知识、科技创新、实践能力及健康状况等方面进行的综合考核。

中期筛选通过后获得 1 学分。凡被中期筛选考核小组确认为“不合格”者，经所在单位签署意见，研究生院审核，报校长办公会批准，终止学籍，做肄业处理。

中期筛选具体工作参照《山东理工大学研究生中期筛选考核实施办法》（研究生函[2015]46号）执行。

### 3. 创新创业（需完成 2 学分）

创新创业活动主要有以下几种形式：

进行 3 个月的出国访学研修或学术交流；

参加学术会议并宣读论文；

做公开学术报告 2 次；

参加全国性的科技竞赛、创意设计、创新创业竞赛等；

参加 6 次以上与本学科相关的学术报告，并提交总结，由导师考核并签字，交学科点核定存档以备核查。

完成以上条件之一，即可获得 1 学分。

The academic activities and training sessions that graduate students must participate in during their studies are also adopt the credit system, generally known as compulsory link credits, at least 6 credits. Compulsory link credits and course credits can't be used universally. Students whose the sum of the two kind of credits are no less than 34 can enter the link of dissertation defense.

#### 1. Paper opening ( 1 credit )

The opening of the topic is the primary link in the development of the dissertation in the postgraduate training process. Before writing a dissertation, graduate students must undergo a serious investigation and research, consult a large number of documents, especially foreign literature, understand the history and current situation of the main research direction, on this basis, determine the research topic of the dissertation, and make the thesis opening report. The opening report should address key issues such as the basis, research plan, expected goals and scientific research results, and work plan of the dissertation.

The opening of the graduate thesis must be approved by the instructor before proceeding. Get 1 credit after passing the exam.

The specific work of the opening of the thesis is carried out in accordance with the "Regulations on the work of postgraduate dissertations of Shandong University of Technology" ( Luli University of Technology Office [2017] No. 5 ) .

#### 2. Medium-term screening ( 1 credit )

Medium-term screening is a comprehensive assessment of graduate students'political



thought and moral character, basic theory and professional knowledge, scientific and technological innovation, practical ability and health status based on the graduate training program after the basic completion of graduate course learning.

One credit was obtained after the mid-term screening. Those who are confirmed to be "unqualified" by the mid-term screening and assessment team shall be examined by the graduate school and submitted to the president's office for approval, terminate their school status and undergraduate treatment.

The specific work of the mid-term screening is carried out in accordance with the "Implementation Measures for the Mid-term Screening and Assessment of Postgraduate Students of Shandong University of Technology" (Graduate Letter [2015] No. 4 (6)).

### 3. Innovation and entrepreneurship (2 credits required)

There are several main forms of innovation and entrepreneurship:

Conduct a three-month study tour or academic exchange abroad;

Participate in academic conferences and read papers;

Make public academic reports 2 times;

Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc.

Participate in more than 6 academic reports related to the subject and submit a summary, which will be reviewed and signed by the instructor, and submitted to the subject for verification and verification for verification.

Upon completion of one of the above conditions, you will receive 1 credit.

## 七、学位论文 Academic Dissertation)

世界经济学科学术学位硕士研究生学位论文要求如下:

1. 学位论文应在导师指导下由研究生独立完成。

2. 学位论文工作的一般程序为:文献阅读和调研、开题报告、理论分析与研究、案例论证或实证分析、论文撰写、论文送审和论文答辩。

3. 学位论文应理论联系实际,内容一般包括:题目、中英文摘要、目录、正文、参考文献、附录、研究成果、致谢等。

4. 论文形式可以是基础研究、应用研究等多种形式,论文选题应紧密结合实践问题。

5. 评价论文水平主要考核其综合运用所学经济理论知识解决实际问题的能力,以及内容是否有创新,是否有实用价值。论文字数不少于3万字。

6. 学位论文严格按照《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》和《山东理工大学硕士学位授予实施细则》的有关规定组织评阅,课程考试成绩合格取得规定学分,方可由学校学位办受理答辩及学位申请事宜。

The master's degree thesis of the world economics academic degree is as follows:

1. The dissertation should be completed independently by the graduate student under the guidance of the instructor.

2. The general procedures for dissertation work are: literature reading and research, opening report, theoretical analysis and research, case argumentation or empirical analysis, paper writing, paper submission and essay defense.

3. The dissertation requires theory to be linked to practice, content of the thesis generally includes: title, Chinese and English abstracts, catalogues, texts, references, appendices, research results, and acknowledgments.

4. The form of the thesis can be a variety of forms such as theory and policy research, international business case analysis, international market research report, business plan, project feasibility report, etc. The topic selection should be closely combined with practical issues.

5. Evaluating the level of the thesis mainly assesses its ability to comprehensively apply the knowledge of international business theory to solve practical problems, and whether the content has innovation and whether it has practical value. The number of words is not less than 30,000 words.

6. The dissertation organizes the review and defense in strict accordance with the relevant provisions of the Provisional Implementation Regulations of the People's Republic of China's Degree Regulations, the Shandong University of Technology Master's Thesis Evaluation Method, and the Shandong Institute of Technology Master's Degree Awarding Implementation Rules. The course examination scores are qualified to obtain the required credits, and the school degree office accepts the reply and the degree application.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

### (一) 毕业要求

满足以下条件, 可获得毕业证书:

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养计划规定课程和其他培养环节, 成绩考核合格;
3. 通过论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及经济学院学位授予有关规定。

#### 1. Graduation requirements

A diploma can be obtained if the following conditions are met.



(1) Have good moral cultivation and academic ethics, seek truth from facts and be brave in innovation;

(2) After completing the courses prescribed in the training plan and other training links, the results are qualified;

(3) Pass the thesis defense and pass the test;

(4) Meet other requirements of the school's relevant regulations.

## 2. Degree requirements

Strictly implement the Provisional Implementation Measures for the Degree Regulations of the People's Republic of China, the Evaluation Methods for Master's Thesis of Shandong University of Technology, the Implementation Rules for the Master's Degree of Shandong University of Technology, the Implementation Rules for the Grant of Master's Degrees of Shandong University of Technology, and the Relevant Provisions for Degrees of Economics.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>掌握社会科学基本理论与方法, 了解经济学、社会学、法学、心理学等人文社科的基本知识和基础理论。具有人文精神, 具有科学严谨、求真务实的治学态度、良好的学术素养及学术道德。</p> <p>Master the basic theories and methods of social science, and understand the basic knowledge and basic theories of humanities and social sciences such as economics, sociology, law, and psychology. It has a humanistic spirit, scientific and rigorous, realistic and pragmatic academic attitude, good academic quality and academic ethics.</p>	<p>中国文化、汉语、论文写作与学术规范、经济学研究方法论、经济哲学</p> <p>Chinese Culture、Chinese、Thesis Writing and Academic、Research Methodology in Applied Economics、Economic Philosophy</p>
综合能力	<p>能熟练阅读本学科外文文献和相关资料, 具有一定的写译能力和基本的听、说能力; 掌握专业领域研究所需的计算机工具; 具有较强的自学能力、实践创新能力、写作能力和学术交流能力。</p> <p>Proficiency in reading foreign language literature and related materials in this subject, with a certain ability to write and basic listening and speaking skills; master the computer tools needed for professional field research; have strong self-learning ability, practical innovation ability, writing ability and academic Communication skills.</p>	<p>论文写作与学术规范、经济学研究方法论、经济哲学、国际经济理论前沿与文献选读、专业经典文献选读、世界经济专题研究</p> <p>Thesis Writing and Academic、Methodology of Economic Research、Economic Philosophy、The Frontier of International Economic Theory and the Reading of Literature、Selective Reading of Professional Classics、Monographic Study on World Economy</p>
研究方向	<p>国际经济理论与政策</p> <p>掌握国际经济学、西方经济学等基础知识, 研究国际经济领域中重大的理论和现实问题, 为我国的对外开放提供理论支持和政策建议。</p> <p>Master the basic knowledge of international economics and Western economics, study major theoretical and practical issues in the international economic field, and provide theoretical support and policy advice for China's opening up.</p>	<p>中级计量经济学、国际经济理论前沿与文献选读、区域经济学、区域与国别经济、专业经典文献选读、世界经济专题研究</p> <p>Intermediate Econometrics、The Frontier of International Economic Theory and the Reading of Literature、Regional Economics、Regional and National Economies、Selective Reading of Professional Classics、Monographic Study on World Economy</p>



<p>国际贸易理论与实 践</p>	<p>掌握国际贸易学、国际经济学等基础知识，研究国际贸易中重大的理论和现实问题，为我国的对外贸易提供理论依据和政策建议。 Master the basic knowledge of international trade and international economics, study major theoretical and practical issues in international trade, and provide theoretical basis and policy recommendations for China's foreign trade.</p>	<p>中级微观经济学、中级国际贸易学、数理统计、国际经济理论前沿与文献选读、世界经济专题研究 Intermediate Microeconomics、Intermediate International Trade、Mathematical Statistics、The Frontier of International Economic Theory and the Reading of Literature、Monographic Study on World Economy</p>
<p>国际金融与国际投 资</p>	<p>掌握国际金融学、国际投资学、国际经济学等基础知识，研究国际金融和国际投资中重大的理论和现实问题，为我国参与国际金融和国际投资活动提供理论依据和政策建议。 Master the basic knowledge of international finance, international investment, international economics, study major theoretical and practical issues in international finance and international investment, and provide theoretical basis and policy recommendations for China's participation in international finance and international investment activities.</p>	<p>数理统计、博弈论、经济学研究方法论、中级国际贸易学、中级国际金融学、发展经济学、专业经典文献选读、世界经济专题研究 Mathematical Statistics, Game Theory, Methodology of Economic Research、Intermediate International Trade、Intermediate International Finance、Development Economics、Selective Reading of Professional Classics、Monographic Study on World Economy</p>
<p>区域与国 别经济</p>	<p>掌握国际经济学、国际经济一体化学、发展经济学等基础知识，研究不同类型国家和地区经济发展的基本规律和热点问题，为我国参与经济全球化提供借鉴经验和教训。 Master the basic knowledge of international economics, international economic integration, and development economics, study the basic laws and hot issues of economic development in different types of countries and regions, and provide lessons for China's participation in economic globalization.</p>	<p>数理统计、博弈论、发展经济学、区域经济学、区域与国别经济、专业经典文献选读、世界经济专题研究 Mathematical Statistics、Game Theory、Development Economics、Regional Economics、Regional and National Economies、Selective Reading of Professional Classics、Monographic Study on World Economy</p>


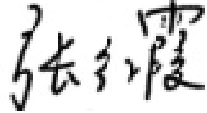


附表 2: 培养计划 (Training Plan)

学科名称	世界经济 World Economy		学科代码	020105		
单位名称	经济学院 School of Economics		培养类型	学术学位硕士研究生 Master degree in academic degree		
学分要求	总学分 Total credits: $\geq 32$ , 必修课程学分 Compulsory course credits: 16, 选修课程学分 Elective course credits: $\geq 13$					
课程 设 置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1	必选	
	G13101	汉语 Chinese	2	1		
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 11 学分	170104	中级计量经济学 Intermediate Econometrics	2	1	必选	
	170103	中级宏观经济学 Macroeconomics	2	1		
	170105	中级微观经济学 (全英文) Intermediate Microeconomics	2	2		
	G11003	数理统计 Mathematical statistics	2	1		
	170001	博弈论 Game Theory	2	2		
	170096	经济学研究方法论 Methodology of economic research	1	1		
方向选修课程 $\geq 13$ 学分	170113	国际经济理论前沿与文献选读 (双语) The Frontier of International Economic Theory and the Reading of Literature (Bilingual)	2	1	不低 于 13 学 分	
	170097	中级国际贸易学 (全英文) Intermediate International Trade	2	2		
	170098	中级国际金融学 Intermediate International Finance	2	2		
	170026	发展经济学 Development Economics	2	2		
	170099	政治经济学 Political Economics	2	1		



	170076	投资学 (B) Investment Science	2	2	
	170058	区域经济学 Regional Economics	2	2	
	170114	区域与国别经济 (双语) Regional and National Economies (Bilingual)	2	2	
	170100	制度经济学 Institutional Economics	2	1	
	170115	专业经典文献选读 (双语) Selective Reading of Professional Classics (Bilingual)	2	2	
	170101	世界经济专题研究 Monographic Study on World Economy	2	1	
素养选修课程 ≤1 学分	170082	经济哲学 Economic philosophy	1	1	
补修课程 不计学分		微观经济学 Microeconomics	2	中期 考核 之前	导师 确定
		宏观经济学 Macroeconomics	2		
		计量经济学 Econometrics	2		
		国际贸易学 International Trade	2		
		金融学 Finance	2		
其他培养环节 (3 学分)					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下, 通过查阅文献、收集资料和调查研究后确定研究课题, 写出开题报告。5 人以上的专家组对开题报告提出评价和修改意见, 不通过可限期重做, 重做后仍未通过者将终止培养。开题通过后即获得 1 学分。</p> <p>Under the guidance of the instructor, the graduate student identifies the research topic by consulting the literature, collecting the data, and investigating the research, and writing the opening report. The expert group of more than 5 people will put forward evaluation and revision opinions on the opening report, and will not be able to redo within a limited time. Those who have not passed the redo will terminate the training. After passing the exam, you will get 1 credit.</p>				3

中期考核 (1 学分)	<p>对研究生的思政、科研、实践、综合素质以及学位论文进展情况等进行考核，考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过后即获得 1 学分。</p> <p>Examine the postgraduate's ideological and political, scientific research, practice, comprehensive quality and progress of the dissertation. Those who are confirmed to be "unqualified" by the mid-term screening and assessment team shall be examined by the graduate school and submitted to the president's office for approval, terminate their school status and undergraduate treatment.</p>	4-5	
创新创业 (1 学分)	<ol style="list-style-type: none"> <li>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</li> <li>3. 参加 6 次以上与本学科相关的学术报告，并提交总结，由导师考核并签字，交学科点核定存档以备核查。</li> </ol> <p>每项记 1 学分</p> <ol style="list-style-type: none"> <li>1. Participate in academic conferences and read papers, or make public academic reports 2 times;</li> <li>2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc. and win awards;</li> <li>3. Participate in more than 6 times academic reports related to the subject, submit a summary, be reviewed and signed by the instructor, and submit the file to the subject for verification.</li> </ol> <p>1 credit per item</p>	1-5	
培养单位 教授委员会主任		培养单位 负责人	



## 管理科学与工程学科学术学位硕士研究生培养方案

学科代码：1201

### The Training Program for Academic Master's Degree in Management Science and Engineering

Credit Code: 1201

#### 一、学科简介 ( Brief Introduction to Discipline )

管理科学与工程学科成立于 1990 年，2003 年取得硕士学位授予权。本学科现有专任教师 30 人，其中硕士生导师 18 人，外籍教师 1 人，校外兼职教师 3 人，山东理工大学教学名师 1 人。本学科专任教师共主持国家/省部级课题 24 项，政府委托项目和横向项目 40 项，发表高水平论文 115 篇，出版专著 7 部，获得省部级教学科研奖励 5 项。

本学科依托山东省生态文化与可持续发展软科学研究基地、山东低碳经济技术研究院、山东理工大学新旧动能转换研究中心等研究平台，在研究生能力培养、国际学术交流、服务地方经济建设等方面取得了丰富的成果，共培养研究生百余人，毕业硕士中有 8 人考取 985/211 高校博士研究生。

本学科具有与其他学科交叉研究的特色与优势，学科成员充分共享计算机科学、机械工程、交通运输管理、应用数学等学科的平台资源，进行交叉协同研究，在物流与供应链管理、大数据与智能决策等领域取得了较好的研究成果。

该学科重点研究同现代生产经营、科技、经济、社会等相适应的管理理论、方法和工具，应用现代管理科学方法与科技成就，阐明和揭示管理活动的规律，发展管理的理论、方法和工具，提高管理的效率。

The discipline of management science and engineering was established in 1990, and it was granted the right to grant master's degree in 2003. The discipline has 30 full-time teachers, including 18 master tutors, 1 foreign teacher, 3 part-time teachers outside the school, and 1 famous teacher Shandong university of science and technology. Full-time teachers in this discipline have presided over 24 national/provincial and ministerial projects, 40 government commissioned projects and horizontal projects. They have published 115 high-level papers, published 7 monographs, and won 5 provincial and ministerial teaching and research awards.

There are 4 the research platforms ,including ecological culture and the sustainable development of Shandong province soft science research base, low carbon economy in Shandong institute of technology, research center of old and new kinetic energy conversion . Rich achievements have been made in postgraduate capacity training, international academic exchanges, and serving local economic construction. More than 100 postgraduates have been trained in total, and 8 of them have been admitted as doctoral candidates of 985/211 universities.

This discipline has the characteristics and advantages of interdisciplinary research ,subject members fully shares the Platform resources of computer science, mechanical engineering, transportation management, applied mathematics and other disciplines, Conduct cross-sectional and collaborative research, and have achieved good research results In logistics and supply chain management, big data and intelligent decision-making and other fields.

The mainly studies are management theories, methods and tools that are compatible with modern production and management, science and technology, economy and society, applies modern management scientific methods and technological achievements, clarifies and reveals the laws of management activities, develops management theories, methods and tools, and improves the efficiency of management.

## 二、培养目标 ( Educational Objectives )

本学科培养具有坚实的数学、管理学和系统科学基础，系统掌握全面、扎实的管理专业知识和较好地分析问题和解决问题的能力，具有学术研究的基本素养和独立从事管理工作的高级人才。具体包括：

1. 拥护党的领导，热爱祖国，遵纪守法，具有良好的职业道德和敬业精神，以及科学严谨、求真务实的治学态度和工作作风。

2. 掌握本专业硕士学位各方向要求的基础理论和基本技能,对于管理科学的思维方式、方法技术有透彻理解。能够有效应用管理学、经济学、系统科学、数学、计算机科学与技术等多学科交叉知识和专业技术解决现实问题。

3. 掌握本学科前沿，适当了解其他领域研究成果，具有广博的科学视野和将不同领域知识相结合的能力；具备良好的科研写作能力、国内外学术交流能力和解决管理科学和管理工程领域实际问题的能力，富有创新和开拓精神；身心健康。

4. 为政府机关、大中型企业、高等院校与科研单位，尤其是与山东制造业基地相关的组织与企业培养管理工作的高级人才。

This discipline cultivates senior talents with a solid foundation of mathematics, management and system science, a systematic grasp of comprehensive and solid professional knowledge of management and a good ability to analyze and solve problems, basic quality of academic research and independent management work.



1. Familiar with Chinese culture and language, systematic grasp and thorough understanding of thinking mode, method and technology of management science, and able to combine qualitative and quantitative methods to solve practical management problems.

Capable of literature research, data query, system simulation and modeling, data analysis and academic communication, capable of high-level management and scientific research.

2. With a sound personality, I have a comprehensive and in-depth understanding of the classic works of my major and international authoritative journals, as well as the research achievements in my field, and can undertake certain scientific research tasks independently.

3. Cultivate senior management talents for government agencies, large and medium-sized enterprises, institutions of higher learning and scientific research institutions, especially organizations and enterprises related to Shandong manufacturing base.

### 三、研究方向 ( Research Orientation )

管理科学与工程(一级学科)学术学位硕士研究生培养方案设置以下 5 个研究方向:

1. 管理科学理论方法与应用
2. 信息管理与智能科学
3. 物流与供应链管理
4. 工业工程与服务科学
5. 能源工程与管理

详见附表 1。

Management science and engineering ( first-level discipline ) academic degree postgraduate training program has the following five research directions:

1. Theory, Method and Application of Management Science
2. Information Management and Intelligent Science
3. Logistics and Supply Chain Management
4. Energy Engineering and Management

The details are shown in Schedule 1。

### 四、学习年限 ( Length of Schooling )

学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

It is a three-year program and the study duration is from 2 to 4 years

Scientific research and thesis writing takes no less than one year. ( From the date of determining the theme ). With the approval of the instructor, students can apply for graduation in advance, but the time requirements for scientific research and paper writing remain the same.

The time of suspension is not counted in the length of study.

Graduate students should complete dissertation defense and graduation-related issues within the basic academic system. For academically justified reasons, the graduate student should submit the dissertation progress report and dissertation extension application report to the academic degree evaluation committee two months before the end of the basic academic system. After the approval of the evaluation committee office, the program can be prolonged for at most one year.

## 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程分为必修课程和选修课程, 学生需在规定时间内完成 16 个必修学分和 13 个选修学分 (至少选修 1 门全外语授课课程) 的学习任务。跨学科攻读学位研究生需根据导师要求修读 2 门及以上课程, 考核合格后方可参与开题答辩, 成绩不计入成绩单。

课程设置情况见附表 2。

The course is divided into compulsory courses and elective courses. Students must complete 16 compulsory credits and 13 elective credits (at least one all-foreign language course) within the specified time. Graduate students studying for cross-disciplinary degrees are required to take two or more courses according to the requirements of their mentors, and only after they have passed the examination can they participate in the reply to the questions, and the results are not included in the report card.

The curriculum is shown in Attached Table 2.

## 六、培养方式与培养环节 (Training Mode and Cultivating Process)

学术硕士研究生培养实行导师负责制, 鼓励实行以导师负责为主的指导小组 (团队) 制。导师负责制订研究生培养计划, 且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

论文开题是研究生培养过程中开展学位论文工作的首要环节, 需满足以下几点要求:

研究生学位开题之前, 需要对其所修课程进行审核, 当所有课程考核合格, 达到研究生所需学分要求时, 方可申请开题; 研究生撰写学位论文, 必须经过认真的调查研究, 查阅大量的文献资料尤其是外文文献, 了解本人研究方向的历史和现状, 在此基础上确定学位论文研究题目, 并作论文开题报告。

研究生学位论文集体开题, 开题必须经导师审核同意方可进行。学位论文开题专家考核小组 (导师回避), 由本学科或相关学科 5 名专家组成, 实行专家小组评分 (等级)



制度。

研究生不通过开题答辩者可限期重做，两次开题时间间隔不得少于3个月，两次开题均未通过者将中止培养。硕士研究生学位论文开题报告审核通过一年后方可申请送审答辩。

## 2. 中期筛选

(1) 第四学期末，对硕士研究生的思政、科研、实践及综合素质等进行中期检查，检查结果作为第二学年度评奖评优的依据之一。

(2) 中期筛选考核小组确定考核成绩为“合格”者，可以继续完成学位论文；考核成绩为“不合格”者，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。

## 3. 创新创业

参加学术会议并宣读论文，或做公开学术报告不少于2次；参加全国性的科技竞赛、创意设计、创新创业竞赛等；参加6次以上与本学科相关的学术报告，并提交总结。每项记1学分，需完成1学分。

The master's degree program is a mentor system, and a guidance group (team) system based on the mentor is encouraged. The instructor is responsible for formulating the postgraduate cultivating plan and has the responsibility of guiding, demonstrating and supervising the moral character and academic integrity of graduate students.

The cultivating of academic degree graduate students adopts a combination of curriculum learning and scientific research which encourages graduate students to participate in course study and scientific research simultaneously.

### 1. Opening Report

The opening topic of the thesis is the first link to carry out the dissertation work in the process of postgraduate training, which needs to meet the following requirements:

(1) Before the graduate degree begins the question, needs to carry on the examination to its course, when all the courses examination passes, meets the graduate student needs the credit request, can apply for the opening question. After careful investigation and research, graduate students must consult a large number of literature, especially foreign literature, to understand the history and present situation of their research direction, and on this basis to determine the research topic of degree thesis, and make the paper opening report.

(2) Graduate degree thesis collective opening questions, the opening of the topic must be approved by the tutor before it can be carried out. The expert assessment group (tutor avoidance) is composed of 5 experts in this subject or related discipline, and the expert group scoring (grade) system is implemented.

(3) Graduate students who fail to answer questions may be redone within a limited period of time, the interval between opening questions shall not be less than 3 months, and those who



fail to answer questions twice will suspend their training. One year after the examination and approval of the opening report of the master's degree thesis, the application can only be submitted to the defense.

## 2. Interim screening

(1) At the end of the fourth school, the ideological and political research, scientific research, practice and comprehensive quality of graduate students are examined in the interim, and the results are regarded as one of the basis for the evaluation of awards in the second academic year.

(2) If the mid-term screening examination group determines that the examination results are "qualified", can continue to complete the dissertation; those whose assessment results are "unqualified" shall be examined and examined by the training unit and graduate school, and shall be submitted to the president's office for approval and treatment, university will terminate their student status.

## 3. Innovation and entrepreneurship

During graduate study, students should participate in academic conferences and read papers, or make public academic reports not less than twice; participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions; participate in more than 6 academic reports related to the subject, and submit a summary. 1 credit for each item and 1 credits for completion.

## 七、学位论文 Academic Dissertation )

1. 硕士学位论文选题应来源于管理实践，研究问题具体；应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持问题导向，概念清晰、数据来源依据可靠、分析严谨，计算结果正确无误，对研究结论给出良好的管理学诠释。

3. 硕士研究生用于做学位论文的时间，应不少于1年（自硕士论文开题报告考核通过起至硕士论文答辩前）

1. The topic of master's dissertation should be derived from management practice, and the research questions should be specific; it should have systematic and complete research ideas and plans, and should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should highlight innovation, cutting-edge and scientific.

2. The main work of the dissertation must be done independently by the author. The research work must adhere to the problem-oriented, clear concept, reliable data source, rigorous analysis, correct calculation results, and a good management interpretation of the research



conclusions.

3. The time for a master's degree student to use a dissertation should be no less than one year ( before the examination of the master's dissertation opening report and before the master's dissertation defense )

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

### (一) 毕业要求

满足以下条件，可获得毕业证书。

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，成绩考核合格；
3. 通过论文预答辩；
4. 通过学位论文学术不端行为检测；
5. 通过论文评审；
6. 通过论文答辩（答辩是否使用外国语言，由学校确定）；
7. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》《山东理工大学博士学位授予工作实施细则》以及管理学院学位授予有关规定。

#### 1. Graduation requirements

A diploma will be awarded if the following conditions are met.

- (1) Have good moral cultivation and academic ethics, seek truth from facts and have the courage to innovate;
- (2) Completed the courses and other training links stipulated in the training program, and passed the performance assessment;
- (3) Pass thesis pre-defense;
- (4) Pass the detection of academic misconduct of dissertation;
- (5) Pass the paper review;
- (6) Pass the thesis defense ( whether the defense use foreign language is determined by the school ) ;
- (7) Other requirements in line with relevant regulations of the school.

#### 2. Degree requirements

Strictly implement the "Provisional Implementation Measures for the Degree Regulations of the People's Republic of China", "Methods for the Evaluation of Master's Dissertation of Shandong University of Technology", "Implementation Rules for the Grant of Master's Degrees of Shandong University of Technology", and relevant regulations of the Business School.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>掌握本学科前沿, 适当了解其他领域研究成果, 具有广博的科学视野和将不同领域知识相结合的能力; 具备良好的科研写作能力、国内外学术交流能力和解决管理工程领域实际问题的能力, 富有创新和开拓精神; 身心健康。</p> <p>Master the frontiers of this discipline, properly understand the research results in other fields, have a broad scientific vision and the ability to combine knowledge in different fields; have good research writing ability, domestic and international academic communication skills and the ability to solve practical problems in the management engineering field, rich Innovation and pioneering spirit; physical and mental health.</p>	<p>中国特色社会主义理论与实践研究、自然辩证法、研究生英语、口语、论文写作与学术规范、管理研究方法、中国传统文化、科研素养与创新能力。</p> <p>Theoretical and practical research on socialism with Chinese characteristics 、Dialectics of nature ( nature )、graduate English、 oral English, thesis writing and academic norms, management research methods 、Chinese traditional culture 、Scientific literacy and innovative capacity.</p>
综合能力	<p>了解管理科学与工程学科的进展、动向和发展前沿, 掌握管理科学与工程学科的基础理论和系统的专门知识; 具备文献分析、实地调研、数据分析建模和仿真的能力; 能够有效应用管理学、经济学、系统科学、数学、计算机科学与技术等多学科交叉知识和专业技术解决现实问题。</p> <p>Understand the progress, trends and development frontiers of management science and engineering disciplines, master the basic theories and systems expertise of management science and engineering disciplines; have the ability to conduct literature analysis, field research, data analysis modeling and simulation; Multidisciplinary knowledge and expertise in economics, systems science, mathematics, computer science and technology solve practical problems.</p>	<p>数理统计、高级运筹学、决策理论与方法、系统理论与方法、多元统计分析与应用、博弈论、信息系统与信息资源管理、服务科学与管理研究、大数据与商业智能、物流与供应链管理、现代工业工程、管理科学与工程前沿等。</p> <p>Mathematical Statistics 、Advanced Operational Research、 Decision Theory and Methods、 System Theory and System Methods、 Multivariate Statistical Analysis and Application、 Game Theory、 Information Management and Information System、 Big Data and Business Intelligence、 Logistics and Supply Chain Management、 Modern Industrial Engineering、 Frontier Research Report on Discipline of Management Science and Engineering</p>



研究 方向	管理科学 理论方法 应用	<p>掌握管理科学基础理论与方法，灵活运用决策理论与方法、管理博弈、风险管理 and 应急管理 etc. 知识研究管理科学领域的实际问题，在现代管理中的系统工程、预测与决策、管理评价、灾害应急管理等方面，为政府部门、企事业单位提供理论技术支持和政策建议，取得符合培养要求的研究成果。</p> <p>Mastering the management theories and methods suitable for modern production and management, science and technology, economy and society, flexibly apply modern management scientific methods and scientific and technological achievements such as grey system theory, rough set theory, fuzzy mathematics, management game theory and combinatorial optimization theory, clarify and reveal the law of modern organization and management activities, in system engineering, prediction and decision-making, management evaluation, etc. Achieved research results that meet the training requirements.</p>	<p>管理研究方法、高级运筹学、多元统计分析与应用、博弈论、应急管理与决策等。</p> <p>Methodology of Management、Advanced Operational Research、Decision Theory and Methods; System Theory and System Method、Emergency Management and Decision Making</p>
	信息管理 与智能科 学	<p>掌握现代管理与智能科学的理论知识、灵活利用运用复杂网络、数据挖掘、社会计算等技术和方法，在管理信息系统和决策支持系统的设计、信息系统的规划方法和安全机制及评估体系、电子商务与电子政务智能商务模式、数据挖掘与数据分析技术等方面，取得符合培养要求的研究成果。</p> <p>Mastering the theoretical knowledge of modern management and intelligent science, flexibly utilizing the technologies and methods of complex network, data mining and social computing, etc., we have achieved good agreement in the design of management information system and decision support system, the planning method of information system, the security mechanism and evaluation system, the intelligent business model of e-commerce and e-government, data mining and data analysis technology, etc. Research results that meet the requirements of cultivation.</p>	<p>管理研究方法、高级运筹学、数理统计、系统理论与方法、信息系统与信息资源管理、大数据与商业智能。</p> <p>Methodology of Management、Advanced Operational Research、Decision Theory and Methods、System Theory and System Methods、Information Management and Information System、Big Data and Business Intelligence</p>
	物流与供 应链管理	<p>掌握物流与供应链管理理论与技术知识，灵活运用数学模型、复杂网络、智能算法、物流系统规划与分析、经济学等理论与技术方法，在供应链物流系统整合优化、区域物流系统布局优化与物流资源整合、物流配送系统优化、供应链风险等方面，取得符合培养要求的研究成果。</p>	<p>系统理论与方法、物流供应链管理、物流系统工程、大数据与商业智能、应急管理与决策等。</p> <p>System Theory and System Methods、Logistics and Supply Chain Management、Logistics System</p>

	<p>Mastering logistics and supply chain management theory and technical knowledge, flexibly use mathematical models, complex networks, intelligent algorithms, logistics system planning and analysis, economics and other theoretical and technical methods, in the supply chain logistics system integration optimization, regional logistics system layout optimization and logistics resources integration, logistics distribution system optimization, supply chain risk, etc., to achieve compliance with training requirements. Research results.</p>	<p>Engineering、Big Data and Business Intelligence、Emergency Management and Decision Making</p>
工业工程与服务科学	<p>掌握工业工程和服务科学理论知识，灵活运用管理学、工程学、系统科学和计算机科学等多学科交叉的相关知识和专业技术，在复杂组织系统中的实际工程管理与服务管理的系统规划、设计、控制、改善和服务工程质量等方面，取得符合培养要求的研究成果。</p> <p>Mastering the theoretical knowledge of industrial engineering and service science, flexibly using applied statistics, intelligent algorithms, advanced manufacturing technology and methods, etc., we have achieved research results that meet the training requirements in the aspects of system analysis, design and optimization of practical engineering management and service management in complex organizational systems, optimization and operation management of production systems, and quality of service engineering.</p>	<p>系统理论与方法、决策理论与方法、现代工业工程、服务科学与管理、现代质量工程等。</p> <p>System Theory and System Methods、Decision Theory and Methods、Modern Industrial Engineering、Service Science and Management、Modern Quality Engineering</p>
能源工程与管理	<p>掌握管理学、经济学、能源技术与环境科学领域的理论与方法，综合运用工程技术、项目管理、能源技术经济分析等知识为各级政府能源管理部门、大中型能源企业、能源金融机构等单位提供理论支持和政策建议，取得符合培养要求的研究成果。</p> <p>Mastering the theories and methods in the fields of management, economics, energy technology and environmental science, and comprehensively apply knowledge such as engineering technology, project management, and energy technology economic analysis to all levels of government energy management departments, large and medium-sized energy enterprises, energy financial institutions, etc. Provide theoretical support and policy advice to achieve research results that meet the training requirements.</p>	<p>管理研究方法、高级运筹学、能源经济学、能源产业管理、能源与环境系统工程。</p> <p>Methodology of Management、Advanced Operational Research、Energy Economics、Energy industry management、Energy and Environmental Systems Engineering</p>



附表 2: 培养计划 (Training Plan)

学科名称	管理科学与工程 Management Science and Engineering		学科代码	1201	
单位名称	管理学院 Business School		培养类型	学术型研究生 Academic	
学分要求	Total credits $\geq 32$ , course credits $\geq 29$ , required courses credits $\geq 16$ , Elective courses credits $\geq 13$				
课程设置					
课程类型	课程编码	课程名称	学分	学期	备注
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1	必选
	G13101	汉语 Chinese	2	1	
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	2	
学科平台课程 $\geq 11$ 学分	G11003	数理统计 Mathematical Statistics	2	2	必选
	180004	信息系统与信息资源管理 (全英文授课) Information Management and Information System (English)	2	2	
	180002	系统理论与方法 System Theory and System Methods	2	2	
	180003	决策理论与方法 Decision Theory and Methods	2	2	
	180001	高级运筹学 Advanced Operational Research	2	2	
	180008	管理研究方法 Research Methods of Management	2	2	
方向选修课程 $\geq 12$ 学分	180048	现代管理学 Modern Management	2	1	
	180009	多元统计分析与应用 Multivariate Statistical Analysis and Application	2	2	
	180072	博弈论 Game Theory	2	2	
	180073	服务工程与管理研究 Research of Service Engineering and Management	2	2	
	180010	现代工业工程 Modern Industrial Engineering	2	2	

	180011	现代质量工程 Modern Quality Engineering	2	2	
	180012	物流与供应链管理 Logistics and Supply Chain Management	2	2	
	180013	物流系统工程 Logistics System Engineering	2	2	
	180074	应急管理决策（全英文授课） Emergency Management and Decision Making ( English )	2	2	
	180015	知识管理 Knowledge Management	2	2	
	180030	企业资源计划 Enterprise Resource Planning	2	2	
	180017	数据仓库与数据挖掘 Data Warehousing and Data Mining	2	2	
	180025	项目计划与控制 Project Planning and Control	2	2	
	180019	创新管理 Innovation Management	2	2	
	180075	大数据与商业智能 Big Data and Business Intelligence	2	2	
	180021	系统分析建模与仿真 System Modeling and Simulation with Witness	2	2	
	180076	管理科学与工程前沿专题 Frontier Research Report on Discipline of Management Science and Engineering	2	2	
	180077	服务科学与管理 Service Science and Management	2	2	
	180070	能源经济学 Energy Economics	2	2	
	180078	资源与环境系统工程 Resource and Environmental Systems Engineering	2	2	
素养选修课程 ≤1 学分	G31001	中国传统文化 Traditional Culture of China	1	2	
	G02060	科研素养与创新能力 Scientific Literacy and Innovation Capacity	1	2	
	G17070	经济学基础 Foundations of Economics	1	2	



	G05024	计算机科学前沿技术应用系列讲座 The Lectures on the Frontier Technology and Application of the Computer Science	1	2	
	G14010	科技英语写作 Technical English Writing	1	2	
补修课程 不计学分		管理学、运筹学、统计学原理、管理信息系统 Management, Operational Research, Statistical Principles, Management Information System			导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告并通过开题</p> <p>Through literature reading and academic research, the topic selection and research content of the thesis are determined. With the approval of the tutor, the opening report is submitted at the end of the third semester and the opening report is passed.</p>				3
中期考核 (1 学分)	<p>对研究生的思政、科研、实践及综合素质等方面进行综合考核并达到要求</p> <p>Comprehensive assessment of graduate students' ideological and political, scientific research, practice and comprehensive quality and meet the requirements</p>				4-5
创新创业 (1 学分)	<p>1. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>3. 参加 6 次以上与本学科相关的学术报告，并提交总结；</p> <p>每项记 1 学分，需完成 1 学分</p> <p>1. participate in academic conferences and read papers, or make two public academic reports</p> <p>2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions and win awards.</p> <p>3. Participate in more than 6 academic reports related to the subject and submit a summary. Each item is credited with one credit, and one credits are required.</p>				1-5
培养单位 教授委员会主任	朱振中		培养单位 负责人	孙同涛	



# 工商管理学科学术学位硕士研究生培养方案

学科代码：1202

## The Training Program for Academic Master's Degree in Business Administration

Credit Code: 1202

### 一、学科简介 ( Brief Introduction to Discipline )

工商管理学科最早成立于1986年。2005年获得企业管理硕士学位二级学科点授予权，并于2006年招收企业管理硕士研究生，于2010年获得工商管理专业（MBA）学位授权点，2018年获得工商管理一级学科硕士学位授权点。现有师资梯队结构合理，研究面向学科前沿，教学科研水平高，具有可持续发展能力，先后承担了50余项国家级及部级项目，发表论著300余篇，获得12项科研奖励。

本学位授权点遵循学科发展规律，从管理、经济、工学等多学科交叉的角度对企业管理理论和现实问题进行深入研究，形成了特色的企业管理理论研究体系，优势在于教学科研并重，不断强化学术研究，围绕国家、地方重大需求和学科发展前沿，注重为区域经济与企业管理实践提供决策服务与智库支持，学科优势和特色进一步彰显，整体水平进一步提升，产出了一批标志性成果。

The program of business administration was first established in 1986. In 2005, Shandong University of Technology obtained the right to grant the master's degree in business management, and enrolled graduate student of business management in 2006. The university obtained the granting right of Master in Business Administration (MBA) in 2010, and the right to grant the academic master's degree in business administration in 2018. The teaching staff with reasonable structure and high level of teaching and research has undertaken more than 50 national and provincial projects, published more than 300 articles, and won 12 research awards.

This program follows the rule of business administration development, and conducts in-depth research on enterprise management theories and practical problems from multidisciplinary perspectives, which lead to a special research system of enterprise management theory. This program emphasizes both on teaching and research, and constantly strengthens academic research, focus on national and local government major needs, pays attention to providing decision-making services and think tank supports for regional economy



and enterprise management practices. The advantages and characteristics are further highlighted, and the overall level is further improved, then resulting in a number of landmark achievements.

## 二、培养目标 ( Educational Objectives )

本学科培养具有坚实的管理学基础知识，系统掌握全面、扎实的工商管理专业知识和较好地分析问题和解决问题的能力，具有学术研究的基本素养和独立从事工商管理工作的高级人才。具体包括：

1. 专业知识方面：了解工商管理学科的进展、动向和发展前沿，掌握工商管理学科的基础理论和系统的专门知识；解决工商管理学科领域的问题并有新的见解。具备文献调研、资料查询、数据分析和学术交流的能力，并能定性与定量相结合，很好地解决管理实际问题，能够胜任高层次的管理和科学研究工作。

2. 综合素质方面：有健全的人格，能适应我国社会主义经济建设的需要，适应科学研究和技术发展的需要；具有创新能力、实践能力和积极向上的精神面貌；对于本专业的经典著作和国际权威期刊、本领域的研究成果，有全面和深入的掌握，能够独立承担一定的科研任务；掌握一门外国语，熟练地阅读本专业的英文资料。

3. 就业面向：为大中型企业、高等院校、政府机关与科研单位等培养从事工商管理工作的高级人才。

This program cultivates high-level talents with comprehensive and solid professional knowledge, basic accomplishment of academic research and abilities to work independently. Specifically include:

(1) Professional knowledge: Understand the progress, trends and development frontiers of business administration, master the basic theories and systematic specialized knowledge of business administration; can solve new problems in the field and have new insights. Grasping the basic methods of document retrieve and information inquiry, data analysis to solve practical management problems and be competent for high-level management and scientific research.

(2) Comprehensive quality: Having a sound personality, adapt to the needs of Chinese socialist economic construction, scientific research and technological development; Having the ability to innovate and practice; Having comprehensive and in-depth mastery of the classics, international authoritative journals and research results in this field, and can independently undertake certain scientific research tasks; master a foreign language so as to read foreign language materials efficiently.

(3) Employment orientation: To train high-level talents that can be engaged in business management for large and medium-sized enterprises, universities, government agencies and scientific research units.

### 三、研究方向 ( Research Orientation )

工商管理 ( 一级学科 ) 学术学位硕士研究生培养方案设以下 4 个研究方向:

1. 企业管理理论与应用
2. 现代财务与会计
3. 创新创业管理
4. 农业组织与管理

详见附表 1。

Business administration ( first-level discipline ) academic degree postgraduate training program has the following four research directions:

1. Theory and application of enterprise management
2. Modern finance and accounting
3. Innovation and entrepreneurship management
4. Agricultural organization and management

For details see Attached Table 1.

### 四、学习年限 ( Length of Schooling )

学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

在基本学制规定时间内, 研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由, 研究生在基本学制结束前两个月向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告, 并经学位评定分委员会组织审查通过, 报校学位评定委员会办公室审核批准后, 可最多延长申请学位年限 1 年。

It is a three-year program and the study duration is from 2 to 4 years, Scientific research and thesis writing takes no less than one year. ( It shall be calculated from the date when the research proposal is adopted ) . With the approval of the instructor, students can apply for graduation in advance, but the time requirements for scientific research and thesis writing remain the same. The time of suspension is not counted in the length of study.

Graduate students should complete dissertation defense and graduation-related issues within the basic academic system. For academically justified reasons, the graduate student should submit the dissertation progress report and dissertation extension application form to the academic degree evaluation committee two months before the end of the basic academic system. After the approval of the school evaluation committee office, the program can be prolonged for at most one year.



## 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

课程教学实行学分制，研究生在规定的时间内至少应完成不少于 29 学分的学习任务。课程分为必修课和选修课，学生需在规定时间内完成 16 必修学分和 13 选修学分的学习任务。跨学科攻读全日制学术型硕士学位研究生，应补修本领域本科阶段主干课程 2 门及导师指定的其它课程，经考试成绩及格（不计学分），方可申请答辩。

课程设置情况见附表 2。

The course teaching implements a credit system, and graduate students should complete at least 29 credits of study tasks within the prescribed time. The course is divided into compulsory courses and elective courses. Students must complete 16 compulsory credits and 13 elective credits within the specified time. Interdisciplinary students who study for full-time academic master's degree can apply for thesis defense after completing 2 additional major course of this field and other courses designated by the instructor and passing all the test scores ( all additional courses are not counted as credits ) .

The curriculum is shown in Attached Table 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订研究生培养计划，组织开题、中期答辩，指导科学研究和学位论文等工作，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

学术学位研究生的培养采取课程学习和科学研究相结合的方式。鼓励研究生入校即进入课题，课程学习与科学研究同步进行。

### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。

论文开题具体工作参照《山东理工大学关于研究生学位论文工作的有关规定》（鲁理工大办发[2017]5 号）执行。

### 2. 中期筛选

研究生课程学习基本结束后，以研究生培养方案为依据，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习科研情况，及时发现研究生培养过

程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期筛选考核小组确定考核成绩为“合格”者，可以继续完成学位论文；考核成绩为“不合格”者，经所在单位签署意见，研究生院审核，报分管校长批准，终止学籍，做研究生肄业处理。

中期筛选具体工作参照《山东理工大学研究生中期筛选考核实施办法》（研究生函[2015]46号）执行。

### 3. 创新创业

完成下列4项中的1项，即获得创新创业1学分：

进行3个月的出国访学研修或学术交流；参加学术会议并宣读论文，或做公开学术报告2次；参加全国性的科技竞赛、创意设计、创新创业竞赛等；参加6次以上与本学科相关的学术报告，并提交总结。

Tutor system is implemented in the master's degree program, and a guidance group (team) system in charge of tutor is encouraged. The tutor is responsible for formulating the postgraduate cultivating plan, organizing Opening Report, mid-term thesis defense, guiding scientific research and dissertations, and guiding, demonstrating and supervising the moral character and academic integrity of graduate students.

The cultivating of academic degree graduate students adopts a combination of curriculum learning and scientific research which encourages graduate students to participate in course study and scientific research simultaneously.

#### 1. Opening Report

In order to ensure the quality of the dissertation, graduate students should determine the research direction and topic through literature reading and academic survey, and then submit the opening report at the end of the third semester with the consent of the tutor. A group of more than 5 experts in this discipline will review the opening report of the students, and provide revision opinions. Student who doesn't pass the review still have only one chance to do so in a stipulated time, or the student won't gain degree.

The specific procedure of the opening of the thesis should obey "Regulations on the postgraduate dissertations of Shandong University of Technology" (SDUT Office [2017] No. 5).

#### 2. Interim screening

In the fourth semester, after the elementary study of postgraduate courses, based on the postgraduate cultivating plan, the graduates' political thoughts and moral qualities, basic theories and professional knowledge, scientific research innovation, practical ability and health status will be comprehensively evaluated. The purpose is to comprehensively evaluate postgraduate study and research since enrollment, to find out the problems in the process of postgraduate cultivating, to explore ways to solve problems, and to clarify the direction of future efforts. Students whose mid-term screening assessment results are "qualified" can continue to complete the dissertation; if their assessment results are "unqualified", after the consensus of



department and graduate school, university will terminate their student status.

The specific work of the mid-term screening should obey “Implementation Measures for the Mid-term Screening and Assessment of Postgraduate Students of Shandong University of Technology” ( Graduate Letter [2015] No. 4 ( 6 ) .

### 3. Innovation and entrepreneurship

During postgraduate study, students should participate in academic conferences and read papers, or make public academic reports twice; participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions; participate in more than 6 academic reports related to the subject, and submit a summary. 1 credits for innovation and entrepreneurship will be obtained by completing 1 of the following 4 credits:

## 七、学位论文 ( Academic Dissertation )

1. 硕士学位论文选题应来源于管理实践，研究问题具体；应具有系统的、完整的研究思路和计划，应对科技进步和国民经济建设具有较大的理论意义或实用价值，学位论文应突出创新性、前沿性和科学性。

2. 学位论文的主要工作，必须由作者独立完成。研究工作必须坚持问题导向，概念清晰、数据来源依据可靠、分析严谨，计算结果正确无误，对研究结论给出良好的管理学诠释。

3. 硕士研究生用于做学位论文的时间，应不少于 1 年（自硕士论文开题报告考核通过起至硕士论文答辩前）

1. The topic of master's dissertation should be derived from management practice, and the research questions should be specific; it should have systematic and complete research ideas and plans, and should have great theoretical significance or practical value for scientific and technological progress and national economic construction. The dissertation should highlight innovation. , cutting-edge and scientific.

2. The main work of the dissertation must be done independently by the author. The research work must adhere to the problem-oriented, clear concept, reliable data source, rigorous analysis, correct calculation results, and a good management interpretation of the research conclusions.

3. The time for a master's degree student to use a dissertation should be no less than one year ( before the examination of the master's dissertation opening report and before the master's dissertation defense )

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

### (一) 毕业要求

满足以下条件，可获得毕业证书。

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，成绩考核合格；
3. 通过论文预答辩；
4. 通过学位论文学术不端行为检测；
5. 通过论文评审；
6. 通过论文答辩（答辩是否使用外国语言，由学校确定）；
7. 符合学校有关规定的其他要求。

## （二）学位要求

申请人在获得毕业证书的基础上，如满足学位授予标准，可授予学位证书。学术成果的认定参照《山东理工大学研究生申请学位学术成果的基本要求》执行。本规定自 2019 年入学的硕士研究生开始执行。

### 1. Graduation requirements

A diploma will be awarded if the following conditions are met.

- (1) Have good moral cultivation and academic ethics, seek truth from facts and have the courage to innovate;
- (2) Completed the courses and other training links stipulated in the training program, and passed the performance assessment;
- (3) Pass thesis pre-defense;
- (4) Pass the detection of academic misconduct of dissertation;
- (5) Pass the paper review;
- (6) Pass the thesis defense (whether the defense use foreign language is determined by the school);
- (7) Other requirements in line with relevant regulations of the school.

### 2. Degree requirements

On the basis of obtaining the graduation certificate, the applicant may be awarded the diploma if he meets the degree conferring standards. The recognition of academic achievements shall be carried out with reference to the basic requirements of academic achievements for graduate students applying for academic degrees in Shandong University of Technology. This stipulation shall be implemented from the admission of master's students in 2019.



附表 1：研究方向简介（Brief Introduction on Research Orientation）

类别	培养目标	支撑课程
综合素质	<p>有健全的人格，适应科学研究和技术发展的需要；具有创新能力、实践能力和积极向上的精神面貌；对于本专业的经典著作和国际权威期刊、本领域的研究成果，有全面和深入的掌握，能够独立承担一定的科研任务；掌握一门外国语，熟练地阅读本专业的的外文资料。</p> <p>Have a sound personality, scientific research and technological development; have the ability to innovate and practice; have comprehensive and in-depth mastery of the classics, International authoritative journals and research results in this field, and can independently undertake certain scientific research tasks; master a foreign language so as to read foreign materials efficiently.</p>	<p>中国特色社会主义理论与实践研究、自然辩证法、研究生英语、口语、论文写作与学术规范、中国传统文化、科研素养与创新能力、科技英语写作</p> <p>Socialist Theory and Practice Research with Chinese Characteristics、Dialectics of Nature、Postgraduate English、Oral English、Paper Writing and Academic Integrity、Chinese Traditional Culture、Scientific Research Literacy and Innovative Ability、Scientific and Technological English Writing</p>
综合能力	<p>了解工商管理学科的进展、动向和发展前沿，掌握工商管理学科的基础理论和系统的专门知识；解决工商管理学科领域的问题并有新的见解。具备文献调研、资料查询、数据分析和学术交流的能力，并能定性与定量相结合，很好地解决管理实际问题，能够胜任高层次的管理和科学研究工作。</p> <p>Understand the progress, trends and development frontiers of business administration, master the basic theories and systematic specialized knowledge of business administration; can solve new problems in the field and have new insights. Grasping the basic methods of document retrieve and information inquiry, data analysis to solve practical management problems and be competent for high-level management and scientific research.</p>	<p>多元统计分析与应用、数理统计、决策理论与方法、管理研究方法、高级运筹学、经济博弈论、工商管理经典文献选读、工商管理学科前沿、高级管理学、管理思想史、国学智慧与经营管理、计量经济分析</p> <p>Multivariate Statistical Analysis and Application、Mathematical Statistics、Decision-making Theory and Method、Management Research Method、Advanced Operational Research、Economic Game Theory、Selection of Classical Documents of Business Administration、Frontier of Business Administration、Advanced Management、History of Management Thoughts、Intelligence of Traditional Chinese Studies and Management、Econometric Analysis</p>



研究 方向	企业管理理论与应用	<p>掌握经济学、管理学、社会学等理论基础及专业知识，运用定量、定性的研究工具和信息技术方法，通过战略决策与管理、企业制度与组织、人力资源管理、市场营销与品牌管理、创业和企业成长等综合分析，研究企业成长的规律和综合管理机制。研究方向包括战略管理、营销管理与人力资源管理等。</p> <p>Master the theoretical foundations and professional knowledge of economics, management, and sociology, and use quantitative and qualitative research tools and information technology methods, through comprehensive analysis of strategic decision-making and management, enterprise systems and organizations, human resource management, marketing and brand management and entrepreneurship to study the law of corporate growth and comprehensive management mechanisms.</p> <p>Research directions: strategic management, marketing management and human resource management.</p>	<p>企业理论、组织行为理论研究、消费者行为研究、企业战略管理、市场营销理论、人力资源开发与管理</p> <p>Enterprise Theory、Organizational Behavior Theory、Consumer Behavior Research、Enterprise Strategic Management、Marketing Theory、Human Resource Development and Management</p>
	现代财务与会计	<p>掌握经济学、会计、审计、财务管理和工商管理理论基础，熟悉会计学与管理学的定性、定量分析方法，探究如何有效反映、监督与控制组织经济活动，及其财务绩效、财务政策、财务战略和财务安全等问题。研究方向包括会计理论与方法、财务理论与应用、审计理论与方法。</p> <p>Master the theoretical foundations of economics, accounting, auditing, financial management and business administration, familiar with the qualitative and quantitative analysis methods of accounting and financial management, and explore how to effectively reflect, supervise and control organizational economic activities, financial performance, financial policies, financial strategy and financial security issues. Research directions: accounting theory and methods, financial theory and application, and auditing theories and methods.</p>	<p>企业理论、公司治理、财务理论与方法、会计理论与方法、审计理论与方法、管理会计研究、税务研究</p> <p>Enterprise Theory、Corporate Governance、Financial Theory and Method、Accounting Theory and Method、Auditing Theory and Method、Management Accounting Research, Taxation Research</p>
	创新创业管理	<p>掌握工程科学、经济学、管理学等基础理论，利用定性研究和定量研究结合的方法，通过技术和经济可行性分析，研究企业技术发展、技术创新、技术应用和技术扩散的经济与管理问题，以及地区、产业和国家等层面的技术发展、技术创新、投资决策、资源利用与环境保护等问题。研究方向包括技术创新、创业研究等。</p>	<p>企业理论、创业管理、创新管理、技术经济学</p> <p>Enterprise Theory、Entrepreneurship Management、Innovation Management、Technological Economics</p>



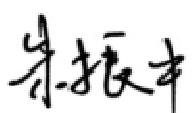

		<p>Master the basic theories of engineering science, economics, management, and use the combination of qualitative research and quantitative research to study the economic and management issues of technological development, technological innovation, technology application and technology diffusion through technical and economic feasibility analysis, technical development, technological innovation, investment decision-making, resource utilization and environmental protection at the regional, industrial and national levels. Research directions: technological innovation and entrepreneurial research.</p>	
	<p>农业组织与管理</p>	<p>掌握经济学、管理学、农学和社会学等基本理论和实践知识，熟悉本专业领域主要研究成果的现状与前沿动态，运用定性或定量方法分析、研究和解决农业组织与管理的理论或现实问题，并展现一定的理论或实践创新能力。研究方向包括农业科技组织与服务、涉农企业管理、农产品营销、农业供应链管理、农业组织管理等。</p> <p>Master basic theoretical and practical knowledge of economics, management, agronomy and sociology, be familiar with the current situation and frontier trends of major research achievements in this field, analyze, study and solve theoretical or practical problems of agricultural organization and management with qualitative or quantitative methods, and demonstrate certain theoretical or practical innovation ability. Research directions: agricultural science and technology organization and service, agriculture-related enterprise management, agricultural product marketing, agricultural supply chain management, agricultural organization management, etc.</p>	<p>企业理论、创新管理、组织理论、经济社会学、农产品电商与互联网技术、农产品市场营销</p> <p>Enterprise Theory、Entrepreneurship Management、Innovation Management、Economic sociology、agricultural products e-commerce and Internet technology、agricultural products marketing</p>

附表 2: 培养计划 (Training Plan)

学科名称	工商管理 Business Administration		学科代码	1202	
单位名称	管理学院 Business School		培养类型	学术型研究生 Academic	
学分要求	课程学分 course credit $\geq$ 29 学分, 必修课程学分 compulsory course credit $\geq$ 16 学分, 选修课程学分 elective course credit $\geq$ 13 学分				
课程 设 置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 5 学分	G13100	中国文化 Chinese Culture	2	1	
	G13101	汉语 Chinese	2	1	
	G15003	论文写作与学术规范 Thesis Writing and Academic	1	2	
学科平台课程 $\geq$ 11 学分	G11003	数理统计 Mathematical Statistics	2	1	必选
	180008	管理研究方法 Research Methodology of Management	2	1	
	180009	多元统计分析与应用 Multivariate Statistical Analysis and Application	2	2	
	180003	决策理论与方法 Theory and Methodology of Decision	2	2	
	180001	高级运筹学 Advanced Operational Research	2	2	
	180006	高级管理学 Advanced Management	2	2	
方向选修课程 $\geq$ 12 学分	180046	工商管理经典文献选读 Selected Classical Literature Study of Management	2	2	
	180047	工商管理学科前沿 Subject Frontiers Of Management	2	2	
	180059	企业理论 Theory of Firm	2	2	
	180081	管理思想史 History of Management Thought	2	2	
	180033	国学智慧与经营管理 Traditional Chinese Wisdom and Business Management	2	2	



	180034	计量经济分析 Econometric Analysis	2	2	
	180061	经济博弈论 Economic Game Theory	2	2	
	180062	组织行为理论研究 Research on Organizational Behavior Theory	2	2	
	180036	消费者行为研究 Consumer Behavior Research	2	2	
	180037	企业战略管理 Strategic Management of Enterprise	2	2	
	180063	市场营销理论 Marketing Theory	2	2	
	180039	人力资源开发与管理 Human Resource Development and Management	2	2	
	180041	公司治理 Corporate Governance	2	2	
	180043	财务理论与研究方法 Financial theory and research methods	2	2	
	180042	会计理论与实证研究 Accounting theory and empirical research	2	2	
	180064	审计理论与方法 Auditing Theory and Methodology	2	2	
	180065	管理会计研究 Research of Management Accounting	2	2	
	180066	税务研究 Research of Taxation	2	2	
	180045	创业管理 Entrepreneurial Management	2	2	
	180019	创新管理 Innovation Management	2	2	
	180067	经济社会学 Economic sociology	2	2	
	180068	农产品电商与互联网技术 Agricultural products e-commerce and Internet technology	2	2	
	180069	农产品市场营销 Agricultural products marketing	2	2	
素养选修课程 ≤1 学分	G31001	中国传统文化 Chinese Traditional Culture	2	2	
	G02060	科研素养与创新能力 Scientific Research Literacy and Innovation Ability	2	2	

	G14010	科技英语写作 Scientific English Writing	2	2	
补修课程 不计学分		管理学原理 Principles of Management	2	2	导师 确定
		基础会计 Fundamental Accounting	2	2	
		技术经济学 Technological Economics	2	2	
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。评审合格记 1 学分。</p> <p>A assessment panel composed of more than five experts will evaluate the opening report made by the students.</p> <p>Student can get 1 credit after passing the examination by tutor.</p>				3
中期考核 (1 学分)	<p>以研究生培养方案为依据，在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。考核合格记 1 学分。</p> <p>In the fourth semester, comprehensively assess the postgraduates' political thoughts and moral qualities, basic theory and professional knowledge, scientific research innovation, practical ability and health status based on the postgraduate training plans.</p> <p>Student can get 1 credit after passing the examination by tutor.</p>				4-5
创新创业 (1 学分)	<p>1. 进行 3 个月以上的出国访学研修或学术交流；</p> <p>2. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>3. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>4. 参加 6 次以上与本学科相关的学术报告，并提交总结；</p> <p>每项记 1 学分，需完成 2 学分。</p> <p>1. Conduct overseas study or academic exchanges for more than 3 months</p> <p>2. Participate in academic conferences and read papers, or make public academic reports twice;</p> <p>3. Win awards in national science and technology competitions, creative design, innovation and entrepreneurship competitions;</p> <p>4. Participate in 6 academic reports related to the subject and submit a summary;</p> <p>1 credit for each qualification, total 1 credits required.</p>				1-5
培养单位 教授委员会主任			培养单位 负责人		



# 中国语言文学学科学术学位硕士研究生培养方案

学科代码：0501

## Chinese Language and Literature Subject Academic Master's Degree Training Program

Credit Code: 0501

### 一、学科简介 ( Brief Introduction to Discipline )

本学科于 2007 年开始招收文艺学专业硕士研究生，2011 年获得中国语言文学一级学科硕士学位授予权。2013 年中国语言文学专业成为学校重点建设的一级学科和山东省应用型人才培养特色名校重点建设专业。学科现有专任教师 40 人，其中研究生指导教师 22 人，教授 11 人，副教授 16 人，讲师 13 人，具有博士学位 26 人，硕士学位 13 人，省级学术骨干 1 人，山东省签约评论家 1 人，山东省中国语言文学类专业教学指导委员会委员 1 人。近 5 年，本学科教师主持国家社科基金项目 12 项，省部级项目 18 项，出版学术著作 16 部，发表高水平学术论文 400 余篇，获得省级科研奖励 11 项。

学科已培养外国留学生 8 人，毕业生就业前景良好，主要去向为：考取博士研究生，从事汉语教学、翻译、科研、文化交流、管理及其他社会工作。学科重视培养留学生对中国文化学习和研究的兴趣，鼓励留学生参加学术会议，拓展学术视野，把握学术前沿。经过十几年的发展，学科现有戏曲戏剧学山东省重点学科，山东作家研究所、山东省齐文化研究基地、山东理工大学戏曲文艺研究所等研究机构，已形成多个方向稳定、特色鲜明、结构合理、科研成果较为显著的学术团队。学科的文学理论研究、“，毕后”作家研究和山东作家研究、中国经学史研究、齐文化文献研究等具有前沿性，在国内学界已产生较大影响。

This discipline began to enroll master's degree students majoring in literature and art in 2007, and obtained the right to confer master's degree in first-level discipline of Chinese language and literature in 2011. In 2013, the major of Chinese language and literature became a first-class discipline under the key construction of the university and a key construction major of famous universities of Shandong province featuring application-oriented talents cultivation. The discipline now has 40 full-time teachers, including 22 graduate tutors, 11 professors, 16

associate professors, 13 lecturers, 26 doctors' degrees, 13 masters' degrees, 1 provincial academic backbone, 1 signed critic of Shandong province, and 1 member of Shandong provincial teaching steering committee of Chinese language and literature major. In recent five years, teachers of this discipline have presided over 12 national social science foundation projects, 18 provincial and ministerial projects, published 16 academic works, published more than 400 high-level academic papers, and won 11 provincial scientific research awards.

The discipline has trained 8 foreign students, and the graduates have good employment prospects. The main direction of the graduates is to be doctoral candidates, engaged in Chinese language teaching, translation, scientific research, cultural exchange, management and other social work. The discipline attaches great importance to cultivating international students' interest in Chinese culture study and research, and encourages them to attend academic conferences, expand their academic vision and grasp the academic frontier. After more than ten years of development, the discipline of drama and drama in Shandong province, Shandong writer's research institute, Shandong qi culture research base, Shandong University of science and technology drama and art research institute and other research institutions, has formed a stable direction, distinctive features, reasonable structure, scientific research achievements are more significant academic team. The research on literary theory, "post-70s" writers, Shandong writers, the history of Chinese classics, and Qi culture literature of the discipline has a leading edge, which has exerted a great influence on the domestic academic circle.

## 二、培养目标 ( Educational Objectives )

立足中华文化的海外传播与文化交流，促进中外社会经济和文化发展，培养具备高水平综合素质的中国语言文学高层次专业人才。

1. 热爱中国文化，知华友华爱华；具有社会责任感，遵纪守法，品德良好，身心健康；愿意服务经济社会和文化发展。

2. 具有良好的学风和严谨的治学态度，恪守学术规范；具备较好的语言和文学素养，对中国历史文化有比较全面的了解；了解本学科的进展、动向和发展前沿，掌握本学科的基础理论、系统的专业知识和研究方法。

3. 掌握现代信息技术、教育技术，并熟练地掌握汉语，能够阅读本专业的汉语资料，具有较好地运用汉语写作和学术交流的能力。

4. 具备运用所学知识独立从事学术研究和解决实际问题的能力，具有较强的写作能力，能胜任汉语教学、翻译、科研、文化交流、新闻出版、管理及其他社会工作。

Based on the overseas dissemination of Chinese culture and cultural exchanges, promote the social, economic and cultural development at home and abroad, and cultivate high-level professional talents with high-level comprehensive quality of Chinese language and literature.

1. Love Chinese culture, know Chinese, friendly Chinese; Have a sense of social



responsibility, law-abiding, good moral character, physical and mental health; willing to serve economic, social and cultural development.

2. Have a good style of study and a rigorous academic attitude, abide by academic norms; Have good language and literature literacy, have a relatively comprehensive understanding of Chinese history and culture; understand the progress, trend and development frontier of this discipline, master the basic theory, systematic professional knowledge and research methods of this discipline.

3. Master modern information technology and education technology, and master Chinese proficiently. Be able to read Chinese materials of this major, and have the ability to use Chinese writing and academic communication well.

4. Have the ability to independently engage in academic research and solve practical problems with what I have learned, have strong writing ability, and be competent for Chinese teaching, translation, scientific research, cultural communication, press and publication, management and other social work.

### 三、研究方向 ( Research Orientation )

中国语言文学（一级学科）学术学位硕士研究生培养方案设以下 6 个研究方向：

1. 文艺学
2. 语言学及应用语言学
3. 中国古代文学
4. 中国现当代文学
5. 中国古典文献学
6. 比较文学与世界文学

研究方向简介详见附表 1。

The training program of academic master's degree in Chinese language and literature (first-level discipline) has the following six research directions:

1. Theory of literature and art
2. Linguistics and applied linguistics
3. Chinese Ancient literature
4. Modern and contemporary Chinese literature
5. Chinese classical philology
6. Comparative literature and world literature

Please refer to appendix 1 for brief introduction of research direction.

### 四、学习年限 ( Length of Schooling )

全日制学术学位硕士研究生（国际学生）的基本学制为 3 年，学习年限一般为 2-4



年（含学位论文答辩时间），科学研究和论文撰写时间不少于 1 年（从开题报告通过之日开始计算）。少数品学兼优的留学生经导师同意，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The basic length of schooling for full-time academic master's degree candidates (international students) is 3 years, and the length of study is generally 2-4 years (including the time for dissertation defense), and the time for scientific research and thesis writing is not less than 1 year (calculated from the date of the proposal adoption). A small number of excellent students can apply for early graduation with the approval of their tutors, but the time requirements for scientific research and thesis writing remain unchanged. Time off from school is not included in the number of years of study.

## 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程教学实行学分制。课程包括必修课程和选修课程，留学生需在规定时间内完成不低于 29 学分的课程学分，其中，必修课不低于 16 学分，选修课不低于 13 学分。

跨专业留学生应根据导师要求补修 2 门及以上本专业的本科生课程。补修课程考试成绩合格方可申请学位答辩，不计学分。

课程设置详见附表 2。

Credit system is adopted in curriculum teaching. The courses include compulsory courses and elective courses. International students should complete no less than 29 course credits within the prescribed time, including no less than 16 compulsory courses and no less than 13 elective courses.

International students with different majors should take 2 or more undergraduate courses according to the requirements of their tutors. Applicants who pass the examination of supplementary courses may apply for the degree defense without credit.

Please refer to schedule 2 for the curriculum.

## 六、培养方式与培养环节 (Training Mode and Cultivating Process)

留学生培养实行导师负责制，鼓励实行以导师负责为主的指导小组（团队）制。导师负责制订留学生培养计划，指导科学研究、实习实践和学位论文等工作，且对留学生的思想品德、学术道德有引导、示范和监督的责任。

留学生须严格按照培养环节要求开展学习、研究和实践，导师（或指导小组）需加强对培养环节的管理和监控。

### 1. 开题报告

留学生在导师的指导下，通过文献阅读、学术调研，确定论文选题和研究内容，在



第三学期末写出开题报告，经导师同意后交由本研究方向的导师组织预开题。预开题通过后，由本学科专业 5 人及以上专家组成评审小组对留学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。

## 2. 中期筛选

留学生课程学习结束后，以留学生培养方案为依据，对留学生的道德品质、基础理论、专业知识、科研创新、实践能力及健康状况等进行综合考核。考核的目的是总结评价留学生入学以来的学习科研情况，及时发现留学生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期考核小组确定考核成绩为“不合格”的留学生，经学院、研究生院审核，报校长办公会批准，终止学籍，做留学生肄业处理。

## 3. 实习实践

教学实践：参与助课、辅导，协助指导毕业设计、课程设计和实习等。教学实践时间累计不少于 1 个月的工作量。

专业实践：参与导师科研项目、实习基地、协作单位的研究和实践活动；参加社会调查、组织会议、新闻编辑、文化宣传和社会管理等活动。专业实践时间累计不少于 1 个月（一般可以利用寒、暑假）。

## 4. 创新创业

进行 3 个月的出国访学研修或学术交流；参加学术会议并宣读论文，或做公开学术报告 2 次；参加全国性的汉语竞赛、创意设计、创新创业竞赛等；参加 6 次以上与本学科相关的学术报告，并提交总结。

实习实践由导师写出考核评语，学院审核，考核合格即获得相应学分。

The system of tutor responsibility is adopted in the cultivation of overseas students, and the guidance group (team) system with the supervisor as the main responsibility is encouraged. The tutor is responsible for formulating the training plan for overseas students, guiding scientific research, practice and academic thesis, and has the responsibility of guiding, demonstrating and supervising the ideology, moral character and academic ethics of overseas students.

International students should study, research and practice in strict accordance with the requirements of the training process. Tutors (or steering groups) should strengthen the management and monitoring of the training process.

### 1. Opening report

Under the guidance of the tutor, the international students shall determine the topic selection and research content of the thesis through literature reading and academic research, and write the proposal report at the end of the third semester. After the approval of the tutor, the thesis proposal will be organized by the tutor of the research direction. After the pre-proposal is

approved, an evaluation team composed of 5 or more experts of the discipline will review the proposal report made by overseas students, and put forward evaluation and modification Suggestions. Those who fail the proposal may redo it within a time limit, and those who fail the proposal will be terminated.

## 2. Mid-term filter

After the completion of the course, the students' moral quality, basic theory, professional knowledge, scientific research innovation, practical ability and health status are comprehensively assessed on the basis of the overseas students' training program. The purpose of the assessment is to summarize and evaluate the study and scientific research situation of overseas students since their enrollment, find out the problems existing in the training process of overseas students in time, discuss the ways to solve the problems, and clarify the direction of future efforts. The mid-term assessment team determines that the assessment result is "unqualified" for overseas students, which shall be reviewed by the college and graduate school, and approved by the President's office. The student's status shall be terminated, and the student shall be completed.

## 3. Practice

Teaching practice: take part in helping classes, tutoring, assisting and guiding graduation design, curriculum design and practice, etc. The cumulative teaching practice time shall not be less than 1 month's workload.

Professional practice: participate in the research and practice activities of the tutor's scientific research projects, internship bases and cooperative units; To participate in activities such as social investigation, organizing conferences, news editing, cultural publicity and social management. The cumulative time of professional practice is not less than 1 month (generally can use the cold and summer vacation).

## 4. Innovation and entrepreneurship

3 months overseas study or academic exchange; Attend academic conferences and read papers, or make public academic reports twice; Participate in national Chinese language competition, creative design competition, innovation and entrepreneurship competition, etc. Participate in academic reports related to the subject more than 6 times and submit summaries.

The internship is evaluated by the tutor, reviewed by the college, and the relevant credits will be obtained if the student passes the assessment.

## 七、学位论文 Academic Dissertation )

中国语言文学学科学术学位硕士研究生学位论文要求如下：

1. 学位论文应在导师指导下由留学生独立完成。
2. 学位论文工作的一般程序为：文献阅读、调研、开题报告、理论分析、科学研究、论文撰写、论文送审和论文答辩。
3. 学位论文应理论联系实际，内容充实、观点明确、逻辑清晰、表达准确、格式规



范。论文结构包括：题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。

4. 学位论文对所研究的课题应在理论分析，文献发掘，知识应用与指导实践等环节具有一定的创新性，提出一定的新见解。

5. 学位论文应具有一定的深度和前沿性，应反映出作者对基础理论和专门知识的掌握情况，反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。

6. 学位论文严格按照《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》等相关文件执行。

The requirements for a academic master's degree dissertation in Chinese language and literature are as follows:

1. The dissertation should be completed independently by overseas students under the guidance of the tutor.

2. The general procedures of dissertation work are: literature reading, research, proposal report, theoretical analysis, scientific research, thesis writing, submission and defense.

3. The dissertation should combine theory with practice, with substantial content, clear views, clear logic, accurate expression and standard format. The structure of the paper includes: title, Chinese and English abstract, contents, text, references, acknowledgements, research results, appendices, etc.

4. The dissertation should be innovative in the aspects of theoretical analysis, document discovery, knowledge application and guiding practice, and put forward some new ideas.

5. The degree thesis should be of certain depth and frontier, which should reflect the author's mastery of basic theories and specialized knowledge, and reflect the author's ability to comprehensively apply relevant theories, methods and means to solve theoretical and practical problems.

6. The dissertation shall be executed in strict accordance with the relevant documents such as "methods for the evaluation of master's dissertation of Shandong University of Technology" and "detailed rules for the implementation of the awarding of master's degree of Shandong University of Technology".

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

留学生修满规定学分，通过论文答辩，并符合学校规定的其他毕业要求者，则准予毕业，并颁发硕士毕业证书；在获得硕士毕业证书的基础上，如达到学校规定的学术成果要求，满足学校制定的硕士学位授予标准，经学院学位评定分委员会审核，报学校学位评定委员会审议通过后可授予硕士学位，并颁发硕士学位证书。

### (一) 毕业要求

满足以下条件，可获得毕业证书。

1. 热爱中国文化，知华友华爱华，具有社会责任感，身心健康。
2. 具有良好的品德修养和学术道德，实事求是，勇于创新。
3. 修读完培养方案规定课程和其他培养环节，成绩考核合格。
4. 完成论文答辩，成绩合格。
5. 符合国家和学校有关规定的其他要求。

## （二）学位要求

在获得毕业证书的基础上，留学生必须满足学术成果要求，达到学位授予标准，方可授予硕士学位证书。

学术成果要求：撰写一篇能够达到在学术期刊上发表水平的、与学位论文内容相关的学术论文。

International students who have completed the required credits, passed the thesis defense, and met other requirements for graduation stipulated by the university will be allowed to graduate, and the master's degree certificate will be issued. On the basis of obtaining the master's diploma, if it meets the requirements of academic achievements stipulated by the school and meets the standards for awarding master's degree set by the school, the master's degree can be awarded and the master's degree certificate can be issued after the examination and approval of the academic degree evaluation sub-committee of the school and the examination and approval of the academic degree evaluation committee of the school.

### 1. Graduation requirements

If you meet the following requirements, you can obtain a diploma.

(1) Love Chinese culture, know China love China, have a sense of social responsibility, physical and mental health.

(2) Have good moral cultivation and academic ethics, seek truth from facts and have the courage to innovate.

(3) Have completed the courses and other training links stipulated in the training program, and have passed the examination.

(4) Completed the thesis defense with qualified results.

(5) Meet other requirements stipulated by the state and the school.

### 2. Degree requirements

On the basis of obtaining the diploma, international students must meet the requirements of academic achievement

Only after the standards for conferring academic degrees can the master's degree certificate is conferred.

Academic achievement requirements: write an academic paper that can reach the level of publication in academic journals and is related to the content of the dissertation.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>热爱中国文化, 崇尚科学精神, 恪守学术道德规范。对中国语言文学的历史和现状有比较全面的了解。具有良好的专业意识和学术潜力, 能比较准确地理解本学科经典文献, 具备独立收集、阅读相关资料, 并完成相关学术研究的基本素质。积极为社会服务, 能胜任汉语教学、翻译、科研、文化交流、新闻出版、管理及其他社会工作。</p> <p>Love Chinese culture, advocate scientific spirit, abides by academic ethics. Have a comprehensive understanding of the history and current situation of Chinese language and literature. With good professional awareness and academic potential, I can understand the classic literature of this discipline accurately, and have the basic quality to collect and read relevant materials independently and complete relevant academic research. Actively serve the society, be competent for Chinese language teaching, translation, scientific research, cultural exchange, press and publication, management and other social work.</p>	<p>中国文化、汉语、论文写作与学术规范、文献检索、国学经典导读、中国古代文论经典导读、中国语言学经典导读、经典作家作品研究、中国古代作家作品研究</p> <p>Chinese culture、Chinese language、thesis writing and academic norms、literature retrieval、introduction to classical sinology、introduction to classical Chinese literary theory、introduction to classical Chinese linguistics、research on works of classical writers、research on works of ancient Chinese writers</p>
综合能力	<p>具有较好的汉语书面和口头表达能力, 及运用汉语收集阅读本学科资料的能力; 具备较好的专业学习、知识获取和文献收集整理能力; 能够运用恰当的研究方法, 独立从事相关学术研究并形成有价值的研究成果。具有较好的问题意识和解决实际问题的能力, 并将这些能力运用到汉语教学、文化交流、新闻出版和现代传媒的相关工作中。熟练掌握本学科研究领域所需的现代信息技术。</p> <p>Good written and oral Chinese skills, and the ability to collect and read materials in Chinese; Good professional learning, knowledge acquisition and literature collection ability; Able to use appropriate research methods, independently engage in relevant academic research and form valuable research results. Have a good problem awareness and ability to solve practical problems, and apply these skills to Chinese language teaching, cultural communication, news publishing and modern media. Proficient in the modern information technology required by the research field of this discipline.</p>	<p>人文科学研究方法论、语言文学前沿、20 世纪中国学术思潮研究、文学批评理论与实践、中国语言学史、目录版本学专题、中国古代文艺思潮、文化视野中的中国现当代文学研究、中西比较文学研究</p> <p>Methodology of humanities research、frontier of language and literature、research on Chinese academic trends in the 20th century、theory and practice of literary criticism、history of Chinese linguistics、special topics of catalogue and edition、Chinese ancient literary trends、research on Chinese modern and contemporary literature in the cultural perspective、and research on Chinese comparative literature</p>

研究 方向	文艺学	<p>掌握文艺学基础理论和系统的专业知识，熟悉中外文艺思想史及美学发展脉络，了解学科发展动态和最新成果。具有开阔的理论视野、较强的理论思维能力、阅读专业文献的能力，能够准确理解本学科经典文献。把握文艺理论研究的主要方法，学会独立运用所学专业知从事文艺理论研究和文艺批评实践。</p> <p>Master the basic theory and systematic professional knowledge of literature and art, familiar with the history of Chinese and foreign thoughts of literature and art and the development of aesthetics, understand the development trend of the discipline and the latest achievements. With a broad theoretical vision, strong theoretical thinking ability, the ability to read professional literature, can accurately understand the classic literature of this discipline. Grasp the main methods of literary and art theory research, learn to independently use the professional knowledge to engage in literary and art theory research and literary criticism practice.</p>	<p>中国古代文论经典导读、文艺美学专题、西方文论专题、美学前沿专题、中国古典文论专题、比较诗学专题</p> <p>Guide to the Classics of Ancient Chinese Literature、Western Literary Theories Topics、Topic on Frontier Aesthetics、Literary and Aesthetic Topics、Chinese Classical Literature Topic、Research on the Comparative Literary Theories</p>
	语言学及应用语言学	<p>掌握扎实的语言学及应用语言学的基础理论和系统的专业知识，以中国境内语言为研究重点，侧重于语言应用理论与语言现实的结合，涉及语言政策、语言规范、语言教育、语言的社会分析、文化诠释，以及语言文字的计算机应用等领域。了解语言学的现代理论和研究方法，具备语言材料分析、规律概括、现象解释的学术研究能力，以及对不同语言现象进行观察、研究和对比分析的能力。</p> <p>Solid grasp of the basic theory of linguistics and applied linguistics and the system of professional knowledge, language as the research focus in the territory of China, focuses on the combination of the theory of language application and language reality, involves language, language specification, language education policy, social analysis, cultural interpretation, as well as the language of computer application, etc. Understand modern theories and research methods of linguistics, have the academic research ability of analyzing language materials, summarizing laws and explaining phenomena, as well as the ability of observing, studying and comparing different language phenomena.</p>	<p>中国语言学经典导读、中国语言学史、现代语言学理论与方法、对外汉语教学研究、对比语言学、词汇语义学与词典学、汉语语法学</p> <p>Guide to Chinese Linguistic Classics、Research on Teaching Chinese as a Foreign Language、Modern Linguistics Theories and Methods、Contrastive Linguistics、Chinese Linguistics History、Lexical Semantics and Lexicography、Chinese Grammatical Study</p>



<p>中国古典 文献学</p>	<p>掌握文献学与文化学基本理论，了解中国传统学术的基本内容与研究方法，把握本学科研究与发展动态。具有较好的检索和阅读古籍文献的能力，挖掘地方文献与地域文化资源，突出齐文化研究特色，学会从文献入手研究地域文化与传统文化，从文化研究的角度阐释古典文献。加强文史哲领域跨学科研究，关注地方文化建设。</p> <p>Master the basic theories of philology and culture logy, understand the basic contents and research methods of traditional Chinese academic studies, and grasp the research and development trends of this discipline. I have a good ability to search and read ancient books and literature, excavate local literature and regional cultural resources, highlight the research characteristics of Qi culture, learn to study regional culture and traditional culture from the literature, and interpret classical literature from the perspective of cultural research. We will strengthen interdisciplinary research in the fields of literature, history and philosophy, and focus on local cultural development.</p>	<p>国学经典导读、中国经学史、齐文化研究、《管子》研究、目录版本学专题、音韵训诂专题、中国文献典籍传播与研究</p> <p>Introduction to Classical Chinese Studies、 History of Chinese Confucian Classics、 Research on Qi Culture、 Catalog Edition Topic、 Research on Guanzi 、 Phonological Exegetics Topic 、 Chinese Classical, Literature and Philology Dissemination and Research</p>
<p>中国古代 文学</p>	<p>掌握中国古代文学理论基础、系统的专业知识和研究方法，了解中国古代的文学现象、文学流派、文学思想、代表作家作品、文学传统、文学发展的规律，以及文学与中国传统思想的关系等。能够运用各种文学批评和文学史方法，从事各体文学研究、文学思想研究和中国古代文学批评。深入了解中国古典戏曲表演、创作、理论、鉴赏等方面的基本知识，具有运用戏剧审美理论对戏曲作品进行理论分析和研究的能力。</p> <p>Master the theoretical basis, systematic professional knowledge and research methods of ancient Chinese literature, understand the literary phenomena, literary schools, literary thoughts, works of representative writers, literary traditions, laws of literary development, and the relationship between literature and traditional Chinese thoughts. Able to use a variety of literary criticism and literary history methods, engaged in various literary research, literary thought research and ancient Chinese literary criticism. In-depth understanding of the basic knowledge of Chinese classical opera performance, creation, theory, appreciation and other aspects, with the ability to use the aesthetic theory of drama to carry out theoretical analysis and research on opera works.</p>	<p>中国古代作家作品研究、中国古代小说与文化、中国古代文体研究、中国古代文艺思潮、中国戏曲史论、中外戏剧比较、戏剧审美理论与实践</p> <p>Research on the Works of Ancient Chinese Writers</p> <p>Ancient Chinese Novels and Culture、 Ancient Chinese Literature Style Research、 Ancient Chinese Literary Thought、 History of Chinese Opera、 Comparison of Chinese and Foreign Dramas 、 Aesthetic Theory and Practice of Dramas</p>



中国现当代文学	<p>掌握中国现当代文学理论基础和系统的专业知识。具有全面的中国现当代文学史、中国古代文学史、外国文学史以及扎实的文艺理论知识；了解学科发展动态和最新成果，把握现代以来的文学思潮、文学流派、作家群体、经典作家作品和文学风格的嬗变，以及各文体的理论批评和研究等。具备独立从事学术研究的能力。</p> <p>Master the theoretical basis and systematic professional knowledge of modern and contemporary Chinese literature. With a comprehensive history of modern and contemporary Chinese literature, ancient Chinese literature, foreign literature and solid theoretical knowledge of literature and art; Understand the development trend of the subject and the latest achievements, grasp the evolution of modern literary trends, literary schools, writer groups, classic works and literary styles, as well as theoretical criticism and research of each style. Ability to independently engage in academic research.</p>	<p>经典作家作品研究、文化视野中的中国现当代文学研究、中国当代小说美学、山东作家研究、“中国后”作家研究专题</p> <p>Classical Writers and Works Research、Research of Modern and Contemporary Chinese Literature from the Perspective of Culture、Aesthetics of Contemporary Chinese Novels、Research on Shandong Writers、Research of Post-70s Writers</p>
比较文学与世界文学	<p>掌握系统的比较文学理论知识和丰富的中外文学知识，具有良好的中外文学功底、较开阔的文学视野，及跨国别、跨文化的学术视角和自觉的跨文化对话意识，在比较视野中对中国文学有更好的理解与把握。能够较熟练阅读汉语文献，并能用汉语准确地表达自己的学术观点。熟悉比较文学的基本原理和方法，以比较的方法开展国别文学研究。</p> <p>Master systematic theoretical knowledge of comparative literature and abundant knowledge of Chinese and foreign literature, have a good foundation of Chinese and foreign literature, a broader literary vision, as well as a cross-national and cross-cultural academic perspective and a conscious awareness of cross-cultural dialogue, and have a better understanding and grasp of Chinese literature in the comparative perspective. Proficient in reading Chinese literature, and able to express their academic views accurately in Chinese. Be familiar with the basic principles and methods of comparative literature, and carry out research on literature of different countries by means of comparison.</p>	<p>20世纪英美小说研究、中西美学比较研究、现当代英美文学专题、比较文学概论、中西比较文学研究</p> <p>Research on 20th Century British and American Fiction、Comparative Research of Chinese and Western Aesthetics、Modern and Contemporary British and American Literature、Chinese and Western Comparative Literature Research、Introduction To Comparative Literature</p>



**附表 2: 培养计划 (Training Plan)**

学科名称	中国语言文学 Chinese Language and Literature		学科代码	0501	
单位名称	文学与新闻传播学院 School of Literature and Journalism		培养类型	学术学位硕士 Master of Academic Degree	
学分要求	总学分 Total Credits: 32 分; 必修课程学分 Credit for Compulsive Course: 16 学分; 选修课程学分 Credit for Optional Course: 13 学分				
课程 设置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 ≥5 学分	G13100	中国文化 Chinese Culture	2	1	必选
	G13101	汉语 Chinese	2	1	
	G14001	论文写作与学术规范 Thesis Writing and Academic Norms	1	1	
学科平台课程 ≥11 学分	130033	文献检索 Document Retrieval	1	1	必选
	130022	人文学科研究方法论 (全英文) Humanities Subject Research Methodology	3	1	
	130001	语言文学前沿 Frontier of Language and Literature	3	2	
	130012	20 世纪中国学术思潮研究 Research on Chinese Academic Ideological Trends in the 20th Century	2	2	
	130007	文学批评理论与实践 Theory and Practice of Literary Criticism	2	2	
方向选修课程 ≥13 学分	130036	中国古代文论经典导读 Guide to the Classics of Ancient Chinese Literature	2.5	1	文艺学 方向
	130005	西方文论专题 Western Literary Theories Topics	2	2	
	130009	美学前沿专题 Topic on Frontier Aesthetics	2	2	
	130008	文艺美学专题 Literary and Aesthetic Topics	2	2	
	130002	中国古典文论专题 Chinese Classical Literature Topic	2	2	

	130003	比较诗学专题 Research on the Comparative Literary Theories	2	1	
	130037	中国语言学经典导读 Guide to Chinese Linguistic Classics	2.5	1	语言学 及应用 语言学 方向
	130060	对外汉语教学研究 Research on Teaching Chinese as a Foreign Language	2	2	
	130054	现代语言学理论与方法 Modern Linguistics Theories and Methods	2	1	
	130055	对比语言学 Contrastive Linguistics	2	2	
	130006	中国语言学史 Chinese Linguistics History	2	2	
	130016	词汇语义学与词典学 Lexical Semantics and Lexicography	2	2	
	130011	汉语语法学 Chinese Grammatical Study	2	2	
	130017	国学经典导读 Introduction to Classical Chinese Studies	2.5	2	
	130040	目录版本学专题 Catalog Edition Topic	2	1	
	130046	中国经学史 History of Chinese Confucian Classics	2	1	
	130027	齐文化研究 Research on Qi Culture	2	1	
	130014	《管子》研究 Research on Guanzi	2	2	
	130050	中国文献典籍传播与研究 Chinese Classical Literature and Philology Dissemination and Research	2	2	
	130053	音韵训诂专题 Phonological Exegetics Topic	2.5	2	
	130039	中国古代作家作品研究 Research on the Works of Ancient Chinese Writers	2	1	中国古 代文学 方向
	130035	中国古代小说与文化 Ancient Chinese Novels and Culture	2	1	
	130013	中国古代文体研究 Ancient Chinese Literature Style Research	2	2	



	130004	中国古代文艺思潮 Ancient Chinese Literary Thought	2	2	
	130020	中国戏曲史论 History of Chinese Opera	2	1	
	130023	中外戏剧比较 Comparison of Chinese and Foreign Dramas	2	2	
	130024	戏剧审美理论与实践 Aesthetic Theory and Practice of Dramas	2	2	
	130021	经典作家作品研究 Classical Writers and Works Research	2.5	1	中国现 当代文 学方向
	130049	文化视野中的中国现当代文学研究 Research of Modern and Contemporary Chinese Literature from the Perspective of Culture	2	1	
	130025	中国当代小说美学 Aesthetics of Contemporary Chinese Novels	2	2	
	130048	山东作家研究 Research on Shandong Writers	2	2	
	130028	“70后”作家研究专题 Research of Post-70s Writers	2	2	
	130029	20世纪英美小说研究 Research on 20th Century British and American Fiction	2	1	比较文 学与世 界文学 方向
	130031	中西美学比较研究 Comparative Research of Chinese and Western Aesthetics	2	2	
	130030	现当代英美文学专题 Modern and Contemporary British and American Literature	2	2	
	130032	中西比较文学研究 Chinese and Western Comparative Literature Research	2	1	
	130034	比较文学概论 Introduction To Comparative Literature	2	2	
素养选修课程 ≤1 学分	160023	中国传统文化 The Culture of China	1	1	
	150084	东方哲学与现代化 Oriental Philosophy and Modernization	1	1	
	020112	科研素养与创新能力 Research Literacy and Innovation	1	1	

补修课程 不计学分					导师 确定
其他培养环节（3 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>留学生在导师的指导下，通过文献查阅、学术调研，确定论文选题和研究内容，写出开题报告。通过预开题后，由本学科专业 5 人及以上专家组成的评审小组评审，提出评价和修改意见，不通过者可限期重做，仍未通过者终止培养。开题通过后即获得 1 学分。</p> <p>Under the guidance of their tutors, international students will determine the topic selection and research content of the thesis through literature review and academic research, and write the opening report. After passing the preliminary proposal, an evaluation team composed of 5 or more experts of the discipline will review and put forward comments on evaluation and modification. Those who fail may do it again within a time limit, and those who fail will be terminated. One credit will be awarded upon passing the proposal.</p>				3
中期考核 (1 学分)	<p>对留学生的道德品质、专业知识、科研创新、实践能力、综合素质及学位论文进展情况等进行考核，考核不合格的，经学院、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过后即获得 1 学分。</p> <p>Conduct assessment on overseas students' moral quality, professional knowledge, scientific research innovation, practical ability, comprehensive quality and degree thesis progress, etc. Those who fail to pass the assessment shall be reviewed by the college and graduate school, and submitted to the President's office for approval. After passing the mid-term examination, I will get 1 credit.</p>				4-5
创新创业 (1 学分)	<p>1. 进行 3 个月以上的出国访学研修或学术交流； 2. 参加学术会议并宣读论文，或做公开学术报告 2 次； 3. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖； 4. 参加 6 次以上与本学科相关的学术报告，并提交总结。 每项记 1 学分，需完成 1 学分。</p> <p>1. More than 3 months of overseas study or academic exchange; 2. Attended academic conferences and read papers or made public academic reports twice; 3. Participated in national science and technology competition, creative design, innovation and entrepreneurship competition and won awards; 4. Participate in academic reports related to the discipline more than 6 times and submit summaries.</p> <p>1 credit for each item and 1 credit for completion.</p>				1-5
培养单位 教授委员会主任	吕逸新		培养单位 负责人	张艳梅	



## 法学学科学术学位硕士研究生培养方案

学科代码：0301

### Law Academic Master's Degree Training programme

Credit Code: 0301

#### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学法学专业迄今为止有 26 年的办学历史。1993 年，经济法学专业设立，设立时间列山东省高校前五；1995 年，设立法学专业；2011 年，山东理工大学成为山东省确定的首批“应用型人才培养特色名校”，法学专业位列重点支持专业；2013 年，法学专业在省属高校专业评估中排名第五；2018 年，成为一级法学硕士学位点。通过长期积累本专业已成为鲁中地区法学学科的龙头，已经形成了一支职称、年龄、知识结构较为合理的学科团队，团队中教授 6 人、副教授 17 人、博士 13 人，其中 1 人获“山东省十大优秀中青年法学家”称号，1 人入选山东省理论人才“百人工程”，1 人为“闽江学者”特聘教授。

法学专业坚持立足淄博，面向鲁中，在执法培训、地方立法、第三方评估、执法绩效评估、地方政府法律顾问等方面具有明显的区域优势。法学学科建设充分融入淄博市校城融合计划，利用地方资源强化专业建设。2016 年 11 月，与淄博市签署法治政府建设全面合作协议，通过“双千计划”等多种渠道与实务部门建立协同创新合作平台，实现了人员互聘、资源共享。同时推行联合培养机制，与司法实务部门的合作，探索“学校—实务部门共同培养”模式；推行海外合作机制，与美国布鲁克林法学院、澳大利亚纽卡斯尔大学法学院、新西兰怀卡托大学法学院、俄罗斯米宁大学法学院等实现了联合培养机制；此外，法学学科推行课堂教学、创新科研、校园文化和社会实践“四位一体”的培养机制。

The major of law in Shandong University of Technology has a history of 26 years so far. In 1993, the major of economic law was set up among five top universities in Shandong Province. In 1995, the general major of law was set up. In 2011, Shandong University of Technology became the first batch of "famous schools for cultivating applied talents" in Shandong Province, and the major of law was ranked as the key supporting major. In 2013, the major of law ranked as the top

fifth in the major evaluation among provincial universities. And in 2018, it became the first-class master of law degree. Through several years' development, this major has become the leading subject of law in central part of Shandong Province, and has built a team of subjects with reasonable titles and knowledge structure. There are 6 professors, 17 associate professors and 13 doctorates in the team. One of them has been awarded the title of "Top Ten Excellent Young and Middle-aged Jurists in Shandong Province" and one has been appointed professor of "Minjiang Scholar".

Jurisprudence majors, based in Zibo and oriented to Luzhong, have obvious regional advantages in law enforcement training, local legislation, third-party evaluation, law enforcement performance evaluation and local government legal advisers. The construction of law discipline is fully integrated into the school-city integration plan of Zibo, and the local resources are used to strengthen the major construction. In November 2016, we signed a comprehensive cooperation agreement with Zibo to build a partnership relationship. Through the "two thousand plan" and other channels, we established a collaborative innovation and cooperation platform with practical departments to achieve mutual employment and resource sharing. At the same time, we carried out joint training mechanism, cooperated with judicial practice departments, explored the mode of "school-practice Department co-cultivation". We also carried out overseas cooperation mechanism, and built joint training mechanism with Brooklyn Law School, Law School of Newcastle University of Australia, Law School of Waikato University of New Zealand, Law School of Mining University of Russia, etc. In addition, law disciplines carry out "Four in One" training mechanism which includes classroom teaching, innovative scientific research, Campus Culture and Social Practice.

## 二、培养目标 ( Educational Objectives )

1. 专业知识方面: 熟悉中国文化与语言, 具备法学学科专业知识, 具有严谨的治学态度、较好的学术修养; 能够独立思考, 具有较强的发现、分析、解决法律和法学问题的能力; 能够掌握正确的研究方向和运用科学的研究方法, 具备应有的科研写作能力。

2. 综合素质方面: 具有良好的身体、心理素质和健全的人格, 德智体美劳全面发展。具有熟练使用计算机、网络及常用软件进行文字处理、文献检索等活动的能力。

3. 就业面向: 具有良好的沟通协调能力, 能完成基本的法律接待、法律谈判和法律咨询等业务。具备良好法律职业能力, 能够为司法实务部门、政府部门、高等学校、科研单位、金融机构以及其他相关行业领域培养高层次研究型法律人才。

1. Professional knowledge: Familiar with Chinese culture and language, with professional knowledge of law disciplines, and good academic accomplishment; be able to think independently, have strong ability to discover, analyze and solve legal problems; be able to grasp the correct research direction and use scientific research methods, and have the due scientific research and writing ability.



2. Comprehensive quality: good physical, psychological quality and sound personality, with all-round development of morality, intelligence, physical fitness, et al. Have a good understanding of a foreign language, be able to read and translate foreign materials of this major, and have a certain listening and speaking ability. Skilled in using computers, which includes common software for word processing, document retrieval and others.

3. Employment orientation: Good communication and coordination skills, able to complete basic legal reception, legal negotiation and legal consultation business. With good legal professional ability. The Law school could train high-level research-oriented legal talents for judicial practice departments, government departments, universities, scientific research institutions, financial institutions and other related industries.

### 三、研究方向 ( Research Orientation )

法学 ( 一级学科 ) 学术学位硕士研究生培养方案设以下 4 个研究方向:

1. 法学理论
2. 宪法学与行政法学
3. 经济法学
4. 环境与资源保护法学

详见附表 1。

There are four research directions in the master's degree training program of law ( first-class discipline ):

1. Legal Theory
2. Constitution and Administrative Law
3. Economic Law
4. Environmental Law

Attached Table 1 for details.

### 四、学习年限 ( Length of Schooling )

学制 3 年, 修业年限 2-4 年, 科学研究和论文撰写时间不少于 1 年 ( 从开题通过之日起计算 )。经导师同意, 可申请提前毕业, 但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The studying term is three years and the length of study could be 2-4 years. The time for scientific research and thesis writing is no less than one year ( calculated from the date of the proposal defense ). With the consent of the instructor, you may apply for early graduation, but the time requirements for scientific research and paper writing remain unchanged. The period of temporary leave does not take into account into the length of study.



## 五、课程设置与学分要求 ( Curriculum and Credit Requirements )

本学科总学分不低于 32 学分。课程分为必修课程和选修课程，学生需在规定时间内完成不低于 26 学分的课程，其中必修不低于 16 学分和选修不低于 9 学分的学习任务。跨学科攻读学位研究生需根据导师要求修读民商法、刑法、诉讼法等若干门本专业的本科生课程，考核合格后方可参与开题答辩，成绩不计入成绩单。

课程设置情况见附表 2。

Courses are divided into compulsory courses and elective courses. Students are required to complete courses of no less than 26 credits in the prescribed time, including compulsory courses of no less than 16 credits and elective courses of no less than 9 credits. Interdisciplinary postgraduates are required to take undergraduate courses in civil and commercial law, criminal law, procedural law and other disciplines according to their tutors' requirements. Only after passing the examination, can they participate in proposal defense. The results are not included in the transcript.

The curriculum is in Table 2.

## 六、培养方式与培养环节 ( Training Mode and Cultivating Process )

学术硕士研究生培养实行导师负责制，鼓励实行以导师负责为主的指导小组(团队)制。导师负责制订研究生培养计划，且对研究生的思想品德、学术道德有引导、示范和监督的责任。

### 1. 开题报告

为确保学位论文的质量，研究生应通过文献阅读、学术调研，确定论文选题和研究内容，经导师同意后于第三学期末提交开题报告。由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审，提出评价和修改意见，不通过者可限期重做，仍不通过者终止培养。

### 2. 中期考核

研究生课程学习基本结束后，以研究生培养方案为依据，对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。其目的是总结评价研究生入学以来的学习科研情况，及时发现研究生培养过程中存在的问题，探讨解决问题的途径，明确今后努力的方向。中期筛选考核小组确定考核成绩为“合格”者，可以继续完成学位论文；考核成绩为“不合格”者，经所在单位签署意见，研究生院审核，报校长办公会批准，终止学籍，做研究生肄业处理。

### 3. 实习实践



**教学实践:** 教学实践时间累计不少于 1 个月的工作量, 结束后由导师写出考核评语, 考核通过即获得 1 学分。内容包括助课, 协助指导毕业论文、课程论文和实习等, 由导师安排并考核。

**专业实践:** 应安排至少 1 个月的时间 (一般可以利用寒、暑假) 到生产、设计研究单位、实习基地、协作单位进行实践训练, 也可以参加结合研究方向的科研工作或实验室等工作。导师考核合格即可获得 1 学分。

**社会实践:** 包括参加社会调查、行业统计信息、组织会议、联系业务、帮助实验室建设及管理等活动, 由导师安排并考核。

#### 4. 创新创业

进行 3 个月的出国访学研修或学术交流; 参加学术会议并宣读论文, 或做公开学术报告 2 次; 参加全国性的科技竞赛、创意设计、创新创业竞赛等; 参加 6 次以上与本学科相关的学术报告, 并提交总结。

以上各项须完成两项。

The tutorial responsibility system is adopted in the training of academic postgraduates, and the tutorial team (team) system is encouraged. The tutor is responsible for formulating postgraduate training plan, and has the responsibility of guiding, demonstrating and supervising the ideological, academic, and morality development of postgraduates.

##### 1. Proposal Defense

In order to ensure the quality of dissertation, graduate students should decide the topic and content of dissertation through literatures reading and academic research, and submit the proposal at the end of the third semester with the consent of their tutors. Assessment panel composed of more than five experts in this subject will evaluate the students' proposals and give comments. Those who fail to pass the defense should redo it within a time limit, and those who fail to pass the report will be terminated.

##### 2. Medium-term screening

At the end of the postgraduate courses, based on the postgraduate training program, a comprehensive assessment of the political, moral qualities, basic theory and professional knowledge, scientific and research innovation, practical ability and health status of Postgraduates will be evaluated in the fourth semester. Its purpose is to summarize and evaluate the study and research situation of graduate students since their admission, find out the problems existing in the process of graduate training in time, explore the ways to solve the problems, and clarify the direction of future efforts. The mid-term screening and assessment team determines that those whose assessment results are "qualified" can continue to complete their dissertations; those whose assessment results are "unqualified" can sign their opinions by their units, examined by graduate schools, report to the president's office for approval, terminate their status

and suspend their graduate studying.

### 3. Internship

**Teaching Practice:** The teaching practice time accumulates not less than one month's workload. After the completion of the assessment, the tutor writes the assessment comments, and then obtains one credit if the assessment passed. The content includes assistant courses, assisting in guiding graduation thesis, course thesis and practice, etc., arranged and assessed by the tutor.

**Professional Practice:** At least one month should be arranged for practical training in production, design and research institutes, practice bases and collaborating institutes, as well as scientific research or laboratory work in combination with research directions. They can get one credit if they pass the examination from tutors.

**Social Practice:** It includes participating in social surveys, industry statistics, organizing meetings, contacting business, helping laboratory construction and management, etc. It is arranged and assessed by tutors.

### 4. Innovation and Entrepreneurship

To conduct 3-month studying in abroad or academic exchanges; to attend academic conferences and present papers, or to make public academic speeches twice; to participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions; to participate in more than 6 academic reports related to the subject and submit summaries.

## 七、学位论文 ( Academic Dissertation )

法学学科学术学位硕士研究生学位论文要求如下:

1. 学位论文应在导师指导下由留学生独立完成。
2. 学位论文工作的一般程序为: 文献阅读、调研、开题报告、理论分析、科学研究、论文撰写、论文送审和论文答辩。
3. 学位论文应理论联系实际, 内容充实、观点明确、逻辑清晰、表达准确、格式规范。论文结构包括: 题目、中英文摘要、目录、正文、参考文献、致谢、研究成果、附录等。
4. 学位论文对所研究的课题应在理论分析, 文献发掘, 知识应用与指导实践等环节具有一定的创新性, 提出一定的新见解。
5. 学位论文应具有一定的深度和前沿性, 应反映出作者对基础理论和专门知识的掌握情况, 反映出作者综合运用有关理论、方法和手段解决理论与实践问题的能力。
6. 学位论文严格按照《山东理工大学硕士学位论文评审办法》《山东理工大学硕士学位授予实施细则》等相关文件执行。



The requirements for a academic master's degree dissertation in Chinese language and literature are as follows:

1. The dissertation should be completed independently by overseas students under the guidance of the tutor.

2. The general procedures of dissertation work are: literature reading, research, proposal report, theoretical analysis, scientific research, thesis writing, submission and defense.

3. The dissertation should combine theory with practice, with substantial content, clear views, clear logic, accurate expression and standard format. The structure of the paper includes: title, Chinese and English abstract, contents, text, references, acknowledgements, research results, appendices, etc.

4. The dissertation should be innovative in the aspects of theoretical analysis, document discovery, knowledge application and guiding practice, and put forward some new ideas.

5. The degree thesis should be of certain depth and frontier, which should reflect the author's mastery of basic theories and specialized knowledge, and reflect the author's ability to comprehensively apply relevant theories, methods and means to solve theoretical and practical problems.

6. The dissertation shall be executed in strict accordance with the relevant documents such as "methods for the evaluation of master's dissertation of Shandong University of Technology" and "detailed rules for the implementation of the awarding of master's degree of Shandong University of Technology".

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

满足毕业要求,可获得毕业证书;在获得毕业证书的基础上,如满足学位授予标准,可授予学位证书。

### (一) 毕业要求

1. 具有良好的品德修养和学术道德, 实事求是、勇于创新;
2. 修读完培养计划规定课程和其他培养环节, 成绩考核合格;
3. 通过论文答辩, 成绩合格;
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》, 以及资源与环境工程学院学位授予有关规定。

A diploma can be issued if the requirements of graduation are met.

#### 1. Graduation requirements

- (1) Having good moral cultivation and academic morality, seeking truth from facts and

daring to innovate;

(2) After completing the courses and other training stipulated in the training plan, the students are qualified in the performance appraisal.

(3) Achievements are qualified through the defense of the thesis.

(4) Complying with other requirements of relevant school regulations.

## 2. Degree requirements

Strictly enforce 《Provisional Measures for the Implementation of the Regulations of the People's Republic of China on Academic Degrees 》, 《Appraisal and Examination Rules for Master's Degree dissertation of Shandong University of Technology 》, 《Specific implementation rules of Master's Degree Granting in Shandong University of Technology 》, 《Specific implementation rules of Doctoral Degree Granting in Shandong University of Technology 》 and relevant regulations on degree granting of Law school.



附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>掌握社会科学基本理论与方法,了解经济学、社会学、法学、心理学等人文社科的基本知识和基础理论。具有科学严谨、求真务实的治学态度和良好的学术素养及学术道德。</p> <p>Master the basic theories and methods of social sciences, understand the basic knowledge and theories of Humanities and social sciences such as economics, sociology, law and psychology. Have scientific and rigorous, realistic and pragmatic academic attitude and good academic quality and ethics.</p>	<p>中国传统文化、社会研究方法、科研素养与创新能力</p> <p>Chinese traditional culture、social research methods、scientific research literacy and innovation ability</p>
综合能力		<p>掌握一门外国语,能熟练阅读本学科外文文献和相关资料,具有一定的写作能力和基本的听、说能力;掌握专业领域研究所需的计算机工具;具有较强的自学能力、实践创新能力、写作能力和学术交流能力。</p> <p>Mastering a foreign language, skilled in reading foreign literature and related materials of the subject, with a certain writing ability and foundation in listening and speaking abilities, computer tools required for professional research, strong self-study ability, practical and innovative ability, writing ability and academic exchange ability.</p>	<p>研究生英语、口语、论文写作与学术规范、法律英语、法理学前沿、法律方法前沿、中国宪法专题、国际经济法专题、国际环境法专题、宏观调控法专题</p> <p>Postgraduate English、Oral English、Paper Writing and Academic Norms、Legal English、Frontier of Jurisprudence、Frontier of Legal Methods、Special Topics of Chinese Constitution、International Economic Law、International Environmental Law and Macro-control Law</p>
研究方向	法学理论	<p>本学科方向主要从事法哲学、法社会学、法经济学、司法学、人权法学、立法学等领域的法律研究。学科特色主要致力于地方立法与司法的善治治理、法律与社会科学理论、人权保障、法律方法论以及科技与法律的交叉等研究。</p> <p>The research direction of this subject is mainly engaged in legal research in the fields of philosophy of law, sociology of law, economics of law, jurisprudence, human rights law, legislation and so on. Discipline characteristics are mainly devoted to good governance of local legislation and justice, legal and social science theory, human rights protection, legal methodology and the intersection of science, technology and law.</p>	<p>法理学前沿、法律方法前沿、法社会学专题、法经济学专题、外国法律思想史专题</p> <p>Frontiers of jurisprudence、legal methods、sociology of law、economics of law and history of foreign legal thoughts</p>

宪法学与行政法学	<p>本学科方向主要从事宪法学、行政法与行政诉讼法学、人权宪法保障、行政执法及比较法等领域的法律研究。学科特色主要致力于法治政府、国家基本制度、宪法保障、公法原理、依法行政、行政程序、区域治理与法治等领域的研究。</p> <p>This subject is mainly engaged in legal research in the fields of Constitutional Law, Administrative Law and Administrative Procedure Law, Constitutional Guarantee of Human Rights, Administrative Law Enforcement and Comparative Law. The characteristics of the subject are mainly devoted to the study of the government ruled by law, the basic system of the state, the constitutional guarantee, the principles of public law, administration according to law, administrative procedures, regional governance and the rule of law.</p>	<p>中国宪法专题、比较宪法专题、中国行政法专题、比较行政法专题、法治与公民权利专题、行政诉讼法学专题</p> <p>Special topics of Chinese Constitution、Comparative Constitution、Chinese Administrative Law、Comparative Administrative Law、Rule of Law and Civil Rights、Administrative Procedure Law</p>
经济法 学	<p>本学科方向主要从事经济法及其发展规律的研究，基础理论与具体制度并重，突出研究领域的学科交叉及多元研究工具的运用，贴近中国经济发展实际，兼顾与其他学科的协调，形成交融、开放、互动的研究特色。研究领域主要包括：经济法基础理论、低碳经济法、竞争与知识产权保护法律制度、国有企业改革与国有资产管理法、金融法、国际经济法等方向。</p> <p>Economic jurisprudence is mainly engaged in the study of economic law and its development law, laying equal stress on basic theory and specific system, highlighting the cross-disciplinary research fields and the application of multi-research tools, approaching the reality of China's economic development, taking into account the coordination with other disciplines, and forming the research characteristics of integration, openness and interaction. The main research fields include: basic theory of economic law, low-carbon economic law, legal system of competition and intellectual property protection, reform of state-owned enterprises and state-owned assets management law, financial law, international economic law, etc.</p>	<p>宏观调控法专题、市场规制法专题、国际经济法专题、知识产权法专题、经济犯罪专题、民商事法律前沿</p> <p>Topics of Macro-control Law、Market Regulation Law、International Economic Law、Intellectual Property Law、Economic Crime and Frontier of Civil and Commercial Law</p>
环境与资源保护法学	<p>本学科方向主要从事环境法学基础理论、污染防治、自然保护和国际环境保护等领域的法律研究。学科特色主要致力于区域环境治理与法治、生态伦理哲学与法、低碳经济促进法、生态保护法（自然保护地与生态红线研究）、环境责任法、环境公益诉讼、国际环境法（国际海洋法）以及能源法等领域的研究。</p>	<p>国际环境法专题、环境伦理哲学与法专题、污染防治法专题、自然保护法专题、能源法专题</p> <p>Topics of International Environmental Law、Philosophy and Law of Environmental Ethics、Pollution Prevention</p>



		<p>Environmental Law is mainly engaged in the basic theory of environmental law, pollution prevention and control, natural protection and international environmental protection. The discipline characteristics are mainly devoted to regional environmental governance and rule of law, ecological ethics philosophy and law, low-carbon economic promotion law, ecological protection law ( natural protection and ecological red line research ) , environmental responsibility law, international environmental law ( international law of the sea ) and energy law.</p>	<p>and Control Law 、 Natural Protection Law and Energy Law</p>
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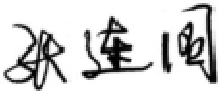


附表 2: 培养计划 (Training Plan)

学科名称	法学 Law	学科代码	0301		
单位名称	法学院 Law School	培养类型	留学学术学位硕士 Master of Law for International Students		
学分要求	总学分 Total Credits: 26, 必修课程学分 Credit for Compulsive Course: 16, 选修课程学分 Credit for Optional Course: 9				
课程 设 置					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 ≥5 学分	G13100	中国文化 Chinese Culture	2	1	
	G13101	汉语 Chinese	2	1	
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科平台课程 ≥11 学分	150152	法理学 Jurisprudence	2	1	必选
	150153	宪法学与行政法学 Constitutional Science and Administrative Law	2	1	
	150154	经济法概述 An Overview of Economic Law	2	1	
	150155	环境法学 Science of Environment Law	2	1	
	150156	法学经典导读 Introduction to Classics of Law	2	1	
	150157	法学前沿 The Frontier of Law	1	2	
方向选修课程 ≥8 学分	150158	法理学前沿 Frontiers of Jurisprudence	2	2	
	150159	法律方法前沿 Frontier of Legal Method	2	2	
	150160	法经济学专题 The topic on Law and Economics	2	2	
	150161	法社会学专题 The topic on Sociology of Law	2	2	
	150162	外国法律思想史专题 The topic on History of Foreign Legal Thoughts	2	3	



	150163	中国宪法专题 The topic of Chinese Constitution	2	2	
	150164	比较宪法专题 The topic of Comparative Constitution	2	2	
	150165	中国行政法专题 The topic of Chinese Administrative Law	2	2	
	150166	法治与公民权利专题 The topic of Rule of law and Civil Rights	2	2	
	150167	比较行政法专题 The topic of Comparative Administrative Law	2	3	
	150168	行政诉讼法学专题 Administrative Procedural Law Special Topic	2	3	
	150169	宏观调控法专题 Macro-control Law Special Topic	2	2	
	150170	市场规制法专题 Market Regulation law Special Topic	2	2	
	150171	国际经济法专题 International Law Special Topic	2	2	
	150172	知识产权法专题 Intellectual Property Law Special Topic	2	3	
	150173	经济犯罪专题 Economic Crime Special Topic	2	3	
	150174	民商事法律前沿 Frontier of Civil and Commercial Law	2	3	
	150175	污染防治法专题 Pollution prevention law	2	2	
	150176	自然保护法专题 Nature protection law	2	2	
	150177	国际环境法 International Environmental law	2	2	
	150178	能源法专题 Energy law	2	2	
	150179	环境伦理哲学与法专题 Environmental Ethics Philosophy and Law	2	3	
素养选修课程 ≤1 学分	140024	人文素养与创新思维 Humanities Literacy and Innovative Thinking	1	2	
补修课程 不计学分					导师 确定

其他培养环节（6 学分）			
培养环节	相关内容及要求		学期
开题报告 (1 学分)	<p>第三学期末完成开题，由本学科专业 5 人以上专家组成评审小组对学生所做开题报告进行评审。</p> <p>At the end of the third semester, a group of more than five experts in this subject will be formed to evaluate the proposal written by students.</p>		3
中期考核 (1 学分)	<p>在第四学期对研究生的政治思想和道德品质、基础理论和专业知识、科研创新、实践能力及健康状况等方面进行综合考核。</p> <p>In the fourth semester, the graduate students' political thought and moral character, basic theory and professional knowledge, scientific research innovation, practical ability and health status were comprehensively assessed.</p>		4-5
实习实践 (2 学分)	<p>教学实践：教学实践时间累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。内容包括助课，协助指导毕业论文、课程论文和实习等，由导师安排并考核。</p> <p>专业实践：应安排至少 1 个月的时间（一般可以利用寒、暑假）到生产、设计研究单位、实习基地、协作单位进行实践训练，也可以参加结合研究方向的科研工作或实验室等工作。导师考核合格即可获得 1 学分。</p> <p>Teaching Practice: The teaching practice time accumulates no less than one month's workload. After the completion of the assessment, the tutor writes the assessment, and if the assessment is positive, and then obtains one credit. The content includes assistant courses, assisting in guiding graduation thesis, course thesis and practice, etc., arranged and assessed by the tutor.</p> <p>Professional Practice: At least one month should be arranged for practical training in production, design and research institutes, practice bases and collaborating institutes, as well as scientific research or laboratory work in combination with research directions. Students can get one credit if they pass the examination.</p>		2-5
创新创业 (2 学分)	<p>1. 进行 3 个月以上的出国访学研修或学术交流；</p> <p>2. 参加学术会议并宣读论文，或做公开学术报告 2 次；</p> <p>3. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</p> <p>4. 参加 6 次以上与本学科相关的学术报告，并提交总结；</p> <p>每项记 1 学分，需完成 2 学分。</p> <p>1. Over 3 months' studying or exchanges abroad;</p> <p>2. Participate in academic conferences and make presentation, or make public academic speeches twice;</p> <p>3. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions and win awards;</p> <p>4. Participate in more than 6 academic reports related to the subject and submit a summary;</p> <p>One Credit each, 2 Credits in total should be obtained.</p>		1-5
培养单位 教授委员会主任			培养单位 负责人
			



## 社会学学科学术学位硕士研究生培养方案

学科代码：030301

### Sociology Academic Master's Degree Training programme

Credit Code: 030301

#### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学于 2006 年获得“社会学二级学科硕士学位”授予权，是目前山东省内三所具备社会学硕士点的院校之一。2011 年，当选为山东省社会学会会长单位，2012 年成为中国社会工作教育协会理事单位，2014 成为淄博市社会工作者协会会长单位，在 2012-2014 年“山东省教育厅省属高校”评比中，连续三年位居全省第一，2017 年被评为山东省首批社会工作专业人才培养基地，2018 年入选学校优势特色学科。学位点现有专任教师 26 位，其中，高级职称 17 人，博士 15 人，硕士生导师 14 人，1 人获“中国哲学社会科学最有影响力学者”称号，1 人当选为山东省社会学类专业教学指导委员会委员，1 人入选学校“双百工程”第二层次。先后承担国家社科基金项目 6 项、省部级项目 30 余项。在人民出版社等权威机构出版学术专著 8 部，发表 CSSCI 论文 50 余篇，获省部级一、二、三等奖 10 余项。学科现有山东省生态文化与可持续发展软科学研究中心、山东省齐文化研究基地、山东省社会工作专业人才培养基地及二十多处社会实践基地。学位点已培养硕士研究生 110 人，毕业生主要就业方向为国家机关、事业单位、企业、省内外社会工作机构、社会公益组织，专业对口率 100%；学位点重视培养学生的国际化视野，积极鼓励学生参加国际交流，并先后选派研究生参加国外短期课程交流项目。经过十几年的发展，本学科已形成多个方向稳定、特色鲜明、结构合理、科研成果较为显著的学术团队，在社会资本、生态治理、齐文化与地方社会发展等研究领域已奠定了在全省乃至全国的优势地位。

In 2006, the Sociology of Shandong University of Technology ( the following abbreviation is SSDUT ) was granted the secondary discipline of “Master of Social Science” . It is one of three institutions with a master's degree in sociology in Shandong province. In 2011, SSDUT was elected as the president unit of the Shandong Social Society. In 2012, SSDUT became the governing unit of the China Social Work Education Association. In 2014, SSDUT became the

president unit of the Zibo Social Workers Association. In 2012–2014, SSDUT was ranked first of “Shandong Provincial Education Department Provincial University” for three consecutive years. In 2017, SSDUT was awarded the first batch of training bases for social workers in Shandong Province. In 2018, it was selected as a dominant subject of Shandong University of Technology ( the following abbreviation is SDUT ) .

There are 26 faculties in SSDUT, including 17 professors, 15 doctors, 14 master's mentors. One professor was awarded the title of “Most Influential scholar in Chinese Philosophy and Social Sciences” , one was elected as a member of the sociology Teaching Steering Committee in Shandong Province, and one was selected to the second level of the “Double Hundred Project” of SDUT.

SSDUT has undertaken 6 national social science fund projects and more than 30 provincial and ministerial level projects. It has published 8 academic monographs in People's Publishing House, published more than 50 CSSCI theses, and won more than 10 provincial and ministerial level prizes.

SSDUT has more than 20 social practice institutions, such as the Shandong Provincial Ecological Culture and Sustainable Development Soft Science Research Institution, Shandong Qi Culture Research Institution, Shandong Province Social Work Professional Training Institution. SSDUT has already graduated 110 postgraduate students which employments were mainly referred to as state organs, state-owned institutions, enterprises, social work organizations, and social welfare organizations. The professional counterpart rate is 100%. SSDUT focuses on cultivating candidates' international vision and encourages them to participate in international conferences and have selected candidates to participate in foreign short-term course exchange programs. After more than ten years of development, SSDUT has formed several stable research directions such as social capital, ecological governance, Qi culture and local social development.

## 二、培养目标 ( Educational Objectives )

本学科秉承“有社会责任、有创新精神、有专门知识、有实践能力、有健康身心”的人才培养理念，面向社会需求，培养具有全球化视野，适应当代社会发展需要的复合型高层次的教学与研究、管理与服务的专门人才。具体要求是：

1. 具有良好的公民意识和强烈的社会责任感。
2. 掌握扎实系统的社会学基础理论知识，具有比较宽厚的社会学素养、独立的研究能力，以及较强的分析和解决社会问题的能力。
3. 具有独立从事社会学调查研究、社会工作实务的能力，对某一重要的社会生活领域有深入的研究和了解，具备一定的解决实际问题的能力。毕业后可在政府、政策研究、企业、新闻媒介、社会服务等单位从事实际工作或在高等院校和科研机构从事教学、科研工作。



4. 有较强的口头和书面文字表达的能力，能熟练运用社会统计软件。

SDUT adheres to the concept of “cultivating social responsibility, innovative spirit, expertise, practical ability, and healthy body and mind”. It aims at the needs of society and cultivates a complex high-level that has a global vision and adapts to the needs of contemporary social development. Specialized in teaching and research, management and service. The specific requirements are:

1. Have the right political direction, citizenship and a strong sense of social responsibility.

2. Master the basic theoretical knowledge of sociology, possess a broad sociological literacy, independent research ability, and strong ability to analyze and solve social problems.

3. Proficiency in the research methods of sociology and social work practice techniques, and have a thorough research of an important social area and master the ability to solve practical problems. After graduation, they could hold a post in sociology in institutions of education, research institutions or government agencies, enterprises, and social organizations. And their academic performance including teaching and research, social policy and social issues research, social surveys, social service project planning and evaluation, cultural communication, social governance, and other specific work.

4. Be proficient in using social statistics software.

### 三、研究方向 ( Research Orientation )

社会学 ( 二级学科 ) 学术学位硕士研究生培养方案设以下 3 个研究方向:

1. 应用社会学

2. 社会工作与社会治理

3. 民俗与地域文化

详见附表 1。

There are three research directions in the master's degree training program of sociology ( secondary discipline ):

1. Applied Sociology

2. Social work and Social Governance

3. Folklore and regional culture

Attached Table 1 for details.

### 四、学习年限 ( Length of Schooling )

全日制硕士研究生的基本学制为 3 年，学习年限为 2-4 年。科学研究和撰写论文时间不少于 1 年 ( 从开题报告通过之日开始计算 )。在满足论文工作时间要求的前提下，经指导教师同意，少数品学兼优的学生提前完成学业，可申请提前毕业，但科学研究和论文撰写时间要求不变。休学时间不计入学习年限。

The basic academic system for full-time postgraduates is 3 years and the duration of the study is 2 to 4 years. Research and writing of papers for not less than 1 year (calculated from the date of the opening report of the dissertation). If the working time requirements of the thesis were fulfilled, candidates can apply for graduation in advance with the consent of the mentor. But the request of the time for research and thesis remains unchanged. The time of suspension is not counted in the length of the study.

## 五、课程设置与学分要求 (Curriculum and Credit Requirements)

课程包括必修课程和选修课程，学生需在规定时间内完成不低于 26 学分的课程学分，其中，必修课不低于 16 学分，选修课不低于 9 学分。

补修课是针对跨专业研究生设置的本学科研究生所必修的专业基础课程，跨专业研究生应补修若干门本专业的本科生课程，由导师根据具体情况确定补修课门数。补修课程考试成绩合格方可申请学位答辩，不计学分。

课程设置情况见附表 2。

The courses of SSDUT include compulsory and elective courses. Candidates are required to complete no less than 26 course credits within the specified time, of which no less than 16 course credits for compulsory courses and no less than 9 course credits for electives courses.

The supplementary course is a compulsory basic course for candidates who are interdisciplinary which should complete several undergraduate courses of SSDUT. The mentor will determine the number of remedial courses according to the specific circumstances. Only if the supplementary course was passed, the candidates can apply for a dissertation presentation. The supplementary course has no course credit.

The curriculum is in Table 2.

## 六、培养方式与培养环节 (Training Mode and Cultivating Process)

研究生培养实行导师负责制或以导师负责为主的指导小组（团队）制。导师（或指导小组）不仅负责制订研究生培养计划，指导科学研究、学术活动、实习实践和学位论文等工作，而且对研究生的思想品德、学术道德有引导、示范和监督的责任。研究生须严格按照培养环节要求开展学习、研究和实践，导师（或指导小组）需加强对培养环节的管理和监控。

必修环节学分为研究生课程结束、进入学位论文阶段后所获得的各类学分，包括论文开题、中期考核、创新创业、实习实践等环节学分。

### 1. 论文开题学分

研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写



出开题报告。5 人以上的专家组对开题报告提出评价和修改意见，不通过可限期重做，重做后仍未通过者将终止培养。开题通过后即获得 1 学分。

## 2. 中期考核学分

对研究生的思政、科研、实践、综合素质以及学位论文进展情况等进行考核，考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过后即获得 1 学分。

## 3. 创新创业学分

- (1) 进行 3 个月以上的出国访学研修或学术交流；
- (2) 参加学术会议并宣读论文，或做公开学术报告 2 次；
- (3) 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；
- (4) 参加 6 次以上与本学科相关的学术报告，并提交总结；

每项记 1 学分，需完成 2 学分。

## 4. 实习实践学分

实习实践是培养研究生理论联系实际，解决问题不可或缺的环节，包括教学实践、专业实践两个方面。

(1) 教学实践：为培养研究生的教学能力和沟通表达能力，研究生在学习期间应参加教学实践。教学实践可采取多种方式进行，如本科课程助教、辅导工作或指导生产实习、课程设计及毕业设计等工作。教学实践时间累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。

(2) 专业实践：为培养研究生的动手操作能力和实践创新能力，本专业研究生都必须有至少一个月（一般可以利用寒、暑假）的社会调查实践活动。三个方向的研究生必须在学院指定的调查实践基地从事调查至少半个月，其余的调查时间可以根据自己的论文选题，在导师的协助下选定调查地点。导师考核合格即可获得 1 学分。

Candidates are trained in a mentoring system or a mentoring team based on the mentor. The mentor (or the steering group) is not only responsible for formulating postgraduate training programs, guiding their research, academic activities, internship practice, and dissertations, but also for guiding, demonstrating, and supervising the postgraduates' morality, and academic ethics. Candidates must conduct a study, research, and practice in strict accordance with the requirements of the training program. The mentor (or the steering group) needs to strengthen the management and monitoring of academic training.

The compulsory procedures are divided into various course credits obtained after the completion of the postgraduate course and the dissertation, including the opening presentation of



the dissertation, the mid-term assessment, the entrepreneurship, and the practice of the internship.

#### 1. The course credits of opening presentation of the dissertation

Under the guidance of the mentor, the candidates identify the subject of the dissertation by analyzing the literature, collecting the data, and investigating, then preparing the opening presentation of the dissertation. The expert group of more than 5 people will submit evaluation and revision opinions on the opening presentation of the dissertation, if it was failed, the candidates shall redo it within a limited time. Those who have not passed the redo will terminate the training of SSDUT. 1 course credit will be awarded if the candidates pass the opening presentation of the dissertation.

#### 2. The course credits of mid-term assessment

The mid-term assessment will evaluate the ideological and political, scientific research, practice, comprehensive quality and progress of the dissertation of the candidates. If the assessment is unqualified, it will be reviewed by the training college and the graduate school of SDUT, and reported to the president's office of SDUT for approval of which this candidate study was at SDUT but not graduate. 1 course credit will be awarded if the candidates pass the mid-term assessment.

#### 3. The course credits of innovation and entrepreneurship

- (1) Overseas study or academic exchanges for more than 3 months;
- (2) Participating in academic conferences and the paper is including in the conference, and reading papers in the conference, or making public academic reports twice;
- (3) Participating in national science and technology competitions, creative design, innovation, and entrepreneurship competition and win a prize;
- (4) Participating in more than 6 academic reports related to the subject and submit a summary;

1 course credit for each item and 2 course credits were required.

#### 4. The course credits of internship practice

Internship practice is aiming to cultivate candidates apply theory to find a solution to practical problems.

It including two sections, education practice, and professional practice.

(1) Education practice: To develop the teaching ability and communication skills of candidates, they should participate in education practice during the semesters. Education practices can be carried out in a variety of ways, such as undergraduate teaching assistants, mentoring or guiding production internships, curriculum design, and graduation design. The education practice time accumulates the workload of not less than 1 month. After the end of the education practice, the mentor issues the assessment comments. 1 course credit will be awarded if the candidates pass the assessment.

(2) Professional practice: To cultivate the ability of practical innovation, candidates of this major must have social investigation and practice activities for at least one month



( generally during the summer and winter vacations ). Candidates in all these directions must be surveyed at the practice institute for at least half a month. The remaining survey time can be based on their thesis and selected by the mentor. 1 course credit will be awarded if the candidates pass the assessment of the mentor.

## 七、学位论文 Academic Dissertation )

学位论文是考察研究生培养质量的关键环节,完成学位论文有如下几个环节:首先,研究生应在导师指导下,选择合适的研究课题,既体现本学科的前沿性、社会学学科的经验性质,又力求与国家、省的研究课题相挂钩,同时注意研究课题与国家政策和国民经济与社会发展的关系。其次,作好开题报告。再次,在正式撰写论文之前,应围绕学位论文撰写一篇有一定学术见解和视野较为开阔的文献综述,并努力在国家级学术期刊上发表。最后,学位论文按照《山东理工大学关于研究生学位论文工作的有关规定》《山东理工大学博士学位授予工作实施细则》《山东理工大学硕士学位授予工作实施细则》等相关文件的有关规定组织评阅与答辩。

开题报告同课程学分一样,将是研究生论文写作的资格之一。规定的开题报告包括如下几个方面:

- (1) 研究摘要。以简洁的语言写明学位论文的基本内容和研究思路;
- (2) 研究题目。说明选题的理由,理论与现实两方面的意义,论文的主要关注点和基本框架,研究和论文写作的可行性;
- (3) 研究状况。列举中外学者在本论文涉及的领域内的已有研究成果、基本观点,并通过说明已有研究成果的不足或不完善之处,论证本论文写作的必要性;
- (4) 研究方案。包括具体的研究问题、研究可能遇到的疑点和难点、研究对象或个案的基本情况介绍与典型意义,以及需要通过研究进行检验和论证的基本假设;
- (5) 研究设计。主要包括资料的收集手段和方法(如抽样设计);
- (6) 资料的整理和分析。针对研究问题和资料特点,提出拟采用的整理和分析资料的方法 and 手段,包括定性和定量研究方法;
- (7) 研究计划。说明从事研究和论文写作的进度和时间安排;
- (8) 参考文献。列出研究和论文写作参阅的中外文献资料的目录,文献阅读量不得少于 50 部(篇)专业中外文文献,其中属于基础理论的文献不得少于 30 部(篇);
- (9) 其他。除上述以外的与论文写作有关事宜。

The dissertation is an essential part of postgraduate training. First of all, under the guidance of their mentor, the candidate should choose appropriate research topics which not only reflect

the cutting-edge of the discipline, but also the empirical of the sociology. They also strive to be linked to national and provincial research topics, while attaching to the national policies, economy and social development. Second, make an opening presentation of the dissertation. Thirdly, a literature review with a certain academic opinion and a broad vision should be written around the dissertation before the writing of the dissertation, and efforts should be made to publish in national academic journals. Finally, the review and defense of the dissertation should be organized in accordance with the relevant provisions of the “Regulations of the Shandong University of Technology on the Work of Postgraduate Thesis Work”, “The Implementation Rules for the Granting of Doctoral Degrees of Shandong University of Technology”, and “The Implementation Rules for the Granting of Master's Degrees of Shandong University of Technology”.

The opening presentation of the dissertation, like the course credits, will be one of the qualifications for postgraduate thesis writing. It includes the following aspects:

(1) Research abstract: the basic content and research ideas of the dissertation are written in a concise language;

(2) Research topic: explaining the reasons for choosing this topic, the theory and reality significance of the topic, the central points and basic framework of the thesis, the feasibility of research and thesis writing;

(3) Literature review: enumerating the research and basic viewpoints of domestic and foreign scholars, and demonstrating the necessity of writing this thesis by explaining the inadequacies or imperfections of previous research;

(4) Research proposal: including specific research questions, suspected and difficult that may be encountered in the research, basic introductions and typical meanings of the research subjects or cases, and basic assumptions that need to be tested and demonstrated through research;

(5) Research design: including the methods for collecting data (such as sampling design);

(6) Analysis of data: propose the methods for collating and analyzing data, including qualitative and quantitative methods;

(7) Research plan: describes the progress and schedule of research and thesis writing;

(8) References: lists the catalogs of domestic and foreign literature for research. The number of literature should not be less than 50, and the theory literature must be no less than 30;

(9) Others: other than the above, related to the writing of the thesis.

## 八、毕业与学位要求 ( Graduate and Degree Requirements )

### (一) 毕业要求

满足以下条件，可获得毕业证书。

1. 具有社会责任感和历史使命感，遵纪守法，身心健康；



2. 具有良好的品德修养和学术道德，实事求是、勇于创新；
3. 修读完培养方案规定课程和其他培养环节，成绩考核合格；
4. 完成论文答辩，成绩合格；
5. 符合学校有关规定的其他要求。

## (二) 学位要求

在获得毕业证书的基础上，研究生必须满足学术成果要求，达到学位授予标准，方可授予学位证书。

学术成果要求：研究生在校学习期间须以山东理工大学为第一署名单位，公开发表一定数量的与学位论文相关的学术成果。具体要求按照学校关于研究生学位授予标准相关文件执行。

### 1. Graduation requirements:

A diploma can be obtained if the following conditions are met.

(1) Have a sense of social responsibility and history sense of life, obey the law, and maintain physical and mental health;

(2) Have good moral cultivation and academic ethics, seek truth from facts, and be brave in innovation;

(3) Complete the training program and other training links, and score assessment qualified;

(4) Complete the dissertation defense, the results are qualified;

(5) Meet other requirements of the SDUT's relevant regulations.

### 2. Degree requirements

Based on obtaining a diploma, candidates must meet the academic achievement requirements and the degree award criteria before they can be awarded a degree certificate.

Academic Achievements: During the period of study, candidates must use the Shandong University of Technology as the first unit to publish a certain number of academic achievements related to the dissertation. Specific requirements are implemented by the documents of the SDUT on the granting of graduate degree standards.

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别	培养目标	支撑课程
综合素质	<p>掌握社会科学基本理论与方法, 了解经济学、社会学、法学、心理学等人文社科的基本知识和基础理论。具有科学严谨、求真务实的治学态度和良好的学术素养及学术道德。</p> <p>Master the basic theories and methods of social sciences, understand the basic knowledge and theories of Humanities and social sciences such as economics, sociology, law and psychology. Have scientific and rigorous, realistic and pragmatic academic attitude and good academic quality and ethics.</p>	<p>中国传统文化、社会研究方法、科研素养与创新能力</p> <p>Chinese traditional culture、social research methods、scientific research literacy and innovation ability</p>
综合能力	<p>掌握一门外国语, 能熟练阅读本学科外文文献和相关资料, 具有一定的写作能力和基本的听、说能力;掌握专业领域研究所需的 spss/stata 等统计软件;具有较强的自学能力、实践创新能力、写作能力和学术交流能力。</p> <p>Master a foreign language, be proficient in reading the foreign literature, have certain writing, listening and speaking ability; master the statistical software such as spss/stata required for professional field research; have strong self-learning ability, practice innovative ability, writing ability and academic communication ability.</p>	<p>外国语、口语、论文写作与学术规范、当代中国社会问题研究、中国社会思想史、社会科学统计软件应用、社会学英文文献阅读导引</p> <p>English for Graduate Students、Oral English、Thesis Writing and Academic Criterion、Research on Social Problems in Contemporary China、History of Chinese Sociology、Application of Social Science Statistics Software、Introduction to the Reading of Sociological English Literature</p>
研究方向	<p>应用社会学</p> <p>该方向注重与政治学、教育学、体育学等学科的交叉融合, 逐步形成了环境社会学、政治社会学、体育社会学、教育社会学等研究领域。学科方向致力于将社会学理论与当前社会治理和社会建设实践相结合, 对城乡社会治理、环境社会学、乡村振兴、贫困问题等进行深入系统地研究, 依托山东省社会工作专业人才培养基地、山东省生态文化与可持续发展软科学研究基地、山东理工大学法治与社会治理研究中心, 不断加强政产学研用的协同创新, 注重通过社会治理的理论、模式、方法的探讨与研究, 为治理实践提供战略指导、政</p>	<p>中国社会学史、国外社会学理论、定量社会研究方法、质性社会研究方法、社会科学统计软件应用、当代中国社会问题研究专题、中国社会政策与社会福利研究专题、农村社会学研究专题、城市社会学研究专题、环境社会学研究专题、教育社会学研究专题、社会心态专题研究</p> <p>History of Chinese Sociology、Foreign Sociology Theory;</p>



	<p>策咨询、人才培养等高端服务。</p> <p>This direction focuses on the integration of political science, education, and physical education, and gradually forms research fields such as environmental sociology, political sociology, sports sociology, and educational sociology. The discipline is devoted to combining sociological theory with current social governance and social construction practices, and conducting systematic research on urban and rural social governance, environmental sociology, rural revitalization, and poverty issues. It relies on the training base for social work professionals in Shandong Province, the Shandong Provincial Institute of Ecological Culture and Sustainable Development, and the Research Center for Rule of Law and Social Governance of Shandong University of Technology. It continuously strengthens the collaborative innovation of government, industry, and research, focuses on the research of theories, patterns, and methods of social governance to provide high-end services such as strategic guidance, policy advice, and talent development.</p>	<p>Quantitative Social Research Method、Qualitative Social Research Method、Application of Social Science Statistics Software、Research on Social Problems in Contemporary China、Special Topics on Social Policy and Social Welfare in China、Special Topics of Social Mentality、Special Topics of Rural Sociology、Special Topics of Rural Sociology、Special Topics of Environmental Sociology、Special Topics of Educational Sociology、Special Topics of Social Mentality</p>
<p>社会工作与社会治理</p>	<p>该方向立足于社会学服务社会实践的需要，将社会学的原理与方法运用于具体的社会现象研究，对大学生弱势群体救助、大学生研究生心理健康教育、居民慈善捐赠行为、社会政策、心理健康教育服务人员的个性胜任特征等问题进行了系统而深刻的研究，主要研究领域包括社会心理、社会工作、社会保障、心理健康教育等。依托山东省社会工作专业人才培养基地，重视通过实证研究解决社会问题，为决策部门提供事实依据，实现社会学服务社会生活的终极目标。</p> <p>This direction is based on the needs of social practice of social science, applying the principles and methods of sociology to conduct specific social phenomena research, including assistance to vulnerable groups of college students, mental health education for postgraduates, charitable donations of residents, social policies, and the system's personality competency of the mental health educator and so on. The main research areas include social psychology, social work, social security, and mental health education. It Relies on the training base of social work professionals in Shandong Province to solving social problems through empirical research, provides a factual basis for decision-making departments.</p>	<p>社会工作理论与方法、社会心理学研究专题、定量社会研究方法、质性社会研究方法、社会科学统计软件应用、当代中国社会问题研究专题、中国社会政策与社会福利研究专题、工会社会工作专题、学校社会工作专题、家庭社会工作专题、社区社会工作研究专题、社会服务项目管理与评估</p> <p>Theory and Method of Social Work、Quantitative Social Research Method、Qualitative Social Research Method、Application of Social Science Statistics Software、A Study of Social Problems in Contemporary China、Special Topics on Social Policy and Social Welfare in China、Special Topics of the Unions Social Work、Special Topics of School Social Work、Special Topics of Family Social Work、Special Topics of Community Social Work、Management and Evaluation of Social Service Projects.</p>

	民俗与地域文化 (交叉)	<p>该方向基于民俗学、文化人类学理论,结合地域文化建设,注重对民俗学、文化人类学理论,山东特别是齐地地域文化(包括非物质文化遗产在内民间文化)的传承,当前文化产业建设等方面的系统深入研究。该方向依托山东理工大学齐文化研究院,注重通过民俗学、文化人类学理论与方法的研究,为优秀民间文化传承与地方文化建设提供政策参考。</p> <p>This direction is based on the theory of folklore and cultural anthropology, combined with the construction of regional culture, focusing on the inheritance the theory of folklore, cultural anthropology, and the regional culture (including the intangible cultural heritage), the current cultural industry, and the study of systems such as construction. This direction relies on the Qi Culture Research Institute of Shandong University of Technology, focusing on the study of folklore and cultural anthropology theory and methods, and provides policy references for the inheritance of outstanding folk culture and local cultural construction.</p>	<p>中国社会学史、国外社会学理论、定量社会研究方法、质性社会研究方法、社会科学统计软件应用、当代中国社会问题研究专题、民俗学理论与方法、文化人类学、人口社会学、中国民间信仰研究、中国传统生态民俗专题研究、区域民俗研究、齐文化研究、民间文艺研究</p> <p>History of Chinese Sociology、Foreign Sociology Theory、Quantitative Social Research Method、Qualitative Social Research Method、Application of Social Science Statistics Software、A Study of Social Problems in Contemporary China、Folklore Theories and Methods、Special Topics of Cultural Sociology、Special Topics of Population Sociology、Study on the Chinese Folk Belief、Study on Chinese Traditional Ecological Folk Customs、Study on Regional Folklore、Study on Qi Culture、Folk Literature and Art Research</p>
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附表 2: 培养计划 (Training Plan)

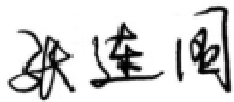

学科名称	社会学 sociology	学科代码	030301		
单位名称	法学院 Law School	培养类型	学术学位硕士研究生 Academic Master of Science in International Studies		
学分要求	总学分 Total course credit: $\geq 26$ , 必修课程学分 Compulsory course credits: $\geq 16$ , 选修课程学分 Elective course credits: $\geq 9$ 。				
课 程 设 置 (中英文对照)					
课程类型	课程编码	课程名称	学 分	学 期	备注
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture	2	1	
	G13101	汉语 Chinese	2	1	
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1	
学科平台课程 $\geq 11$ 学分	150121	中国社会学前沿理论研究 Study on the Frontier Theory of Sociology in China	2	1	必选
	150122	国外社会学理论 Foreign Sociology Theory	2	1	
	150123	定量社会研究方法 Quantitative Social Research Method	2	1	
	150124	质性社会研究方法 Qualitative Social Research Method	2	1	
	150125	社会心理学研究专题 Special Topics of Social Psychology	2	2	
	150126	社会科学统计软件应用 Application of Social Science Statistics Software	2	2	
方向选修课程 $\geq 8$ 学分	150127	中国社会思想史 Chinese Social Thought	2	2	
	150128	中国社会政策与社会福利研究专题 Special Topics on Social Policy and Social Welfare in China	2	2	
	150129	当代中国社会问题研究 A Study of Social Problems in Contemporary China	2	2	
	150130	农村社会学研究专题 Special Topics of Rural Sociology	2	3	



150131	城市社会学研究专题 Special Topics of Rural Sociology	2	3
150132	环境社会学专题研究 Special Topics of Environmental Sociology	2	3
150133	教育社会学研究专题 Special Topics of Educational Sociology	2	3
150134	文化社会学研究专题 Special Topics of Cultural Sociology	2	3
150135	人口社会学研究专题 Special Topics of Population Sociology	2	3
150136	体育社会学研究专题 Special Topics of Sports Sociology	2	3
150137	社会工作理论与方法 Theory and Method of Social Work	2	2
150138	社区社会工作研究专题 Special Topics of Community Social Work	2	3
150139	工会社会工作研究专题 Special Topics of the Unions Social Work	2	3
150140	学校社会工作专题 Special Topics of School Social Work	2	3
150141	社会服务项目管理与评估 Management and Evaluation of Social Service Projects	2	3
150142	社会心态专题研究 Special Topics of Social Mentality	2	3
150143	家庭社会工作专题研究 Special Topics of Family Social Work	2	3
150144	民俗学理论与方法 Folklore Theories and Methods	2	2
150145	中国民间信仰研究 Study on the Chinese Folk Belief	2	3
150146	中国传统生态民俗专题研究 Study on Chinese Traditional Ecological Folk Customs	2	3
150147	区域民俗研究 Study on Regional Folklore	2	3
150148	齐文化研究专题 Study on Qi Culture	2	3



	150149	民间文艺研究 Folk Literature and Art Research	2	3	
	150150	社会学英文文献阅读导引 Introduction to the Reading of Sociological English Literature	1	2	
素养选修课程 ≤1 学分	150151	研究生心理健康教育 Postgraduate Mental Health	1	1	
补修课程 不计学分					导师 确定
其他培养环节（6 学分）					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生在导师的指导下，通过查阅文献、收集资料和调查研究后确定研究课题，写出开题报告。5 人以上的专家组对开题报告提出评价和修改意见，不通过可限期重做，重做后仍未通过者将终止培养。开题通过后即获得 1 学分。</p> <p>Under the guidance of the mentor, the candidates identify the subject of the dissertation by analyzing the literature, collecting the data, and investigating, then preparing the opening presentation of the dissertation. The expert group of more than 5 people will submit evaluation and revision opinions on the opening presentation of the dissertation, if it was failed, the candidates shall redo it within a limited time. Those who have not passed the redo will terminate the training of SSDUT. 1 course credit will be awarded if the candidates pass the opening presentation of the dissertation.</p>				3
中期考核 (1 学分)	<p>对研究生的思政、科研、实践、综合素质以及学位论文进展情况等进行考核，考核不合格的，经培养单位、研究生院审核，报校长办公会批准，做肄业处理。中期考核通过后即获得 1 学分。</p> <p>The mid-term assessment will evaluate the ideological and political, scientific research, practice, comprehensive quality and progress of the dissertation of the candidates. If the assessment is unqualified, it will be reviewed by the training college and the graduate school of SDUT, and reported to the president's office of SDUT for approval of which this candidate study was at SDUT but not graduate. 1 course credit will be awarded if the candidates pass the mid-term assessment.</p>				4-5
实习实践 (2 学分)	<p>(1) 教学实践 为培养研究生的教学能力和沟通表达能力，研究生在学习期间应参加教学实践。教学实践可采取多种方式进行，如本科课程教学、辅导工作或指导课程实习、课程设计及毕业设计等工作。教学实践时间累计不少于 1 个月的工作量，结束后由导师写出考核评语，考核通过即获得 1 学分。</p> <p>(2) 专业实践 为培养研究生的动手操作能力和实践创新能力，研究生在学习期间应参</p>				2-5

	<p>加专业实践。研究生应安排至少 1 个月的时间（一般可以利用寒、暑假）到企事业单位、社区、社会组织等进行实践训练，也可以参加结合研究方向的调查和研究等工作。导师考核合格即可获得 1 学分。</p> <p>Internship practice is aiming to cultivate candidates apply theory to find a solution to practical problems.</p> <p>It including two sections, education practice, and professional practice.</p> <p>(1) Education practice</p> <p>To develop the teaching ability and communication skills of candidates, they should participate in education practice during the semesters. Education practices can be carried out in a variety of ways, such as undergraduate teaching assistants, mentoring or guiding production internships, curriculum design, and graduation design. The education practice time accumulates the workload of not less than 1 month. After the end of the education practice, the mentor issues the assessment comments. 1 course credit will be awarded if the candidates pass the assessment.</p> <p>(2) Professional practice</p> <p>To cultivate the ability of practical innovation, candidates of this major must have a social investigation and practice activities for at least one month (generally during the summer and winter vacations). Candidates in all four directions must be surveyed at the practice institute for at least half a month. The remaining survey time can be based on their thesis and selected by the mentor. 1 course credit will be awarded if the candidates pass the assessment of the mentor.</p>		
<p>创新创业 (2 学分)</p>	<ol style="list-style-type: none"> <li>1. 进行 3 个月以上的出国访学研修或学术交流；</li> <li>2. 参加学术会议并宣读论文，或做公开学术报告 2 次；</li> <li>3. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖；</li> <li>4. 参加 6 次以上与本学科相关的学术报告，并提交总结；</li> </ol> <p>每项记 1 学分，需完成 2 学分。</p> <ol style="list-style-type: none"> <li>1. Overseas study or academic exchanges for more than 3 months;</li> <li>2. Participating in academic conferences and the paper is including in the conference, and reading papers in the conference, or making public academic reports twice;</li> <li>3. Participating in national science and technology competitions, creative design, innovation, and entrepreneurship competition and win a prize;</li> <li>4. Participating in more than 6 academic reports related to the subject and submit a summary;</li> </ol> <p>1 course credit for each item and 2 course credits were required.</p>	<p>1-5</p>	
<p>培养单位 教授委员会主任</p>		<p>培养单位 负责人</p>	



## 图书情报与档案管理学科学术学位硕士研究生培养方案

学科代码：1205

### Library, Information and Archives Management Science Training Program for Overseas Academic Master's Degree

Credit Code: 1205

#### 一、学科简介 ( Brief Introduction to Discipline )

山东理工大学情报学硕士学位授权点创建于 2003 年，是国务院学位委员会批准增设的第九批硕士学位授予单位，是山东省第一个情报学学术硕士学位授权点。近五年学位点先后承担过数十项国家级及省部级课题，获得过多项国家级及省部级教学成果奖（包括省级研究生教学成果一等奖），发表过数百篇 SCI、SSCI、CSSCI 高水平论文。2018 年获批图书情报与档案管理一级学科硕士学位授予权。

学位点突出理工特色，超过 60% 的毕业生考入北京大学、武汉大学、南京大学、中国科学院大学、中国人民大学、南开大学、大连理工大学等著名院校读博深造，学位点还与美国路易斯安纳州立大学、肯特州立大学等国外知名大学建立了长期交流合作关系。

The master's degree authorization point of Shandong University of Technology in information science was founded in 2003. It is the 9th batch of master's degree-granting units approved by the Academic Degrees Committee of the State Council. It is the 1st authorized academic Master of Information Science in Shandong Province. In the past five years, it has undertaken dozens of national and provincial-level projects, and won multiple national and provincial-level teaching achievement awards (including the first prize for provincial graduate teaching achievements), and published hundreds of SCI, SSCI and CSSCI high-level papers. In 2018, it got the first level master's degree in Library, Information and Archive Management Science.

It highlights the characteristics of science and technology. At present, more than 60% of graduates are admitted to Peking University, Wuhan University, Nanjing University, University of Chinese Academy of Sciences, Renmin University of China, Nankai University, Dalian University of Technology and other famous universities for further education. It has established long-term exchanges and cooperative relations with Louisiana State University, Kent State

University and other well-known foreign universities.

## 二、培养目标 ( Educational Objectives )

1. 熟悉中国文化与语言，掌握图书情报与档案管理基本理论、基础知识和技能，熟悉学科领域的发展方向；具备独立开展与本学科有关的科研和教学工作的能力。

2. 具有科学严谨、求真务实的治学态度和良好的学术素养及学术道德。

1. The students should be familiar with Chinese culture and language, master the basic theories, basic knowledge and skills of library, information and archives management, understand the development direction of the subject area; independently carry out research and teaching work related to the subject.

2. The students should have the truth-seeking and pragmatic academic attitude, good academic quality and academic ethics.

## 三、研究方向 ( Research Orientation )

图书情报与档案管理学科学术学位硕士研究生培养方案设以下 4 个研究方向：

1. 信息计量与科学评价
2. 数字图书馆与档案管理
3. 信息检索与信息资源管理
4. 知识产权管理与分析评价 ( 交叉方向 )

详见附表 1。

This training programme has four research directions as follows:

1. Informatics and Scientific Evaluation
2. Digital Library and Archives Management
3. Information Retrieval and Information Resource Management
4. Intellectual Property Management and Analysis Evaluation ( Interdiscipline )

Attached Table 1 for details.

## 四、学习年限 ( Length of Schooling )

全日制学术型硕士研究生基本学制为 3 年，学习年限为 2-4 年 ( 含学位论文答辩时间 )。科学研究和撰写学位论文的时间不少于 1 年 ( 从通过开题报告算起 )。经导师同意，可申请提前毕业，但科学研究和学位论文撰写时间要求不变。休学时间不计入学习年限。

在基本学制规定时间内，研究生应完成学位论文答辩和授予学位审查等各项工作。如因学术性的正当理由，研究生在基本学制结束前两个月内向所在培养单位学位评定分委员会提交学位论文进展报告和学位论文延期申请报告，并经学位评定分委员会组织审



查通过、报校学位评定委员会办公室审核批准后，可最多延长申请学位年限 1 年。

The basic academic system for full-time academic master is 3 years, and the length of study is 2-4 years (including the time for thesis defense). The time for scientific research and writing of papers is no less than one year (from the thesis proposal). With the consent of the supervisor, students can apply for graduation in advance, but the time required for scientific research and paper writing remains unchanged. The time of suspension is not counted in the length of study.

Within the time limit set by the basic academic system, graduate students should complete the work of thesis defense and degree evaluating. For academically justified reasons, the graduate student submits the thesis progress report and the thesis extension application report to the degree evaluation subcommittee of the ISTI two months before the end of the basic academic system and is approved by the degree evaluation subcommittee to report the university. After the approval of the evaluation committee office, the application for a maximum of one year may be extended.

### 五、培养方式与培养环节 ( Training Mode and Cultivating Process )

研究生培养实行导师负责制或以导师负责为主的指导小组 ( 团队 ) 制。导师 ( 或指导小组 ) 不仅负责制订研究生培养计划，指导科学研究、专业实践、服务实习和学位论文等工作，而且对研究生的思想品德、学术道德有引导、示范和监督的责任。

研究生须严格按照培养环节要求开展学习、研究和实践，导师 ( 或指导小组 ) 需加强对培养环节的管理和监控。

Postgraduate training is based on a mentoring system or a mentoring team. The mentor ( or the mentoring group ) is not only responsible for formulating postgraduate training programs, guiding scientific research, professional practice, service internships and thesis, but also the responsibility for guiding, demonstrating and supervising the ethics and academic ethics of students.

Students must carry out study, research and practice in strict accordance with the requirements of the training session, and the mentor ( or the mentoring group ) needs to strengthen the management and monitoring of the training.

### 六、课程设置与学分 ( Curriculum and Credit Requirements )

课程包括必修课程和选修课程，学生需在规定时间内完成不低于 26 学分的课程学习任务，其中，必修课不低于 16 学分，选修课不低于 9 学分。

课程设置与学分见附表 2。

The course includes compulsory courses and elective courses. Students are required to complete a course of no less than 26 credits within the specified time. The required courses are

no less than 16 credits and elective courses are no less than 9 credits.

Attached Table 2 for details.

## 七、必修环节及学分 ( Required Parts and Credits )

研究生在学期间必须参与的学术活动和培养环节同样采取学分制, 统称为必修环节学分, 至少 3 学分。必修环节学分和课程学分不得通用, 两者分数总和不低于 32 学分方可进入学位论文送审答辩环节。

### 1. 学位论文开题

学位论文开题是研究生培养过程中开展学位论文工作的首要环节。开题报告应论述学位论文选题依据、研究方案、预期目标与科研成果、工作计划等关键问题。

研究生学位论文开题必须经导师审核同意方可进行。开题通过后获得 1 学分。

学位论文开题具体工作参照《山东理工大学关于研究生学位论文工作的有关规定》执行。

### 2. 中期筛选

中期筛选是在研究生课程学习基本结束之后, 以研究生培养方案为依据, 对研究生的政治思想和道德品质、基础理论和专业知识、科技创新、实践能力及健康状况等方面进行的综合考核。

中期筛选通过后获得 1 学分。中期筛选具体工作参照《山东理工大学研究生中期筛选考核实施办法》执行。

### 3. 创新创业

创新创业活动主要有以下几种形式:

参加省级以上学术会议并宣读论文;

在省级以上学术会议上做公开学术报告 2 次;

参加全国性的科技竞赛、创意设计、创新创业竞赛等;

参加 6 次以上与本学科相关的学术报告, 提交报告总结, 由导师考核并签字, 交学科点核定存档以备核查。

完成以上条件之一, 即可获得 1 学分, 至少完成 1 学分。

The academic activities and training sessions that graduate students must participate in during their studies also adopt credit system, collectively referred to as compulsory credits, at least 3 credits. Compulsory credits and course credits are not allowed. The total credits, including course credits and compulsory credits, are not less than 32 credits before thesis review and defense.



### 1. Thesis proposal

The thesis proposal is the primary link in the development of the thesis in the postgraduate training sessions. The thesis proposal should discuss the key issues such as the selected topic basic, the research plan, the anticipated goal, the scientific research achievements and the work plan of the thesis.

The thesis proposal must be approved by the instructor before proceeding. Student obtains 1 credit after passing the thesis proposal.

The thesis proposal will be conducted according to "Regulations on Graduate Dissertation Work of Shandong University of Technology".

### 2. Mid-term screening

Mid-term screening is a comprehensive assessment of students' political thought and moral character, basic theory and professional knowledge, scientific and technological innovation, practical ability and health status based on the graduate training program after the basic completion of graduate course learning.

Student obtains 1 credit after passing the mid-term screening. The Mid-term screening will be conducted according to "Implementation Measures for the Mid-term Screening and Assessment of Postgraduates in Shandong University of Technology".

### 3. Innovation and entrepreneurship

There are several main forms of innovation and entrepreneurship:

Participate in academic conferences above the provincial level and read papers.

Make public academic reports twice at academic conferences above the provincial level.

Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc.

Participate in more than 6 academic reports related to the discipline and submit report summaries to the discipline for verification, which are reviewed and signed by the instructor.

If one of the above conditions is fulfilled, one credit will be obtained, at least 1 credit.

## 八、学位论文 ( Academic Dissertation )

图书情报与档案管理学科学术学位硕士研究生学位论文要求如下:

1. 学位论文应在导师指导下由研究生独立完成。
2. 研究生必须在完成培养方案规定的教学计划之后,方可进入撰写学位论文阶段。
3. 学位论文的题目应在导师(或指导小组成员)的共同协商认可下确定,论文选题应直接来源于生产实际或具有明确的工程应用背景,并结合工程实际需要、解决工程实际问题。
4. 学位论文要求内容充实、结论正确、格式规范、条理清楚、表达准确。学位论文应具有一定的深度和先进性,应反映出作者对基础理论和专门知识的掌握情况,反映



出作者综合运用有关理论、方法和手段解决理论与实际问题的能力。

5. 按照《山东理工大学硕士学位授予实施细则》要求组织论文开题、中期考核、学位论文预答辩和正式答辩等环节，论文答辩要做到严格要求、公正、公开。

The requirements for the dissertation of master's degree in library, information and archives management science are as follows:

1. Dissertations should be completed independently by graduate students under the guidance of tutors.

2. Graduate students must complete the teaching plan stipulated in the training program before they can enter the stage of writing dissertations.

3. The title of the dissertation should be determined by the consultation and approval of the instructor (or the members of the steering group). The topic of the dissertation should be directly derived from the actual production or have a clear engineering application background, and solve the practical engineering problems in accordance with the actual needs of the project.

4. The dissertation requires full content, correct conclusion, standard format, clear organization and accurate expression. The dissertation should have a certain depth and advanced nature. It should reflect the author's mastery of basic theory and expertise, and the author's ability to solve theoretical and practical problems comprehensively by using relevant theories, methods and means.

5. In accordance with "Rules for the Grant of Master's Degree of Shandong University of Technology", it is required to organize the opening of thesis, mid-term assessment, dissertation pre-defense and formal defense, etc. The defense of dissertation should be strict, fair and open.

## 九、毕业与学位要求 ( Graduate and Degree Requirements )

### (一) 毕业要求

满足以下条件，可获得毕业证书。

1. 具有良好的品德修养和学术道德，实事求是、勇于创新；
2. 修读完培养方案规定课程和其他培养环节，成绩考核合格；
3. 通过学位论文答辩；
4. 符合学校有关规定的其他要求。

### (二) 学位要求

严格执行《中华人民共和国学位条例暂行实施办法》、《山东理工大学硕士学位论文评审办法》、《山东理工大学硕士学位授予实施细则》有关规定。

#### 1. Graduation requirements

A diploma can be obtained if the following conditions are met.

- (1) Have a good moral character and academic ethics, realistic and innovative.



(2) After completing the training program and other training courses, the results are qualified.

(3) Pass the thesis defense.

(4) Meet other requirements of the school's relevant regulations.

## 2. Degree requirements

It shall be strictly implemented according to the “Regulations of the People's Republic of China on Academic Degrees”, “Evaluation Methods for Master's Degree Thesis of Shandong University of Technology” and “Rules for the Grant of Master's Degree of Shandong University of Technology” .

附表 1: 研究方向简介 ( Brief Introduction on Research Orientation )

类别		培养目标	支撑课程
综合素质		<p>掌握社会科学基本理论与方法, 了解经济学、社会学、法学、心理学等人文社科的基本知识和基础理论。具有科学严谨、求真务实的治学态度和良好的学术素养及学术道德。</p> <p>Master the basic theories and methods of social sciences, understand the basic knowledge and theories of Humanities and social sciences such as economics, sociology, law and psychology. Have scientific and rigorous, realistic and pragmatic academic attitude and good academic quality and ethics.</p>	<p>中国传统文化、社会研究方法、科研素养与创新能力</p> <p>Chinese traditional culture、social research methods、scientific research literacy and innovation ability</p>
综合能力		<p>熟悉汉语语言, 具有良好的听、说、读、写能力; 掌握应用统计性软件和信息分析工具及专业领域研究所需的其他计算机工具; 具有较强的自学能力、实践创新能力、写作能力和学术交流能力。</p> <p>Familiar with Chinese language, have good listening, speaking, reading and writing skills; master the application of statistical software and information analysis tools and other computer tools needed for professional research; have strong self-learning ability, practical innovation ability, writing ability and Academic communication skills.</p>	<p>中国文化、汉语、计算机科学前沿技术应用系列讲座、论文写作与学术规范</p> <p>Chinese culture、Chinese, The Lectures on the Frontier Technology and Application of the Computer Science、Thesis Writing and Academic</p>
研究方向	信息计量与科学评价	<p>掌握信息检索技术、数据采集技术、评价学理论、文本分析与信息计量方法, 通过编程语言、统计分析软件, 计量分析文献与网络信息数据, 构建合理的科学评价指标体系, 对科研机构、学科、人才以及网络信息资源进行评价研究。</p> <p>Master information retrieval technology, data collection technology, evaluation theory, text analysis and information measurement methods; and through programming language and statistical analysis software, measure and analyze literature and network information data, and construct a reasonable scientific evaluation index system for scientific research institutions, disciplines, talents and network information resources for evaluation research.</p>	<p>信息计量学、Java 语言程序设计、数据采集技术、文本信息分析技术、评价学理论与方法</p> <p>Informetrics、Java Programming、Data Acquisition Technology、Analysis Technology of Text Information、Evaluation Theory and Method</p>



数字图书馆与档案管理	<p>掌握知识关联、语义化信息组织、智能信息检索、跨领域信息融合、数字资源长期保存、自然语言处理及文本挖掘等关键技术，研究图书馆数字资源收集、整理、加工、保管、检索、分析与利用，研究智慧图书馆、泛在图书馆、知识服务为中心等新型服务模式等重大理论问题和实践问题，研究档案信息资源规范组织、方便用户的档案信息获取、提高档案信息价值作用的重要途径。</p> <p>Master key technologies such as knowledge association, semantic information organization, intelligent information retrieval, cross-domain information fusion, long-term preservation of digital resources, natural language processing and text mining, and should study the collection, collation, processing, storage, retrieval, analysis and utilization of digital resources in libraries, the major theoretical and practical issues in the study of new service modes such as intelligent library, ubiquitous library and knowledge service as the center, the standardized organization of archival information resources, user-friendly access to archival information, important ways to improve the value of archives information.</p>	<p>信息组织与数字图书馆、数据科学理论与实践、人工智能及其应用、档案学理论研究、数字档案馆的理论与实践</p> <p>Information Organization and Digital Library、Theory and Practice of Data Science、Artificial Intelligence and Application、Research on Archives Theory、Theory and Practice of Digital Archives</p>
信息检索与信息资源管理	<p>掌握信息资源管理和信息检索的基本理论，熟悉数据管理、网络系统资源管理、信息系统规划与开发，具备信息分析、文献计量分析、信息系统建设与维护、信息技术应用、信息检索的能力。</p> <p>Master the basic theory of information resource management and information retrieval, data management, network system resource management, information system planning and development, and have the information analysis, document measurement analysis, information system construction and maintenance, information technology application, information retrieval capabilities.</p>	<p>信息资源管理、信息管理学基础、信息分析与决策咨询、信息用户与服务研究</p> <p>Information Resource Management、Information Management Foundation、Information Analysis and Decision-making Consultation、Information User and Service Research</p>
知识产权管理与分析评价	<p>掌握知识产权管理、竞争情报分析、信息检索、数据采集与文本挖掘、跨领域信息融合等关键技术，以信息资源的搜集、整理、加工、分析为基础，从技术、经济、法律角度，研究知识产权质量与价值评估、专利管理与专利运营、创新空间与创新启示、产业动态与发展趋势追踪、市场机会与威胁识别，为战略规划、创新部署、技术研发、成果转化等提供决策支持。</p>	<p>知识产权研究、数据采集技术、数据挖掘与统计学习、竞争情报研究</p> <p>Intellectual property research、Data Acquisition Technology、Data Mining and Statistical Learning Topics、Research on Competitive Intelligence</p>

		<p>Master key technologies such as intellectual property management, competitive intelligence analysis, information retrieval, data acquisition and text mining, cross-domain information fusion; and based on the collection, collation, processing and analysis of information resources, research the intellectual property quality and value evaluation, patent management and patent operation, innovation space and innovation enlightenment, industry dynamics and development trend tracking, market from the perspective of technology, economy and law Opportunity and threat identification provide decision support for strategic planning, innovation deployment, technology development, and transformation of results.</p>	
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附表 2: 培养计划 (Training Plan)

学科名称	图书情报与档案管理 Library Information and Archives Management		学科代码	1205		
单位名称	图书馆 Library		培养类型	学术型硕士研究生 Academic Master's Degree		
学分要求	总学分 Total credit: $\geq 32$ , 必修课程学分 Compulsory course credit: $\geq 10$ , 选修课程学分 Elective course credit: $\geq 12$					
课程设置						
课程类型	课程编码	课程名称	学分	学期	备注	
公共必修课程 $\geq 5$ 学分	G13100	中国文化 Chinese Culture	2	1		
	G13101	汉语 Chinese	2	1		
	G30033	论文写作与学术规范 Thesis Writing and Academic	1	1		
学科平台课程 $\geq 11$ 学分	300002	信息资源管理 Information Resource Management	2	1	必选	
	300031	图书情报学理论研究 Theoretical Research on Library and Information Science	2	1		
	300024	图书情报与档案管理前沿研究 Frontier Research on Library, Information and Archives Management	2	1		
	300004	信息组织与数字图书馆 Information Organization and Digital Library	2	1		
	300005	信息计量学 Informetrics	2	1		
	300032	图书情报学研究思维与方法 Thinking & Methods of Library and Information Science Research	2	1		
方向选修课程 $\geq 8$ 学分	300003	竞争情报研究 Research on Competitive Intelligence	2	2		
	300006	文本信息分析技术 Analysis Technology of Text Information	2	2		
	300007	信息分析与决策咨询 Information Analysis and Decision-making Consultation	2	2		

300008	情报检索进展研究 Research on Information Retrieval Progress	2	1
300010	信息检索技术 Information retrieval technology	2	2
300011	知识产权 Research on Intellectual property	2	1
300012	图书馆管理与发展研究 Research on Library Management and Development	2	1
300013	档案学理论研究 Research on Archives Theory	2	1
300015	知识管理研究 Research on Knowledge Management	2	1
300016	知识网络研究 Research on Knowledge Network	2	2
300017	统计分析软件 SPSS Statistical Analysis Software SPSS	2	2
300018	评价学理论与方法 Evaluation Theory and Method	2	2
300019	科技情报分析与研究 Analysis and Research of Scientific and Technological Information	2	2
300020	数字档案馆的理论与实践 Theory and Practice of Digital Archives	2	1
300021	数据科学理论与实践 Theory and Practice of Data Science	2	1
300022	图书馆学概论 Introduction to Library Science	2	1
300023	数字人文研究 Digital Humanities Research	2	1
300025	古典文献整理研究 Research on the Arrangement of Classical Literature Review	2	1
300026	信息行为研究理论与方法 Theory and Method of Information Behavior Analysis	2	1
300027	信息用户与服务研究 Information User and Service Research	2	2
300028	社会网络分析 Social Network Analysis	2	2



	300029	信息管理学基础 Information Management Foundation	2	1	
	010009	神经网络技术及其应用 Neural Network Technology and Application	2	2	
	030020	可视化编程语言 Visual Programming Language	2	1/2	
	030135	人工智能及其应用 Artificial Intelligence and Application	2	1	
	030136	数据采集技术 Data acquisition technology	2	1/2	
	050003	Java 语言程序设计 Java Programming	2	1	
	050013	搜索引擎理论与技术 Principle and Technology of Search Engine	2	2	
	050014	机器学习基础与实践 Machine Learning: Fundamentals and Practices	2	2	
	050018	数据分析与 R 语言 Data Analysis with R	2	1	
	050020	数据可视化 Data Visualization	2	1	
	050025	数据仓库与数据挖掘 Data Warehouse and Data Mining	2	1	
	110039	数据分析及统计软件 Data analysis and statistics software	2	2	
	110051	数据挖掘与统计学习专题 Data mining and statistical learning topics	2	1	
	180004	信息系统与信息资源管理 Information System and Information Resource Management	2	2	
	180057	信息资源与管理信息系统工程 Information Resources and Management Information System Engineering	2	2	
素养选修课程 ≤1 学分	G031001	中国传统文化 Chinese Traditional Culture	1	1/2	
	G15001	东方哲学与现代化 Eastern Philosophy and Modernization	1	1/2	
	G05024	计算机科学前沿技术应用系列讲座 The Lectures on the Frontier Technology and Application of the Computer Science	1	2	



	G02060	科研素养与创新能力 Scientific research literacy and innovation ability	1	2	
	G10014	实验设计与统计分析 Experimental design and statistical analysis	1	1/2	
	G14010	科技英语写作 Scientific English writing	1	2	
补修课程 不计学分					导师 确定
其他培养环节 (≥3 学分)					
培养环节	相关内容及要求				学期
开题报告 (1 学分)	<p>研究生学位论文开题必须经导师审核同意方可进行。开题报告内容及要求参照《山东理工大学关于研究生学位论文工作的有关规定》执行。</p> <p>The thesis proposal must be approved by the instructor before proceeding. The thesis proposal will be conducted according to "Regulations on Graduate Dissertation Work of Shandong University of Technology".</p>				3
中期考核 (1 学分)	<p>中期考核内容及要求参照《山东理工大学研究生中期筛选考核实施办法》执行。</p> <p>The Mid-term examination will be conducted according to "Implementation Measures for the Mid-term Screening and Assessment of Postgraduates in Shandong University of Technology".</p>				4-5
创新创业 (≥1 学分)	<p>1. 参加省级以上学术会议并宣读论文,或在省级以上学术会议上做公开学术报告 2 次;</p> <p>2. 参加全国性的科技竞赛、创意设计、创新创业竞赛等并获奖;</p> <p>3. 参加 6 次以上与本学科相关的学术报告,提交总结,导师考核并签字,交学科点核定存档以备核查。</p> <p>每项记 1 学分。</p> <p>1. Participate in academic conferences above the provincial level and read papers, or make public academic reports twice at academic conferences above the provincial level.</p> <p>2. Participate in national science and technology competitions, creative design, innovation and entrepreneurship competitions, etc.</p> <p>3. Participate in more than 6 academic reports related to the discipline and submit report summaries to the discipline for verification, which are reviewed and signed by the instructor.</p> <p>1 credit for each item.</p>				1-5
培养单位 教授委员会主任			培养单位 负责人		