目　录

矿业工程博士研究生培养方案

（学科代码：0819　授 工学博士 学位）

一、培养目标

培养系统全面掌握矿业工程学科坚实宽广的基础理论和专门知识及相关学科知识；能运用现代科学理论、实验手段和信息工具，独立从事矿业工程领域科学研究和独立担负专门技术工作，在本学科有关理论和工程实际问题的研究中做出创造性成果的高层次人才。

二、研究方向

1. 矿床开采理论与技术
2. 岩土力学与边坡工程
3. 矿业经济与系统工程
4. 爆炸理论与应用
5. 矿物加工新工艺及新设备
6. 矿物化学提取
7. 城市矿产资源综合利用
8. 铁矿造块与直接还原

三、学习年限

本学科博士生的学习年限一般为 3-5 年。

四、学分要求

矿业工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课学分	≥12 学分	公共必修课 6 学分 其中：汉语 4 学分，中国概况 2 学分 学科基础课≥4 学分 专业选修课≥2 学分
研究环节	12 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告及考核 1 学分 学位论文 9 学分
具体课程设置见课程计划表		

五、培养要求

1.基本要求

全面系统掌握本学科的科学理论与技术及相关学科的理论基础，对本学科的发展历史、现状和前沿动态有深入的了解，具备坚实的基础理论和系统宽广的专门知识。能运用现代科学理论和实验手段、计算机应用技术和信息技术，创造性地进行本学科方向有关的理论和实际问题的研究。具有创造性地发现和解决矿业工程实际问题的能力，遵守学术道德规范，具有强烈的事业心和责任感。至少掌握一门外国语，具备熟练阅读本专业的外文文献，进行国际学术交流的能力。达到《中华人民共和国高等教育法》、《中华人民共和国学位条例》等的相关要求。

2.开题要求

以书面及答辩形式作为开题报告，记 1 学分，成绩按通过/不通过登记。

开题报告的内容主要包括：课题来源和选题依据，对国内外有关文献进行阅读、分析和总结（不少于 70 篇）；研究方案需阐明：研究目标、研究内容、关键问题与创新点、研究方法、技术路线、实验方案等；研究工作计划及时间安排。

开题报告至少由 5 名具有副教授以上职称（其中至少 3 名教授）审定并签署意见，答辩环节至少有 5 名具有副教授以上职称（其中至少 3 名教授）参加，答辩未能通过者，必须重新做开题报告。

开题报告一般应为 0.8～1.5 万字。开题报告评审通过后，须完整填写《博士研究生开题报告》，交学院留存，毕业时归入学位档案。

3.论文中期进展要求

必须以书面及答辩形式做论文研究中期进展报告，记 1 学分。

中期进展报告就课题的实验方法、数据、结果的可靠性、设计方案初步结论的正确性以及能否如期完成学位论文工作等进行公开答辩，须有至少 5 名具有副教授以上职称（其中至少 3 名教授）或博士学位者对中期报告进行考核，对存在的问题提出指导性建议。

中期考核通过后，须填写《博士生中期报告及综合考核表》交研究生院，复印件和书面开题报告交学院留存。

4.参加学术活动要求

研究生须参加 9 次以上学术活动，记 1 学分。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前，经导师签字的书面记录交学院备案并记相应学分。

5.发表学术论文要求

按照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》执行。

6.学位论文预答辩要求

研究生完成所有培养环节，满足发表学术论文要求，按照《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

7.学位论文答辩要求

按照《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

矿业工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BD01101	矿业系统科学原理与方法	32	2	1	资源与环境工程学院	采矿工程选修
		15BD01102	岩石力学新进展	32	2	1	资源与环境工程学院	
		15BD01121	湿法冶金学	40	2.5	1	资源与环境工程学院	矿物加工工程选修
		15BD01122	结构化学	40	2.5	2	资源与环境工程学院	
		15BD01123	泥沙运动学	40	2.5	2	资源与环境工程学院	
选修课	专业选修课	15BC01101	采矿科学与新技术	32	2	1	资源与环境工程学院	采矿工程选修
		15BC01121	现代矿物浮选溶液化学	40	2.5	1	资源与环境工程学院	矿物加工工程选修
研究环节		15BYJ0101	开题报告		1		资源与环境工程学院	必修
		15BYJ0102	学术交流≥9 次		1			
		15BYJ0103	论文中期进展报告及考核		1		资源与环境工程学院	
		15BYJ0104	学位论文		9		资源与环境工程学院	

Educational Program for Doctoral Students of Mineral Engineering

(Discipline Code：0819 Conferred Degrees：Doctor of Engineering)

Ⅰ.Educational Objectives

The program's purpose is to educate high-caliber personnel with such abilities as: having a solid foundation of basic theories, and specialized and relevant knowledge in Mineral Engineering discipline; conducting independent scientific research and undertaking specialized technical work in the field of Safety Science and Engineering with modern scientific theories, experimental equipment and information tools; and having made creative achievements in theoretical study and practical engineering work in this disciplinary domain.

Ⅱ.Research Fields

1. Mining Theories and Technologies
2. Rock and Soil Mechanics and Slope Engineering
3. Mining Economics and Systems Engineering
4. Explosion Theory and Application
5. New Mineral Processing Technologies and Equipment
6. Mineral Chemical Extraction
7. Comprehensive Utilization of Urban Mineral Resources
8. Iron Mine Agglomeration and Direct Reduction

Ⅲ. Program Duration

The duration of study for doctoral students normally ranges from 3 to 5 years.

Ⅳ.Credit Requirements

Credit Requirements and Allocation Instructions for Doctoral Students of Mineral Engineering

Total Credits	≥24credits	
course credits	≥12credits	Public Compulsory Courses total 6 credits, among which 4 credits are for Chinese Language, and 2 credits for A Survey of China Subject Basic Courses ≥4 credits Elective Specialized Courses ≥2 credits
research session	12credits	Thesis Proposal, 1 credit Academic communication, 1 credit

		Mid-term Progress Report and Thesis Assessment, 1 credit Dissertation, 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Training Requirements

1. Basic Requirements

Completely mastering scientific theories and technologies of the discipline and theoretical foundation of relevant disciplines. Having an in-depth understanding of the development history, status quo and leading edge of the discipline, and possessing solid basic theories and systematic and extensive expertise. Being able to conduct original studies both in theories and practice with modern scientific theories, experimental means, computer application technology and information technology. Innovatively discovering and resolving practical problems in Mineral Engineering, Complying with academic ethics, and having a strong sense of dedication and responsibility. Mastering at least one foreign language to read foreign professional literatures and conducting international academic exchanges. Meeting requirements of The Higher Education Law of the People's Republic of China and Regulations of the People's Republic of China on Academic Degrees.

2.Thesis Proposal Requirements

Thesis proposal shall be presented in a written and oral defense form, counting 1 credit, Grades are either pass or fail.

Contents of a thesis proposal shall include: the background and basis of the selected topic, a review of domestic and abroad literature with an analysis and a summary (no less than 70 articles); The research program should illustrate research objectives, content, key problems and innovation, research method, technical approach, and experiment means; and a research plan and a time schedule.

A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles (at least three of whom are professors). There should be at least five associate professors and above titles (at least three professors) attending the oral defense. If students failed the oral defense, the thesis proposals should be re-prepared.

A thesis proposal normally ranges from 8000 to 15,000 words. When a proposal report is appraised and approved, a Doctoral Candidate’s Thesis Proposal Form shall be completed and submitted to one’s school and reserved in the degree achieves.

3.The Mid-term Progress Requirements for a Thesis

The mid-term progress of a thesis shall be presented in a written and oral defense form, counting 1 credit.

The mid-term progress report should be presented publicly around the validity of experiment methods, data, results, preliminary conclusion from the research approach, and whether the thesis can be completed on schedule. There should be at least five associate professors and above titles (at least three professors) or doctors attending

the oral defense and providing advice for existing problems.

Once the mid-term examination is passed, a Doctoral Student's Mid-term Report and Comprehensive Assessment Form shall be completed and submitted to the Graduate School, and a copy of that and a written form of the original thesis proposal report shall be preserved by the school.

4.Requirements for Academic Activities

A graduate student shall participate in at least nine academic activities, counting 1 credit. A written record shall be prepared for each academic activity and a written material shall be reserved for an academic presentation. The written record signed by the supervisor shall be submitted to the school to register credits before applying for a degree.

5. Academic Articles Publishing Requirements

Follow the Provisions of Doctoral and Master Students of Wuhan University of Science and Technology Applying for a Degree and Gaining Academic Achievements.

6. Dissertation Pre-Defense Requirements

A graduate student shall complete all training sessions, meet academic articles publishing requirement, and shall follow the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and the Graduate Student Dissertation Detection Rules of Wuhan Wuhan University of Science and Technology (Trial).

7.Dissertation Defense Requirements

Follow the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and Graduate Student Dissertation Detection Rules of Wuhan Wuhan University of Science and Technology (Trial), etc.

Curriculum for Doctoral Students of Mineral Engineering

Category	Course Nature	Course Code	Course Name	Hour	Credit	Semester	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15BD01101	Principles and Methods of System Analysis in Mining Industry	32	2	1	School of Resource and Environmental Engineering	Optional for Mining Engineering Major
		15BD01102	New Development in Rock Mechanics	32	2	1	School of Resource and Environmental Engineering	
		15BD01121	Hydro-metallurgy	40	2.5	1	School of Resource and Environmental Engineering	Optional for Mineral Processing Engineering Major
		15BD01122	Structural Chemistry	40	2.5	2	School of Resource and Environmental Engineering	
		15BD01123	Sediment Kinematic	40	2.5	2	School of Resource and Environmental Engineering	
Selective Courses	Elective Specialized Courses	15BC01101	Mining Science and New Technology	32	2	1	School of Resource and Environmental Engineering	Optional for Mining Engineering Major
		15BC01121	Solution Chemistry of Modern Mineral Flotation	40	2.5	1	School of Resource and Environmental Engineering	Optional for Mineral Processing Engineering Major
research session		15BYJ0101	Research Proposal		1		School of Resource and Environmental Engineering	Compulsory
		15BYJ0102	Academic Communication, ≥9 times		1			
		15BYJ0103	The Mid-term Progress Report and evaluation		1		School of Resource and Environmental Engineering	
		15BYJ0104	Dissertation		9		School of Resource and Environmental Engineering	

矿业工程硕士研究生培养方案

（学科代码：0819 授 工学硕士 学位）

一、培养目标

培养掌握矿业工程学科坚实的基础理论和系统的专门知识，具备运用计算机和先进测试手段的能力，具有从事科学研究或独立担负专门技术工作的能力，了解学科现状、发展趋势及国际发展动态，在本学科有关理论和工程实际问题的研究中取得成果的高层次人才。

二、研究方向

1. 采矿系统工程
2. 矿床开采方法与工艺
3. 资源经济
4. 爆破工程
5. 矿物加工理论与新工艺
6. 矿物提取技术
7. 二次资源综合利用
8. 造块与直接还原理论与技术

三、学习年限

全日制攻读学术型硕士学位的学习年限为 2-3 年。

四、学分要求

矿业工程学术硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课学分	≥23 学分	公共必修课≥6 学分 学科基础课≥10 学分 专业选修课≥7 学分
研究环节	7 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告 1 学分 学位论文 4 学分
具体课程设置见附表		

五、研究环节与学位论文

1.培养基本要求

具有本学科坚实的基础理论和系统的专门知识，了解学科现状、发展趋势及国际发展动态。具备运用计算机和先进测试手段的能力，具有从事科学研究或独立担负专门技术工作的能力。具有科学的世界观和方法论，具备严谨的科研作风和良好的团队合作精神。至少熟练掌握一门外国语，具备阅读本专业外文文献的能力。达到《中华人民共和国高等教育法》、《中华人民共和国学位条例》等的相关要求。

2.开题要求

以书面及答辩形式就论文开题作报告，记 1 学分。

开题报告的内容一般应包括：（1）课题来源和选题依据，对国内外有关文献进行阅读、分析和总结（不少于 40 篇，其中外文不少于 10 篇）；（2）研究方案，阐明研究目标、研究内容、关键问题与创新点、研究方法、技术路线、实验方案等；（3）研究工作基础，说明具备的研究条件、研究过程中可能遇到的困难和问题及其可能的解决办法和措施；（4）研究工作计划及时间安排。

开题报告须有至少 5 名具有副教授以上职称或博士学位者审定并签署意见，答辩环节至少有 5 名具有副教授以上职称或博士学位者参加，答辩未能通过者，必须重新做开题报告。

书面开题报告一般应为 0.5～1.0 万字。开题报告评审答辩通过后，须完整填写《硕士研究生开题报告》，交学院留存，毕业时归入学位档案。

3.参加学术活动要求

研究生须参加 6 次以上学术活动，记 1 学分。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前，经导师签字的书面记录交学院备案并记相应学分。

4.学位论文答辩要求

研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》、《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

矿业工程学术硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SD01101	高等采矿学	48	3	1	资源与环境工程学院	采矿工程选修，≥10学分
		15SD01103	采矿系统工程	48	3	1		
		15SD01104	弹塑性力学	40	2.5	1		
		15SD01102	高等岩石力学	48	3	2		
		15SD01105	GIS 原理及应用	32	2	2		
		15SD01123	胶体与表面化学	48	3	1		矿物加工工程选修，≥10 学分
		15SD01124	界面分选原理	40	2.5	2		
		15SD01125	高等造块学	48	3	2		
		15SD01126	高等矿物加工学	48	3	2		
		15SD01127	浮选电化学	32	2	2		
选修课	专业选修课	17SY01119	试验设计与系统综合评价技术	48	3	2	资源与环境工程学院	采矿工程选修，≥7学分
		15SY01103	岩土工程数值计算	40	2.5	2		
		15SY01104	岩土工程测试技术	32	2	2		
		15SY01105	近代岩土工程加固技术	32	2	2		
		15SY01106	矿床开采新技术	32	2	2		
		15SY01110	二次资源综合利用	32	2	2		矿物加工工程选修，≥7 学分
		15SY01111	矿物加工实验技术	32	2	1		
		15SY01112	直接还原与熔融还原	32	2	2		
		15SY01113	矿物先进提取技术	32	2	2		
		15SY01114	矿物分析测试技术	32	2	2		
		15SY01115	矿物材料导论	32	2	2		

研究环节	15SYJ0101	开题报告		1		资源与环境工程学院	必修
	15SYJ0102	学术交流≥6 次		1			
	15SYJ0103	论文中期进展报告		1			
	15SYJ0104	学位论文		4			

Educational Program for Master Students of Mineral Engineering

(Discipline Code：0819 Conferred Degrees：Master of Engineering)

Ⅰ. Educational Objectives

The program's purpose is to educate high-caliber personnel with such abilities as: having a solid foundation of basic theories and systematically specialized knowledge in the Mineral Engineering discipline; having the ability to work with computer and advanced experimental techniques; conducting independent scientific research or undertaking specialized technical work; understanding the status quo, development trends and frontier dynamics of the discipline; and having made achievements in theoretical study and practical engineering work in this disciplinary domain.

Ⅱ.Research Fields in Mineral Engineering

1. Mining System Engineering
2. Mining Theories and Technologies
3. Resource Economics
4. Explosion Engineering
5. Mineral Processing Theories and New Technologies
6. Mineral Extraction Technologies
7. Comprehensive Utilization of Secondary Resources
8. Agglomeration and Direct Reduction Theories and Technologies

Ⅲ. Program Duration

The duration of study for full-time master students (academic) normally ranges from 2 to 3 years.

Ⅳ.Credit Requirements

Credit Requirements and Allocation Instructions for Academic Master Students of Mineral Engineering

Total Credits	≥30	
Course Credits	≥23credits	Public Compulsory Courses ≥6 credits, Subject Basic Courses ≥ 10 credits Elective Specialized Courses ≥ 7 credits
Research Session	7credits	Thesis Proposal, 1 credit Academic communication, 1 credit

		Mid-term Progress Report, 1 credit Degree Thesis, 4 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Research and Dissertation

1. Basic Requirements

Possessing a solid foundation of basic theories and systematically specialized knowledge of the subject; being able to work with computers and advanced experimental techniques; having the ability to independently conduct scientific research or undertake specialized technical work; possessing a scientific world outlook and methodology with a rigorous research style and teamwork spirit; Mastering at least one foreign language to read foreign professional literatures; and meeting requirements of The Higher Education Law of the People's Republic of China and Regulations of the People's Republic of China on Academic Degrees.

2. Thesis Proposal Requirements

Thesis proposal shall be presented in a written and oral defense form, counting 1 credit.

Contents of a thesis proposal shall include: (1) the background and basis of the selected topic, and a review of domestic and abroad literature with an analysis and a summary (no less than 40 articles including at least 10 foreign language articles); (2) a research program with an illustration of research objectives, content, key research questions, innovation points, research method, technical approach, experiment means, etc. (3) the research foundation illustrating exsiting research condition, and possible difficulties, problems, and their possible solutions and measures during the research process; (4) a research plan and a time schedule.

A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles or doctors. There should be at least five (associate) professors or doctors attending the oral defense. If students failed the oral defense, the thesis proposals should be re-prepared.

A thesis proposal normally ranges from 5000 to 10,000 words. When a proposal report is appraised and approved, a Master Candidate’s Thesis Proposal Form shall be completed and submitted to one’s school and reserved in the degree achieves.

3.Requirements for Academic Activities

A graduate student shall participate in at least six academic activities, counting 1 credit. A written record shall be prepared for each academic activity and a written material shall be kept for an academic presentation. The written record signed by the supervisor shall be submitted to the school to register credits before applying for a degree.

4.Dissertation Defense Requirements

A graduate student shall complete all training sessions, and shall follow the Provisions of Doctoral and Master Students of Wuhan University of Science and Technology Applying for a Degree and Gaining Academic Achievements, Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and

Technology, and the Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial).

Curriculum for Master Students of Mineral Engineering

Category	Course Nature	Course Code	Course Name	Hour	Credit	Semester	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15SD01101	Advanced Mining Theory	48	3	1	School of Resource and Environmental Engineering	Optional for Mining Engineering Major, ≥10 credits
		15SD01103	Systems Engineering in Mining	48	3	1		
		15SD01104	Elasticity and Plasticity	40	2.5	1		
		15SD01102	Advanced Rock Mechanics	48	3	2		
		15SD01105	GIS Principles and Applications	32	2	2		
		15SD01123	Colloid and Surface Chemistry	48	3	1		Optional for Mineral Processing Engineering Major, ≥10 credits
		15SD01124	Interface Separation Principle	40	2.5	2		
		15SD01125	Higher Agglomeration	48	3	2		
		15SD01126	Higher Mineral Processing	48	3	2		
		15SD01127	Flotation Electrochemistry	32	2	2		
Selective Courses	Elective Specialized Courses	17SY01119	Experiment Design and Comprehensively Systematic Assessment Technology	48	3	2	School of Resource and Environmental Engineering	Optional for Mining Engineering Major, ≥7 credits
		15SY01103	Computational Geomechanics	40	2.5	2		
		15SY01104	Testing Techniques in Rock Mechanics	32	2	2		

Selective Courses	Elective Specialized Courses	15SY01105	Reinforcement Techniques in Geotechnical Engineering	32	2	2	School of Resource and Environmental Engineering	
		15SY01106	New Techniques in Mining Engineering	32	2	2		
		15SY01110	Comprehensive Utilization of Secondary Resources	32	2	2		Optional for Mineral Processing Engineering Major, ≥7 credits
		15SY01111	Mineral Processing Experiment Technology	32	2	1		
		15SY01112	Direct Reduction and Smelting Reduction	32	2	2		
		15SY01113	Advanced Mineral Extraction Technology	32	2	2		
		15SY01114	Mineral Analysis Testing Technology	32	2	2		
		15SY01115	Introduction to Mineral Materials	32	2	2		
research session		15SYJ0101	Research Proposal		1		School of Resource and Environmental Engineering	Compulsory
		15SYJ0102	Academic Communication, ≥6 times		1			
		15SYJ0103	The mid-term progress report and evaluation		1		School of Resource and Environmental Engineering	
		15SYJ0104	Dissertation		4		School of Resource and Environmental Engineering	

安全科学与工程博士研究生培养方案

（学科代码：0837 授 工学博士 学位）

一、培养目标

培养系统全面掌握安全科学与工程学科坚实宽广的基础理论和专门知识及相关学科知识；能运用现代科学理论、实验手段和信息工具，独立从事安全科学与工程领域科学研究和独立担负专门技术工作，在本学科有关理论和工程实际问题的研究中做出创造性成果的高层次人才。

二、研究方向

1. 金属矿山安全生产理论与技术
2. 工业通风除尘与职业危害控制
3. 冶金装备故障诊断与风险控制
4. 城市地下空间火灾动力学与防治
5. 冶金企业安全生产管理与风险评价

三、学习年限

本学科博士生的学习年限一般为 3-5 年。

四、学分要求

安全科学与工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课学分	≥12 学分	公共必修课 6 学分 其中：汉语 4 学分，中国概况 2 学分 学科基础课≥4 学分 专业选修课≥2 学分
研究环节	12 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告及考核 1 学分 学位论文 9 学分
具体课程设置见课程计划表		

五、培养要求

1.基本要求

全面系统掌握本学科的科学理论与技术及相关学科的理论基础，对本学科的发展历史、现状和前沿动态有深入的了解，具备坚实的基础理论和系统宽广的专门知识。能运用现代科学理论和实验手段、计算机应用技术和信息技术，创造性地进行本学科方向有关的理论和实际问题的研究。遵守学术道德规范，具有强烈的事业心和责任感。至少掌握一门外国语，具备熟练阅读本专业的外文文献，进行国际学术交流的能力。达到《中华人民共和国高等教育法》、《中华人民共和国学位条例》等的相关要求。

2.开题要求

以书面及答辩形式作为开题报告，记 1 学分，成绩按通过/不通过登记。

开题报告的内容主要包括：课题来源和选题依据，对国内外有关文献进行阅读、分析和总结（不少于 70 篇）；研究方案需阐明：研究目标、研究内容、关键问题与创新点、研究方法、技术路线、实验方案等；研究工作计划及时间安排。

开题报告至少由 5 名具有副教授以上职称（其中至少 3 名教授）审定并签署意见，答辩环节至少有 5 名具有副教授以上职称（其中至少 3 名教授）参加，答辩未能通过者，必须重新做开题报告。

开题报告一般应为 0.8～1.5 万字。开题报告评审通过后，须完整填写《博士研究生开题报告》，交学院留存，毕业时归入学位档案。

3.论文中期进展要求

必须以书面及答辩形式做论文研究中期进展报告，记 1 学分。

中期进展报告就课题的实验方法、数据、结果的可靠性、设计方案初步结论的正确性以及能否如期完成学位论文工作等进行公开答辩，须有至少 5 名具有副教授以上职称（其中至少 3 名教授）或博士学位者对中期报告进行考核，对存在的问题提出指导性建议。

中期考核通过后，须填写《博士生中期报告及综合考核表》交研究生院，复印件和书面开题报告交学院留存。

4.参加学术活动要求

研究生须参加 9 次以上学术活动，记 1 学分。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前，经导师签字的书面记录交学院备案并记相应学分。

5.发表学术论文要求

按照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》执行。

6.学位论文预答辩要求

研究生完成所有培养环节，满足发表学术论文要求，按照《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

7.学位论文答辩要求

按照《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

安全科学与工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BD01202	气溶胶科学与技术	32	2	1	资源与环境工程学院	
		15BD01203	采动灾害控制工程	32	2	1	资源与环境工程学院	
		15BC01202	公共安全学	32	2	1	资源与环境工程学院	
		15BD01205	火灾风险评估方法学	32	2	1	资源与环境工程学院	
		15BD01206	爆炸理论与危害控制术	32	2	1	资源与环境工程学院	
选修课	专业选修课	15BY01202	工业通风与防尘新进展	32	2	1	资源与环境工程学院	
		15BY01206	现代安全管理学	32	2	1	资源与环境工程学院	
研究环节		15BYJ0101	开题报告		1		资源与环境工程学院	必修
		15BYJ0102	学术交流≥9 次		1			
		15BYJ0103	论文中期进展报告及考核		1		资源与环境工程学院	
		15BYJ0104	学位论文		9		资源与环境工程学院	

Educational Program for Doctoral Students of Safety Science and Engineering

(Discipline Code：0837 Conferred Degrees：Doctor of Engineering)

Ⅰ. Educational Objectives

The program's purpose is to educate high-caliber personnel with such abilities as: having a solid foundation of basic theories, and specialized and relevant knowledge in Safety Science and Engineering; conducting independent scientific research and undertaking specialized technical work in the field of Safety Science and Engineering with modern scientific theories, experimental equipment and information tools; and having made creative achievements in theoretical study and practical engineering work in this disciplinary domain.

Ⅱ.Research Fields

1. Theory and technology of safety production in metal mines
2. Industrial ventilation and dust removal and occupational hazard control
3. Fault diagnosis and risk control of metallurgical equipment
4. Urban underground space fire dynamics and prevention technology
5. Safety management and risk assessment of metallurgical enterprises

Ⅲ. Program Duration

The duration of study for doctoral students normally ranges from 3 to 5 years.

Ⅳ. Credit Requirements

Credit Requirements and Allocation Instructions for Doctoral Students of Safety Science and Engineering

Total Credits	≥24Credits	
Course Credits	≥12Credits	Public Compulsory Courses total 6 credits, among which 4 credits are for Chinese Language, and 2 credits for A Survey of China Subject Basic Courses ≥4 credits Elective Specialized Courses ≥2 credits
Research Session	Credits	Thesis Proposal, 1 credit Academic Communication, 1 credit Mid-term Progress Report and Thesis Assessment, 1

		credit Dissertation, 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Training Requirements

1. Basic Requirements

Completely mastering scientific theories and technologies of the discipline and theoretical foundation of relevant disciplines. Having an in-depth understanding of the development history, status quo and leading edge of the discipline, and possessing solid basic theories and systematic and extensive expertise. Being able to conduct original studies both in theories and practice with modern scientific theories, experimental means, computer application technology and information technology. Complying with academic ethics, and having a strong sense of dedication and responsibility. Mastering at least one foreign language to read foreign professional literatures and conducting international academic exchanges. Meeting requirements of The Higher Education Law of the People's Republic of China and Regulations of the People's Republic of China on Academic Degrees.

2.Thesis Proposal Requirements

Thesis proposal shall be presented in a written and oral defense form, counting 1 credit. Grades are either pass or fail.

Contents of a thesis proposal shall include: the background and basis of the selected topic, a review of domestic and abroad literature with an analysis and a summary (no less than 70 articles); The research program should illustrate research objectives, content, key problems and innovation, research method, technical approach, and experiment means; and a research plan and a time schedule.

A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles (at least three of whom are professors). There should be at least five associate professors and above titles (at least three professors) attending the oral defense. If students failed the oral defense, the thesis proposals should be re-prepared.

A thesis proposal normally ranges from 8000 to 15,000 words. When a proposal report is appraised and approved, a Doctoral Candidate’s Thesis Proposal Form shall be completed and submitted to one’s school and reserved in the degree achieves.

3.The Mid-term Progress Requirements for a Thesis

The mid-term progress of a thesis shall be presented in a written and oral defense form, counting 1 credit.

The mid-term progress report should be presented publicly around the validity of experiment methods, data, results, preliminary conclusion from the research approach, and whether the thesis can be completed on schedule. There should be at least five associate professors and above titles (at least three professors) or doctors attending the oral defense and providing advice for existing problems.

Once the mid-term examination is passed, a Doctoral Student’s Mid-term Report and Comprehensive Assessment Form shall be completed and submitted to the Graduate School, and a copy of that and a written form

of the original thesis proposal report shall be preserved by the school.

4. Requirements for Academic Activities

A graduate student shall participate in at least nine academic activities, counting 1 credit. A written record shall be prepared for each academic activity and a written material shall be reserved for an academic presentation. The written record signed by the supervisor shall be submitted to the school to register credits before applying for a degree.

5. Academic Articles Publishing Requirements

Follow the Provisions of Doctoral and Master Students of Wuhan University of Science and Technology Applying for a Degree and Gaining Academic Achievements.

6. Dissertation Pre-Defense Requirements

A graduate student shall complete all training sessions, meet academic articles publishing requirement, and shall follow the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and the Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial).

7.Dissertation Defense Requirements

Follow the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial), etc.

Curriculum for Doctoral Students of Safety Science and Engineering

Category	Course Nature	Course Code	Course Name	Hour	Credit	Semester	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15BD01202	Aerosol Science and Technology	32	2	1	School of Resource and Environmental Engineering	
		15BD01203	Mining Hazards Control Engineering	32	2	1		
		15BC01202	Public Safety Methodology	32	2	1		
		15BD01205	Fire Risk Assessment Methodology	32	2	1		
		15BD01206	Explosion Theory and Hazard Control Technology	32	2	1		
Selective Courses	Elective Specialized Courses	15BY01202	Development of Industrial Ventilation and Dust Proof	32	2	1	School of Resource and Environmental Engineering	
		15BY01206	Modern Safety Management	32	2	1		
Research Session		15BYJ0101	Thesis Proposal		1		School of Resource and Environmental Engineering	Compulsory
		15BYJ0102	Academic Activities ≥9 times		1			
		15BYJ0103	The Mid-term Progress Report and evaluation		1		School of Resource and Environmental Engineering	
		15BYJ0104	Dissertation		9			

安全科学与工程硕士研究生培养方案

（学科代码：0837 授 工学硕士 学位）

一、培养目标

培养掌握安全科学与工程学科坚实的基础理论和系统的专门知识，具备运用计算机和先进测试手段的能力，具有从事科学研究或独立担负专门技术工作的能力，了解学科现状、发展趋势及国际发展动态，在本学科有关理论和工程实际问题的研究中取得成果的高层次人才。

二、研究方向

1. 金属矿山安全生产理论与技术
2. 工业通风除尘与职业危害控制
3. 冶金装备故障诊断与风险控制
4. 城市地下空间火灾动力学与防治
5. 冶金企业安全生产管理与风险评价

三、学习年限

全日制攻读学术型硕士学位的学习年限为 2-3 年。

四、学分要求

安全科学与工程学术硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课学分	≥23 学分	公共必修课≥6 学分 学科基础课≥10 学分 专业选修课≥7 学分
研究环节	7 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告 1 学分 学位论文 4 学分
具体课程设置见附表		

五、研究环节与学位论文

1.培养基本要求

具有本学科坚实的基础理论和系统的专门知识，了解学科现状、发展趋势及国际发展动态。具备运用

计算机和先进测试手段的能力，具有从事科学研究或独立担负专门技术工作的能力。具有科学的世界观和方法论，具备严谨的科研作风和良好的团队合作精神。至少熟练掌握一门外国语，具备阅读本专业外文文献的能力。达到《中华人民共和国高等教育法》、《中华人民共和国学位条例》等的相关要求。

2.开题要求

以书面及答辩形式就论文开题作报告，记 1 学分。

开题报告的内容一般应包括：（1）课题来源和选题依据，对国内外有关文献进行阅读、分析和总结（不少于 40 篇，其中外文不少于 10 篇）；（2）研究方案，阐明研究目标、研究内容、关键问题与创新点、研究方法、技术路线、实验方案等；（3）研究工作基础，说明具备的研究条件、研究过程中可能遇到的困难和问题及其可能的解决办法和措施；（4）研究工作计划及时间安排。

开题报告须有至少 5 名具有副教授以上职称或博士学位者审定并签署意见，答辩环节至少有 5 名具有副教授以上职称或博士学位者参加，答辩未能通过者，必须重新做开题报告。

书面开题报告一般应为 0.5～1.0 万字。开题报告评审答辩通过后，须完整填写《硕士研究生开题报告》，交学院留存，毕业时归入学位档案。

3.参加学术活动要求

研究生须参加 6 次以上学术活动，记 1 学分。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前，经导师签字的书面记录交学院备案并记相应学分。

4.学位论文答辩要求

研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》、《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

安全科学与工程硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	公共必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BY01206	现代安全管理学	32	2	1	资源与环境工程学院	≥10学分
		15SY01104	高等消防工程学	32	2	2	资源与环境工程学院	
		15SD01201	高等流体力学	32	2	1	资源与环境工程学院	
		15SY01204	气溶胶力学	32	2	2	资源与环境工程学院	
		15SD01204	模拟计算技术	32	2	1	资源与环境工程学院	
	专业选修课	15SY01201	应急救援与防护	32	2	2	资源与环境工程学院	≥7学分
		15SY01203	火灾爆炸学	32	2	1	资源与环境工程学院	
		15SY01107	矿山安全技术	32	2	2	资源与环境工程学院	
		15SY01205	系统可靠性分析	32	2	2	资源与环境工程学院	
		15SY01206	防排烟理论与技术*	32	2	1	资源与环境工程学院	
		15SD01205	安全系统预测技术	32	2	2	资源与环境工程学院	
研究环节		15SYJ0101	开题报告		1		资源与环境工程学院	必修
		15SYJ0102	学术交流≥6次		1		资源与环境工程学院	
		15SYJ0103	论文中期进展报告及考核		1		资源与环境工程学院	
		15SYJ0104	学位论文		4		资源与环境工程学院	

Educational Program for Master Students of Safety Science and Engineering

(Discipline Code：0837 Conferred Degrees:Master of Engineering)

Ⅰ. Educational Objectives

The program's purpose is to educate high-caliber personnel with such abilities as: having a solid foundation of basic theories and systematically specialized knowledge in the Safety Science and Engineering discipline; having the ability to work with computer and advanced experimental techniques; conducting independent scientific research or undertaking specialized technical work; understanding the status quo, development trends and frontier dynamics of the discipline; and having made achievements in theoretical study and practical engineering work in this disciplinary domain.

Ⅱ. Research Fields

1. Theory and technology of safety production in metal mines
2. Industrial ventilation and dust removal and occupational hazard control
3. Fault diagnosis and risk control of metallurgical equipment
4. Urban underground space fire dynamics and prevention technology
5. Safety management and risk assessment of metallurgical enterprises

Ⅲ. Program Duration

The duration of study for full-time master students (academic) normally ranges from 2 to 3 years.

Ⅳ. Credit Requirements

Credit Requirements and Allocation Instructions for Academic Master Students of Safety Science and Engineering

Total Credits	≥30credits	
Course Credits	≥23credits	Public Compulsory Courses ≥6 credits, Subject Basic Courses ≥ 10 credits Elective Specialized Courses ≥ 7 credits
Research Session	7credits	Thesis Proposal, 1 credit Academic communication, 1 credit Mid-term Progress Report, 1 credit Degree Thesis, 4 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Research and dissertation

1. Basic Requirements

Possessing a solid foundation of basic theories and systematically specialized knowledge of the subject; being able to work with computers and advanced experimental techniques; having the ability to independently conduct scientific research or undertake specialized technical work; possessing a scientific world outlook and methodology with a rigorous research style and teamwork spirit; Mastering at least one foreign language to read foreign professional literatures; and meeting requirements of The Higher Education Law of the People's Republic of China and Regulations of the People's Republic of China on Academic Degrees.

2. Thesis Proposal Requirements

Thesis proposal shall be presented in a written and oral defense form, counting 1 credit.

Contents of a thesis proposal shall include: (1) the background and basis of the selected topic, and a review of domestic and abroad literature with an analysis and a summary (no less than 40 articles including at least 10 foreign language articles); (2) a research program with an illustration of research objectives, content, key problems, innovation points, research method, technical approach, experiment means, etc. (3) the research foundation illustrating existing research condition, and possible difficulties, problems, and their possible solutions and measures during the research process; (4) a research plan and a time schedule.

A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles or doctors. There should be at least five (associate) professors or doctors attending the oral defense. If students failed the oral defense, the thesis proposals should be re-prepared.

A thesis proposal normally ranges from 5000 to 10,000 words. When a proposal report is appraised and approved, a Master Candidate’s Thesis Proposal Form shall be completed and submitted to one’s school and reserved in the degree achieves.

3. Requirements for Academic Activities

A graduate student shall participate in at least six academic activities, counting 1 credit. A written record shall be prepared for each academic activity and a written material shall be kept for an academic presentation. The written record signed by the supervisor shall be submitted to the school to register credits before applying for a degree.

4.Dissertation Defense Requirements

A graduate student shall complete all training sessions, and shall follow the Provisions of Doctoral and Master Students of Wuhan University of Science and Technology Applying for a Degree and Gaining Academic Achievements, Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and the Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial).

Curriculum for Master Students of Safety Science and Engineering

Category	Course Nature	Course Code	Course Name	Hour	Credit	Semester	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	Public Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15BY01206	Modern Safety Management	32	2	1	School of Resource and Environmental Engineering	≥10
		15SY01104	Advanced Fire Engineering	32	2	2		
		15SD01201	Advanced Hydrodynamics	32	2	1		
		15SY01204	Aerosol Dynamics	32	2	2		
		15SD01204	Simulation Calculation Technology	32	2	1		
	Elective Specialized Courses	15SY01201	Emergency Rescue and Protection	32	2	2	School of Resource and Environmental Engineering	≥7
		15SY01203	Fire and Explosion	32	2	1		
		15SY01107	Mine Safety Technology	32	2	2		
		15SY01205	System Reliability Analysis	32	2	2		
		15SY01206	Theory and Technology of Smoke Control	32	2	1		
		15SD01205	Technology of Safety System Prediction	32	2	2		
Research Session		15SYJ0101	Thesis Proposal		1		School of Resource and Environmental Engineering	Compulsory
		15SYJ0102	Academic Activities ≥6 times		1			
		15SYJ0103	The mid-term progress report and evaluation		1			
		15SYJ0104	Dissertation		4			

材料科学与工程博士研究生培养方案

（代码：0805　授 工学博士 学位）

一、培养目标

1. 掌握坚实宽广的材料科学与工程领域基础理论和系统深入的专业知识，熟悉本学科前沿动态和新型材料设计、制备、加工和测试分析技术；

2. 具备独立从事材料科学与工程领域的研究的能力，在本学科或专门技术上做出创造性的成果；

3. 熟练掌握一门外国语，具备听、说、读、写能力。

二、研究方向

1. 先进耐火材料设计与制备
2. 新型无机非金属材料
3. 新型钢铁材料
4. 材料表界面与功能材料
5. 材料加工过程组织及性能控制
6. 材料成型过程建模及控制

三、学习年限

全日制博士研究生，学制 3 年，学习年限一般为 3～5 年。

四、学分要求

材料科学与工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课学分	≥12 学分	公共必修课 6 学分 其中：汉语 4 学分，中国概况 2 学分 学科基础课≥4 学分 专业选修课≥2 学分
研究环节	12 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告及考核 1 学分 学位论文 9 学分
具体课程设置见课程计划表		

五、本学科对博士研究生培养提出的具体要求

1.培养基本要求

研究生培养采取导师负责、导师指导团队协助的培养方式。导师负责指导研究生制定个人培养计划、撰写开题报告和学位论文、开展学术（科学）研究、组织学术交流、并召集指导团队对研究生进行指导等。导师指导团队中至少有两名专家应该具有博士导师资格，主要协助进行研究生日常指导工作，参与研究生培养的各个环节。

2.开题要求

研究生开题报告的要求参见 《武汉科技大学开题报告管理细则》。要求修满课程规定的学分和科目以后，《选题报告》经过导师审核，认为已经达到《选题报告》的要求后，向导师所在系申请进行《选题报告》的评审，一般在第 3 学期内进行。由导师所在系组织专门的评审小组，评审小组由五名以上的具有高级技术职称的有关人员组成。由博士生向评审小组作选题报告，时间约 40 分钟。评审小组根据其书面质量、口头报告质量和回答问题情况，填写评审意见和成绩。

3.论文中期进展要求

在通过《选题报告》评审 6 个月以后，《中期研究报告》经过导师审核，认为已经达到《中期研究报告》的要求后，向导师所在系申请进行《中期研究报告》的评审，一般在第 4 或第 5 学期内进行。由导师所在系组织专门的评审小组，评审小组由五名以上的具有高级技术职称的有关人员组成。评审小组根据其书面质量、口头报告质量和回答问题情况，填写评审意见和成绩。中期研究报告通过者，继续进行论文工作。未通过者可在 6 个月内再补作一次中期研究报告，仍未通过者，不得继续进行论文工作，按肄业处理。

4.参加学术活动要求

博士研究生须参加 9 次以上学术活动。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前交学院备案并记相应学分。

5.发表学术论文要求

学习期间，发表学术论文数量和级别应符合学校相关规定。

6.学位论文预答辩要求

所有博士生申请博士学位前，均需进行博士学位论文预答辩，具体执行应按照学校博士学位论文预答辩暂行办法来执行。

7.学位论文答辩要求

博士研究生需要在论文答辩前完成课程学分、开题报告、学术交流、论文中期考核、论文写作等方面的要求。完成所有要求后方可申请正式的论文答辩，有关博士研究生答辩相关政策按照学校相关规定来执行。

材料科学与工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BD02101	材料科学与工程前沿	64	4	1	材料与冶金学院	必修
选修课	专业选修课	15BY02102	材料科学与工程选论	48	3	2	材料与冶金学院	选修
研究环节		15BYJ0201	开题报告		1		材料与冶金学院	必修
		15BYJ0202	学术交流≥9 次		1		材料与冶金学院	
		15BYJ0203	论文中期进展报告及考核		1		材料与冶金学院	
		15BYJ0204	学位论文		9		材料与冶金学院	

Educational Program for Doctoral Students of Materials Science and Engineering

(Discipline Code: 0805 Conferred Degrees: Doctor of Engineering)

Ⅰ. Educational Objectives

This program aims to develop talented individuals who can display the following abilities:

1. To grasp solid and extensive basic theories and a strong fundamental knowledge of Materials Science & Engineering, and to know well about current development of the discipline and the technology of design, preparation, process and test & analysis of new materials;

2. To have the ability to conduct advanced research on Materials Science & Engineering, and to apply this knowledge and make creative achievements in Materials Science & Engineering;

3. To have a good command of a foreign language with the ability of listening, speaking, reading and writing.

Ⅱ. Research Fields

1. Design and Preparation of Advanced Refractories
2. New Inorganic Non-metallic Materials
3. New Iron and Steel Materials
4. Material Interface and Functional Materials
5. Microstructure and Performance Control of Materials Processing
6. Modeling and Control of Material Forming Process

Ⅲ. Program Duration

Schooling of full-time doctoral candidate lasts 3 years and the duration of schooling is usually 3-5 years.

Ⅳ. Credits and Requirements

Credit Requirements for PhD student of Material Science and Engineering

Total Credits	≥24credits	
Courses	≥10credits	Common General Courses: 6 credits (Chinese Language, 4 credits, A Survey of China, 2 credits) Required Departmental Core Subjects ≥ 4 credits Rrestricted Electives ≥ 2 credits
Research stage	12credits	Research proposal, 1 credits Seminar, 1 credits Thesis mid-term report, 1 credits PhD thesis, 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Specific Requirements for PHD Students

5.1. Basic requirements for PHD Students

The training mode of doctoral candidate is for the supervisor to takes charge, while the supervisor team provides assistance. The supervisor is responsible for providing guidance for doctoral candidate to make personal training program, write thesis proposal and dissertation, make academic (scientific) research, and to organize academic exchange and for convening supervisor team for the guidance of the doctoral candidate. The supervisor team should have at least two experts qualified to be supervisor of doctoral candidate whose main task is to provide regular guidance for doctor candidate and participate in the whole process of training.

5.2. Research Proposal Requirement

For requirements of thesis proposal of doctoral student, see *Management Rules of Thesis Proposal in Wuhan University of Science and Technology*. After completing all credit hours and required subjects, and getting the supervisor's approval about the Topic Selection, the doctoral student can apply to the department of the supervisor for Topic Selection evaluation, which is supposed be held in the third semester. The special evaluation group of more than five members will be organized by the department of the supervisor, all of whom are senior professional title holders. The doctoral student should make presentation of the Topic Selection to the evaluation group, which will last about 40 minutes. The evaluation group will write down comments and grades according to the quality of writing, quality of oral presentation and ways of giving answers. .

5.3. Mid-term Research Report Requirement

Six months after passing Topic Selection, with the Interim Research Report gets approved by supervisors and deemed to meet the demands, the doctoral student can apply to the department of the supervisor for Interim Research Report evaluation, which will be carried out in the fourth or fifth semester. The special evaluation group of more than five members will be organized by the department of the supervisor, all of whom are senior professional title holders. The evaluation group will write down comments and grades according to the quality of writing, quality of oral presentation and ways of giving answers. The one who passes interim research report presentation can enter into the stage of thesis work. And the one who fails in the evaluation will have a chance to do a supplementary presentation of interim research report in six months. If the presentation fails again, the doctoral student will not be allowed to enter into the stage of thesis writing and the student will be considered as one student who fails to finish school.

5.4 Requirement of Academic Activities

Academic Activities: doctoral students need to participate in more than nine academic activities. There should be written records of participating in academic activities, and as for academic report, there should be also written materials, all of which should be presented to the Materials Science & Engineering school for one credit before applying for degrees.

5.5 Requirement of Papers

The quantity and quality of published or accepted papers should fit with the relevant provisions of the university.

5.6 Pre defense Requirements for Doctoral Degree Application

All doctoral candidates to apply for a doctoral degree are required to carry out a pre-defense of doctoral dissertation, the implementation of which is subject to the Tentative Procedures for the Pre-defense of the Doctoral Dissertation of WUST.

5.7 Requirements of Doctoral Degree Defense

Doctoral candidate need to complete the course credits, thesis writing, academic activities, practice and other aspects of the requirements before thesis defense. Those who have successfully passed their pre-defense can apply for formal thesis defense. For details of the specific doctoral dissertation review and related defense work, see the relevant provisions of the university.

Curriculum for Doctoral Students of Material Science and Engineering

Type	Course Type	Course No.	Course Name	Class hours	credit	semester	College	Note
Required courses	Common General courses	17BSA0601	Chinese Language	160	4	1	Arts, law and Economics	Required
		17BSA2101	A Survey of China	32	2	1	International School	
	Departmental Core Subjects	15BD02101	Latest Development in Materials and Engineering	64	4	1	Materials and Metallurgy	Required
Elective courses	Restricted electives	15BY02102	Selected Lecture of Material Science and Engineering	48	3	2	Materials and Metallurgy	Electives
Research		15BYJ0201	Research proposal		1		Materials and Metallurgy	Required
		15BYJ0202	Seminar≥9		1		Materials and Metallurgy	
		15BYJ0203	Thesis mid-term report		1		Materials and Metallurgy	
		15BYJ0204	Thesis		9		Materials and Metallurgy	

材料科学与工程硕士研究生培养方案

（代码：0805　授 工学硕士 学位）

一、培养目标

1. 掌握材料工程领域基础理论和系统深入的专业知识，熟悉本专业的学科前沿动态；
2. 掌握一门外语，并能较熟练地阅读专业文献资料和撰写论文；
3. 具备独立从事工程设计、工程实施、工程研究、工程开发、工程管理等能力；
4. 具有良好的职业道德和敬业精神。

二、研究方向

1.先进耐火材料设计与制备
2.新型无机非金属材料
3.材料表界面与功能材料
4.材料加工过程组织及性能控制
5.材料成型过程建模及控制
6.新型钢铁材料研究

三、学习年限

全日制攻读学术硕士学位研究生学制 3 年，学习年限一般为 2~3 年。

四、学分要求

材料科学与工程硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课学分	≥23 学分	公共必修课≥6 学分 学科基础课≥10 学分 专业选修课≥7 学分
研究环节	7 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告 1 学分 学位论文 4 学分
具体课程设置见附表		

五、研究环节与学位论文

1.培养基本要求

研究生培养可采取导师负责、导师指导团队等培养方式。导师负责指导研究生制定个人培养计划、撰写开题报告和学位论文、开展学术（科学）研究、组织学术交流、并召集指导团队对研究生进行指导等。研究生导师指导团队一般有包括导师在内的具有副高级及以上职称的 3-5 名校内外专家组成。研究生导师指导团队主要协助进行研究生日常指导工作，参与研究生培养的各个环节。

2.开题要求

研究生在学习期间阅读不少于 40 篇文献，其中国外文献不少于 1/3。研究方案应明确：研究意义、研究内容、研究方法、研究工作的重点、研究创新、研究进度、预期研究成果和实验计划等。至少由五名教授或副教授（材料科学与工程专业方向至少 3 人）组成开题报告答辩小组，如果答辩不通过，则需要重新撰写开题报告，进行开题答辩。要求在第三学期完成开题报告。

3.参加学术活动要求

硕士研究生须参加 6 次以上学术活动。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前交学院备案并记相应学分。

4.学位论文答辩要求

至少发表一篇 C 级学术论文，研究生必须是论文的第一作者（或者导师第一作者，研究生第二作者），第一单位应是武汉科技大学。

学位论文的质量应达到：选题具有实际意义和新颖性；了解和掌握所研究领域国内外的权威文献及进展情况；在理论分析、测试技术、数据处理、仪器设备和工艺技术等某一方面具有新的见解或改进；达到培养方案所要求的理论知识和实验技能，或分析和解决实际问题的能力；文字表述通顺、逻辑性强，公式、图表、计量单位、引文等符合规范；具有严谨的学风和工作态度。硕士学位论文满足《武汉科技大学研究生学位论文检测规定》要求。

材料科学与工程硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SD02101	材料结构与性能	32	2	1	材料与冶金学院	≥10 学分
		15SD02103	材料制备技术	32	2	1	材料与冶金学院	
		15SD02102	材料热力学	32	2	2	材料与冶金学院	
		15SD02111	材料测试与表征	32	2	1	材料与冶金学院	
		15SY02111	材料动力学	32	2	1	材料与冶金学院	
选修课	专业选修课	15SY02110	计算材料学	32	2	2	材料与冶金学院	≥ 7credits
		15SY02112	耐火材料应用专题	32	2	2	材料与冶金学院	
		15SY02113	金属材料失效电化学原理及应用	32	2	1	材料与冶金学院	
		15SY02114	材料表面与界面	32	2	2	材料与冶金学院	
		15SY02115	薄膜技术与薄膜材料	32	2	2	材料与冶金学院	
		15SY02116	金属材料制造与加工技术	32	2	2	材料与冶金学院	
		15SY02117	成型过程的物理及数值模拟	32	2	2	材料与冶金学院	
		15SY02118	高精度轧制理论与技术	32	2	1	材料与冶金学院	
		15SY02119	金属加工过程的组织与性能控制	32	2	1	材料与冶金学院	
		15SY02120	材料电化学导论	32	2	1	材料与冶金学院	
		15SY02121	半导体材料与器件	32	2	2	材料与冶金学院	
		15SY02122	新型能源材料	32	2	2	材料与冶金学院	
研究环节		15SYJ0201	开题报告		1		材料与冶金学院	必修
		15SYJ0202	学术交流≥6 次		1		材料与冶金学院	
		15SYJ0203	论文中期进展报告		1		材料与冶金学院	
		15SYJ0204	学位论文		4		材料与冶金学院	

Educational Program for Master Students of Materials Science and Engineering

(Code: 0805 Conferred Degrees: Master of Engineering)

1. Educational Objectives

This program aims to develop talented individuals who can display the following abilities:

1. To grasp solid and extensive basic theories and a strong fundamental knowledge of Materials Science & Engineering, and to know well about current development of the discipline;

2. To have the ability to conduct researches on Materials Science & Engineering, and make creative achievements in Materials Science & Engineering;

3. To have the ability to work independently in the field of engineering design, project implementation, engineering research, and engineering development or project management;

4. To have a good command of a foreign language with the ability of listening, speaking, reading and writing.

II. Research Fields

1. Design and Preparation of Advanced Refractories
2. New Inorganic Non-metallic Materials
3. New Iron and Steel Materials
4. Material Interface and Functional Materials
5. Microstructure and Performance Control of Materials Processing
6. Modeling and Control of Material Forming Process

III. Program Duration

Schooling of full-time master candidate lasts 3 years and the duration of schooling is usually 2-3 years.

IV. Credits and Requirements

Credit Requirements for Master student of Material Science and Engineering

Total credits	≥30credits	
Courses	≥23credits	General Institute Requirement: 6 credits ≥ 6 credits Required Departmental Core Subjects ≥ 10credits Restricted Electives ≥ 7credits
Research	7credits	Research proposal, 1 credits Seminar, 1 credits Thesis mid-term report, 1 credits Thesis, 4 credits
Please refer to the attached Curriculum for specific course arrangements		

V. Research and Dissertation

5.1 Basic requirement for master degree

The training mode of master candidate is for the supervisor to takes charge, while the supervisor team provides assistance. The supervisor is responsible for providing guidance for the student to make personal training program, write thesis proposal and dissertation, make academic (scientific) research, and to organize academic exchange and for convening supervision team for the guidance of the student. The supervisor team should have at least two experts with the title of associate professor, whose main task is to provide regular guidance for the master candidate and participate in the whole process of training.

5.2 Research proposal requirement

Graduate student should read no less than 40 literature items during the study period, of which foreign literature covers no less than 1/3.

The master research proposal should clearly describe the significance of the research, research contents, research methods, key points in research job, innovation of research, schedule of research, expected results and experimental plan etc. At least five associate professors or professor (at least 3 members are from Material Science and Engineering) are required to form the defense panel for research proposal of master application. If the candidate cannot pass the defense, he or she is required to make a new research proposal. The research proposal should be applied in third term.

5.3 Requirements of Academic Activities

The master student is required to attend at least 6 seminars before applying for master degree.

5.4 Requirements of doctoral degree defense

At least one academic paper related to the dissertation content should be published or accepted by Class C core journal in China or international academic journals. Graduate student should be the first author of the published papers (or supervisor as the first author, graduate student as the second author) and the affiliation should be Wuhan University of Science and Technology.

The requirements for the thesis: an innovative topic with practical significance; awareness about the authoritative literature and the new development of research topics, new ideas or improvements in the theoretical analysis, testing technique, data processing, instruments and equipment and crafts; acquisition of the theoretical knowledge and skills as well as the abilities for analysis and practical application required by the syllabus.The thesis must have correct argument, tight logic, smooth writing, in accordance with academic conventions concerning formula, charts, data, direct speech and measurement unit. The thesis must be written independently and follow the science ethic. The degree thesis must meet the demands of the the relevant provisions of the university on detection of "academic misconduct detection system (TMLC2)” .

Curriculum for Master Students of Material Science and Engineering

Type	Course Type	Course No.	Course Name	Class hours	credit	semester	College	Note
Required courses	Common General courses	17BSA0601	Chinese Language	160	4	1	Arts, law and Economics	required
		17BSA2101	A Survey of China	32	2	1	International School	
	Departmental Core Subjects	15SD02101	Structure and Properties of Materials	32	2	1	Materials and Metallurgy	≥10 credits
		15SD02103	Processing for Materials	32	2	1		
		15SD02102	Materials Thermodynamics	32	2	2		
		15SD02111	Materials testing and characterization	32	2	1		
		15SY02111	Kinetic Process of Materials	32	2	1		
Elective courses	Restricted electives	15SY02110	Computational Materials Science	32	2	2	Materials and Metallurgy	≥ 7credits
		15SY02112	Special Topic for Refractory Application	32	2	2		
		15SY02113	Electrochemistry for Materials Science	32	2	1		
		15SY02114	Surface and interface of Materials	32	2	2		
		15SY02115	Thin Film Technology and Thin Film Materials	32	2	2		
		15SY02116	Manufacture and Processing of the metal materials	32	2	2		
		15SY02117	Physical and numerical simulation of materials forming process	32	2	2		
		15SY02118	Theory and technology of high precision rolling	32	2	1		

		15SY02119	Controlling of microstructure and property in metal forming process	32	2	1		
		15SY02120	Electrochemical introduction	32	2	1		
		15SY02121	Semiconductor materials and devices	32	2	2		
		15SY02122	New energy materials	32	2	2		
Research		15SYJ0201	Research proposal		1		Materials and Metallurgy	required
		15SYJ0202	Seminar≥6		1		Materials and Metallurgy	
		15SYJ0203	Thesis mid-term report		1		Materials and Metallurgy	
		15SYJ0204	Thesis		4		Materials and Metallurgy	

冶金工程博士研究生培养方案

（代码：0806 授 工学博士 学位）

一、培养目标

1. 在提取冶金、冶金物理化学、金属学等方面具备坚实、宽广的理论基础，并在所研究领域具有深入系统的专门知识，对本学科的现状和发展趋势有深入的了解。

2. 具有独立从事科学研究工作的能力。能有效地运用计算机、先进的实验技术和检测方法进行冶金新工艺、新技术、新产品及相关理论方面的研究。

3. 在科学或专门技术上做出创造性的成果。博士论文应做到在理论上有创见，方法上有创新或在应用上有突破。

4. 掌握一至二门外国语。其中第一外国语要求熟练地阅读本专业的外文资料，并且具有运用该外语进行本专业科技论文写作及学术交流的能力；第二外国语要求具有阅读本专业外文资料的初步能力。

5. 学位获得者诚实守信，治学严谨，遵守科学研究者的职业道德。能胜任高等学校、科研机构、企业的教学、科研、工程设计等技术工作或高层次的管理工作。

二、研究方向

1. 冶金过程数学物理模拟及控制
2. 钢铁冶金新理论与工艺
3. 有色冶金新理论与工艺
4. 高温熔体物理化学
5. 先进钢铁材料生产及性能控制
6. 冶金资源综合利用与环保

三、学习年限

全日制博士研究生，学制 3 年，学习年限一般为 3～5 年

四、学分要求

冶金工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课学分	≥12 学分	公共必修课 6 学分 其中：汉语 4 学分，中国概况 2 学分 学科基础课≥4 学分 专业选修课≥2 学分
研究环节	12 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告及考核 1 学分 学位论文 9 学分
具体课程设置见课程计划表		

五、本学科对博士研究生培养提出的具体要求

1.培养基本要求

研究生培养采取导师负责、导师指导团队协助的培养方式。导师负责指导研究生制定个人培养计划、撰写开题报告和学位论文、开展学术（科学）研究、组织学术交流、并召集指导团队对研究生进行指导等。导师指导团队中至少有两名专家应该具有博士导师资格，主要协助进行研究生日常指导工作，参与研究生培养的各个环节。

2.开题要求

研究生开题报告的要求参见 《武汉科技大学开题报告管理细则》。要求修满课程规定的学分和科目以后，《选题报告》经过导师审核，认为已经达到《选题报告》的要求后，向导师所在系申请进行《选题报告》的评审，一般在第 3 学期内进行。由导师所在系组织专门的评审小组，评审小组由五名以上的具有高级技术职称的有关人员组成。由博士生向评审小组作选题报告，时间约 40 分钟。评审小组根据其书面质量、口头报告质量和回答问题情况，填写评审意见和成绩。

3.论文中期进展要求

在通过《选题报告》评审 6 个月以后，《中期研究报告》经过导师审核，认为已经达到《中期研究报告》的要求后，向导师所在系申请进行《中期研究报告》的评审，一般在第 4 或第 5 学期内进行。由导师所在系组织专门的评审小组，评审小组由五名以上的具有高级技术职称的有关人员组成。评审小组根据其书面质量、口头报告质量和回答问题情况，填写评审意见和成绩。中期研究报告通过者，继续进行论文工作。未通过者可在 6 个月内再补作一次中期研究报告，仍未通过者，不得继续进行论文工作，按肄业处理。

4.参加学术活动要求

博士研究生须参加 9 次以上学术活动。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前交学院备案并记相应学分。

5.发表学术论文要求

学习期间，发表学术论文数量和级别应符合学校相关规定。

6.学位论文预答辩要求

所有博士生申请博士学位前，均需进行博士学位论文预答辩，具体执行应按照学校博士学位论文预答辩暂行办法来执行。

7.学位论文答辩要求

研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》、《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

冶金工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BC02201	冶金过程理论	32	2	1	材料与冶金学院	≥4 学分
		15BD02201	冶金过程解析与模拟	32	2	1	材料与冶金学院	
选修课	专业选修课	15BY02201	冶金前沿技术	32	2	1	材料与冶金学院	≥2 学分
		15BY02202	冶金流程工程学	32	2	1	材料与冶金学院	
研究环节		15BYJ0201	开题报告		1		材料与冶金学院	必修
		15BYJ0202	学术交流≥9 次		1		材料与冶金学院	
		15BYJ0203	论文中期进展报告及考核		1		材料与冶金学院	
		15BYJ0204	学位论文		9		材料与冶金学院	

Educational Program for Doctoral Students of Metallurgical Engineering

(Discipline Code：0806 Conferred Degrees：Doctor of Engineering)

Ⅰ. Educational Objectives

This program aims to develop talented individuals who can display the following abilities:

1. To grasp solid and extensive basic theories and a strong fundamental knowledge about extraction metallurgy, physical chemistry of metallurgy, metallography; and to know well about current development of this discipline and the technology of design, preparation, process and test & analysis of new materials.

2. To have the ability to conduct advanced researches on Metallurgical engineering, and to apply this knowledge and make creative achievements in Metallurgical engineering or expertise; to be able to effectively use computer, advanced experimental technology and testing methods to study the aspects of metallurgical new technology, new technology, new products and related theories.

3. To make creative achievement theoretically and technically. Doctoral dissertation should be innovated in theory, experiment method and application.

4 To Master one or two foreign languages. The first foreign language proficiency enables the student to have the skill to read the professional foreign language literature, and to write professional scientific papers and communicate with others on academic matters. For the second foreign language, the student should be able to read professional foreign language literature.

5 To be honest and trustworthy, to have rigorous scholarship, and to comply with the professional ethics of scientific researchers. The aim of this program is to educate students to be qualified for the job of teaching, scientific research, engineering design and high level management in higher school, research institutions and enterprises.

Ⅱ. Research Fields

1. Mathematical and physical simulation and control of metallurgical processes
2. New theory and technology of ferrous metallurgy
3. New theory and technology of nonferrous metallurgy
4. Physical chemistry of High-temperature melts
5 .Production and performance control of advanced iron and steel materials
6. Comprehensive utilization of Metallurgical Resources and environmental protection

Ⅲ. Program Duration

Schooling of full-time doctoral candidate lasts 3 years and the duration of schooling is usually 3-5 years.

Ⅳ. Credits and Requirements

Credit Requirements for PhD student of Metallurgical Engineering

Total Credits	≥24credits	
Courses	≥10credits	Common General Courses：6 credits （Chinese Language, 4 credits，A Survey of China, 2 credits） Required Departmental Core Subjects ≥ 4 credits Rrestricted Electives ≥ 2 credits
Research stage	12credits	Research proposal, 1 credits Seminar, 1 credits Thesis mid-term report, 1 credits PhD thesis, 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Specific Requirements for PHD Students

1.Basic requirements for PHD Students

The training mode of doctoral candidate is for the supervisor to takes charge, while the supervisor team provides assistance. The supervisor is responsible for providing guidance for doctoral candidate to make personal training program, write thesis proposal and dissertation, make academic (scientific) research, and to organize academic exchange and for convening supervisor team for the guidance of the doctoral candidate. The supervisor team should have at least two experts qualified to be supervisor of doctoral candidate whose main task is to provide regular guidance for doctor candidate and participate in the whole process of training

2.Research Proposal Requirement

For requirements of thesis proposal of doctoral student, see Management Rules of Thesis Proposal in Wuhan University of Science and Technology. After completing all credit hours and required subjects, and getting the supervisor's approval about the Topic Selection, the doctoral student can apply to the department of the supervisor for Topic Selection evaluation, which is supposed be held in the third semester. The special evaluation group of more than five members will be organized by the department of the supervisor, all of whom are senior professional title holders. The doctoral student should make presentation of the Topic Selection to the evaluation group, which will last about 40 minutes. The evaluation group will write down comments and grades according to the quality of writing, quality of oral presentation and ways of giving answers.

3.Mid-term Research Report Requirement

Six months after passing Topic Selection, with the Interim Research Report gets approved by supervisors and deemed to meet the demands, the doctoral student can apply to the department of the supervisor for Interim Research Report evaluation, which will be carried out in the fourth or fifth semester. The special evaluation group of more than five members will be organized by the department of the supervisor, all of whom are senior

professional title holders. The evaluation group will write down comments and grades according to the quality of writing, quality of oral presentation and ways of giving answers. The one who passes interim research report presentation can enter into the stage of thesis work. And the one who fails in the evaluation will have a chance to do a supplementary presentation of interim research report in six months. If the presentation fails again, the doctoral student will not be allowed to enter into the stage of thesis writing and the student will be considered as one student who fails to finish school.

4 Requirement of Academic Activities

Academic Activities: doctoral students need to participate in more than nine academic activities. There should be written records of participating in academic activities, and as for academic report, there should be also written materials, all of which should be presented to the Materials Science & Engineering school for one credit before applying for degrees.

5.Requirement of Papers

The quantity and quality of published or accepted papers should fit with the relevant provisions of the university.

6.Pre defense Requirements for Doctoral Degree Application

All doctoral candidates to apply for a doctoral degree are required to carry out a pre-defense of doctoral dissertation, the implementation of which is subject to the Tentative Procedures for the Pre-defense of the Doctoral Dissertation of WUST.

7.Requirements of Doctoral Degree Defense

Doctoral candidate need to complete the course credits, thesis writing, academic activities, practice and other aspects of the requirements before thesis defense. Those who have successfully passed their pre-defense can apply for formal thesis defense. For details of the specific doctoral dissertation review and related defense work, see the relevant provisions of the university, such as Regulations on Applying for Degrees and Making Academy Achievements of Doctoral Candidates and Master Degree Candidates in Wuhan University of Science and Technology, Rules of Doctor's & Master's Degree Awarding in Wuhan University of Science and Technology, and (Trial) Regulations on Detection of Academic Dissertation of Graduate Student in Wuhan University of Science and Technology.

Curriculum for Doctoral Students of Metallurgical Engineering

Type	Course Type	Course No.	Course Name	hours	credit	semester	College	Note
Required courses	Common General courses	17BSA0601	Chinese Language	160	4	1	Arts, law and Economics	required
		17BSA2101	A Survey of China	32	2	1	International School	
	Departmental Core Subjects	15BC02201	Metallurgical process theory	32	2	1	Materials and Metallurgy	≥4 credits
		15BD02201	Metallurgical process analysis and simulation	32	2	1	Materials and Metallurgy	
Elective courses	Restricted electives	15BY02201	Metallurgical cutting-edge technology	32	2	1	Materials and Metallurgy	≥2 credits
		15BY02202	Metallurgical Process Engineering	32	2	1	Materials and Metallurgy	
Research		15BYJ0201	Research proposal		1		Materials and Metallurgy	Required
		15BYJ0202	Seminar≥9		1		Materials and Metallurgy	
		15BYJ0203	Thesis mid-term report		1		Materials and Metallurgy	
		15BYJ0204	Thesis		9		Materials and Metallurgy	

冶金工程硕士研究生培养方案

（代码：0806 授 工学硕士 学位）

一、培养目标

1. 冶金工程硕士学位获得者应在冶金学、冶金原理、冶金传输原理、金属学等方面掌握扎实的理论基础和系统的专业知识，了解近代冶金学科的进展和动向。

2. 能运用计算机、先进实验技术和检测手段进行冶金工程领域的实验研究，具有从事科学研究工作或独立承担专门技术工作能力。

3. 能运用第一外国语要求比较熟练地阅读本专业的外文资料。

4. 学位获得者诚实守信、治学严谨，遵守科学研究者的职业道德。硕士论文在理论上应有新见解，或在方法上和技术上有改进。能胜任高等学校、科研机构、企业的教学、科研、工程设计等技术工作或高层次的管理工作。

二、研究方向

1. 冶金过程数学物理模拟及控制
2. 钢铁冶金新理论与工艺
3. 有色冶金新理论与工艺
4. 高温熔体物理化学
5. 先进钢铁材料生产及性能控制
6. 冶金资源综合利用与环保

三、学习年限

全日制攻读学术硕士学位研究生学制 3 年，学习年限一般为 2~3 年。

四、学分要求

冶金工程硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课学分	≥23 学分	公共必修课≥6 学分 学科基础课≥10 学分 专业选修课≥7 学分
研究环节	7 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告 1 学分 学位论文 4 学分
具体课程设置见附表		

五、研究环节与学位论文

1.培养基本要求

研究生培养采取导师负责、导师指导团队等培养方式。导师负责指导研究生制定个人培养计划、撰写开题报告和学位论文、开展学术（科学）研究、组织学术交流、并召集指导团队对研究生进行指导等。研究生导师指导团队一般有包括导师在内的具有副高级及以上职称的 3-5 名校内外专家组成。研究生导师指导团队主要协助进行研究生日常指导工作，参与研究生培养的各个环节。

2.开题要求

研究生在学习期间阅读不少于 40 篇文献，其中国外文献不少于 1/3。研究方案应明确：研究意义、研究内容、研究方法、研究工作的重点、研究创新、研究进度、预期研究成果和实验计划等。至少由五名教授或副教授（材料科学与工程专业方向至少 3 人）组成开题报告答辩小组，如果答辩不通过，则需要重新撰写开题报告，进行开题答辩。要求在第三学期完成开题报告。

3.参加学术活动要求

硕士研究生须参加 6 次以上学术活动。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前交学院备案并记相应学分。

4.学位论文答辩要求

至少发表一篇 C 级学术论文，研究生必须是论文的第一作者（或者导师第一作者，研究生第二作者），第一单位应是武汉科技大学。

学位论文的质量应达到：选题具有实际意义和新颖性；了解和掌握所研究领域国内外的权威文献及进展情况；在理论分析、测试技术、数据处理、仪器设备和工艺技术等某一方面具有新的见解或改进；达到培养方案所要求的理论知识和实验技能，或分析和解决实际问题的能力；文字表述通顺、逻辑性强，公式、图表、计量单位、引文等符合规范；具有严谨的学风和工作态度。硕士学位论文满足《武汉科技大学研究生学位论文检测规定》要求。

冶金工程硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SD02201	冶金过程热力学与动力学	32	2	1	材料与冶金学院	≥10 学分
		15SD02202	冶金电化学理论及应用	32	2	1	材料与冶金学院	
		15SD02203	冶金物理化学研究方法	32	2	1	材料与冶金学院	
		15SD02204	高等传输原理	32	2	1	材料与冶金学院	
		15SY02201	钢铁冶金新技术	32	2	2	材料与冶金学院	
选修课	专业选修课	15SY02203	连铸理论与实践	32	2	2	材料与冶金学院	≥7 学分
		15SY02202	有色冶金新技术	32	2	2	材料与冶金学院	
		15SY02204	计算冶金学	32	2	2	材料与冶金学院	
		15SY02205	冶金资源综合利用	32	2	2	材料与冶金学院	
		15SY02206	冶金原料新技术	32	2	2	材料与冶金学院	
研究环节		15SYJ0201	开题报告		1		材料与冶金学院	必修
		15SYJ0202	学术交流≥6 次		1		材料与冶金学院	
		15SYJ0203	论文中期进展报告		1		材料与冶金学院	
		15SYJ0204	学位论文		4		材料与冶金学院	

Educational Program for Master Students of Metallurgical Engineering

(Discipline Code：0806 Conferred Degrees：Master of Engineering)

Ⅰ. Educational Objectives

This program aims to develop talented individuals who can display the following abilities:

1.Grasp solid and extensive basic theories and a strong fundamental knowledge about metallurgy theory, metallurgical transmission principle and metallography; and to know well about current development and future trends of this discipline

2.Have the ability to conduct researches on Metallurgical engineering, and to to do research and technical work independently; to be able to effectively use computer, advanced experimental technology and testing methods to study the aspects of metallurgical new technology, new technology, new products and related theories.

3.To Master a foreign language with listening, speaking, reading and writing skills. This language proficiency enables the student to read the professional foreign language literature

4.Be honest and trustworthy, to have rigorous scholarship, and to comply with the professional ethics of scientific researchers. The aim of this program is to educate students to be qualified for the job of teaching, scientific research, engineering design and high level management in higher school, research institutions and enterprises.

Ⅱ. Research Fields

1. Design and Preparation of Advanced Refractories
2. New Inorganic Non-metallic Materials
3. New Iron and Steel Materials
4. Material Interface and Functional Materials
5. Microstructure and Performance Control of Materials Processing
6. Modeling and Control of Material Forming Process

Ⅲ. Program Duration

Schooling of full-time master candidate lasts 3 years and the duration of schooling is usually 2-3 years.

Ⅳ. Credits and Requirements

Credit Requirements for Master student of Metallurgical Engineering

Total credits	≥30credits	
Courses	≥23credits	General Institute Requirement：6 credits ≥ 6 credits Required Departmental Core Subjects ≥ 10credits Unrestricted Electives ≥ 7credits
Research	7credits	Research proposal, 1 credits

		Seminar, 1 credits Thesis mid-term report, 1 credits PhD thesis, 4 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Research and dissertation

5.1 Basic requirement for master degree

The training mode of master candidate is for the supervisor to takes charge, while the supervisor team provides assistance. The supervisor is responsible for providing guidance for the student to make personal training program, write thesis proposal and dissertation, make academic (scientific) research, and to organize academic exchange and for convening supervision team for the guidance of the student. The supervisor team should have at least two experts with the title of associate professor, whose main task is to provide regular guidance for the master candidate and participate in the whole process of training.

5.2 Research proposal requirement

Graduate student should read no less than 40 literature items during the study period, of which foreign literature covers no less than 1/3.

The master research proposal should clearly describe the significance of the research, research contents, research methods, key points in research job, innovation of research, schedule of research, expected results and experimental plan etc. At least five associate professors or professor (at least 3 members are from Material Science and Engineering) are required to form the defense panel for research proposal of master application. If the candidate cannot pass the defense, he or she is required to make a new research proposal. The research proposal should be applied in third term.

5.3 Requirements of Academic Activities

The master student is required to attend at least 6 seminars before applying for master degree.

5.4 Requirements of doctoral degree defense

At least one academic paper related to the dissertation content should be published or accepted by Class C core journal in China or international academic journals. Graduate student should be the first author of the published papers (or supervisor as the first author, graduate student as the second author) and the affiliation should be Wuhan University of Science and Technology.

The requirements for antithesis: an innovative topic with practical significance; awareness about the authoritative literature and the new development of research topics, new ideas or improvements in the theoretical analysis, testing technique, data processing, instruments and equipment and crafts; acquisition of the theoretical knowledge and skills as well as the abilities for analysis and practical application required by the thesis must have correct argument, tight logic, smooth writing, in accordance with academic conventions concerning formula,

charts, data, direct speech and measurement unit. The thesis must be written independently and follow the science ethic. The degree thesis must meet the demands of the the relevant provisions of the university on detection of "academic misconduct detection system (TMLC2)".

Curriculum for Master Students of Metallurgical Engineering

Course Type	Course Nature	Course Code	Course Name	Hours	Credit	Semester	School	Note
Required courses	Common General courses	17BSA0601	Chinese Language	160	4	1	Arts, law and Economics	required
		17BSA2101	A Survey of China	32	2	1	International School	
	Departmental Core Subjects	15SD02201	Metallurgical thermodynamics and dynamics	32	2	1	Materials and Metallurgy	≥10credits
		15SD02202	Metallurgy Electra chemical theory and application	32	2	1	Materials and Metallurgy	
		15SD02203	Research methods on metallurgical physical chemistry	32	2	1	Materials and Metallurgy	
		15SD02204	Higher transmission principle	32	2	1	Materials and Metallurgy	
		15SY02201	New technologies on iron and steel metallurgy	32	2	2	Materials and Metallurgy	
Elective courses	Restricted electives	15SY02203	Theory and practice of continuous casting	32	2	2	Materials and Metallurgy	≥7credits
		15SY02202	Theory and application of Nonferrous metallurgy	32	2	2	Materials and Metallurgy	
		15SY02204	Numerical metallurgy	32	2	2	Materials and Metallurgy	
		15SY02205	Comprehensive utilization of metallurgical resources	32	2	2	Materials and Metallurgy	
		15SY02206	New technology of metallurgical raw materials	32	2	2	Materials and Metallurgy	
Research		15SYJ0201	Research proposal		1		Materials and Metallurgy	required
		15SYJ0202	Seminar≥6		1		Materials and Metallurgy	
		15SYJ0203	Thesis mid-term report		1		Materials and Metallurgy	
		15SYJ0204	Thesis		4		Materials and Metallurgy	

机械工程博士研究生培养方案

（代码：0802　授 工学博士 学位）

一、培养目标

机械工程专业博士将具备本学科扎实的基础理论知识和宽广的专业知识。掌握机械设计、制造和分析方面系统且前沿的理论和方法。培养的博士生具备独立从事科学研究的能力，能综合运用计算机、先进实验和测试手段等方法对复杂机械系统进行深入地创新性研究。能在科研机构、教育、工业研究、工程设计及高级管理等领域从事相关工作。

二、研究方向

1. 机械设计及理论：光机电检测理论及应用；冶金装备智能设计；冶金设备力学、强度及工作行为；设备检测与诊断；现代设计方法；结构的多尺度模拟方法；非线性信号分析与故障诊断；复杂机电系统可靠性设计；机器视觉与图像处理；智能结构及智能材料；摩擦学与表面工程；金属微观界面；健康监测。

2. 机械制造及其自动化：制造系统工程及网络化制造；制造过程控制技术与应用；智能制造理论与技术；增材制造；精密制造。

3. 机械电子工程：数字伺服系统与智能控制；井下数字控制工程；机电液系统动态设计；机电系统运动行为及控制；液压系统可靠性最优化与智能故障诊断；液压传动及控制系统智能故障诊断。

4. 车辆工程：电动汽车动力学及控制；现在车辆设计理论；交通设备控制与信息技术。

三、学习年限

全日制博士研究生，学制 3 年，学习年限一般为 3～5 年。

四、学分要求

机械工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课	≥12	公共必修课 6 其中：汉语 4，中国概况 2 学科基础课≥4 专业选修课≥2
研究环节	12	开题报告 1 学术交流 1 论文中期进展报告及考核 1 学位论文 9
具体课程设置见课程计划表		

五、本学科对博士研究生培养提出的具体要求

1. 培养基本要求：培养计划应包含核心理论课程和科学研究。导师负责博士生培养方案指定。课题组

参与硕士生培养。经过上级主管部门同意后，可以安排一名副导师参与指导。

2. 开题要求：毕业生在学习阶段应阅读 40 篇以上文献，其中外文文献不少于 1/3。博士开题报告应详细介绍研究意义、研究内容、研究方法、研究重点、创新之处、研究进度、研究预期成果和试验计划等。开题报告评委会要求至少 5 名副高以上人员组成（至少三名为机械工程专业）。如果开题报告未通过，需再次开题，开题在第三学期进行。

3. 论文中期进展要求：论文答辩前需进行中期报告，考核小组至少有 5 名副高以上职称人员组成（至少 3 名为机械工程专业）。考核要点是与论文相关的实验方法、数据、实验结果准确性等。只有通过论文中期报告的学生方可进行后续研究。

4. 参加学术活动要求：硕士生攻读学位期间应参加至少 9 次学术交流（至少一次国际学术交流）。

5. 学位论文答辩要求：发表或录用的论文参照武汉科技大学相关文件执行。

6. 学位论文预答辩要求：申请博士学位答辩前需进行预答辩。

7. 学位论文答辩要求：博士研究生需完成学分、论文写作及各项学术活动，通过论文预答辩。

机械工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BC03149	国际学术交流方法与实践	16	1	1	机械自动化学院	必修
		15BC03157	机械工程学科前沿	16	1	1	机械自动化学院	
		15BD07100	科学与工程计算	24	1.5	1	理学院	
		15BD03151	冶金设备研究方法论	24	1.5	2	机械自动化学院	
		15BD03152	非线性理论与应用	24	1.5	2	机械自动化学院	
选修课	专业选修课	17SX14019	第二外国语(德语上)	32	2	1	外国语学院	选修
		17SX14020	第二外国语(德语下)	32	2	2	外国语学院	
		15BY03153	现代设计与制造	16	1	1	机械自动化学院	
		15BY03154	设备故障预测理论与技术	16	1	2	机械自动化学院	
		15BY03155	机器人动力学及控制	16	1	1	机械自动化学院	
		15BY14100	汽车节能技术与新能源应用专论	16	1	1	汽车学院	
		15BY03156	知识工程原理	16	1	1	机械自动化学院	
		15BY03158	精密制造	16	1	1	机械自动化学院	
		15BY03159	液压可靠性优化与智能故障诊断(2)	16	1	1	机械自动化学院	
研究环节		15BYJ0301	开题报告		1	3	机械自动化学院	必修
		15BYJ0302	学术交流≥9 次		1	1-4		
		15BYJ0303	论文中期进展报告及考核		1	5	机械自动化学院	
		15BYJ0304	学位论文		9		机械自动化学院	

Educational Program for Doctoral Students of Mechanical Engineering

(Discipline Code：0802 Conferred Degrees：Doctor of Engineering)

Ⅰ. Educational Objectives

PhD program aims at fostering abilities such as: having a systematic understanding of the basic theories and advanced methods in Mechanical Engineering; mastering theories and methods in mechanical design, manufacturing and analysis; being capable of conducting independent scientific research on complicated mechanical systems with skills in computer technolo The gy and experimentation. Graduates are expected to be qualified for positions in research institutions, academic institutions ect. in this field.

Ⅱ. Research Fields

1. Mechanical design and theories: optic-electromechanical based measurement and its application; intelligent design of metallurgical equipment; dynamical and strength analysis of metallurgical equipment; test and diagnosis of equipment; modern design methods; multi-scale simulation method of structure; nonlinear signal analysis and fault diagnosis; reliability design of complex electromechanical system; machine vision and image processing; smart structure and material; tribology and surface engineering; micro-interface of metal; structure healthy monitoring.

2. Mechanical manufacture and automation: manufacture system engineering and network manufacture; technology of process control for manufacture and its application; intelligent manufacture and its application; additive manufacturing; precision manufacturing.

3. Mechanical-electronic engineering: digital servo system and intelligence control; digital control engineering for under well; dynamic design of electromechanical-hydraulic system; electromechanical system dynamical and its application; reliability optimize and smart fault diagnosis of hydraulic system; smart fault diagnosis of hydraulic transmission and control system.

4. Vehicle engineering: dynamical and control of electro mobile; modern vehicle design theory; traffic equipment control and information technology.

Ⅲ. Program Duration

The duration of study for doctoral students normally ranges from 3 to 5 years.

Ⅳ. Credit Requirements

Credit requirements for PhD in Industrial Engineering

Total Credits	≥24credits	
Courses	≥12credits	Public Compulsory Courses: 6 credits (4 credits for Chinese Language and 2 credits for A Survey of China) Subject Basic Courses ≥4 credits Elective Specialized Courses ≥2 credits
Research	12credits	Thesis proposal: 1 credit Seminar: 1 credit Mid-term Progress Report and Thesis Assessment: 1 credit Dissertation: 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Specific Requirements for Doctoral Candidates in Mechanical Engineering

1. Basic requirements

The education for candidates should include study on theories and practice in research. A doctoral supervisor is responsible for the education. With approval from the senior management, an assistant supervisor is allowed to provide guidance.

2. Thesis proposal

Candidates should read no less than 40 academic articles (at least 1/3 from international resources. The PhD thesis proposal should clearly describe the following aspects of the research: purpose, subjects, methods, problems to be solved, key ideas of innovation, schedule, expected results, means of experiment, work hours, financial requirement etc.. A thesis proposal shall be reviewed and commented especially on the methods of experiment and expected results by at least five associate professors and above titles (at least three specializing in mechanical engineering). IF a candidate fails the assessment, a new thesis proposal shall be made. A thesis proposal is usually made in the third semester.

3. Mid-term Progress Report and Thesis Assessment

The mid-term progress report should be presented around the validity of experiment methods, data, results, preliminary conclusion from the research approach, and whether the thesis can be completed on schedule. There should be at least five associate professors and above titles (at least three specializing in mechanical engineering) assessing the report and providing advice. Only the report is passed should the candidate be able to continue the research.

4. A graduate student shall participate in at least nine academic activities (at least one at international level).

5. Academic Articles Publishing Requirements

Please refer to the relevant regulations provided by the university.

6. Dissertation Pre-Defense Requirements

After the thesis paper is completed and reviewed by the supervisor, the doctoral candidate is required to attend the pre-defense.

7. Dissertation Defense Requirements

Please refer to the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial), etc.

Curriculum for Doctoral Students of Mechanical Engineering

Course Type	Course Nature	Course Code	Course Name	Hours	Credits	Season	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15BC03149	International Academic Communication Methods and Practice	16	1	1	School of Machinery and Automation	Compulsory
		15BC03157	Academic Foreland	16	1	1	School of Machinery and Automation	
		15BD07100	Science and Engineering Calculation	24	1.5	1	College of Science	
		15BD03151	Metallurgical Equipment Research Methodology	24	1.5	2	School of Machinery and Automation	
		15BD03152	Nonlinear Theory and Application	24	1.5	2	School of Machinery and Automation	
Selective Courses	Elective Specialized Courses	15BY03153	Modern Design and Manufacturing	16	1	1	School of Machinery and Automation	Elective
		15BY03154	Equipment Failure Prediction Theory and Technology	16	1	2	School of Machinery and Automation	
		15BY03155	Robot Dynamics and Control	16	1	1	School of Machinery and Automation	
		15BY14100	Monograph on Automobile Energy Saving Technology and Application of New Energy	16	1	1	School of Automobile and Traffic Engineering	
		15BY03156	Knowledge Engineering Principles	16	1	1	School of Machinery and Automation	
		15BY03158	Precision Manufacturing	16	1	1	School of Machinery and Automation	
		15BY03159	Hydraulic Reliability Optimization and Intelligent Fault Diagnosis（2）	16	1	1	School of Machinery and Automation	
Research		15BYJ0301	Thesis Proposal		1	3	School of Machinery and Automation	
		15BYJ0302	Academic Communication		1	1-4		
		15BYJ0303	Mid-Term Evaluation		1	5	School of Machinery and Automation	
		15BYJ0304	Dissertation		9		School of Machinery and Automation	

机械工程硕士研究生培养方案

（学科代码：0802　授 工学硕士 学位）

一、培养目标

机械工程专业博士将具备本学科扎实的基础理论知识和宽广的专业知识。掌握机械设计、制造和分析方面系统且前沿的理论和方法。培养的博士生具备独立从事科学研究的能力，能综合运用相关理论、计算机、先进实验和测试手段等方法对机械系统进行研究。能在科研机构、教育、工业研究、工程设计及管理等领域从事相关工作。

二、研究方向

1. 机械设计及理论

冶金设备力学、强度和工作行为研究；新型冶金技术与装备的研究及开发；智能机器及受控机构；机电系统计算机建模及仿真；机电系统动态设计；机械系统虚拟现实；机械 CAD/CAM/CAE；金属结构疲劳；高温陶瓷与金属的复合结构；计算机辅助设计支撑软件技术；仿生设计；实时机器视觉；图像识别与处理；智能机械与传感技术；摩擦学原理与应用；机械振动理论及其应用；机械振动噪声分析及智能控制；机械故障诊断；智能机械与计算机仿真技术；

2. 机械电子工程

机电系统的故障诊断及在线监控；数字伺服系统与智能控制；计算机辅助测试与虚拟仪器；机电一体化及工业机器人；复杂机电液系统测控理论与技术；

3. 机械制造及其自动化

绿色制造；制造过程控制；制造系统工程；工业工程与管理系统；制造业信息化；先进制造工艺与装备；计算机辅助设计/制造一体化（CAD/CAM）；现代制造工艺；控制及仿真技术；精密加工及其测试；企业制造过程信息化原理与技术；制造装备自动化；数字化成形与制造；增材制造；

4. 车辆工程

汽车优化设计与轻量化；汽车污染控制与清洁燃料技术；汽车电控技术；汽车动力学；车辆振动与噪声控制；混合动力电动汽车；汽车检测技术；汽车运用管理。

三、学习年限

全日制硕士研究生，学制 3 年，学习年限一般为 2～4 年。

四、学分要求

机械工程学术硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课	≥23 学分	公共必修课：6 学分 其中：汉语 4，中国概况 2 学科基础课≥10 学分 选修课≥7 学分

科研	7 学分	开题报告 1 学分 学术交流 1 学分 中期报告 1 学分 论文 4 学分

五、研究环节与学位论文

1. 培养基本要求：培养计划应包含核心理论课程和科学研究。导师负责硕士生培养方案指定。课题组参与硕士生培养。研究课题须在学校、科研机构和工厂完成。

2. 开题要求：毕业生在学习阶段应阅读 40 篇以上文献，其中外文文献不少于 1/3。硕士生开题报告应详细介绍研究意义、研究内容、研究方法、研究重点、创新之处、研究进度、研究预期成果和试验计划等。开题报告评委会要求至少 5 名副高以上人员组成（至少三名为机械工程专业）。如果开题报告未通过，需再次开题，开题在第三学期进行。

3. 参加学术活动要求：硕士生攻读学位期间应参加至少 6 次学术交流。

4. 学位论文答辩要求：答辩前要求至少在 C 刊以上发表或录用学术论文，学生作为第一作者或导师第一作者，学生第二作者。发表单位为武汉科技大学。

学术论文应有创新性，合理应用理论、实验和数值分析等方法进行研究工作。论文应论点正确，逻辑合理并充分论证、论文内容详实，文笔流畅，格式规范。图、表等表达正确。论文必须为硕士学位申请人独立撰写，并通过学术查重系统。

机械工程学术硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SA07003	矩阵分析	32	2	1	理学院	≥4 学分
		15SA07004	数值分析	32	2	1	理学院	
		15SA07001	随机过程	32	2	2	理学院	
		15SA03158	机械工程学科前沿	16	1	1	机械自动化学院	
		15SD03125	智能控制原理	32	2	1	机械自动化学院	
		15SD03126	结构分析的计算机方法	32	2	2	机械自动化学院	
		15SD03127	传感与测控技术	32	2	1	机械自动化学院	
		15SD03128	信号分析方法	32	2	2	机械自动化学院	
		15SD03129	系统建模与仿真	32	2	2	机械自动化学院	
		15SD03130	机构综合与优化	16	2	2	机械自动化学院	
		15SD23001	车辆系统动力学	40	2.5	2	汽车与交通工程学院	
选修课	专业选修课	15SY03131	机械振动Ⅱ	32	2	1	机械自动化学院	
		15SY03132	弹塑性理论	32	2	1	机械自动化学院	
		15SY03133	现代数字控制工程	32	2	2	机械自动化学院	
		15SY03135	仿生机械与智能机械	16	1	2	机械自动化学院	
		15SY03136	机器视觉原理与应用	16	1	2	机械自动化学院	
		15SY03137	机器人技术及应用	16	1	2	机械自动化学院	
		15SY03138	过程装备腐蚀与防护	16	1	2	机械自动化学院	
		15SY03139	材料成形界面工程	16	1	2	机械自动化学院	
		15SY03140	精密制造	32	2	2	机械自动化学院	
		15SY03141	计算流体力学	32	2	2	机械自动化学院	
		15SY03142	摩擦学原理与应用	16	1	2	机械自动化学院	
		15SY03143	液压可靠性最优化与智能故障诊断（1）	16	1	2	机械自动化学院	
		15SY03144	系统 CAE 分析技术	16	1	2	机械自动化学院	
		15SY03145	喷射技术理论及应用	16	1	2	机械自动化学院	

		15SY03146	疲劳分析、试验与仿真	16	1	2	机械自动化学院	
		15SY03147	边界层理论	16	1	2	机械自动化学院	
		15SY03148	磁悬浮技术基础	16	1	2	机械自动化学院	
		17SY03149	振动结构模态分析	32	2	2	机械自动化学院	
		15SY23002	车辆控制技术	32	2	2	汽车与交通工程学院	
		15SY23007	新能源汽车技术	16	1	2		
		15SY23008	汽车排放控制技术	16	1	2		
研究环节		15SYJ0301	开题报告		1	3	机械自动化学院	必修
		15SYJ0302	学术交流≥6 次		1	1-4		
		15SYJ0303	论文中期进展报告		1	3-4	机械自动化学院	
		15SYJ0304	学位论文		4	5-6	机械自动化学院	
补修课		15ST03101	机械设计				机械自动化学院	只计成绩不计学分
		15ST03102	机械制造				机械自动化学院	
		15ST03103	流体力学与液压传动				机械自动化学院	

Educational Program for Master Students of Mechanical Engineering

(Discipline Code：0802 Conferred Degrees：Master of Engineering)

Ⅰ. Educational Objectives

The Master Program in Mechanical Engineering aims at fostering abilities such as: having a systemic understanding of the basic theories and advanced methods in Mechanical Engineering; mastering advanced theories and methods in mechanical design, manufacturing and analysis; being capable of conducting independent scientific research on mechanical systems with skills in computer technology and experimentation. Graduates are expected to be qualified for positions in research institutions, academic institutions ect. in this field.

Ⅱ. Research Fields

1.Mechanical design and theory: dynamical and strength analysis of metallurgical equipment; new metallurgical technology and equipment design and development; intelligent machine and controlled institutions; computer based modeling and simulation of electromechanical system; dynamical design of electromechanical system; virtual reality of mechanical system; mechanical CAD/CAM/CAE; fatigue of metal construction; complex construction of high temperature ceramic and metal; support software technology of CAD; bionic design; real-time machine vision; image detection and processing; smart machine and sensor technology; tribology and its application; mechanical vibration and its application; mechanical vibration noise analysis and intelligent control; mechanical fault diagnosis; intelligent machine and computer simulation technology;

2. Mechanical electronic engineering: Fault diagnosis and online monitoring for electromechanical system; digital servo system and intelligence control; computer aid measurement and virtual instrument; electromechanical system and industry robot; measurement and control of complex electromechanical-hydraulic system

3. Mechanical manufacture and automation: green manufacture; control of manufacture process; industry engineering and management system; information of manufacture enterprise; additive manufacturing process and equipment; CAD/CAM; modern manufacture process; control and simulation technology; precision manufacturing and measurement; information theory and technology of manufacturing process; automation of manufacture equipment; digital molding and manufacture; additive manufacturing

4. Vehicle engineering: optimize and lighting technology for vehicle; vehicle pollution control and clear fuel technology; vehicle electricity control technology; dynamical of vehicle; vehicle vibration and noise control; hybrid electric vehicle; vehicle testing technology; management of vehicle usage.

Ⅲ. Program Duration

The duration of study for full-time master students (academic) normally ranges from 2 to 4 years.

Ⅳ. Credit Requirements

Credit requirements for Master's Degree in Mechanical Engineering

Total credits	≥30credits	
Courses	≥23credits	Public Compulsory Courses ≥6 credits, Subject Basic Courses ≥ 10 credits Elective Specialized Courses ≥ 7 credits
Research	7credits	Thesis Proposal, 1 credit Academic communication, 1 credit Mid-term Progress Report, 1 credit Degree Thesis, 4 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Research and dissertation

1. Basic requirements

The education for candidates should include study on theories and practice in research. A doctoral supervisor is responsible for the education. Research should be carried out in school, research institutions and factories.

2. Thesis proposal

Candidates should read no less than 40 academic articles (at least 1/3 from international resources）. The thesis proposal should clearly describe the following aspects of the research: purpose, subjects, methods, problems to be solved, key ideas of innovation, schedule, expected results, means of experiment, work hours, financial requirement etc.. A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles (at least three specializing in mechanical engineering). If a thesis proposal is not passed, the student has to make a new one. A thesis proposal is usually made in the third semester.

3. Requirement of academic events: The master student is required attend at least 6 times seminar before apply master degree.

4. Requirements of defense: At least one C-stage academic paper related to their dissertations content should be published or received by China or international academic journals. Graduate students must be the first author of the published papers (or supervisor is the first author, graduate student is second author) and the institute should be Wuhan University of Science and Technology.

The thesis should include innovative ideas and the research in question should be carried out with appropriate theories and methods as well as accurate statistics. The thesis must be composed with good reasoning, sufficient evidence and language fluency. The thesis must be written by the postgraduate student independently following science ethics. The thesis must pass the detection of "academic misconduct detection system (TMLC2)" .

Curriculum for Master Students of Mechanical Engineering

Course Type	Course Nature	Course Code	Course Name	Hours	Credits	Season	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15SA07003	Matrix Analysis	32	2	1	College of Science	≥4credits
		15SA07004	Numerical Analysis	32	2	1	College of Science	
		15SA07001	Stochastic Process	32	2	2	College of Science	
		15SA03158	Academic Foreland	16	1	1	School of Machinery and Automation	
		15SD03125	Intelligent Control Theory	32	2	1	School of Machinery and Automation	
		15SD03126	Computer Methods of Structure Analysis	32	2	2		
		15SD03127	Sensing and Measurement and Control Technology	32	2	1		
		15SD03128	Signal Analysis Method	32	2	2		
		15SD03129	Modeling and Simulation of the System	32	2	2		
		15SD03130	Synthesis and Optimization	16	2	2		
		15SD23001	Vehicle system Dynamics	40	2.5	2	School of Automobile and Traffic Engineering	
Selective Courses	Elective Specialized Courses	15SY03131	Mechanical Vibration Ⅱ	32	2	1	School of Machinery and Automation	
		15SY03132	Elastic-Plastic Theory	32	2	1		
		15SY03133	Modern Digital Control Engineering	32	2	2	School of Machinery and Automation	

		15SY03135	Biomimetic Mechanical and Intelligent Machines	16	1	2		
		15SY03136	Principle and Application of Machine Vision	16	1	2		
		15SY03137	Robot Technology and Application	16	1	2		
		15SY03138	Process Equipment Corrosion and Protection	16	1	2		
		15SY03139	Material Forming Interface Engineering	16	1	2		
		15SY03140	Precision Manufacturing	32	2	2		
		15SY03141	Computational Fluid Dynamics	32	2	2		
		15SY03142	Tribological Principle and Application	16	1	2	School of Machinery and Automation	
		15SY03143	Hydraulic Reliability Optimization and Intelligent Fault Diagnosis（1）	16	1	2		
		15SY03144	CAE Analysis Technology	16	1	2		
		15SY03145	Jet Technology Theory and Application	16	1	2		
		15SY03146	Fatigue Analysis, Experiment and Simulation	16	1	2		
		15SY03147	Boundary Layer Theory	16	1	2		
		15SY03148	Introduction to Basic Magnetic Bearings	16	1	2		
		17SY03149	Model analysis of construction vibration	32	2	2		
		15SY23002	Vehicle Control Technology	32	2	2	School of Automobile and Traffic Engineering	
		15SY23007	New Energy Automotive Technology	16	1	2		
		15SY23008	Vehicle Emission Control Technology	16	1	2		
Research		15SYJ0301	Thesis Proposal		1	3	School of Machinery and Automation	Requirement

	15SYJ0302	Academic communication		1	1-4		
	15SYJ0303	Mid-Term Evaluation		1	3-4	School of Machinery and Automation	
	15SYJ0304	Dissertation		4	5-6	School of Machinery and Automation	
Complementary Course	15ST03101	Mechanical Design				School of Machinery and Automation	Grade Only No Credit
	15ST03102	Machinery Manufacturing				School of Machinery and Automation	
	15ST03103	Fluid Mechanics and Hydraulic Transmission				School of Machinery and Automation	

工业工程博士研究生培养方案

（学科代码：0802Z1 授 工学 博士学位）

一、培养目标

主要培养掌握坚实宽广的基础理论和系统深入的工业工程专门知识，熟练掌握工程技术与管理知识，知识面宽广，能够从事工程设计、生产运作与管理及工业工程理论研究的，能够对复杂生产和服务系统进行分析、规划、设计和运作，具备较强的工程实践能力、团队协作能力、组织管理能力和创新能力，具有独立从事科学研究工作的能力，并能取得创造性的成果，具备国际化视野和行业前瞻力的高水平复合型人才。具体要求如下：

1. 工业工程学科工学博士学位获得者应德智体全面发展，具有开拓进取、锐意改革、自主创新的精神，严谨的科学态度和作风，并具有科研团队精神。

2. 应坚实而宽广地掌握本学科的基础理论和深入而系统的专门知识，通晓本学科及相关学科的现状，深入了解本学科的发展前沿方向及研究水平。

3. 具有良好的心理、生理素质，能独立从事科研工作，正确地运用定性与定量相结合的系统分析方法及相应的工程技术方法，创造性地研究和解决该学科的有关理论和实际问题。

4. 能运用外语熟练地阅读专业书刊资料，达到能读、写、听、说的程度。

二、研究方向

1. 绿色制造与再制造系统理论与技术
2. 生产与服务系统
3. 产品与制造系统
4. 物流及供应链管理
5. 知识工程与管理

三、学习年限

全日制博士研究生，学制 3 年，学习年限一般为 3～5 年。

四、学分要求

工业工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课学分	≥12 学分	公共必修课 6 学分 其中：汉语 4 学分，中国概况 2 学分 学科基础课≥4 学分 专业选修课≥2 学分
研究环节	12 学分	开题报告 1 学分 学术交流 1 学分

		论文中期进考核 1 学分 学位论文 9 学分
详细课程设置见课程计划表		

五、本学科对博士研究生培养提出的具体要求

1. 培养基本要求

博士生培养实行导师负责，鼓励组成指导小组集体指导。跨学科或交叉学科培养博士生时，应从相关学科中聘请副导师协助指导；博士生应在良好的学术环境下进行培养，在导师指导下选学有关课程，查阅文献资料，参加学术交流，确定具体课题，独立从事科学研究，并应取得创造性成果；博士生的培养以科学研究为主。重点强化创新意识和创新能力，培养独立从事科学研究的能力。

2. 开题要求

以书面及答辩形式就论文开题作报告，记 1 学分，成绩按通过/不通过登记。开题报告须有至少 5 名具有副教授以上职称的学者（其中同学科教授不少于 3 名）审定并签署意见，答辩环节至少有 5 名具有副教授以上职称的学者（其中同学科教授不少于 3 名）参加，报告人就选题的意义、研究内容、研究方法、拟解决的技术难题、创新之处、进度安排和预期效果以及拟采用的实验手段、估计课题的工作量、所需经费等做出论述和答辩，由指导小组确定是否通过。开题报告一般应在第 3 学期进行。

3. 论文中期进展要求

博士研究生必须以书面及答辩形式做论文研究中期进展报告，记 1 学分。至少 5 名具有副教授以上职称学者（其中至少 3 名教授）对中期报告进行考核，就课题的实验方法、数据、结果的可靠性、设计方案初步结论的正确性以及能否如期完成学位论文工作等进行答辩，对存在的问题提出指导性建议。中期考核合格者继续做博士学位论文，不合格者，应终止攻读博士学位，或令其退学。

4. 参加学术活动要求

博士研究生须参加 9 次以上学术活动，其中必须具有参加国际学术会议（境外）1 次以上或国际（境外）短期合作研究或学习经历方可准予毕业。每次参加学术活动应有书面记录，做学术报告应有书面材料，在申请学位前交学院备案并记相应学分。

5. 发表学术论文要求

所发表论文的数量和质量安格按照学校相关规定执行

6. 学位论文预答辩要求

申请博士学位的研究生在完成学位论文初稿，经导师审阅后，在学位论文正式送审前必须提出博士学位论文预答辩申请。学位论文初稿由 3-5 位相关学科的教授或具有博士学位的副教授组成，申请预答辩的博士生，应在预答辩前 10 天将学位论文初稿交给答辩专家。预答辩通过者，应根据预答辩专家小组提出的意见，进行修改，修改后的学位论文经导师审阅通过后，方可提出学位论文评阅申请。对预答辩不通过者，必须根据预答辩专家小组提出的意见，针对学位论文中存在的问题，在导师的指导下，作出实质性的修改，三个月后可再次提出学位论文预答辩申请。

7. 学位论文答辩要求

研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》、《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

工业工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
.学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BD03201	制造系统科学	32	2	1	机械自动化学院	≥2 学分
		15BD03202	决策理论与方法	32	2	1	机械自动化学院	
选修课	专业选修课	15BY03203	工业工程前沿	32	2	2	机械自动化学院	≥2 学分
		15BY05204	管理工程前沿	32	2	2	机械自动化学院	
研究环节		15BYJ0301	开题报告		1	3	机械自动化学院	必修
		15BYJ0302	学术交流		1	1-4		
		15BYJ0303	中期考核		1	5	机械自动化学院	
		15BYJ0304	学位论文		9		机械自动化学院	

Educational Program for Doctoral Students of Industrial Engineering

(Discipline Code：0802Z1 Conferred Degrees：Doctor of Engineering)

I. Educational Objectives

The PhD program aims at fostering abilities such as: having a systematic understanding of the basic theories and advanced methods in Industrial Engineering; conducting independent scientific research and undertaking specialized technical work; being capable of analyzing, planning, designing and operating in engineering projects skills in teamwork, management and innovation. Upon graduation, candidates are expected to

1. Be balanced in their development of morality, intelligence and physical fitness and comply with academic ethics, and have a strong sense of dedication and responsibility；

2. Master theories and technologies of the discipline and have sufficient knowledge of the status quo and leading-edge developments in the discipline as well as in relevant disciplines;

3. Be psychologically and physically healthy to engage in scientific research, and be capable of resolving theoretical and practical problems in industrial engineering with systemic analysis , advanced techniques and creative thinking.

4. Master foreign language skills and beg capable of searching for and analyzing academic literature in a foreign language.

II. Research Fields

1. Theories and technologies of green manufacturing and remanufacturing system
2. Production and service system
3. Products and manufacturing system
4. Logistics and supply chain management
5. Knowledge engineering and management

III. Program Duration

The duration of study for doctoral candidates normally ranges from 3 to 5 years.

IV. Credit Requirements

Credit requirements for PhD in Industrial Engineering

Total Credits	≥24 credits	
Courses	≥12 credits	Public Compulsory Courses: 6 credits (4 credits for Chinese Language and 2 credits for A Survey of China) Subject Basic Courses ≥4 credits Elective Specialized Courses ≥2 credits

Research	12 credits	Thesis proposal: 1 credit Seminar: 1 credit Mid-term Progress Report and Thesis Assessment: 1 credit Dissertation: 9 credits
Please refer to the attached Curriculum for specific course arrangements		

V. Specific Requirements for Doctoral Candidates in Industrial Engineering

1. Basic requirements

A doctoral supervisor is responsible for the education of his/her doctoral candidates and seminars are encouraged to give guidance on candidates. In the case of cross-disciplinary candidates, an assistant supervisor from the other discipline should be employed to give guidance. Under the guidance of supervisors, candidates should attend courses, read academic literature, and participate in academic communication so as to make a thesis proposal, conduct research and strive for expected achievement. The focus of education is developing the capability of innovation and the skills in scientific research.

2. Thesis proposal requirements

Thesis proposal shall be presented in a written form and an oral defense form, counting 1 credit. Grades are either pass or fail. The PhD thesis proposal should clearly describe the following aspects of the research: purpose, subjects, methods, problems to be solved, key ideas of innovation, schedule, expected results, means of experiment, work hours, financial requirement etc.. A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles (at least three professors). There should be at least five associate professors and above titles (at least three professors) attending the oral defense. If a candidate failed the oral defense, the thesis proposal should be re-started. A thesis proposal is usually made in the third semester.

3. Mid-term Progress Report and Thesis Assessment

The mid-term progress of a thesis shall be presented in a written form and an oral defense form, counting 1 credit. The mid-term progress report should be presented publicly around the validity of experiment methods, data, results, preliminary conclusion from the research, and whether the thesis can be completed on schedule. There should be at least five associate professors and above titles (at least three professors) assessing the report and providing advice. A failed report may lead to the termination of the doctoral program.

4. Requirements for Academic Activities

A candidate shall participate in at least nine academic activities, counting 1 credit. A written record shall be prepared for each academic activity and a written material shall be reserved for an academic presentation. The written record signed by the supervisor shall be submitted to the school to register credits before applying for a degree.

5. Academic Articles Publishing Requirements

Please refer to the relevant regulations provided by the university.

6. Dissertation Pre-Defense Requirements

After the thesis paper is completed and reviewed by the supervisor, the doctoral candidate is required to apply for the pre-defense before submitting the paper to the final defense panel. The thesis paper should be submitted to a pre-defense panel consisting of three to five professors or associate professors with a PhD ten days before the pre-defense. A pass in the pre-defense allows the candidate to revise the paper based on the panel's suggestions, submit it to the supervisor for a second review, and then apply for the dissertation defense. A candidate who fail the pre-defense has to make substantial changes in the thesis paper based on suggestions of the panel and the supervisor's guidance and applies for another pre-defense after three months.

7. Dissertation Defense Requirements

Please refer to the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and Graduate Student Dissertation Detection Rules of Wuhan Wuhan University of Science and Technology (Trial), etc.

Curriculum for Doctoral Students of Industrial Engineering

Course Type	Course Nature	Course Code	Course Name	Hours	Credit	Season	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese language	160	4	1	School of Literature, Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Discipline Basic Courses	15BD03201	Manufacturing System Science	32	2	1	School of Machinery and Automation	≥2 Credit
		15BD03202	Decision-Making Theories and Methods	32	2	1	School of Machinery and Automation	
Elective Courses	Elective Specialized Courses	15BY03203	Industrial Engineering Frontier	32	2	2	School of Machinery and Automation	≥2 Credit
		15BY05204	Management Engineering Frontier	32	2	2	School of Machinery and Automation	
Research		15BYJ0301	Thesis proposal		1	3	School of Machinery and Automation	Compulsory
		15BYJ0302	Academic Communication		1	1-4		
		15BYJ0303	Mid-Term Evaluation		1	5	School of Machinery and Automation	
		15BYJ0304	Dissertation		9		School of Machinery and Automation	

工业工程硕士研究生培养方案

（学科代码：0802Z1 授 工学 硕士学位）

一、培养目标

主要培养掌握在数学理论,生产系统和服务系统等方面具有坚实理论基础的高水平复合型人才，具体要求如下：

1. 工业工程专业硕士学位获得者应德智体全面发展，具有严谨的科学态度和工作作风。

2. 硕士生应了解工业工程专业的发展前沿，在本学科及相关学科中具有坚实的基础理论和宽广的专业知识，以及基本的实验技能和计算机应用技能。

3. 掌握一门外语，能够熟练地查阅专业文献资料和撰写科技论文。

4. 培养科研团队精神，具有从事科学研究工作能力、学术创新能力、学术交流能力等，能够胜任本学科领域教学、科研、工程技术与管理工作。

二、研究方向

1. 绿色制造与再制造系统工程
2. 生产与服务系统工程
3. 产品与制造系统工程
4. 物流及供应链管理工程
5. 制造业信息化工程

三、学习年限

全日制硕士研究生，学制 3 年，学习年限一般为 2～4 年。

四、学分要求

工业工程学术硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课学分	≥23 学分	公共必修课≥6 学分 学科基础课≥10 学分 专业选修课≥7 学分
研究环节	7 学分	开题报告 1 学分 学术交流 1 学分 论文中期考核 1 学分 学位论文 4 学分
详细课程设置见课程计划表		

五、研究环节与学位论文

1. 培养基本要求

以优化知识结构、加强实践能力为主，采取理论学习和科研相结合的方式，既要使硕士生掌握基础理论和专业知识，又要培养其科学研究的能力；在导师指导下，制定个人培养计划，撰写开题报告和学位论文、开展学术（科学）研究、组织学术交流，系主管部门应对执行情况进行监督和检查；研究生指导实行导师负责制，导师应由学术水平较高、在科研工作中有成绩的教授或副教授担任。

2. 开题要求

以书面及答辩形式就论文开题作报告，记 1 学分，成绩按通过/不通过登记。研究生开题报告的内容一般应包括：课题来源和选题依据，对国内外有关文献进行阅读、分析和总结；研究方案，阐明研究目标、研究内容、关键问题与创新点、研究方法、技术路线、实验方案等；研究工作基础，说明具备的研究条件、研究过程中可能遇到的困难和问题及其可能的解决办法和措施；

开题报告须有至少 5 名具有副教授以上职称（其中至少 3 名教授）或博士学位者审定并签署意见，答辩环节至少有 5 名具有副教授以上职称（其中至少 3 名教授）或博士学位者参加，答辩未能通过者，必须重新做开题报告。开题报告一般应在第 3 学期进行。

3. 参加学术活动要求

硕士研究生须参加 6 次以上学术活动，记 1 学分。每次参加学术活动应有书面记录，做学术报告应有书面材料，并交导师签字认可，在申请学位前交学院备案并记相应学分。

4. 学位论文答辩要求

研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》、《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

工业工程学术硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SC03217	数据、模型与决策	16	1	1	机械自动化学院	≥8 学分
		15SC03218	统计学应用	32	2	1	机械自动化学院	
		15SA07003	矩阵分析	32	2	1	理学院	
		15SA07004	数值分析	32	2	1	理学院	
		15SD03219	管理研究方法	16	1	1	机械自动化学院	
		15SD03220	制造系统工程	16	1	2	机械自动化学院	
		15SD03221	制造系统建模与仿真	32	1	2	机械自动化学院	
		15SD03222	现代工业工程	16	1	2	机械自动化学院	
选修课	专业选修课	17SY03223	绿色制造和再制造	16	1	2	机械自动化学院	≥6 学分
		17SY03224	产品创新工程	16	1	2	机械自动化学院	
		17SY03225	生产计划与调度	16	1	2	机械自动化学院	
		17SY03226	质量管理与可靠性	16	1	2	机械自动化学院	
		17SY03227	供应链管理	16	1	2	机械自动化学院	
		17SY03228	制造业信息化工程	16	1	2	机械自动化学院	
		15SY03229	新型软件开发原理与工具	32	2	2	机械自动化学院	
		17SY03230	增材制造	16	1	2	机械自动化学院	
研究环节		15SYJ0301	开题报告		1	3	机械自动化学院	必修
		15SYJ0302	学术交流≥6 次		1	1-4		
		15SYJ0303	论文中期进展报告		1	3-4	机械自动化学院	
		15SYJ0304	学位论文		4	5-6	机械自动化学院	
补修课		15ST03201	工业工程基础	16		2	机械自动化学院	只计成绩不计学分

Educational Program for Master Students of Industrial Engineering

(Discipline Code：0802Z1 Conferred Degrees：Master of Engineering)

I. Educational Objectives

The Master Program in Industrial Engineering (IE) to educate qualified talents mastering knowledge in mathematics, production systems and service systems. Graduates are expected to:

1. Be balanced in their development of morality, intelligence and physical fitness and be disciplined in scientific research;

2. Have sufficient knowledge of the development in industrial engineering and master a systemic understanding of basic theories in the discipline and be equipped skills in research skills and computer technology;

3. Master foreign language skills and being capable of searching for and analyzing academic documents in a foreign language;

4. Be capable of academic research and communication especially in teamwork, and be qualified for positions of planning, designing, evaluating and innovating in the field of industrial engineering.

II. Research Fields

1. Green manufacturing and remanufacture system engineering
2. Production and service system engineering
3. Products and manufacturing system engineering
4. Logistics and supply chain management engineering
5. Manufacture information engineering

III. Program Duration

The duration of study for full-time master students normally ranges from 2 to 4 years.

IV. Credit Requirements

Credit requirements for Master's Degree in Industrial Engineering

Total credits	≥30credits	
Courses	≥23credits	Public Compulsory Courses ≥6 credits, Subject Basic Courses ≥ 10 credits Elective Specialized Courses ≥ 7 credits
Research	7credits	Thesis Proposal, 1 credit Academic communication, 1 credit Mid-term Progress Report, 1 credit Degree Thesis, 4 credits
Please refer to the attached Curriculum for specific course arrangements		

V. Research and dissertation

1. Basic requirements

Students are expected to optimize their knowledge structure and enhance practicing capability with education on theories and experience in research. Under the guidance of the supervisor, a student should customize his/her development plan, compose thesis proposal and thesis paper, carry our academic studies and participate in academic communication, all of which should be monitored and assessed by the department. The supervisors responsible for the education should be professors or associate professors with sufficient experience in academic studies and scientific research.

2. Research proposal requirements

Thesis proposal shall be presented in a written form and an oral defense form, counting 1 credit.

Contents of a thesis proposal shall include: the background and basis of the selected topic, and a review of domestic and abroad literature with an analysis and a summary; a research program with an illustration of research objectives, content, key problems, innovation points, research method, technical approach, experiment means, etc.; the research foundation illustrating existing research condition, and possible difficulties, problems, and their possible solutions and measures during the research process.

A thesis proposal shall be reviewed and commented by at least five associate professors and above titles (at least three professors). There should be at least five (associate) professors or doctors attending the oral defense. If students failed the oral defense, the thesis proposals should be re-started. The thesis proposal is usually made in the third semester.

3. Requirement of academic activities

A student shall participate in at least six academic activities, counting 1 credit. A written record shall be prepared for each academic activity and a written material shall be kept for an academic presentation. The written record signed by the supervisor shall be submitted to the school to register credits before applying for a degree.

4. Requirements of defense

A student shall complete all training sessions, and shall follow the Provisions of Doctoral and Master Students of Wuhan University of Science and Technology Applying for a Degree and Gaining Academic Achievements, Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and the Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial).

Curriculum for Master Students of Industrial Engineering

Course Type	Course Nature	Course Code	Course Name	Hours	Credit	Season	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature, Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15SC03217	Data, Model and Decision	16	1	1	School of Machinery and Automation	≥8 Credit
		15SC03218	Application of Statistics	32	2	1		
		15SA07003	Matrix Analysis	32	2	1	College of Science	
		15SA07004	Numerical Analysis	32	2	1	College of Science	
		15SD03219	Management Research Methods	16	1	1	School of Machinery and Automation	
		15SD03220	Manufacturing System Engineering	16	1	2		
		15SD03221	Modeling and Simulation of Manufacturing System	32	1	2		
		15SD03222	Modern Industrial Engineering	16	1	2		
	Major Elective Course	15SY03223	Green Manufacturing and Remanufacturing	16	1	2	School of Machinery and Automation	≥6credit
		15SY03224	Product Innovation Engineering	16	1	2		
		15SY03225	Production Planning and Scheduling	16	1	2		
		15SY03226	Quality Management and Reliability	16	1	2		
		15SY03227	Supply Chain Management	16	1	2		
		15SY03228	Manufacturing Information Engineering	16	1	2	School of Machinery and Automation	

		15SY03229	New Software Development Principles and Tools	32	2	2		
		15SY03230	Additive Manufacturing	16	1	2		
Research		15SYJ0301	Thesis Proposal		1	3	School of Machinery and Automation	
		15SYJ0302	Academic Communication		1	1-4		
		15SYJ0303	Mid-Term Evaluation		1	3-4	School of Machinery and Automation	
		15SYJ0304	Thesis		4	5-6		
Complementary Course		15ST03201	Industrial Engineering Fundamentals	16		2	School of Machinery and Automation	Grade Only No Credit

控制科学与工程博士研究生培养方案

（学科代码：0811 授 工学博士 学位）

一、培养目标

1. 具有活跃的学术思想、严密的逻辑思维和创新意识。
2. 具有独立从事本学科理论研究及高科技项目的研发能力，做出具有创造性的成果。
3. 具有批判性学习的能力，能胜任科研、教学和科研项目的技术管理工作。

二、研究方向

1. 控制理论与应用
2. 复杂工业过程控制及优化
3. 微光机电系统集成与测控技术
4. 状态监测与故障诊断
5. 多媒体信息处理与通信
6. 机器人与智能系统

三、学习年限

全日制攻读博士学位研究生，学制 3 年，学习年限一般为 3~5 年。

四、学分要求

控制科学与工程博士研究生学分要求及学分分配表

总学分	≥24 学分	
修课学分	≥12 学分	公共必修课 6 学分 其中：汉语 4 学分，中国概况 2 学分 学科基础课≥4 学分 专业选修课≥2 学分
研究环节	12 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告及考核 1 学分 学位论文 9 学分
具体课程设置见附表		

五、具体要求

1.培养基本要求

1）具有严谨求实的科学态度、工作作风和高尚的职业道德，德、智、体全面发展；

2）具有本科学坚实宽广的理论基础，系统深入的专业知识；

3）具有独立从事本学科理论研究及高科技项目的研发创新能力，能独立承担和完成本学科的各类研究课题，能胜任科研、教学和科研项目的技术管理工作。

2.开题要求

以书面及答辩形式作开题报告，记 1 学分，成绩按通过/不通过登记。

开题报告及答辩均须至少 5 名具有副教授以上职称或博士学位的老师（至少 3 名教授）审定及参加，答辩未能通过者 3 个月后可再次申请。开题报告参考文献一般不少于 70 篇，且近五年内的文献不少于总数的三分之一。开题工作原则上应于入学后第四学期结束前完成，且与论文答辩时间间隔不得少于 12 个月。具体要求参照《武汉科技大学研究生学位论文开题报告管理办法》执行。

3.论文中期进展要求

以书面及答辩形式作论文研究中期进展报告，记 1 学分，成绩按通过/不通过登记。

至少 5 名具有副教授以上职称或博士学位的老师对中期报告进行考核。中期考核不合格者 6 个月后可再次申请考核，中期考核与论文答辩的时间间隔不得少于 6 个月。

4.参加学术活动要求

博士研究生必须参加 15 次以上校内外学术交流，其中至少用外文作一次学术报告，记 1 学分，成绩按通过/不通过登记。

5.发表学术论文要求

至少公开发表一篇与研究课题相关专业文章，且被 SCI 收录。

6.学位论文预答辩要求

参照《武汉科技大学博士学位论文预答辩暂行办法》。

7.学位论文答辩要求

博士研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士研究生申请学位取得学术成果的规定》、《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

控制科学与工程博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15BC04101	控制理论中的泛函分析	32	2	1	理学院	≥2 学分
		15BC04102	系统工程的优化方法	32	2	1		
		15BD04101	复杂系统理论与应用	32	2	1	信息科学与工程学院	≥2 学分
		15BY04109	模式分析与机器视觉	32	2	2		
选修课	专业选修课	17SX14019	第二外国语(德语上)	32	2	1	外国语学院	≥2 学分
		17SX14020	第二外国语(德语下)	32	2	2	外国语学院	
		15BY04101	现代检测理论及应用	32	2	1	信息科学与工程学院	
		15BY04102	高级人工智能	32	2	1		
		15BY04103	多智能体系统理论	32	2	1		
		15BY04104	预测控制理论及应用	32	2	1		
		15BY04105	信息融合	32	2	2		
		15BY04106	智能机器人	32	2	2		
		15BY04107	过程监测与故障诊断	32	2	2		
		15BY04108	现代图像处理与分析	32	2	2		
		15BD04102	鲁棒控制理论	32	2	2		
研究环节		15BYJ0401	开题报告		1	4	信息科学与工程学院	必修
		15BYJ0402	学术交流≥15 次		1	1-5		
		15BYJ0403	论文中期进展报告及考核		1	5		
		15BYJ0404	学位论文		9	6		

Educational Program for Doctoral Students of Control Science and Engineering

(Discipline Code：0811 Conferred Degrees：Doctor of Engineering)

Ⅰ. Educational Objectives

1. With active academic thinking, rigid logical thinking and innovative consciousness.

2. Have the ability to independently engage in theoretical research and high-tech projects in this field, and achieve creative results.

3. Have the ability to critically study and be competent for technical management of scientific research, teaching and research.

Ⅱ. Research Fields

1. Control Theory and Application

2. Complex Industrial Process Modeling Control and Optimization

3. Integration, Measurement and Control Technology of Micro-opto-electro-mechanical System

4. Condition Monitoring and Faulting Diagnosis

5. Multimedia Information Procession and Communication

6. Robotics and Intelligent System

Ⅲ. Program Duration

The length of schooling for full-time Ph.D. candidates is 3 years and the duration of study is normally 3 to 5 years.

Ⅳ. Credit Requirements

Credit Requirement and Allocation for Doctoral Candidates of Control Science and Engineering

Total Credits	≥24 credits	
Courses Credits	≥12 credits	Public compulsory courses =6 credits among which: Chinese Language= 4 credits, A Survey of China=2 credits Subject Basic Courses≥4 credits Elective Specialized Courses≥2 credits

Research Session	12 credits	Research Proposal 1 credits Academic Communication 1 credits Mid-term Progress Report and Thesis Assessment 1 credits Dissertation 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Specific Requirements for Doctoral Candidates

1. Basic Requirements

（1）With a rigorous and realistic scientific attitude and style of work, a strong professional ethics and a sound moral, intellectual and physical development；

（2）Have a solid and broad theoretical foundation in this discipline, and a systematic and in-depth professional knowledge;

（3）Have the ability to independently conduct theoretical research, undertake high-tech projects and complete all kinds of research projects in this discipline, be competent for scientific research, teaching and the technical management of scientific research projects.

2. Thesis Proposal Requirements

Thesis proposal shall be presented in a written and oral defense form, counting 1 credit. Grades are either pass or fail.

A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles (at least three of whom are professors) or doctors. If the candidate fails, he may apply again in 3 months.

The number of references should be not less than 70, of which at least 1/3 must be published in the recent five years. Report of research proposal should be completed before the end of the fourth semester, and at least 12 months before the defense. The specifications can be consulted in the relevant files of WUST.

3. Mid-term Evaluation Requirements

The mid-term progress of a thesis shall be presented in a written and oral defense form, counting 1 credit. Grades are either pass or fail.

There should be at least five associate professors and above titles (at least three professors) or doctors attending the mid-term report. Those who fail can apply in six months, and the interval between mid-term evaluation and oral defense shall not be less than 6 months.

4. Academic Communication Requirements

Doctoral students must participate in academic exchanges on or off the campus for more than 15 times, including at least one academic report in foreign languages, which accounts for 1 credit, and the grades are either pass or fail.

5. Requirements for Academic Paper Publication

Publish at least one academic article related to the research topic, which should be indexed by SCI.

6. Pre-defense Requirements

Refer to the Interim Measures for the Preliminary Defense of the Doctoral Dissertation of Wuhan University of Science and Technology.

7. Defense Qualification Requirements

A doctoral student shall complete all training sessions, and shall follow the Provisions of Doctoral and Master Students of Wuhan University of Science and Technology Applying for a Degree and Gaining Academic Achievements, Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and the Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial).

Curriculum for Doctoral Students of Control Science and Engineering

Category	Course Nature	Course Code	Course Name	Hour	Credit	Semester	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15BC04101	Functional Analysis in Control Theory	32	2	1	School of Science	≥2 credits
		15BC04102	Optimization Methods for System Engineering	32	2	1		
		15BD04101	Theory and Application of Complex System	32	2	1	School of Information Science and Engineering	≥2 credits
		15BY04109	Pattern Analysis and Machine Vision	32	2	2		
Elective Courses	Electve Specialized Coursies	17SX14019	Second Foreign Language(GermanI)	32	2	1	School of Foreign Languages	≥2 credits
		17SX14020	Second Foreign Language(GermanII)	32	2	2		
		15BY04101	Theory and Application of Modern Detection	32	2	1	School of Information Science and Engineering	
		15BY04102	Advanced Artificial Intelligence	32	2	1		
		15BY04103	Theory of Multi-agent System	32	2	1		
		15BY04104	Theory and Application of Predictive Control	32	2	1		
		15BY04105	Information Fusion	32	2	2		
		15BY04106	Intelligent Robot	32	2	2		
		15BY04107	Process Monitoring and Fault Diagnosis	32	2	2		
		15BY04108	Modern Image Processing and Analysis	32	2	2		

		15BD04102	Theory of Robust Control	32	2	2		
Research Session		15BYJ0401	Research Proposal		1	3-4	School of Information Science and Engineering	Compulsory
		15BYJ0402	Academic Communication		1	1-5		
		15BYJ0403	Mid-term Evaluation		1	5		
		15BYJ0404	Dissertation		9	6		

控制科学与工程硕士研究生培养方案

（学科代码： 0811 授 工学硕士 学位）

一、培养目标

1. 培养从事控制科学与工程方面的研究、开发、教学、管理的高层次人才：
2. 具有高度的事业心和责任感，具有开放精神和团队精神，诚实守信，恪守学术道德规范。
3. 具有活跃学术思想、严密逻辑思维、一定创新意识和较强的基本实验技能；
4. 具有独立从事科学研究的能力。

二、研究方向

1. 控制理论与应用
2. 复杂工业过程建模控制及优化
3. 微光机电系统集成与测控技术
4. 状态监测与故障诊断
5. 机器人与智能系统
6. 多媒体技术
7. 现代网络通信技术
8. 嵌入式与电子系统集成

三、学习年限

全日制攻读学术型硕士学位的学习年限为 3 年。

四、学分要求

控制科学与控制工程学术硕士研究生学分要求及学分分配表

总学分	≥30 学分	
修课学分	≥23 学分	公共必修课=6 学分 专业基础课≥10 学分 专业选修课≥7 学分
研究环节	7 学分	开题报告 1 学分 学术交流 1 学分 论文中期进展报告 1 学分 学位论文 4 学分
具体课程设置见附表		

五、研究环节与学位论文

1. 培养基本要求

(1) 具有严谨求实与创新开拓的精神、具备理论研究与工程实践的能力；

(2) 能完成系统设计与核心技术研发 ,具有硬件设计能力与程序开发能力；

(3) 在国际会议或期刊上，至少公开发表一篇与研究课题相关专业文章。

2. 开题要求

以书面及答辩形式就论文选题作报告，记 1 学分，成绩按通过/不通过登记。

开题报告及答辩环节须有 3~5 名具有副教授以上职称或具有博士学位的老师审定、参加并签署意见。开题报告的参考文献一般不少于 40 篇，其中近五年内的文献不少于文献总数的三分之一。

研究生开题报告原则上应在第三学期完成，特殊情况可推迟至第四学期。为保证有足够的论文工作时间，提交开题报告与论文答辩的时间间隔不得少于 9 个月。

3.参加学术活动要求

学术交流为全日制学术型硕士研究生的必修环节，记 1 学分，成绩按通过/不通过登记。

硕士研究生必须参加 6 次以上学术交流，并提交 5000 字以上的行业前沿综述，交导师签字认可。

4.学位论文答辩要求

硕士研究生完成所有培养环节，学位论文的相关要求参照《武汉科技大学博士、硕士学位授予工作细则》及《武汉科技大学研究生学位论文检测规定（试行）》等文件执行。

控制科学与工程硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SA07003	矩阵分析	32	2	1	理学院	≥10 学分
		15SD04303	现代电路理论	32	2	1	信息科学与工程学院	
		15SC04102	线性系统理论	32	2	1		
		17SC04101	数字图像处理	32	2	2		
		15SD04102	模式识别	32	2	2		
		15SD04301	现代通信原理	32	2	1		
		15ZD04101	现代信号处理	32	2	2		
		15SY04103	时间序列综合与分析	32	2	2		
		17SC04102	运筹学	32	2	1		
选修课	专业选修课	17SY04101	现代检测技术及仪表	16	1	1	信息科学与工程学院	≥7 学分
		15SY04102	故障诊断方法与应用	32	2	1		
		15SY04105	智能控制系统	32	2	2		
		15SY04106	网络化控制的理论与实现	32	2	2		
		15SY04107	机器人原理与应用	32	2	2		
		17SY04102	机器视觉原理与应用	32	2	1		
		15SY04303	现代网络技术	32	2	2		
		17SY04103	模糊数学及应用	16	1	1		
		15SD04302	数模混合集成系统设计	32	2	2		
研究环节		15SYJ0401	开题报告		1	3-4	信息科学与工程学院	必修
		15SYJ0402	学术交流≥6 次		1	1-5		
		15SYJ0403	论文中期进展报告		1	4-5		
		15SYJ0404	学位论文		4	6		

Educational Program for Master Students of Control Science and Engineering

(Discipline Code：0811 Conferred Degrees：Master of Engineering)

Ⅰ. Educational Objectives

1. To educate highly qualified engineering scholars in research and development, education and management in the field of control science and engineering:

2. With a high sense of professionalism and responsibility, open-mindedness and team spirit, being honest and trustworthy, and abide by academic ethics.

3. With active and strict logical thinking, sense of innovation and strong experimental skills;

4. With ability to work independently in scientific research.

Ⅱ. Research Fields in Control Science and Engineering

1. Control Theory and Application
2. Complex Industrial Process Modeling Control and Optimization
3. Integration, Measurement and Control Technology of Micro-opto-electro-mechanical System
4. Condition Monitoring and Faulting Diagnosis
5. Robotics and Intelligent System
6. Multimedia Technology
7. Modern network Communication Technology
8. Integration of Embedded and Electronic System

Ⅲ. Program Duration

The length of schooling for full-time Master degree candidates is 3 years.

Ⅳ. Credit Requirements

Credit Requirement and Allocation for Master Degree Candidates of Control Science and Engineering

Total Credits	≥30 credits	
Courses Credits	≥23 credits	Public compulsory courses =6 credits Subject Basic Courses≥10 credits Elective Specialized Courses≥7 credits
Research Session	7 credits	Research Proposal 1 credits Academic Communication 1 credits

		Mid-term Progress Report and Thesis Assessment 1 credits Dissertation 4 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Research and dissertation

1. Basic Requirements

(1) Being rigorous, realistic and innovative, and have the ability of doing theoretical research and engaged in engineering practice;

(2) Able to complete system design and core technology research and development, with capabilities of hardware design and program development;

(3) Publish at least one academic paper related to the research topic in the international conferences or journals.

2. Research Proposal Requirements

Thesis proposal shall be presented in a written and oral defense form, counting 1 credit. Grades are either pass or fail.

A thesis proposal report shall be reviewed and commented by at least five associate professors and above titles (at least three of whom are professors) or doctors. The number of references should be not less than 40, of which 1/3 must be published in the recent five years.

Report of research proposal should be completed in the third semester, and in special circumstances, it can be postponed to the fourth semester. The interval between the report and the defense is at least 9 months.

3. Academic Communication Requirements

Academic communication is compulsory for full-time academic master degree candidates, which accounts for 1 credit, and the grades are either pass or fail.

Master degree candidates must participate in academic exchanges for more than 6 times, and submit a 5,000-plus word review of the frontiers in the discipline, signed and confirmed by the supervisor.

4. Defense Qualification Requirements

A master degree candidate shall complete all training sessions, and shall follow the Working Rules on Awarding Doctoral and Master Degrees of Wuhan University of Science and Technology, and the Graduate Student Dissertation Detection Rules of Wuhan University of Science and Technology (Trial).

Curriculum for Master Students of Control Science and Engineering

Category	Course Nature	Course Code	Course Name	Hour	Credit	Semester	School	Notes
Degree Courses	Public Compulsory Courses	17BSA0601	Chinese Language	160	4	1	School of Literature Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Subject Basic Courses	15SA07003	Matrix Analysis	32	2	1	School of Science	≥10 credits
		15SD04303	Modern Circuit Theory	32	2	1	School of Information Science and Engineering	
		15SC04102	Theory of Linear System	32	2	1		
		17SC04101	Digital Image Processing	32	2	2		
		15SD04102	Pattern Recognition	32	2	2		
		15SD04301	Modern Communication Principles	32	2	1		
		15ZD04101	Modern Signal Processing	32	2	2		
		15SY04103	Synthesis and Analysis of Time Series	32	2	2		
		17SC04102	Operational Research	32	2	1		
Elective Courses	Elective Specialized Courses	17SY04101	Modern Detection Technology	16	1	1	School of Information Science and Engineering	≥7 credits
		15SY04102	Theory and Practice of Fault Diagnosis	32	2	1		
		15SY04105	Intelligent Control System	32	2	2		
		15SY04106	Theory and Application of Networked Control	32	2	2		

		15SY04107	Principle and Application of Robot	32	2	2	School of Information Science and Engineering	
		17SY04102	Theory and Application of Machine Vision	32	2	1		
		15SY04303	Modern Network Technology	32	2	2		
		17SY04103	Fuzzy Mathematics and Its Application	16	1	1		
		15SD04302	Design of Mixed-Signal System	32	2	2		
Research Session		15SYJ0401	Research Proposal		1	3-4	School of Information Science and Engineering	Compulsory
		15SYJ0402	Academic Communication		1	1-5		
		15SYJ0403	Mid-term Evaluation		1	4-5		
		15SYJ0404	Dissertation		4	6		

化学工程与技术博士研究生培养方案

（学科代码：0817 授 工学博士 学位）

一、培养目标

本学科旨在培养留学生跟踪各种类型过程工业（特别是化学工业）化学与物理过程最新知识的能力，满足现代化学工业对高端化学工程人才的需求。毕业生应具备坚实的理论基础和系统的专业知识，创新精神和团队合作精神，还应具备胜任在现代化学工业及其相关领域从事开发、教育和管理的能力。

二、研究方向

1. 化学工程
2. 化学工艺
3. 生物化工
4. 应用化学
5. 工业催化
6. 材料化学工程
7. 制药与精细化工

三、学习年限

全日制博士研究生应在 3 至 5 年内完成学业并获得学位，超过 5 年将被取消资格。

四、学分要求

化学工程与技术博士研究生学分要求及学分分配表

总学分	≥24 学分	
课程学分	≥12 学分	公共必修课程 为 6 学分，包括汉语(4 学分)和中国概况 (2 学分)； 学科基础课≥ 4 学分 专业选修课≥2 学分
研究学分	≥12 学分	开题报告：1 学分 学术交流：1 学分 论文中期进展报告及考核：1 学分 博士学位论文：9 学分
具体课程设置见课程计划表		

五、本学科对博士研究生培养提出的具体要求

1. 培养基本要求

导师和博士生指导小组负责博士研究生的培养，负责制定培养计划，并全面指导学位论文。博士生指导小组中应有部分成员来自其他院系。博士研究生必须在其导师的指导下独立开展科研工作，完成学位论文。在学习期间，博士研究生应至少花费 2 年的时间进行科学研究和准备学位论文。导师负责指导学生选择一个好的课题并进行研究，还应该组织学生参加学术活动和国际学术会议。

2. 博士论文开题要求

博士学位论文开题报告应不少于 10000 字，包含至少 80 篇参考文献，其中一半必须是近 5 年出版的。博士研究生应该为学位论文选择一个研究课题，并在导师指导下花费不少于 2 年的时间进行论文研究和撰写论文。对博士学位论文的详细规定和要求参照“武汉科技大学关于硕士、博士研究生学位论文的选题、研究方案和组成的规定”。博士学位论文开题报告的撰写和答辩应在不迟于第二学年完成。

3.综合测试与中期考核

所有课程完成后，为了检查学生对本学科的基本理论和专业知识的掌握程度，将会对学生进行综合测试。一般而言，综合测试将安排在第三个学期进行，由考试委员会主持。考试委员会由本专业或相关学科的 3~5 名教授和或副教授组成。中期考核在综合测试基础上进行的。具体的要求参照“武汉科技大学关于研究生中期考核的规定”。

4. 学术活动要求

参加学术活动包括做学术讲座和听学术报告。研究生在学期间要求做两次以上的讲座。参加学术活动的学分为 1 分，其中做专题报告每次计 0.25 分，参加各类学术报告和讲座，每次计 0.1 分，参加全国学术会议每次计 0.5 学分。学生每次参加学术报告后应该写一篇不少于 250-500 字的活动摘要，填写学术活动登记表，由导师签字后生效。学生按要求参加学术报告并核准后才能取得相应的学分。如未达到要求，将被视为未完成，不得进行答辩。

5. 发表学术论文要求

为了满足学位的要求，博士研究生必须有一定数量的与论文研究相关的学术论文发表。学位论文的相关要求参照《武汉科技大学博士、硕士学位授予工作细则》。

6. 学位论文预答辩要求

预答辩会是最后答辩的一个“彩排”，通过预答辩解决论文中存在的撰写问题，回答专家提问以及解决最后答辩之前需要妥善处理的一些问题。学位申请者应为答辩准备一份研究的电子副本和陈述材料。学位申请者将作 25-35 分钟的口头陈述，重点放在研究发现和结论上。学位申请者的预答辩稿和考试成绩表经学位委员会和学位委员会主任批准和签字后安排答辩。预答辩稿和考核结果表必须在论文答辩前 14 天批准和签字。

7. 学位论文答辩要求

学位论文答辩的实施参照武汉科技大学学位评定委员会的规定。论文委员会表决有三种可能的结果，即通过、复审或不通过。

如果大多数学位委员会委员认为申请学位者达到或超过了在论文开题报告中提出的要求，则通过论文答辩，但有可能需要对学位论文进行小的修改。

如果有两个或两个以上学位委员会委员发现论文工作中或答辩过程中存在严重的问题，则需要复审。委员会的成员将为学位申请者提供一份修改清单，要求在第二次学位论文答辩前修改好。除非学位委员会和研究生院院长特批，复审将在同一学期或下一学期中进行。

如果大多数学位委员会委员认为学位申请者的论文质量和论文答辩水平低于授予博士学位的学术标准，则答辩不通过。学位申请者可向答辩委员会主席及学位委员会主任申诉重新评估。

化学工程与技术博士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	17BC22101	化工技术进展	32	2	1	化学与化工学院	必修
		15BD22101	近代分析测试技术	32	2	1	化学与化工学院	必修
选修课	专业选修课	15BY22101	碳材料科学研究进展	32	2	2	化学与化工学院	选修：≥2 学分
		15BY22102	现代生物技术进展	32	2	2	化学与化工学院	
		15BY22103	超分子化学	32	2	2	化学与化工学院	
研究环节		15BYJ2201	开题报告		1	3	化学与化工学院	必修
		15BYJ2205	学术活动 ≥9 次		1	1-6		
		15BYJ2203	论文中期报告及考核		1	4	化学与化工学院	
		15BYJ2204	学位论文		9		化学与化工学院	

Educational Program for Doctoral Students of Chemical Engineering and Technology

(Discipline Code：0817 Conferred Degrees：Doctor of Engineering)

Ⅰ. Educational Objectives

The discipline is aimed at fostering international students' ability in keeping abreast of the advancements in chemical and physical processes in all types of processing industries (chemical industry in particular), in meeting the needs of modern chemical industry for top chemical engineering talents. The graduates are expected to possess the fundamental theories and systematic professional knowledge, the spirit of innovation and team work, and the ability to excel at development, education, and management in the modern chemical industries and some other related fields.

Ⅱ. Research Fields

1. Chemical Engineering
2. Chemical Technology
3. Biochemical Engineering
4. Applied Chemistry
5. Industrial Catalysis
6. Materials-oriented Chemical Engineering
7. Pharmaceutical and fine chemicals

Ⅲ. Program Duration

Full time PhD students are expected to complete their studies and earn their degrees in 3 to 5 years, and they will be disqualified from the program after 5 years.

Ⅳ. Credits and Requirements

Credit Requirement and Allocation for Doctoral Candidates of Chemical Engineering and Technology

Total Credits	≥24 credits	
Course credits	≥12 credits	Public compulsory courses: 6 credits, including Chinese Language (4 credits) and A Survey of China (2 credits); Discipline basic courses≥ 4 credits Professional electives≥2 credits
Research credits	≥12credits	Dissertation proposal: 1 credit Academic activities: 1 credit Dissertation interim progress report and assessment: 1 credit PhD dissertation: 9 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Pecific Requirements for Doctoral Candidates in Chemical Engineering and Technology

1. Basic Requirements for Cultivation

The supervisor and doctoral guidance group are responsible for the training of PhD students. Supervisor and guidance group are responsible for drawing up the training project and guiding dissertation writing. Doctoral guidance group should cooperate with members from other relative departments. It is necessary for a PhD student to carry out scientific researches independently under the guidance of his/her supervisor and complete a qualified degree dissertation. During the study period, doctoral graduates should spend at least 2 years focusing on scientific research and preparing his/her dissertation. The supervisor is responsible for guiding his/her students to select a good topic and performing the research. He/she should also organize the students to attend academic activities such as international academic conferences.

2. PhD Dissertation Topic and Research Proposal

PhD dissertation proposal should be no less than 10,000 words and have at least 80 references, half of which must be published in the recent 5 years. A PhD student should choose a research topic for the PhD dissertation and spend no less than 2 years on the research and dissertation writing all under the guidance of his/her supervisor. Detailed regulations and requirements on PhD dissertation are documented in the "WUST Regulations on Topic Selection, Research Proposal and Composition of Postgraduate Theses and Dissertations". PhD dissertation research proposal writing and defense should be completed no later than the second academic year of the program.

3. Comprehensive qualifying exam and mid-term examination

After all courses are completed, in order to check if the students master the basic theory and in-depth specialized knowledge of the discipline, comprehensive qualifying examinations should be carried out. Generally, the examination will be arranged at the third semester which is chaired by examination committee consisting of 3 to 5 professors and associated professors majored in this or related discipline. Mid-term examination is carried out based on comprehensive examination. Detailed descriptions are specified in the "WUST Regulations on the Mid-term Examination for Graduate Students".

4. Academic activities

Academic activities involve attending academic reports. Students are required to make no less than two seminar presentations during their study. The credit for attending academic activities is 1, which includes 0.25 credit for each specialist report delivery, 0.1 credit for each academic report and lecture attendance, and 0.5 credit for each national academic conference attendance. After academic activities, students should write an abstract about the activities which is no less than 250-500 words and fill out an academic activity registration form which takes effect only with their supervisors' permission and signature. Credits can be achieved only after qualified examination and verification. If one fails to meet the requirements, s/he will be regarded as not finishing the program and will not be permitted to undertake dissertation defense.

5. Publication

To meet the degree requirements, a PhD student is required to have a certain number of academic publications related to the dissertation research. Detailed requirements are documented in "WUST Regulations on a PhD Student's Publications of Research Works".

6. Pre-defense

The Pre-defense meeting serves as a rehearsal for the final defense presentation and is the opportune time to address any final edits, questions, or concerns leading up to the Final Defense. The candidate is responsible for preparing an electronic copy of the research and presentation materials for the defense. The presentation consists of a 25-35 minute oral introduction of the study with an emphasis on the findings and the conclusions. Once the Pre-defense manuscript has been approved by the committee and the program director and the examination results form has been signed by the committee and the program director, the final defense can be scheduled. The Pre-defense manuscript and examination results form must be fully approved at least 14 days prior to the final dissertation defense.

7. Final Defense Process

The implementation of dissertation defense should abide by the provisions agreed upon by the Degree Evaluation Committee of WUST. There are three possible results from the dissertation committee vote, namely, pass, re-examination or failure.

The evaluation of pass indicates that a majority of members of the dissertation committee conclude that the candidate meets or exceeds the requirements set forth in the dissertation proposal, however s/he may be required to make minor editorial modifications to the dissertation.

An evaluation of re-examination indicates that two or more members of the Committee found substantive problems in the work or the defense of the dissertation. The committee members will prepare a list of modifications or improvements required before a second dissertation defense is scheduled. The re-examination will be arranged in the same or subsequent semester unless the dissertation committee and the dean of the graduate school grant additional time to effect the necessary changes.

An evaluation of failure indicates that the majority of the dissertation committee judge the quality of the candidate's dissertation and the defense of the dissertation to be below the standards expected of doctoral level scholarly performance. In this case, the candidate can petition the chair and program director for the opportunity for re-evaluation.

Curriculum for Doctoral Students of Chemical Engineering and Technology

Category	Course Nature	Course Code	Course name	Hour	Credit	Term	School	Note
Degree course	Common compulsory courses	17BSA0601	Chinese Language	160	4	1	School of Literature Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Discipline fundamental courses	17BC22101	Progress of Chemical Engineering and Technology	32	2	1	School of Chemistry and Chemical Engineering	Compulsory
		15BD22101	Modern Analysis and Measurement Technology	32	2	1		Compulsory
Elective course	Professional elective courses	15BY22101	Progress of Carbon Material Science	32	2	2	School of Chemistry and Chemical Engineering	Elective: ≥2 credits
		15BY22102	Progress of Modern Biotechnology	32	2	2		
		15BY22103	Supramolecular Chemistry	32	2	2		
Research		15BYJ2201	Dissertation proposal		1	3	School of Chemistry and Chemical Engineering	Compulsory
		15BYJ2205	Academic activities ≥9 times		1	1-6		
		15BYJ2203	Mid-term progress report and assessment		1	4		
		15BYJ2204	Dissertation		9			

化学工程与技术硕士研究生培养方案

（学科代码：0817 授 工学硕士 学位）

一、培养目标

本学科旨在培养在化学工程与技术领域具有广泛的知识和深厚的学术基础的留学生。通过持续的智力开发和学术训练，留学生能够胜任工程设计、系统分析、过程集成、操作管理工作，具备在化学工程、化学工艺、能源与环境工程、材料科学与工程、制药工程、生物化工等领域开展学术研究的能力。具有专业和道德责任感、国际视野、创新精神、实践能力和竞争力。

二、研究方向

1. 化学工程
2. 化学工艺
3. 生物化工
4. 应用化学
5. 工业催化
6. 材料化学工程
7. 制药与精细化工

三、学习年限

全日制攻读学术型硕士学位的学习年限为 2-3 年。

四、学分要求

化学工程与技术硕士研究生学分要求及学分分配表

总学分	≥30 学分	
课程学分	≥23 学分	公共必修课程 为 6 学分，包括汉语(4 学分)和中国概况 (2 学分)； 学科基础课≥ 10 学分 专业选修课≥7 学分
研究学分	≥7 学分	开题报告：1 学分 学术交流：1 学分 论文中期进展报告及考核：1 学分 学位论文：4 学分
具体课程设置见课表		

五、研究环节与学位论文

1.培养基本要求

硕士留学生的培养采取导师为第一责任人的导师负责制，也可以实行以导师为主的指导小组负责制。指导小组的组成可根据硕士留学研究生的研究方向及课题内容由导师提名、学院领导批准，小组成员一般由 3~5 名副教授和专业教师（含导师）组成，导师在硕士留学研究生培养中起主导作用。同时，指导小组应协助导师对硕士留学研究生的课程学习、科学研究和学位论文进行指导。学院要指导和检查硕士留学研究生的培养工作。

在培养过程中，应采取理论学习和科学研究相结合的办法，特别要注意培养硕士留学生的独立工作能力、自学能力、分析和解决实际问题的能力；要鼓励硕士留学研究生参加学术活动、独立钻研、自己选题和从事探索性的研究。对于缺乏实践经验和因学科交叉而专业知识不足的硕士留学生，应创造条件让他们弥补这些不足之处。

2.学位论文开题报告要求

硕士研究生应首先进行文献检索和实际调研，掌握学科前沿，重视知识产权，撰写文献综述，并在综述的基础上完成开题报告。开题报告应不少于 5000 字，至少有 40 篇参考文献，其中一半必须是近 5 年出版的。最后，学生必须在导师安排的开题报告会上公开做开题报告和答辩。学生只有在通过开题报告答辩的前提下才能开展学位论文研究工作。详细的规定和要求参照“武汉科技大学关于硕士、博士研究生学位论文的选题、研究方案和组成的规定”。硕士论文开题报告的撰写和答辩应在不迟于第二学年完成。

3. 参加学术活动要求

学生在学习期间必须参加不少于 6 次的各类学术报告。学生每次参加学术报告后应该写一篇不少于 250-500 字的活动摘要，填写学术活动登记表，由导师签字后生效。学生按要求参加学术报告并核准后才能取得相应的学分。如未达到要求，将被视为未完成，不得进行答辩。

4. 发表论文要求

为了满足学位的要求，硕士研究生必须有一定数量的与论文研究内容相关的学术论文发表。学位论文的相关要求参照《武汉科技大学博士、硕士学位授予工作细则》。

5.学位论文答辩要求

学位论文答辩的实施参照武汉科技大学学位评定委员会的规定。论文委员会表决有三种可能的结果，即通过、复审或不通过。

如果大多数学位委员会委员认为申请学位者达到或超过了在论文开题报告中提出的要求，则通过论文答辩，但有可能需要对学位论文进行小的修改。

如果有两个或两个以上学位委员会委员发现论文工作中或答辩过程中存在严重的问题，则需要复审。委员会的成员将为学位申请者提供一份修改清单，要求在第二次学位论文答辩前修改好。除非学位委员会和研究生院院长特批，复审将在同一学期或下一学期中进行。

如果大多数学位委员会委员认为学位申请者的论文质量和论文答辩水平低于授予博士学位的学术标准，则答辩不通过。学位申请者可向答辩委员会主席及学位委员会主任申诉重新评估。

化学工程与技术硕士研究生课程计划表

类别	课程性质	课程编号	课程名称	学时	学分	开课学期	开课学院	备注
学位课	公共必修课	17BSA0601	汉语	160	4	1	文法与经济学院	必修
		17BSA2101	中国概况	32	2	1	国际学院	
	学科基础课	15SD22101	传递过程原理	32	2	1	化学与化工学院	必修
		15SD22102	化学反应工程	40	2.5	1	化学与化工学院	必修
		15SD22103	高等化工热力学	40	2.5	1	化学与化工学院	必修
		15SD22104	化工过程分析与集成	32	2	2	化学与化工学院	必修
		15SY22101	高等分离工程	32	2	2	化学与化工学院	必修
选修课	专业选修课	15SY22103	高等有机化学	32	2	2	化学与化工学院	选修：≥7 学分
		15SY22109	现代仪器分析	32	2	2	化学与化工学院	
		15BY22103	超分子化学	32	2	2	化学与化工学院	
		15SY22110	生化工程前沿	32	2	2	化学与化工学院	
		17BC22101	化工技术进展	32	2	1	化学与化工学院	
研究环节		15SYJ2201	开题报告		1	3	化学与化工学院	必修
		15SYJ2205	学术活动 ≥6 次		1	1-6		
		15SYJ2203	中期进展报告及考核		1	4	化学与化工学院	
		15SYJ2204	学位论文		4		化学与化工学院	

Educational Program for Master Students of Chemical Engineering and Technology

(Discipline Code：0817 Conferred Degrees：Master of Engineering)

Ⅰ. Educational Objectives

This program is to prepare international students with broad knowledge and an in-depth academic foundation in the field of chemical engineering and technology. After continual scholarly training and developing their intellectual capacity and , the students are expected to (1) be qualified for positions in such fields as engineering design, system analysis, process integration, operational management and academic research in chemical engineering, chemical technology, energy and environmental engineering, material science and engineering, pharmaceutical engineering and biochemical engineering; (2) have professional and ethical responsibility, international perspective, innovative spirit, practical competence and competitiveness.

Ⅱ. Research Fields

1. Chemical Engineering
2. Chemical Technology
3. Biochemical Engineering
4. Applied Chemistry
5. Industrial Catalysis
6. Material Chemical Engineering
7. Pharmaceutical and fine chemical

Ⅲ. Program Duration

The duration of the full-time program for academic master's degree is 2-3 years.

Ⅳ. redits and Requirements

Credit Requirement and Allocation for Master Degree Candidates of Chemical Engineering and Technology

Total credits	≥30 credits	
Course credits	≥23 credits	Common compulsory courses are 6 credits, including Chinese Language(4 credits) and A Survey of China (2 credits); Discipline basic courses ≥ 10 credits; professional elective courses ≥7 credits
Research credits	≥7 credits	Thesis proposal: 1 credit; Academic activities: 1 credit;

		Thesis interim progress report and assessment: 1 credit; Thesis: 4 credits
Please refer to the attached Curriculum for specific course arrangements		

Ⅴ. Research and dissertation

1. Basic Requirements for Cultivation

Cultivating overseas students in master's program is based on the mentor responsibility system where the mentor is the first responsible party, or on an instructing team responsibility system with the mentor as the director. The instructing team, composed of 3-5 associate professors and professional teachers (including the mentor), should be nominated by the mentor and then approved by relevant schools with mentors playing a leading role in the overseas graduates' cultivating according to the students' research fields and research subjects. The instructing team should assist the mentor to instruct courses, research work and dissertation writing. During the cultivation, both theoretical study and scientific research should be combined. The program should: (1) emphasize the cultivation of the ability of carrying out independent and creative scientific work; (2) instruct students to learn, and to analyze and solve practical problems independently; (3) encourage them to participate in academic activities actively and support them in independent researches ; (4) assist them in selecting their research field for their thesis and exploring their research. For the students who are lack of experience and expertise and interdisciplinary knowledge, mentors and schools should create favorable environment for them to make up.

2. Thesis proposal

Candidate masters should: (1) be familiar with frontier of the research discipline through both literature search and reading and practical surveying; (2) respect the intellectual property and write a qualify literature review and complete a thesis proposal based on the review.

The thesis proposal should be no less than 5000 words and should have at least 40 references, half of which must be published in recent 5 years.

Students should report and defend their thesis publicly in a session arranged by their mentors. Only the students who pass the thesis proposal evaluation can start their research and thesis composition. Detailed regulations and requirements on master thesis proposal are documented in the "WUST Regulations on Topic Selection, Research Proposal and Composition of Postgraduate Theses and Dissertations". Master thesis research proposal writing and defense should be completed in no later than the second academic year of the program.

3. Academic activities

Students are required to attend academic reports of any kinds no less than 6 times during their study period. After attending academic activities, students should write an abstract about the activities in no less than 250-500 words and fill out an academic activities enrollment form which takes effect only with their supervisors' permission and signature the document. Credits can be achieved only after qualified examination and verification. If one fails to meet the requirements, s/he will be regarded as not finishing the program and will not be permitted to undertake thesis defense.

4. Publication

To meet the degree requirements, a master student is required to have a certain number of academic publications related to their dissertation research. Detailed requirements are documented in "WUST regulations on a Postgraduate's Publications of Their Research Work".

5. Thesis Defense

The implementation of dissertation defense should abide by the provisions agreed upon by the Degree Evaluation Committee of WUST. There are three possible results from the dissertation committee vote, namely, pass, re-examination or failure.

The evaluation of pass indicates that a majority of members of the dissertation committee conclude that the candidate meets or exceeds the requirements set forth in the dissertation proposal, however s/he may be required to make minor editorial modifications to the dissertation.

An evaluation of re-examination indicates that two or more members of the Committee found substantive problems in the work or the defense of the dissertation. The committee members will prepare a list of modifications or improvements required before a second dissertation defense is scheduled. The re-examination will be arranged in the same or subsequent semester unless the dissertation committee and the dean of the graduate school grant additional time to effect the necessary changes.

An evaluation of failure indicates that the majority of the dissertation committee judge the quality of the candidate's dissertation and the defense of the dissertation to be below the standards expected of doctoral level scholarly performance. In this case, the candidate can petition the chair and program director for the opportunity for re-evaluation.

Curriculum for Master Students of Chemical Engineering and Technology

Category	Course nature	Course Code	Course name	Hour	Credit	Term	School	Note
Degree course	Common compulsory course	17BSA0601	Chinese Language	160	4	1	School of Literature Law and Economics	Compulsory
		17BSA2101	A Survey of China	32	2	1	International School	
	Discipline fundamental course	15SD22101	The Principle of Transfer Processes	32	2	1	School of Chemistry and Chemical Engineering	Compulsory
		15SD22102	Chemical Reaction Engineering	40	2.5	1		Compulsory
		15SD22103	Advanced Chemical Engineering Thermodynamics	40	2.5	1		Compulsory
		15SD22104	Chemical Process Analysis and Integration	32	2	2		Compulsory
		15SY22101	Advanced Separate Engineering	32	2	2		Compulsory
Elective course	Professional elective course	15SY22103	Advanced Organic Chemistry	32	2	2	School of Chemistry and Chemical Engineering	Elective: ≥7 credits
		15SY22109	Modern Instrumental Analysis	32	2	2		
		15BY22103	Supramolecular Chemistry	32	2	2		
		15SY22110	Frontier of Biochemical Engineering	32	2	2		
		17BC22101	Progress of Chemical Engineering and Technology	32	2	1		
Research		15SYJ2201	Thesis proposal		1	3	School of Chemistry and Chemical Engineering	Compulsory
		15SYJ2205	Academic activities ≥6 times		1	1-6		
		15SYJ2203	Mid-term progress report and assessment		1	4		
		15SYJ2204	Thesis		4			