轻工技术与工程一级学科硕士研究生培养方案

Training Scheme for Master Degree of Light Industry Technology and Engineering First-level discipline

专业代码：082200　　学科门类：工　学

Code of Specialty: 082200　　Department of Discipline: Engineering

一级学科：轻工技术与工程　　学分要求：40～42

First-level Discipline: Light industry technology and engineering　　Credit Setting: 40～42

一、学科、专业简介 (Disciplines Instruction)

轻工技术与工程学科涵盖了制浆造纸工程、发酵工程、染整、制糖工程和皮革化学与工程等学科。在新世纪，轻工技术与工程将对我国的社会主义现代化建设、人民生活水平的提高、社会和经济的健康与协调发展及中国的繁荣富强起重要作用。本学科涉及轻工的工程设计、制造、检测、改造、管理等基础理论、技术和方法，并与化学工程、生物工程、食品工程、材料工程、机械工程、计算机技术、控制工程、能源工程、环境工程、制药工程、农业工程、林业工程等工程领域密切相关。

Light industry technology and engineering is a comprehensive discipline on the intersection of pulp and paper engineering, sugar engineering, fermentation engineering and leather chemistry and engineering. In the new century, light industry and engineering will certainly play an important role in the socialist modernization construction, the improvement of people's living standard, the steady and coordinated development of society and economy, and the prosperity of our country. This discipline involves the basic theory, technology and method on design, manufacture, test, modification and management in light industry, and is closely relates to chemical engineering, biological engineering, food engineering, materials engineering, mechanical engineering, computer technology, control engineering, energy engineering, environment engineering, pharmaceutical engineering, agricultural engineering, forestry engineering.

我校在制浆造纸工程和发酵工程两个二级学科硕士点的基础上于 2010 年成功获得轻工技术与工程一级学科硕士学位授予权。本学科师资力量雄厚，职称、年龄结构合理；教学科研条件良好，设备仪器齐全。配有高效液相色谱仪、气相色谱仪、Zeta 电位测定仪、TAPPI 标准的成套纸页抄造设备、马尔文激光粒度测定仪、超速离心机、全自动发酵罐等先进仪器设备。在造纸湿部化学、轻工助剂合成与应用、生物质资源开发与利用、加工纸与特种纸、微生物制药、生物催化技术及生化分离技术等研究领域有较高水平。近年来，先后承担多项国家自然科学基金项目、省部级项目及横向项目，获得多项省部级奖励及其他奖项，获得多项发明专利，尤其是实现了多项科研成果的产业化。

On the basis of two secondary discipline master's degree programs, pulp and paper engineering and fermentation engineering, we further successfully got the authority to launch master degree programs of the discipline in light industry technology and engineering in 2010. At present, this discipline possesses solid qualified teachers with rational technical titles and age structure, and is provided with good conditions for both teaching and research. Many modern instruments and equipments, such as High performance liquid chromatograph (HLPC), gas chromatograph (GC), Zeta-potential determinator, a set of paper making equipments based on TAPPI standard, Malvern laser particle analyzer, ultracentrifuge, full-automatic fermentation tank, are

equipped in the above laboratories. The research achievements and results on papermaking wet-end chemistry, synthesis and application of additives in light chemical engineering, exploitation and utilization of biomass resources, converted paper and specialty paper, microbial pharmaceutical, biological catalytic technology and biochemical separation technique, etc, are all at a higher level. In recent years, dozens of research projects from natural science foundation of China, province and ministry, and enterprises have been assumed/accomplished, awards from province and ministry and other research awards have been granted, scores of research results have been successfully transformed into productivity. Not only inventive patents have been authorized, but also academic monograph, academic papers with higher research level have been issued in China and abroad.

二、培养目标（Objectives of Training）

本学科培养具有扎实的轻工技术与工程基础理论和宽广的专业知识，了解本学科最新科研发展动向，具备熟练的专业实验技能，具有独立从事轻工技术与工程领域的科学研究和新产品开发的能力以及专业外语阅读和口语能力，能在轻工技术与工程领域从事设计开发、科学研究、教学和管理等工作的高层次人才。

This discipline aims to train senior research talents with rich elementary theory and broad knowledge of light industry technology and engineering, who will be engaged in research and development in this technology and engineering field. The master students of this discipline should grasp the basic theory and specialty knowledge of light industry technology and engineering, get wise to the latest scientific development trend of relevant majors, possess good special experimental skills, be capable of being independently engaged in scientific research and developing new products in light industry technology and engineering, be able to read and talk about the related majors with foreign languages, and be able to engage in the design development, scientific research, education, and management in modern chemical and related industries..

三、学制及学习年限（Educational System and Length of Schooling）

硕士研究生学制为 3 年，可根据实际情况允许研究生提前或延期毕业，一般不超过 4 年。课程学习为 1～2 学期，论文工作不少于 1 年。硕士生课程学习实行学分制，至少应修 40 学分，其中学位课程≥18 学分，研究环节 13 学分。

The basic length of schooling for master's postgraduate education shall be two to three years, the postgraduates are allowed to graduate according the actual requirements，but always less than four years. The length of curriculum is usually one to four terms, and the time of writing a paper is at least one year. The studying of master's post graduate courses carry out the credit system, the students should obtain forty to forty-two credits during the studying. The degree courses are at least eighteen credits, the research links are thirteen credits.

四、研究方向（Research Orientation）

序号 NO.	名　　称 Name	研究方向及特点 The Research Orientation and characteristic
1	生物质资源转化与综合利用 Biomass Resources Conversion and Comprehensive Utilization	研究将生物质材料（纤维素、半纤维素、木质素、淀粉、甲壳素、瓜尔胶、蛋白质等）转化为能源、高附加值功能材料和精细化学品的原理和应用技术。 Focus on the research of basic theory and practical technology on the conversion biomass (cellulose, hemicellulose, lignin, starch, chitin, guar gum, protein, etc.) into energy resource,high value-added functional materials and .fine chemicals

2	清洁生产技术与装备 Clean Production Technology and Equipment	轻工生产过程的清洁生产工艺关键技术与装备的研究开发。 Focus on the research and development of key technology and equipment needed in clean productive technology of light industry.
3	轻化工助剂合成与应用 Synthesis and Application of Additives in Light Chemical Engineering	研究轻化工助剂的合成原理、合成工艺及其在实际生产中的应用。研究制浆和造纸湿部的化学原理、工艺条件及其对纸产品性能的影响规律。 Focus on the synthesis principles, synthesis technology and the practical application of additives in light chemical engineering. Focus on the research of the chemistry principles, technological conditions of pulping and wet-end and its impact on the property of final paper product.
4	加工纸与特种纸 Converted Paper and Specialty Paper	研究加工纸与特种纸的生产工艺技术、评价其实际应用性能。 Focus on the development of productive technology of converted paper and specialty paper, evaluation of their practical application.
5	微生物发酵与生化工程 Microbial Fermentation and Biochemical Engineering	研究微生物发酵、酶及微生物细胞的固定化、生化反应和分离技术及生物化工产品开发等。 Research orientation including: Microbial fermentation, Immobilization of enzymes and microbial cells, Biochemical reactions, Biochemical separation technology , Bio-chemical products, etc.
6	海洋资源利用 Utilization of marine resources	包括海洋动植物及微生物资源与利用、水产品加工及海洋活性物质等。物催化、生物提取、细胞培养、抗菌素发酵生产、药物半合成及海洋生物制药等。 Research orientation including: Marine animals, plants and microbiology; Aquatic products processing and the Marine active substances etc.
7	食品生物技术与食品安全 Food Biotechnology and Food safety	包括发酵和酿造的传统生物技术及应用现代生物技术来改良食品质量、生产功能食品、开发新型食品和食品添加剂；食品安全及食品的生物技术检测。 Research orientation including: Food fermentation and brewing of traditional biotechnology, application of modern biotechnology to improve food quality, Production of functional foods, New food and food additives, Food Safety, Food testing of biotechnology, etc.
8	酿酒科学与工程 Brewing Science and Engineering	应用现代生物技术、分析检测技术等改造和提升传统酿酒生产工艺，研究开发酿酒行业共性及关键技术，加快传统酿酒产业产品技术升级进步。 Using modern biotechnology, analytical techniques to transform and upgrade traditional wine production process, research and develop the commmon of wine industry and key technologies, accelerate the technological upgrading of traditional products, wine industry progress, etc.

五、课程设置（Course Setting）

轻工技术与工程一级学科硕士研究生课程设置

（Course Setting of Master Degree for Light Industry Technology and Engineering）

课程类别	课程编号	课程名称 Course Name	课堂学时	学分 Credit	开课学期	教学方式	考核方式	开课单位	备注 Remarks

Course Type	Course NO			Class Hour		Semester Classes	Teaching Method	Assessing Method	Class Department	
学位课 Degree Course	公共基础课 Common Course	G000042	中国特色社会主义理论与实践研究 Socialist Theory with Chinese Characteristics and Practical Research	36	2	I	A	B	马克思主义学院	必修 Obligatory Course
		G000039	科学人文讲座 Scientific and Humanistic Lectures	16	1	II	A	C	马克思主义学院	必修 Obligatory Course
		G000037	基础英语（I，含16学时视听） Basic English(I， Contains 16 classes of audio-visual)	64	2	I	A	A	外国语学院	必修 Obligatory Course
		G000038	基础英语（II） Basic English（II）	32	2	II	A	A	外国语学院	必修 Obligatory Course
		G000046	英语高级（硕）（限免修生） Advanced English Course (only the students who are exempted from this course allowed)	64	2	I	A	A	外国语学院	必修 Obligatory Course
			小语种（小语种考生） Minority Languages (minority languages students)	96	4	I、II	A	A	外国语学院	必修 Obligatory Course
		G000019	数值分析 Numerical Analysis	32	2	I	A	A	数理学院	必修 Obligatory Course
		G000020	应用统计 Application of Statistics	32	2	I	A	A	数理学院	必修 Obligatory Course
	专业基础课 Specialized Course	M012098	现代仪器分析 Contemporary Instrumental Analysis	32	2	I	A	A	化工学院	必修 Obligatory Course
		M012046	高等有机化学 Advanced Organic Chemistry	32	2	I	A	A	化工学院	必修 Obligatory Course
		M012047	天然高分子结构分析及应用 Structure Analysis and Application of Natural Polymers	32	2	I	A	A	化工学院	必修 Obligatory Course
学位课 Degree Course		M012055	纸基功能材料 Paper-based Functional Materials	32	2	I	0.5A+0.5B	C	化工学院	必修 Obligatory Course
			高等生物化学 Advanced biochemistry	32	2	I	A	A+B	化工学院	必修 Obligatory Course

		M012066	现代生物工程导论 **Modern bioengineering introduction**	32	2	Ⅰ	0.5A+0.5B	C	化工学院	必修 Obligatory Course
		M012091	发酵工程专论 Fermentation Engineering Monographs	32	2	Ⅰ	0.5A+0.5B	A+B	化工学院	必修 Obligatory Course
选修课 Selective Course	G000006		自然辩证法概论 Introduction to Natural Dialectics	18	1	I	A	A	马克思主义学院	必选 Obligatory Course
	G000017		科技论文撰写 Writing of Technological Thesis	16	1	II	A	A	化学院	必选 Obligatory Course
	M012050		精细高分子合成与应用 The Synthesis and Application of Fine Polymers	32	2	I	A	A	化工学院	选修 Selective Course
	M012051		浆纸分析与检验 Test and Analysis and Detection of Pulp and Paper	32	2	I	0.4A+0.6D	D	化工学院	选修 Selective Course
	M012052		制浆化学 Pulping Chemistry	32	2	I	0.7A+0.3D	C	化工学院	选修 Selective Course
	M012053		造纸化学 Papermaking Chemsitry	32	2	I	0.7A+0.3B	C	化工学院	选修 Selective Course
	M012054		轻化工助剂化学与应用 Chemistry and Application of Additives in Light Chemical Engineering	32	2	I	0.6A+0.4B	B	化工学院	选修 Selective Course
	M012094		胶体与固体表面化学 Colloid and Solid Surface Chemistry	32	2	Ⅰ	A	A	化工学院	选修 Selective Course
	M012071		现代生物分离工程 Modern Bioseparation Engineering	32	2	I	0.5A+0.5B	C	化工学院	选修 Selective Course
	M012108		现代分子生物学 Modern Molecular Biology	32	2	I	0.5A+0.5B	A+B	化工学院	选修 Selective Course
			应用酶工程 Applied Enzyme Engineering	32	2	I	0.5A+0.5B	C	化工学院	选修 Selective Course
			海洋资源利用 Utilization of marine resource	32	2	I	A	A	化工学院	选修 Selective Course

	M012057	生物制药进展 Progress in Biological Pharmacy	32	2	I	0.7A+0.3B	C	化工学院	选修 Selective Course
	M012058	应用微生物学进展 Progress in Applied Microbiology	32	2	I	0.7A+0.3B	C	化工学院	选修 Selective Course
	M012059	生物信息学应用技术 Bioinformatics Applied Technology	32	2	I	0.5A+0.5D	C	化工学院	选修 Selective Course
		食品安全概论 **Introduction of Food Safty**	32	2	I	0.6A+0.4B	B		
研究环节 Research Part	M012001	开题报告 Thesis Proposal		1					
	M012002	学术报告 Academic Lectures		1					
	M012003	实践活动 Practical Activity		1					
	M012004	中期考核 Medium-term Assessment		1					
	M012005	发表论文 Published Thesis		1					
	M012006	学位论文 Degree Thesis		8					
补修课程 Make-up Course	M012060	天然高分子化学 Chemistry of Natural Polymers	64			A	A	化工学院	可根据导师要求补修，不计入学分 Patching in order to mentor's requirement, Not included in the credit
	M012061	轻化工工艺 Technology of Light Chemical Engineering	64			A	A	化工学院	
	M012062	轻化工设备 Equipment of Light Chemical Engineering	64			A	A	化工学院	
	M012063	精细化学品化学 Chemistry of Fine Chemicals	48			A	A	化工学院	
	M012064	生物制药工艺学 Bio-pharmaceutical technology	32			A	A	化工学院	
	M012065	化学制药工艺 Chemical Pharmaceutical Technology	32			A	A	化工学院	

注 1. 教学方式代码：A—课堂讲授，B—学术研讨，C—专题报告，D—实践，E—其他；例：0.7A+0.3B

Notes1. Teaching method codes: A—lecturing in class B—Academic discussion, C—subjective report, D—practice,E—others; e.g.: 0.7A+0.3B

注 2. 考核方式代码：A—闭卷笔试，B—开卷笔试，C—课程论文，D—平时作业，E—口试，F—其他；例：0.8A+0.2D

Notes2 Examining method codes: A—written exam with closed paper, B—written exam with opened paper, C—Class paper, D—ordinarily assignment,

E—oral test ,F—others； e.g.: 0.8A+0.2D.

六、课程教学（Course Teaching）

研究生课程实行学分制，分为学位课和非学位课两部分，每个专业应积极创造条件逐步做到至少有一门专业课用外语讲授。每位研究生在学期间应修完个人培养计划中所要求的学分，方能进入中期考核。

The courses are divided into two parts, degree courses and non-degree courses, with an assessment system of credit. Each specialty should actively create conditions to gradually achieve that at least one specialized course should be given in English. Each postgraduate should complete the required credits in the cultivation plan to enter the mid-term assessment.

研究生课程的教学方法应建立以研究生为主体的教学方式，充分发挥研究生的主动性和自觉性，更多地采用启发式、研讨式及参与式的教学方法。课程考核分考试与考查，除特殊情况外，学位公共课一般采用闭卷考试。学位基础课、学位专业课采取闭、开卷考试与考查相结合的方式。

Student-oriented teaching method should be established, making full use of students' initiative and self-consciousness, adopting heuristic, seminar-style and participatory means more. Examination and test are used to evaluate students. Except politics for Doctor's Degree, public degree courses generally use a closed-book exam. Basic degree courses and professional degree courses use a combination of closed-book, open-book exam and test.

七、论文的要求（Dissertation Requirements）

学位论文是硕士研究生培养的重要要组成部分。论文涉及内容应选对我国经济和社会发展有切实相关意义的课题或是学科前沿课题；学位论文要突出创新性、前沿性和科学性。课题研究与论文撰写是对研究生进行科学研究或承担专门技术工作的全面训练，是研究生综合运用所学知识，发现问题、分析问题和解决问题能力的过程，是对研究生综合能力的评判。

This is a major component in the process of cultivating postgraduate students. Research paper should focus on issues that have great significance for China's economic and social development, or is the frontier, important subject. The dissertation should be innovative and scientific. This is a comprehensive training of what the students are researching or undertaking specialized tasks, a process of finding, analyzing and solving problems, and a judgment of a student's comprehensive abilities.

学生应在导师的指导下，在第 2～3 学期在一级学科范围内确定论文题目、制定研究计划，并经研究室审核后报研究生部，并接受研究生部和学院的定期检查。学位论文必须独立完成，要做到资料可靠，理论正确、思路清晰、有创新点。按照《中华人民共和国学位条例》和《青岛科技大学硕士学位授予工作细则》的规定，经答辩合格者授予硕士学位。

Students should choose topics, make plans, and submit to the postgraduate department under the guidance of tutors in the second or third term. The dissertation should be finished independently, with reliable resources, correct theories, clear thoughts and creative ideas. Those who pass the graduation oral examination through the discussion of College Degree Assessment Points Committee, after being reported to and approved by School Academic Degree Evaluation Committee, will be awarded a Master's degree.

学院院长：
Dean of School

研究生处处长：
Director of Postgraduate Office

主管副校长：
Vice President