沈阳化工大学本科培养方案

机械与动力工程学院

专业名称：油气储运工程

专业代码：081504

制　　定：冯　颖

审　　核：战洪仁

审　　定：于三三

批　　准：金志浩

2021 年 8 月

油气储运工程专业培养方案

一、培养目标

本专业培养具备良好的人文素养、社会责任感和职业道德，具有创新意识和实践能力、系统思维与国际视野、沟通能力及合作精神，掌握宽厚的基础理论知识和专业知识，能在油气储运工程领域从事项目规划、工艺设计、系统建设、技术研究以及运行管理等工作的应用型工程技术人才，成为身心健康、德智体美劳全面发展的社会主义事业建设者和接班人。

专业对所培养的学生在毕业后 5 年左右的目标预测：

（1）适应世界油气储运工程技术发展，具备综合运用专业知识和油气储运行业新技术，针对油气储运工程项目，综合考虑经济、安全、法律和环境等因素，分析复杂工程问题，提供系统性的解决方案的能力。

（2）能够跟踪油气储运工程专业的前沿技术，具备较强的工程设计能力和一定的工程管理能力及创新能力，胜任油气田集输、油气管道输送、油气储存与销售、城市燃气输配等油气储运工程项目的规划设计、施工管理、生产运营、技术研究等工作。

（3）具备团队协作精神，能够就油气储运技术问题通过文书、图纸和语言等方式进行清晰的表达，对涉外技术及跨学科交流能够进行有效的沟通，在油气储运工程项目团队中作为技术骨干或管理人员发挥作用。

（4）具备良好的思想品德、人文素养、社会责任感和职业道德，具有全球化意识和国际视野，适应国内外专业技术发展趋势，能够通过多种渠道提升专业素质、更新专业知识，具备自主学习和终身学习能力。

二、专业方向

不分方向

三、毕业要求

毕业要求 1：能够将数学、自然科学、工程基础和专业知识用于解决油气田集输、油气管道输送、油气储存与销售、城市燃气输配等油气储运领域中的复杂工程问题。

毕业要求 2：能够应用数学、自然科学和油气储运工程科学的基本原理，识别、表达、并通过文献研究分析油气储运复杂工程问题，以获得有效结论。

毕业要求 3：能够遵守相关法律法规和油气储运工程设计规范，针对油气储运工程领域的复杂工程问题设计解决方案，设计满足特定需求的油气储运单元、系统或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

毕业要求 4：能够基于科学原理并采用科学方法对油气田集输、油气管道输送、油气储存与销售、城市燃气输配等的复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

毕业要求 5：能够针对油气储运领域中的复杂工程问题，选择与使用恰当的技术、资源、现代工程

工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

毕业要求 6：能够基于油气储运工程相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

毕业要求 7：能够理解和评价针对油气储运复杂工程问题的工程实践对环境、社会可持续发展的影响。

毕业要求 8：具有良好的思想品质、人文社会科学素养、社会责任感，树立和践行社会主义核心价值观，能够在油气储运工程实践中理解并遵守工程职业道德和规范，履行责任。

毕业要求 9：能够在石油与天然气工程、化学工程、动力工程等多学科背景下的团队中承担个体、团队成员以及负责人的角色。

毕业要求 10：能够就油气储运复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

毕业要求 11：理解并掌握工程管理原理与经济决策方法，并能在石油与天然气工程、化学工程、动力工程等多学科环境中应用。

毕业要求 12：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

毕业能力要求及其指标点分解：

毕业要求	指标点
毕业要求 1： 工程知识：能够将数学、自然科学、工程基础和专业知识用于解决油气田集输、油气管道输送、油气储存与销售、城市燃气输配等油气储运领域中的复杂工程问题。	1-1.掌握数学、物理、化学等自然科学知识并运用其表述工程问题。
	1-2.掌握力学、热力学、电工学等工程基础知识，能针对油气储运领域中的复杂工程问题建立数学模型并求解。
	1-3.能够将专业知识和数学模型方法用于推演、分析油气储运专业工程问题。
	1-4. 能够将专业知识和数学模型方法用于油气储运系统设计方案、复杂工程问题解决方案的对比分析。
毕业要求 2： 问题分析：能够应用数学、自然科学和油气储运工程科学的基本原理，识别、表达、并通过文献研究分析油气储运复杂工程问题，以获得有效结论。	2-1.能够运用相关科学原理，识别和判断油气储运复杂工程问题的关键环节和要素。
	2-2.能基于相关科学原理和数学模型方法正确表达复杂工程问题。
	2-3.能认识到解决问题有多种方案可选择，基于油气储运工程基本原理，通过文献研究寻求工程问题可替代的解决方案。
	2-4. 能运用油气储运工程基本原理，借助文献研究，分析油气储运过程的影响因素，获得有效结论。
毕业要求 3： 设计/开发解决方案：能够遵守相关法律法规和油气储运工程设计规范，针对油气储运工程领域的复杂工程问题设计解决方案，设计满足特定需求的油气储运单元、系统或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。	3-1.掌握油气储运工艺系统设计、设备设计的基本设计/开发方法和技术，了解影响设计目标和技术方案的各种因素。
	3-2.能够针对油气储运复杂工程问题的解决方案，进行设备选型、单元工艺和设备设计、装置设计。
	3-3.能够针对油气储运的特定需求进行系统、设备或工艺流程设计，并能够在设计环节中体现创新意识。
	3-4.在设计中能够考虑社会、健康、安全、法律、文化以及环境等制约因素。

毕业要求 4： 研究：能够基于科学原理并采用科学方法对油气田集输、油气管道输送、油气储存与销售、城市燃气输配等的复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。	4-1.能够基于科学原理，通过文献研究及相关方法，调研和分析油气储运工程中复杂工程问题的解决方案。
	4-2. 能够针对油气储运设施、管道系统以及输送工艺系统等复杂工程问题的特征，规划研究思路，设计可行的实验方案。
	4-3.能够根据实验方案构建实验系统，安全地开展实验，正确地采集实验数据。
	4-4.能对实验结果进行分析和解释，并通过信息综合得到合理有效的结论。
毕业要求 5： 使用现代工具：能够针对油气储运领域中的复杂工程问题，选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。	5-1.了解油气储运工程专业常用的现代仪器、信息技术工具、工程工具和模拟软件的使用原理和方法，并理解其局限性。
	5-2.能够选择和使用现代仪器、CAD、专业数据库及模拟软件等，对具体的储运设施和输配工艺系统复杂工程问题进行分析、计算与设计。
	5-3.能够利用计算机语言编制程序等现代工具，对油气储运系统复杂工程问题进行预测与模拟，并能够分析其局限性。
毕业要求 6： 工程与社会：能够基于油气储运工程相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。	6-1.了解油气储运工程专业相关领域的技术标准体系、知识产权、产业政策和法律法规，理解不同社会文化对工程活动的影响。
	6-2.能分析和评价油气储运工程实践和复杂工程问题解决方案对社会、健康、安全、法律、文化的影响，以及这些制约因素对项目实施的影响，并理解应承担的责任。
毕业要求 7： 环境和可持续发展：能够理解和评价针对油气储运复杂工程问题的工程实践对环境、社会可持续发展的影响。	7-1.知晓和理解环境保护和可持续发展的理念和内涵，能够在油气储运工程实践中建立可持续发展的意识。
	7-2.能够站在环境保护和可持续发展的角度思考油气储运复杂工程问题的工程实践的可持续性，评价油气储运工程中可能对人类和环境造成的损害和隐患。
毕业要求 8： 职业规范：具有良好的思想品质、人文社会科学素养、社会责任感，树立和践行社会主义核心价值观，能够在油气储运工程实践中理解并遵守工程职业道德和规范，履行责任。	8-1.有良好的思想品质、人文社会素养和正确的价值观，理解个人与社会的关系，了解中国国情。
	8-2.理解诚实公正、诚信守则的工程职业道德和规范，并能在油气储运工程实践中自觉遵守。
	8-3.理解油气储运工程师对公众的安全、健康和福祉，以及环境保护的社会责任，能够在工程实践中自觉履行责任。
毕业要求 9： 个人和团队：能够在石油与天然气工程、化学工程、动力工程等多学科背景下的团队中承担个体、团队成员以及负责人的角色。	9-1.理解多学科背景下个人和团队的关系，具有良好的团队合作意识和能力，能与其他学科的成员有效沟通，合作共事。
	9-2.能够在石油与天然气工程、化学工程、动力工程等多学科背景团队中独立或合作开展工作。
	9-3.能够在石油与天然气工程、化学工程、动力工程等多学科背景团队中组织、协调和指挥团队开展工作。
毕业要求 10： 沟通：能够就油气储运复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。	10-1.能够就油气储运中的复杂工程问题，通过撰写报告、设计文稿和陈述发言等方式清晰地表达观点，回应质疑，理解与业界同行和社会公众交流的差异性。
	10-2.了解油气储运工程专业领域的国际发展趋势、研究热点，理解和尊重世界不同文化的差异性和多样性。
	10-3.具有跨文化交流的语言和书面表达能力，能就油气储运工程专业问题，在跨文化背景下进行基本沟通和交流。

毕业要求 11： 项目管理：理解并掌握工程管理原理与经济决策方法，并能在石油与天然气工程、化学工程、动力工程等多学科环境中应用。	11-1.掌握油气储运工程项目中涉及的管理与经济决策方法。
	11-2.了解油气储运工程项目全周期、全流程的成本构成，理解其中涉及的工程管理与经济决策问题。
	11-3.能够在石油与天然气工程、化学工程、动力工程等多学科环境下（含模拟环境），运用工程管理与经济决策方法，设计开发解决油气储运工程领域的规划、设计、施工和管理等问题。
毕业要求 12： 终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。	12-1.能够在社会发展的大背景下了解油气储运工程行业发展的新趋势，认识到自主和终身学习的必要性。
	12-2.掌握自主学习的方法，具有知识拓展的能力，包括对技术问题的理解能力，归纳总结的能力和提出问题的能力等。

毕业要求支撑培养目标实现的关系矩阵

毕业要求	培养目标			
	培养目标 1	培养目标 2	培养目标 3	培养目标 4
1：工程知识	√			
2：问题分析	√	√		
3：设计/开发解决方案	√	√		
4：研究	√	√		
5：使用现代工具		√		
6：工程与社会	√		√	√
7：环境和可持续发展	√			√
8：职业规范			√	√
9：个人和团队			√	
10：沟通			√	√
11：项目管理			√	√
12：终身学习		√		√

四、主干学科

石油与天然气工程；动力工程及工程热物理；化学工程与技术

五、专业核心课程

工程流体力学；工程热力学；传热学；泵与压缩机；油库设计与管理；输油管道设计与管理；输气管道设计与管理；油气集输；城市燃气输配；油罐及管道强度设计

六、修业年限

本科基本学制 4 年，弹性学习年限 3-6 年，按照学分制度管理。

七、授予学位

学生应修满 171 学分（并取得课外实践环节的 9 学分）方可毕业。符合《沈阳化工大学本科毕业生学士学位授予工作有关规定(2017 年 3 月修订)》学位授予条件者，可授予工学学士学位。

八、学分要求

课程类别	课程模块		课程性质	学分要求	小计	比例(%)
通识教育课	通识教育必修课	思政类	必修	17	44	25.73
		外语类		12		
		计算机类		5		
		军事安全类		2		
		劳动体育类		5		
		创新创业类		2		
		心理健康类		1		
	通识教育选修课	美育类(400)	选修	2	8	4.68
		中国与世界(500)		2		
		四史(600)		1		
		经济管理类(700)		1		
		科学技术类(800)		0		
		传统文化(900)		2		
	通识教育实践课	军训	实践	2	2	1.17
学科平台课	学科基础课程	公共基础类	必修	58	62	68.42
		专业基础类				
	学科实践课程	-	实践	4		
专业教育课	专业核心课程	-	必修	17	50	
	专业选修课程	-	选修	4		
	专业实践课程	-	实践	29		
能力拓展课	专业特色课程	-	必修（或实践）	5	5	
课外环节	课外通识实践	人文社会实践	课外	4		

		身心健康实践	实践			
		外语技能实践				
	创新创业实践	创新训练		4		
		创新大赛				
		创客活动				
	生涯教育	成长规划类		1		
总学分/比例					171	100

Oil and Gas Storage and Transportation Engineering Major 2021 Undergraduate Education Program

I、Educational Objectives

This major cultivates students with good humanistic quality, sense of social responsibility and professional ethics, innovative consciousness and practical ability, systematic thinking and international vision, communication ability and cooperation spirit and a good command of the basic theoretical knowledge and professional knowledge. To become applied engineering and technical personnel who can be engaged in project planning, process design, system construction, technical research, and operation management in the field of oil and gas storage and transportation engineering, and to become a builder and successor of socialist cause with physical and mental health, all-round development of morality, intelligence, sports, beauty and labor.

The major predicts the goal of the students about 5 years after graduation:

（1）Adapt to the development of oil and gas storage and transportation engineering technology in the world, have the ability to comprehensively apply professional knowledge and new technologies in the oil and gas storage and transportation industry to analyze complex engineering problems in oil and gas storage and transportation engineering projects, and provide systematic solutions, while comprehensively consider factors such as safety, laws and regulations, environment, culture and sustainable development.

（2）Be able to track the frontier technology of oil and gas storage and transportation engineering, have strong engineering design ability, certain engineering management ability and innovation ability, and be competent for project planning and design, construction management, production and operation, and technical research of oil and gas storage and transportation engineering projects such as oil and gas gathering and transportation, oil and gas pipeline transportation, oil and gas storage and sales, and urban gas transmission and distribution.

（3）Have team spirit, able to express technical issues related to oil and gas storage and transportation clearly through documents, drawings, and language. Able to effectively communicate with foreign technology and interdisciplinary exchanges, and play a role as technical backbone or management personnel in oil and gas storage and transportation project team.

（4）Have good ideological and moral character, humanistic quality, sense of social responsibility and professional ethics, global awareness and international vision, adapt to the development trend of professional technology at home and abroad, be able to improve professional quality and update professional knowledge through a variety of channels, and have the ability of self-learning and lifelong learning.

II、 Major direction

Regardless of professional direction

III、 Graduation Requirements

Graduation ability requirements and index point decomposition:

Graduation Requirements	Indices
Requirement 1： Engineering knowledge: be able to use mathematics, natural science, engineering foundation and professional knowledge to solve complex engineering problems in oil and gas storage and transportation fields, such as oil and gas gathering and transportation, oil and gas pipeline transportation, oil and gas storage and sales, urban gas transmission and distribution, etc.	1-1. Master natural science knowledge such as mathematics, physics, chemistry, and apply it to express engineering problems.
	1-2. Master the basic engineering knowledge of mechanics, thermodynamics and electrical engineering, and be able to establish and solve mathematical models for complex engineering problems in the field of oil and gas storage and transportation.
	1-3.Be able to use professional knowledge and mathematical model method to deduce and analyze engineering problems of oil and gas storage and transportation.
	1-4. Be able to apply professional knowledge and mathematical model method to the comparative analysis of oil and gas storage and transportation system design scheme and complex engineering problem solutions.
Requirement 2： Problem analysis: be able to apply the basic principles of mathematics, natural science and oil and gas storage and transportation engineering science to identify, express and analyze complex engineering problems of oil and gas storage and transportation through literature research, so as to obtain effective conclusions.	2-1. Be able to use relevant scientific principles to identify and judge the key links and elements of complex engineering problems of oil and gas storage and transportation.
	2-2. Be able to correctly express complex engineering problems based on relevant scientific principles and mathematical models.
	2-3.Recognize that there are multiple options to solve a problem. Based on the basic principles of oil and gas storage and transportation engineering, be able to find alternative solutions to engineering problems through literature research.
	2-4. Using the basic principles of oil and gas storage and transportation engineering, with the help of literature research, analyze the influencing factors of oil and gas storage and transportation process, and obtain effective conclusions.
Requirement 3： Design / development solutions: be able to comply with relevant laws and regulations and oil and gas storage and transportation engineering design specifications, design solutions for complex engineering problems in the field of oil and gas storage and transportation engineering, design oil and gas storage and transportation systems, units or process flows that meet specific needs, and reflect the sense of innovation in the design process, taking into account social, health, safety, legal and environmental factors Cultural and environmental factors.	3-1.Master the basic design / development methods and technologies of oil and gas storage and transportation process system design and equipment design, and understand various factors affecting design objectives and technical schemes.
	3-2. Capable of equipment selection, unit process and equipment design, and device design for complex engineering problems in oil and gas storage and transportation.
	3-3.Be able to design the system, equipment or process according to the specific requirements of oil and gas storage and transportation, and embody the innovative consciousness in the design process.
	3-4. Social, health, safety, legal, cultural, environmental and other constraining factors can be considered in the design.
Requirement 4：	4-1.Based on scientific principles, be able to investigate and analyze solutions

Research: be able to study complex engineering problems of oil and gas gathering and transmission, oil and gas pipeline transportation, oil and gas storage and sales, urban gas transmission and distribution based on scientific principle and scientific method, including designing experiment, analyzing and interpreting data and getting reasonable and effective conclusion through information synthesis.	to complex engineering problems in oil and gas storage and transportation engineering through literature research or related methods.
	4-2. According to the characteristics of complex engineering problems such as oil and gas storage and transportation facilities, pipeline system and transportation process system, be able to plan research ideas and design feasible experimental schemes.
	4-3.According to the experimental scheme, the experimental system can be constructed, the experiment can be carried out safely, and the experimental data can be collected correctly.
	4-4.Be able to analyze and explain the experimental results, and get reasonable and effective conclusions through information synthesis.
Requirement 5： Use modern tools: be able to select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems in the field of oil and gas storage and transportation, including prediction and simulation of complex engineering problems, and be able to understand their limitations.	5-1.Understand the principles and methods of modern instruments, information technology tools, engineering tools and simulation software commonly used in oil and gas storage and transportation engineering, and understand their limitations.
	5-2. Be able to select and use modern instruments, CAD, professional database and simulation software to analyze, calculate and design complex engineering problems of specific storage and transportation facilities and transportation and distribution process system.
	5-3. Be able to use modern tools such as computer language programming to predict and simulate complex engineering problems in oil and gas storage and transportation systems, and analyze their limitations.
Requirement 6： Engineering and society: be able to conduct reasonable analysis based on the relevant background knowledge of oil and gas storage and transportation engineering, evaluate the impact of professional engineering practice and complex engineering problem solutions on society, health, safety, law and culture, and understand the responsibilities to be undertaken.	6-1.Understand the technical standard system, intellectual property rights, industrial policies, laws and regulations of oil and gas storage and transportation engineering, and understand the influence of different social cultures on engineering activities.
	6-2. Be able to analyze and evaluate the impact of oil and gas storage and transportation engineering practice and complex engineering problem solutions on society, health, safety, law and culture, as well as the impact of these constraints on project implementation, and understand the responsibilities to be undertaken.
Requirement 7： Environment and sustainable development: be able to understand and evaluate the impact of engineering practice for complex engineering problems of oil and gas storage on environment and social sustainable development.	7-1.Knowing and understanding the concept and connotation of environmental protection and sustainable development can establish the awareness of sustainable development in the practice of oil and gas storage and transportation engineering.
	7-2. Considering the sustainability of the engineering practice for complex engineering problems in oil and gas storage and transportation from the perspective of environmental protection and sustainable development, and evaluate the possible damage and hidden danger to human and environment in oil and gas storage and transportation engineering.
Requirement 8： Professional norms: have good ideological quality, humanities and social science literacy,	8-1. Having good ideological qualities, humanistic and social literacy, and correct values, understanding the relationship between individuals and society, and understanding China's national conditions.

sense of social responsibility, establish and practice socialist core values, be able to understand and abide by engineering professional ethics and norms in the practice of oil and gas storage and transportation engineering, and fulfill responsibilities.	8-2. Understand the engineering professional ethics and norms of honesty, justice and integrity code, and consciously abide by them in the practice of oil and gas storage and transportation engineering.
	8-3. Understand the social responsibility of oil and gas storage and transportation engineers for public safety, health and well-being, as well as environmental protection, and be able to consciously fulfill their responsibilities in engineering practice.
Requirement 9： Individual and team: be able to play the role of individual, team member and leader in a team with interdisciplinary backgrounds such as oil and gas engineering, chemical engineering, and power engineering.	9-1. Understand the relationship between individual and team in multi-disciplinary background, have good sense and ability of teamwork, and be able to effectively communicate and work with members of other disciplines.
	9-2. Be able to work independently or cooperatively in a multidisciplinary team such as oil and gas engineering, chemical engineering, and power engineering.
	9-3. Be able to organize, coordinate and direct team in a multidisciplinary background such as oil and gas engineering, chemical engineering, and power engineering to carry out work.
Requirement 10： Communication: be able to effectively communicate with peers in the industry and the public on complex engineering problems of oil and gas storage and transportation, including writing reports and designing manuscripts, making statements and responding to instructions. And have a certain international vision, be able to communicate in the cross-cultural background.	10-1. Be able to clearly express opinions on complex engineering problems in oil and gas storage and transportation by writing reports, designing manuscripts and presenting, respond to queries, and understand the differences in communication with peers in the industry and the public.
	10-2. Understand the international development trends and research hotspots in the field of oil and gas storage and transportation engineering, and understand and respect the differences and diversity of different cultures in the world.
	10-3.Have the language and written ability of cross-cultural communication, and be able to conduct basic communication and exchange on professional issues of oil and gas storage and transportation engineering under the cross-cultural background.
Requirement 11： Project Management: understand and master engineering management principles and economic decision-making methods, and be able to apply them in a multidisciplinary environment such as petroleum and natural gas engineering, chemical engineering, and power engineering.	11-1.Master the management and economic decision-making methods involved in oil and gas storage and transportation projects.
	11-2. Understand the cost structure of the whole cycle and process of oil and gas storage and transportation engineering projects, and understand the engineering management and economic decision-making issues involved.
	11-3. Capable of applying engineering management and economic decision-making methods in multidisciplinary environments such as oil and gas engineering, chemical engineering, and power engineering (including simulated environments) to design, develop, and solve planning, design, construction, and management issues in the field of oil and gas storage and transportation engineering.
Requirement 12： Lifelong learning: have the consciousness of independent learning and lifelong learning, and have the ability to learn and adapt to development.	12-1.Under the background of social development, be able to understand the new development trend of oil and gas storage and transportation engineering industry, and realize the necessity of autonomous and lifelong learning.
	12-2. Master the method of autonomous learning, have the ability to expand knowledge, including the ability to understand technical problems, the ability to summarize and put forward problems.

The relationship between graduation requirements and educational objectives

Graduation Requirements	Educational Objectives			
	Educational Objectives 1	Educational Objectives 2	Educational Objectives 3	Educational Objectives 4
1：Engineering Knowledge	√			
2：Problem Analysis	√	√		
3：Design/Development Solutions	√	√		
4：Research	√	√		
5：Use Modern Tools		√		
6：Engineering and Society	√		√	√
7：Environment and Sustainable Development	√			√
8：Career Planning			√	√
9：Individuals and Teams			√	
10：Communication			√	√
11：Project Management			√	√
12：Lifelong Learning		√		√

IV、Major Subject

Oil and Gas Engineering; Power Engineering and Engineering Thermophysics; Chemical Engineering and Technology.

V、Core Courses

Engineering Fluid Mechanics; Engineering Thermodynamics; Heat Transfer; Pump and Compressor; Oil Depot Design and Management; Oil Pipeline Design and Management; Gas Pipeline Design and Management; Oil and Gas Gathering and Transportation; Urban Gas Transmission and Distribution; Strength Design of Oil Tank and Pipeline.

VI、Educational System

The basic undergraduate system is 4 years, and the elastic study period is 3-6 years, and it is managed according to the credit system.

Students should complete 171 credits (and obtain 9 credits in extracurricular practice) before graduation. The Bachelor of Engineering degree can be granted to those who meet the degree awarding requirements of the relevant regulations on the awarding of bachelor's degree for graduates of Shenyang University of Chemical Technology (revised in March 2017).

VIII、Credit Requirements

Course Type	Course Modules		Course Nature	Credit requirement	Subtotal	Proportion（%）
General Education	General Education (Compulsory)	Ideological and Political Courses	Compulsory	17	44	25.73
		Foreign Language Courses		12		
		Computer Courses		5		
		Military and Safety Courses		2		
		Labor and Sport Education		5		
		Innovation and Entrepreneurship		2		
		Mental Health		1		
	General Education (Optional)	Aesthetic Education (400)	Optional	2	8	4.68
		China and the World (500)		2		
		Four Histories (600)		1		
		Economic Management (700)		1		
		Science and Technology (800)		0		
		Traditional Culture (900)		2		

	General Education (practice)	Military Training	Practice	2	2	1.17
Discipline Education	Basic Courses	Public Basic Course	Compulsory	58	62	68.42
		Professional Basic Courses				
	Basic Practice Courses	-	Practice	4		
Specialized Education	Core Courses	-	Compulsory	17	50	
	Optional Courses	-	Optional	4		
	Specialized Practice Courses	-	Practice	29		
Competency Development	Individualized Courses	-	Compulsory(or Practice)	5	5	
Extracurricular links	Extracurricular General Education Practice	Culture and Society Practice	Extracurricular Practice	4		
		Mentally and Physically Practice				
		Foreign Language Proficiency Training Practice				
	Extracurricular Characteristic Practice	Innovative Training		4		
		Innovative Competition				
		Chuangke Activities				
	Career Education	Growth Planning Courses		1		
Total/Proportion					171	100

九、油气储运工程专业教学进程表

Table of Teaching Schedule for Oil and Gas Storage and Transportation Engineering Major

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Credits	总学时数 Total Credit Hours	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lecture	实验 Experiment	上机 Programming	课外实践 Practice	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
通识教育课 General Education	必修 Compulsory	思政类 Ideological and Political Courses	0710093001	思想道德与法治|| Ideological Morality and the Rule of Law	3.0	48	32			16		2							
			0710053001	中国近现代史纲要||Outline of Chinese Contemporary and Modern History	3.0	48	32			16	2								
			0710103001	马克思主义基本原理*||Basic Principles of Marxism*	3.0	48	32			16			2						
			0710133001	毛泽东思想和中国特色社会主义理论体系概论*||Mao Zedong Thought and Theory of Socialism with Chinese Characteristics*	3.0	48	32			16				2					
			0710123001	习近平新时代中国特色社会主义思想概论||Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	3.0	48	40			8					3				
			0710012301	形势与政策||Current Situation and Policies	2.0	64	64				2	2	2	2	2	2	2	2	
		外语类 Foreign Language Courses	0211003101	大学外语I||College English I	3.0	48	48				3								
			0211003201	大学外语II*||College English II*	3.0	48	48					3							
			0241003301	大学外语III||College English III	3.0	48	48						3						五选一

				大学外语III（进阶英语）|| College English III（Advanced English CET 6-Orientated）	3.0	48	48						3						
				大学外语III（英语口语表达与交流）|| College English III（English Oral Expression and Communication）	3.0	48	48						3						
				大学外语III（跨文化交际）|| College English III（Intercultural Communication）	3.0	48	48						3						
				大学外语III（英语写作表达与交流）|| College English III（English Writing Expression and Communication）	3.0	48	48						3						
			0241003401	大学外语IV*||College English IV*	3.0	48	48							3					五选一
				大学外语IV（进阶英语）|| College English IV（Advanced English CET 6-Orientated）	3.0	48	48							3					
				大学外语IV（英语口语表达与交流）|| College English IV（English Oral Expression and Communication）	3.0	48	48							3					
				大学外语IV（跨文化交际）|| College English IV（Intercultural Communication）	3.0	48	48							3					
				大学外语IV（英语写作表达与交流）|| College English IV（English Writing Expression and Communication）	3.0	48	48							3					
		计算机类 Computer Courses	1614262001	计算机信息技术||Computer Information Technology	2.0	36	24		12		2								
			1613253001	C 语言程序设计||C Language Programming	3.0	56	32		24			2							
		军事安全类 Military and Safety Courses	0710081001	军事理论||Military Theory	1.0	16	16					2							
			2114031712	安全教育||Safety Education	1.0	16	16				2	2	2	2	2	2	2		
		劳动体育类	2640021001	劳动教育||Labour Education	1.0	16	16					2							

		Labor and Sport Education	0410011101	大学体育I||College Physical EducationI	1.0	36	36				2								
			0410021201	大学体育II||College Physical EducationII	1.0	36	36					2							
			0410031301	大学体育III||College Physical EducationIII	1.0	36	36						2						
			0410041401	大学体育 IV||CollegePhysical EducationIV	1.0	36	36							2					
		创新创业类 Innovation and Entrepreneurship courses	2156281002	创造性思维与创新方法||Creative Thinking and Innovative Methods	1.0	16	16						2						
			1740011001	创业基础||Entrepreneurial Foundation	1.0	16	16							2					
		心理健康类 Mental Health Courses	0510041001	大学生心理与健康教育||Mental and Health Education for College Students	1.0	16	16				2	2	2						
		小计 Subtotal			44.0	828	720	0	36	72									
	选修 Optional	分为经济管理类（1.0）、美育类（2.0）、科学技术类（0.0）、四史（1.0）、传统文化（2.0）、中国与世界（2.0）课程类 6 个模块 每个模块最多选修 2.0 学分，每学期最多选修 2 门课程。 Including 6 modules: Economic Management（1.0）, Aesthetic Education （2.0）, Science and Technology（0.0）, Four Histories（1.0）, Traditional Chinese Culture（2.0）, China and the World（2.0）. Up to 2.0 credits per module and up to 2 courses per semester.																	
		小计 Subtotal			8.0	128	128												
	实践 Practice		0415102011	军训||military training	2.0	48				48	+2								集中
	合计 Total				54.0	1004	848	0	36	120									
学科平台课 Discipline Education	必修 Compulsory	数学与自然科学类 Natural Science & Mathematics	0310004101	高等数学 I*||Advanced Mathematics I*	4.5	80	72			8	6								
			0310005201	高等数学 II*||Advanced Mathematics II*	5.5	96	88			8		6							
			0310032001	线性代数|| Linear Algebra	2.0	32	32						2						
			0310042001	概率论与数理统计||Probability and Statistics	2.0	32	32							2					
			0310063101	大学物理 I*||University Physics I*	3.0	48	46	2				3							

			0310063201	大学物理 II*||University Physics II*	3.0	48	46	2					3						
			0311073001	大学化学*||College Chemistry*	3.0	48	48				4								
			0310101111	大学物理实验 I|| Physical Experiment of College I	1.0	24	6	18				3							
			0310101211	大学物理实验 II||Physical Experiment of College II	1.0	24		24					3						
			0311091011	大学化学实验 || College Chemistry Experiment	1.0	24		24				4							
		工程基础类 Foundation Engineering	2118004001	工程制图及 CAD|| Engineering Drawing & CAD	4.0	68	56		12					4					
			2110083002	理论力学 A*||Theoretical Mechanics A*	3.0	48	48						4						
			2110063002	材料力学 B*||Mechanics of Materials B*	3.0	48	40	8						3					
			1510122001	电工学||Electrical Engineering	2.5	44	32	12					3						
			1401152002	工程材料||Engineering Materials	2.0	32	24	8						2					
			2110723001	机械设计基础 ||Fundamentals of Mechanical Design	3.0	48	40	8							3				
		专业基础类 Subject Foundation Requisite	2156141002	油气储运工程专业导论||Introduction of Oil and Gas Storage and Transportation Engineering	1.0	16	16				2								
			2116013002	工程流体力学*||Engineering Fluid Mechanics *	3.0	48	48							3					
			2116022002	工程热力学||Engineering Thermodynamics	2.0	32	32								2				
			2116032002	泵与压缩机*||Pumps and Compressors*	2.5	40	40									4			
			2116042002	传热学*||Heat Transmission *	2.5	40	40									4			
			2115011002	工程项目管理|| Engineering Project Management	1.0	16	16									2			

			2116051002	油气储运专业英语||Specialized English of Oil and Gas Storage and Transportation	1.0	16	16								2				
			2116061002	储运油料学||Oil-gas Storage and Transporting Naphthology	1.5	24	24								2				
			小计 Subtotal		58.0	976	842	106	12	16									
	实践 Practice		2110074031	金工实习||Metalworking Practice	4.0	96		96					+4						集中
			小计 Subtotal		4.0	96		96											
	合计 Total				62.0	1072	842	202	12	16									
专业教育课 Specialized Education	必修 Compulsory		2116072002	输气管道设计与管理*||Design and Management of Natural Gas Transportation Pipeline*	2.0	32	32									3			
			2116083002	油库设计与管理*||Design and Management of Oil Depot*	3.0	48	48									4			
			2116092002	油罐及管道的腐蚀与防护||Corrosion and Protection of Oil Tank and Pipeline	2.0	32	32									3			
			2116103002	油气集输*||Oil and Gas Gathering and Transferring*	3.0	48	48										4		
			2116113002	输油管道设计与管理*||Design and Management of Oil Transportation Pipeline*	3.0	48	48										4		
			2116122002	城市燃气输配||Urban Gas Transmission and Distribution	2.0	32	32										3		
			2116132002	油罐及管道强度设计||Strength Design of Oil Tank and Pipeline	2.0	32	32										3		
			小计 Subtotal		17.0	272	272												
	选修 Optional		2136142002	原油流变性及测量||Rheology and Measurement of Crude Oil	2.0	32	32									3			
			2136161002	仪表与检测技术||Instrumentation and Detection Technology	2.0	32	32										3		

		2136171002	储运工程最优化||Optimization of Storage and Transportation Engineering	1.5	24	24								2				
		2136181002	管道瞬变流动分析||Analysis of Transient Flow in Pipeline	1.5	24	24								2				
		2136192002	油田水处理技术||Oilfield Water Treatment Technology	2.0	32	32									3			
		2136202002	油气储运工程施工技术||Construction Technology of Oil and Gas Storage and Transportation Engineering	2.0	32	32									3			
		小计 Subtotal		4.0	64	64													
		选修课程要求修满 4 学分。																	
	实践 Practice	2116214022	油库设计课程设计||Course Design of Oil Depot Design	4	96		96								+4			集中
		2116224022	输油管道课程设计||Course Design of Oil Pipeline	4	96		96									+4		集中
		2116232012	油气储运专业实验||Specialized Experiment of Oil and Gas Storage and Transportation	2	48		48									2		分散
		2116242012	油气储运基础实验||Basic Experiment of Oil and Gas Storage and Transportation	2	48		48						2	2	2	2		分散
		2118081042	毕业设计（论文）||Graduation Design（Thesis)	14	336		336										+14	集中
		2116261032	认识实习||Cognition Practice	1	24		24							+1				集中
		2116272032	生产实习||Production Practice	2	48		48								+2			集中
		小计 Subtotal		29.0	696		696											
	合计 Total			50.0	1032	336	696											
能力拓展课 Competency Development	必修或实践 Compulsory or Practice	2116281302	科技信息检索（双语）||Science and Technology Information Retrieval (dual-language)	0.5	8	8								2				

			2116291302	学科前沿讲座||Lectures on Frontier Discipline	0.5	8	8							2	2	2	2		分散
			2116301302	油气储运工程HSE管理||HSE Management of Oil and Gas Storage and Transportation Engineering	2.0	32	32								2				
			2116311302	油气储运工程虚拟仿真实训||Virtual Simulation Training of Oil and Gas Storage and Transportation Engineering	2.0	48			48								2		分散
			小计 Subtotal		5	96	48	0	48										
			本环节含必修 3 学分，实践 2 学分。																
课外环节 Extracurricular links	课外实践 Extracurricular practice	人文社会实践 Culture and Society Practice	2110301052	社会调查||Social Survey	0.5	12				12								0.5	分散
		身心健康社会实践 Mentally and Physically Practice	0410050751	课外体育锻炼||Extracurricular Physical Exercise	0.5	12				12							0.5		分散
			2640030011	劳动教育实践||Labour Education Practice	0.5	12				12						0.5			分散
			0510070311	心理健康辅导||Mental Health Counseling	0.5	12				12							0.5		分散
		外语技能实践类 Foreign Language Proficiency Training Practice	0210010011	外语技能实践（初级）||Foreign Language Proficiency Training Practice（elementary）	2.0	48				48				2					二选一
			0210020011	外语技能实践（高级）||Foreign Language Proficiency Training Practice（advanced）	2.0	48				48				2					
		能力与创新实践 Capability and Innovation Practice	2110194012	大学生素质拓展与创新实践||Quality Development and Innovation Practice	4.0	96				96	1～8 学期依据《沈阳化工大学创新创业实践学分认定办法》由创新创业学院认定								分散

		成长规划类 Growth Planning Courses	2110011012	职业规划与就业指导||Career Planning and Employment Guidance	1.0	40				40	2					2			
总计 Sum					171.0	3204	2074	898	96	136	20.5	22.5	23.5	24	20	23	21.5	16	

理论课 1 学分 16 学时，实验课程、上机等 1 学分 24 学时，体育课 1 学分 36 学时，集中实践环节 1 个教学周计 1 学分，学分最小单位为 0.5,课程名称中画*为考试课。

十、油气储运工程专业学士学位课程一览表

A List of Bachelor's Degree Programs in Oil and Gas Storage and Transportation Engineering Major

课程类别 Course Type	模块名称 Modules	序号 No.	课程编号 Course Codes	课程名称 Course Name	学分 Credits	开课学期 Semester
通识教育课 General Education	政治理论 Political Theory	1	0710103001	马克思主义基本原理*||Basic Principles of Marxism*	3	3
		2	0710133001	毛泽东思想和中国特色社会主义理论体系概论*||Mao Zedong Thought and Theory of Socialism with Chinese Characteristics*	3	4
学科平台课 Discipline Education	数学 Mathematics	3	0310004101	高等数学 I*||Advanced Mathematics I*	4.5	1
		4	0310005201	高等数学 II*||Advanced Mathematics II*	5.5	2
	物理 Physics	5	0310063201	大学物理 II*||University Physics II*	3	3
	工程基础 Engineering Foundation	6	2110083002	理论力学 A*||Theoretical Mechanics A*	3	3
		7	2110063002	材料力学 B*||Mechanics of Materials B*	3	4
	专业基础 Subject Foundation Requisite	8	2116013002	工程流体力学*||Engineering Fluid Mechanics *	3	4
		9	2116032002	泵与压缩机*||Pumps and Compressors*	2.5	6
		10	2116042002	传热学*||Heat Transmission *	2.5	6
专业教育课 Specialized Education	专业课 Specialized Courses	11	2116072002	输气管道设计与管理*||Design and Management of Natural Gas Transportation Pipeline*	2	6
		12	2116083002	油库设计与管理*||Design and Management of Oil Depot*	3	6
		13	2116103002	油气集输*||Oil and Gas Gathering and Transferring*	3	7
		14	2116113002	输油管道设计与管理*||Design and Management of Oil Transportation Pipeline*	3	7

说明：关于学士学位课的具体要求见《沈阳化工大学关于学士学位课程水平审核制度的若干规定》

十一、全学程实践环节周历安排 **Weekly Calendar of all Practice Sessions**

学期	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	备注
一		☆	☆															::	::	·		
二																		::	::	·		
三					※	※	※	※										::	::	·		
四																		::	::	·		
五															▼			::	::	·		
六												/	/	△	△	△	△	::	::	·		
七														△	△	△	△	::	::	·		
八	=	=	=	=	=	=	=	=	=	=	=	=	=	=								

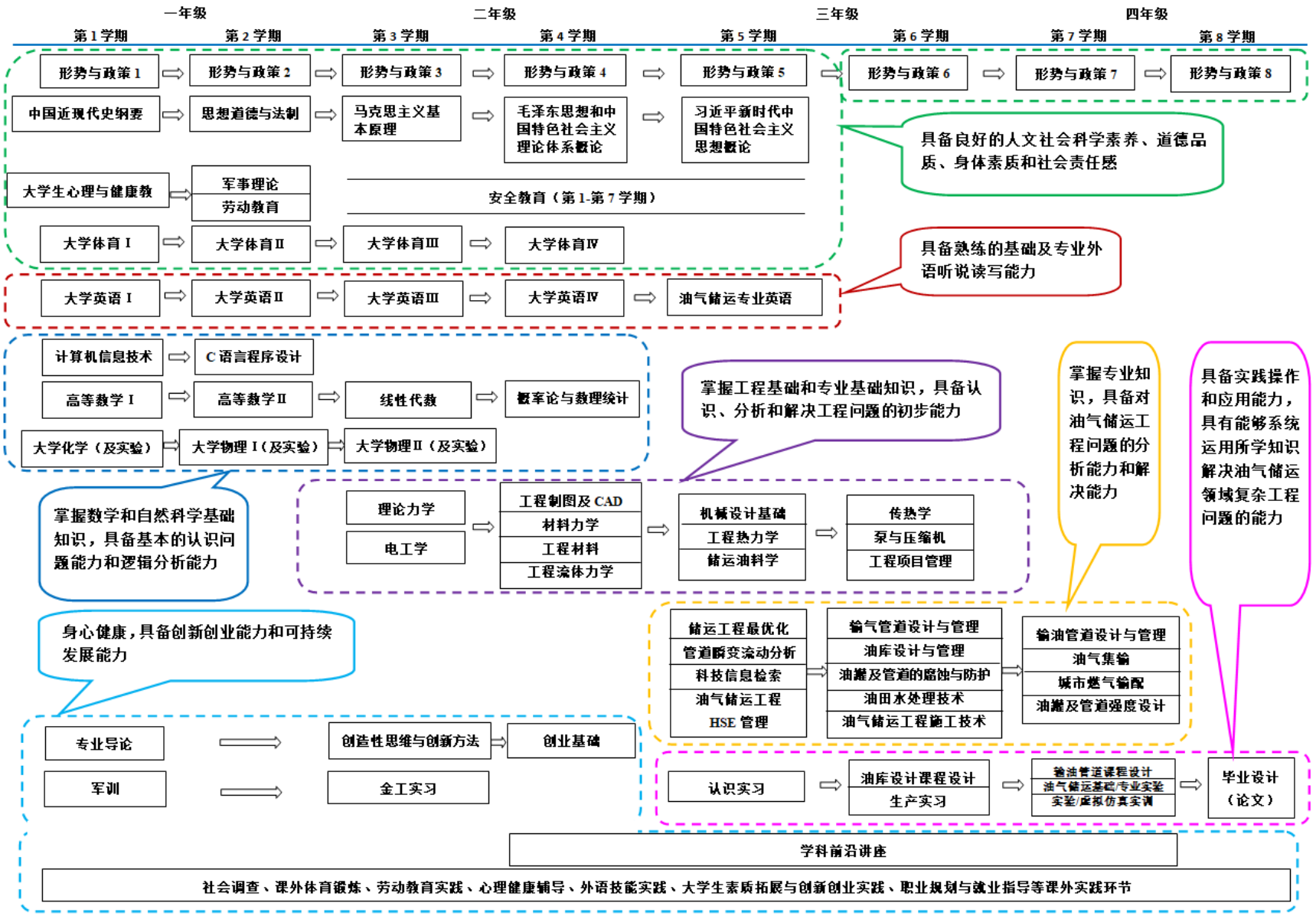
符号说明(Symbol Description)：

※金工实习||Metalworking Practice　△课程设计||Curriculum Design　/生产实习||Specialized Production Practice　L 专业实验||Specialty Experiment

P 各类实训、学年论文||Practical Training、Term Paper　:: 考试||Examination　▼ 认识实习||Cognition Practice　☆军训||Military Training

= 毕业设计（论文）||Graduation Project(Thesis)　·小学期||Primary Term

十二、课程体系配置图 Curriculum System Configuration Diagram



十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
思想道德与法治||Ideological Morality and the Rule of Law																				H		H			H												
中国近现代史纲要||Outline of Chinese Contemporary and Modern History																								M	L												
马克思主义基本原理*||Basic Principles of Marxism*																								H	H												
习近平新时代中国特色社会主义思想概论||Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era																								H		H	H										
毛泽东思想和中国特色社会主义理论体系概论||Mao Zedong Thought and Theory of Socialism with Chinese Characteristics																								H	H												
形势与政策||Current Situation and Policies																				M		M		M													

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																		
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
大学外语 ||College English																														L		H					M
计算机信息技术||Computer Information Technology																	H	M																			M
C 语言程序设计||C Language Programming																		M	H																		
军事理论 ||Military Theory																								L			M										
安全教育 ||Safety Education												M									M	L	L														
劳动教育 ||Labour Education																										M			L								
大学体育 ||College Physical Education																												M									
创造性思维与创新方法 ||Creative Thinking and Innovative Methods											M																										H
创业基础 ||Entrepreneurial Foundation																											L						M			L	
大学生心理与健康教育 ||Mental and Health																									M		M										

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
Education for College Students																																					
美育类‖ Aesthetic Education（400）																								M													
中国与世界‖ China and the World（500）																															M	M					
四史‖ Four Histories（600）																								M													
经济管理类‖ Economic Management（700）																																	M	M			
传统文化‖ Traditional Chinese Culture（900）																								M							L	L					
军训‖Military Training																									L		M										
高等数学*‖Advanced Mathematics*	H	M			H																																
线性代数‖ Linear Algebra	M				L																																
概率论与数理统计‖Probability and Statistics	L				M											L																					
大学物理*‖University Physics *	H				H								L																								
大学化学*‖College	H				H								L																								

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
Chemistry*																																					
大学物理实验|| Physical Experiment of College														M	H																						
大学化学实验 || College Chemistry Experiment														M	M																						
工程制图及 CAD|| Engineering Drawing & CAD		L				L												H																		
理论力学 *||Theoretical Mechanics*		M				M																															
材料力学 B*||Mechanics of MaterialsB*		H				H							L																								
电工学 ||Electrical Engineering		H				M									L																						
工程材料|| Engineering Materials			L				H									M																						
机械设计基础 ||Fundamentals of Mechanical Design		L				H				M																											
油气储运工程专业导论|| Introduction to Oil and Gas Storage and Transportation																				H		H			H						H					H	

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
Engineering																																					
工程流体力学*‖Engineering Fluid Mechanics *			H				H						H																								
工程热力学‖ Engineering Thermodynamics		H				H							M																								
泵与压缩机*‖ Pumps and Compressors*			H							H			H																								
传热学*‖ Heat Transmission *			H				H						H																								
油气储运专业英语‖ Specialized English of Oil and Gas Storage and Transportation							L																									H					L
储运油料学‖ Oil-gas Storage and Transporting Naphthology			M									L	M																								
金工实习‖ Metalworking Practice																	M											L						L			
输气管道设计与管理*‖ Design and Management of Natural Gas Transportation Pipeline*				H				H	H																												

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																				
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
油库设计与管理*|| Design and Management of Oil Depot*								H		H						H														M							
油罐及管道的腐蚀与防护 ||Corrosion and Protection of Oil Tank and Pipeline												H											H														
油气集输*|| Oil and Gas Gathering and Transferring*				H							H					H																					
输油管道设计与管理 *||Design and Management of Oil Transportation Pipeline*				H					H							H																					
城市燃气输配 ||Urban Gas Transmission and Distribution				L					H							M																	H				
油罐及管道强度设计 ||Strength Design of Oil Tank and Pipeline				M				H		H																											
原油流变性及测量||Rheology and Measurement														L				L																			

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																				
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
of Crude Oil																																					
工程项目管理‖ Engineering Project Management									L														M										H	H			
仪表与检测技术‖ Instrumentation and Detection Technology															L		L																				
储运工程最优化‖ Optimization of Storage and Transportation Engineering							L												L														L				
管道瞬变流动分析‖Analysis of Transient Flow in Pipeline			L				L												L																		
油田水处理技术‖Oilfield Water Treatment Technology										L		L											L														
油气储运工程施工技术‖ Construction Technology of Oil and Gas Storage and Transportation Engineering																				L															L		
油库设计课程设计‖Course											H									H								H		H					H		

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
Design of oil Depot Design																																					
输油管道课程设计‖ Course Design of Oil Pipeline								M				H																		H					H		H
油气储运专业实验‖ Specialized Experiment of Oil and Gas Storage and Transportation														H	H													H								
油气储运基础实验‖ Basic Experiment of Oil and Gas Storage and Transportation														H	H													H								
毕业设计（论文）‖Graduation Design（Thesis)											H			H				H			H		H			H				H					H		H
认识实习‖ Cognition Practice																	H				H					L			H						L		
生产实习‖ Production Practice									M								H				L					H			H					H			
科技信息检索‖ Science and Technology Information Retrieval								L									M															H					H
学科前沿讲座‖ Lectures on Frontier Discipline											L																				H				H		

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																				
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
油气储运工程 HSE 管理|| HSE Management of Oil and Gas Storage and Transportation Engineering												H									H	H																
油气储运工程虚拟仿真实训|| Virtual Simulation Training of Oil and Gas Storage and Transportation Engineering														M				H	H																		
社会调查 ||Social Survey																				L																M	
课外体育锻炼 ||Extracurricular Physical Exercise																												M									
劳动教育实践 ||Labour Education Practice																													M								
心理健康辅导 ||Mental Health Counseling																											M										
外语技能实践 ||Foreign Language Proficiency Training Practice																																L					M

十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

Correlation Matrix between Key Courses and Graduation Requirements （High Correlation—H, Medium Correlation—M, Low Correlation—L）

课程（Courses）	毕业能力要求（Graduation Requirements）																																				
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	11.3	12.1	12.2
大学生素质拓展与创新实践||Quality Development and Innovation Practice																											H		H					H		L	
职业规划与就业指导||Career Planning and Employment Guidance																									L		M									L	