石油工程（全英语）
留学生本科培养方案

（专业代码：081502　学制：4 年　学位：工学学士学位）

一、培养目标

本专业培养适应现代石油工业发展、具备石油与天然气工程基础理论、专业知识、实践创新和解决复杂工程问题能力的国际化高素质人才，能适应新时代能源革命与碳中和发展需求，知华、友华、具备全球视野，毕业后能在全球油气行业从事工程设计、科技研发、生产运行、项目管理、国际交流与合作等工作，且具有自主创新意识、跨文化沟通能力、可持续发展理念、工程伦理素养与全球视野。

二、毕业要求及实现矩阵

毕业生应获得以下几方面的知识和能力：

1.汉语毕业要求：学生毕业前须通过汉语水平考试（HSK）4 级，具备基本的汉语听、说、读、写能力，能够适应在中国学习、生活及未来职业发展的语言需求。学生须完成以下指定课程并取得合格成绩：《中国概况（2-1）》《中国概况（2-2）》《初级汉语》《中级汉语》《高级汉语》。

2. 工程知识（Engineering Knowledge）：能够将数学、自然科学、计算、工程基础和专业知识用于分析和解决石油与天然气工程领域的复杂工程问题。

3. 问题分析（Problem Analysis）：能够应用数学、自然科学和工程科学的基本原理，识别、表达并通过文献研究分析石油与天然气工程领域的复杂工程问题，综合考虑可持续发展的要求，以获得有效结论。

4. 设计 / 开发解决方案（Design/Development of Solutions）：能够针对石油与天然气工程领域复杂工程问题设计和开发解决方案，设计满足特定需求的系统、单元（部件）或工艺流程，体现创新性，并从健康、安全与环境、全生命周期成本与净零碳要求、法律与伦理、社会与文化等角度考虑可行性。

5. 研究（Research）：能够基于科学原理并采用科学方法对石油与天然气工程领域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。

6. 使用现代工具（Modern Tool Usage）：能够针对石油与天然气工程领域的复杂

工程问题，开发、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。

7. 工程与可持续发展（Engineering and Sustainability）：在解决石油与天然气工程领域复杂工程问题时，能够基于工程相关背景知识，分析和评价工程实践对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任。

8. 工程伦理和职业规范（Ethics and Professionalism）：有工程报国、为民造福的意识，具有人文社会科学素养和社会责任感，能够理解和践行工程伦理，在石油与天然气工程实践中遵守工程职业道德、规范和相关法律，履行责任。

9. 个人与团队（Individual and Teamwork）：能够在多样化、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。

10. 沟通（Communication）：能够就石油与天然气工程领域的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、清晰表达或回应指令，并能够在跨文化背景下进行沟通和交流，理解、尊重语言和文化差异。

11. 项目管理（Project Management）：理解并掌握与工程项目相关的管理原理与经济决策方法，并能够在多学科环境中应用。

12. 终身学习（Lifelong Learning）：具有自主学习、终身学习和批判性思维的意识和能力，能够理解广泛的技术变革对工程和社会的影响，适应新技术变革。

毕业要求指标点分解与实现矩阵

毕业要求	指标点	课程
1. 工程知识：能够将数学、自然科学、计算、工程基础和专业知识用于分析和解决石油与天然气工程领域的复杂工程问题	1.1 掌握石油与天然气工程领域所需的数学、力学、计算基础知识，并能够用于分析和解决油气藏建模与生产动态模拟、钻采工程设备与杆管柱运动学和动力学特性等复杂工程问题	高等数学 (2-1)，高等数学 (2-2)，线性代数，工程力学，流体力学，渗流力学，岩石力学，程序设计，油藏数值模拟基础
	1.2 掌握石油与天然气工程领域所需的物理、化学基础知识，并能够用于分析和解决物理法、化学法提高油气采收率机理和工程设计等复杂工程问题	大学物理 (2-1)，大学物理 (2-2)，大学物理实验 (2-1)，大学物理实验 (2-2)，大学化学，应用物理化学，油层物理，油田化学，油田开发地质学，提高采收率原理

毕业要求	指标点	课程
	1.3 掌握石油与天然气工程领域所需的油气地质学等工程基础知识，并能够用于分析和解决渗流物理、油气藏描述以及岩石和流体对油气采收率影响等复杂工程问题	地质学基础，地质实习，油田开发地质学，油层物理，渗流力学，岩石力学，油田化学，测井方法及综合解释
	1.4 掌握石油与天然气工程领域所需的专业知识，并能够用于分析和解决工程方案设计、生产与措施施工方式优选以及生产工况诊断与效果评价等复杂工程问题	钻井工程，采油工程，油藏工程，气藏工程，天然气开采与安全，油水井增产增注技术，定向钻井理论与技术，人工举升技术，提高采收率原理，油气层保护技术，现代试井解释原理，钻井新技术
2. 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达并通过文献研究分析石油与天然气工程领域的复杂工程问题，综合考虑可持续发展的要求，以获得有效结论	2.1 了解石油与天然气工程领域发展现状及前沿动态，研究分析新技术的特点、工作机理和适用条件，进行应用效果的预测，以获得高效生产	钻井工程，采油工程，油藏工程，气藏工程，天然气开采与安全，钻井新技术，提高采收率原理，油藏数值模拟基础，专业实习
	2.2 能够应用数学、自然科学和工程科学的基本原理和工程方法，识别、表达并通过文献研究分析石油与天然气工程领域的复杂工程问题，并综合考虑可持续发展的要求，以获得有效结论	高等数学，线性代数，大学物理，流体力学，工程力学，渗流力学，岩石力学，油层物理，应用物理化学，油田化学，地质实习，专业实习
3. 设计 / 开发解决方案：能够针对石油与天然气工程领域复杂工程问题设计和开发解决方案，设计满足特定需求的系统、单元（部件）或工艺流程，体现创新性，并从健康、安全与环境、全生命周期成本与净零碳要求、法律与伦理、社会	3.1 能够针对石油与天然气工程领域复杂工程问题的关键环节和参数进行单井工程设计	钻井工程，采油工程，油藏工程，气藏工程，石油工程综合设计，定向钻井理论与技术，人工举升技术，油水井增产增注技术
	3.2 能够针对石油与天然气工程领域复杂工程问题设计和开发解决方	钻井工程，采油工程，油藏工程，气藏工程，石油工程综合设计，提高采收率原理，

毕业要求	指标点	课程
与文化等角度考虑可行性	案，根据油气田开发整体方案编制的特定需求设计系统、单元（部件）或工艺流程，并体现创新性	油气层保护技术，油藏数值模拟基础
	3.3 能够在设计 / 开发环节从健康、安全与环境、全生命周期成本与净零碳要求、法律与伦理、社会与文化等角度考虑可行性	石油工程 HSE，天然气开采与安全，油田化学，技术经济学，专业实习，毕业设计
4. 研究：能够基于科学原理并采用科学方法对石油与天然气工程领域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 能够基于科学原理并采用科学方法对石油与天然气工程领域的复杂工程问题进行研究	钻井工程，采油工程，油藏工程，渗流力学，岩石力学，油层物理，油田化学，提高采收率原理，现代试井解释原理
	4.2 能够设计和实施相关实验，正确地采集数据，并对实验数据进行分析和解释	大学物理实验 (2-1)，大学物理实验 (2-2)，流体力学，油层物理，油田化学，地质学基础，地质实习，专业实习
	4.3 能够将研究或实验结果通过信息综合得到合理有效的结论，并用于单井工程设计和油气田开发整体方案的编制	石油工程综合设计，毕业设计，专业实习，油藏数值模拟基础，提高采收率原理
5. 使用现代工具：能够针对石油与天然气工程领域的复杂工程问题，开发、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 掌握计算机、互联网、数据库及工程设计等技术工具的使用方法	程序设计，大学计算机，工程制图，油藏数值模拟基础
	5.2 能够开发、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，针对石油与天然气工程领域的复杂工程问题进行模拟与预测，并能够理解其局限性	油藏数值模拟基础，石油工程综合设计，毕业设计，专业实习

毕业要求	指标点	课程
6. 工程与可持续发展：在解决石油与天然气工程领域复杂工程问题时，能够基于工程相关背景知识，分析和评价工程实践对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任	6.1 熟悉石油与天然气工程实践及复杂工程问题解决方案可能涉及的健康、安全、环境、法律等方面的问题，能够理解经济和社会可持续发展的内涵与意义	石油工程 HSE，天然气开采与安全，油田化学，技术经济学，毕业设计，专业实习
	6.2 能够基于工程相关背景知识，分析和评价石油与天然气工程实践对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任	地质实习，专业实习，石油工程 HSE，技术经济学，毕业设计
7. 工程伦理和职业规范：有工程报国、为民造福的意识，具有人文社会科学素养和社会责任感，能够理解和践行工程伦理，在石油与天然气工程实践中遵守工程职业道德、规范和相关法律，履行责任	7.1 能够树立正确的世界观、人生观、价值观、道德观、法律观，能理解社会主义核心价值体系，具备良好的人文社会科学素养、思想道德品质和社会责任感	道德与法律，中国概况（2-1），中国概况（2-2），中级汉语，高级汉语，管理概论
	7.2 具有工程报国、为民造福的意识，理解工程伦理的核心理念，熟悉石油与天然气工程师的职业性质和社会责任，能够在工程实践中遵守工程职业道德、规范和相关法律，履行责任	石油工程 HSE，专业实习，毕业设计，管理概论
8. 个人与团队：能够在多样化、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	8.1 具有较强的团队合作意识,能够在多样化、多学科背景下的团队中承担个体、团队成员和负责人的角色	地质实习，专业实习，毕业设计
	8.2 具有一定的组织管理和协作能力，能够在多样化、多学科背景下与团队成员有效沟通并协作完成任务	石油工程综合设计，毕业设计，专业实习，管理概论

毕业要求	指标点	课程
9. 沟通：能够就石油与天然气工程领域的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、清晰表达或回应指令，并能够在跨文化背景下进行沟通和交流，理解、尊重语言和文化差异	9.1 能够就石油与天然气工程领域复杂工程问题，以陈述发言、撰写文稿等方式，准确表达自己的观点，并与业界同行及社会公众进行有效沟通和交流	专业实习，地质实习，中级汉语，高级汉语，中国概况
	9.2 能够撰写石油与天然气工程领域复杂工程问题相关的研究报告或设计报告，具备在公众场合开展报告陈述及交流、答辩的能力	石油工程综合设计，毕业设计，专业实习
	9.3 具有良好的外语应用能力和一定的国际视野，能在跨文化背景下进行沟通和交流,理解、尊重语言和文化差异	初级汉语口语，初级汉语精读，中级汉语，高级汉语，中国概况（2-1），中国概况（2-2）
10. 项目管理：理解并掌握与工程项目相关的管理原理与经济决策方法，并能够在多学科环境中应用	10.1 能够理解并掌握与工程项目相关的管理原理与经济决策方法	技术经济学，管理概论，石油工程 HSE
	10.2 能够将工程项目相关的管理原理与经济决策方法应用于涉及多学科的石油与天然气工程实践中	石油工程综合设计，毕业设计，专业实习，技术经济学
11. 终身学习：具有自主学习、终身学习和批判性思维的意识和能力，能够理解广泛的技术变革对工程和社会的影响，适应新技术变革	11.1 具有自主学习、终身学习和批判性思维的意识和能力	专业实习，毕业设计，钻井新技术，提高采收率原理，现代试井解释原理
	11.2 能够理解广泛的技术变革对工程和社会的影响，具有适应新技术变革的能力	专业实习，毕业设计，钻井新技术，提高采收率原理，油藏数值模拟基础，油气层保护技术

三、毕业要求

1. 本专业学生应具备良好的思想品德、人文素养、国际视野和工程职业道德，身心健康，能在跨文化背景下沟通协作；系统掌握石油与天然气工程领域数学、自然科学、

工程基础及专业知识，能综合运用所学解决油气勘探开发、钻采工程、油气储运与安全环保等复杂工程问题；具备工程设计、科学研究、现代工具应用、团队协作、沟通表达、项目管理与终身学习能力，能在石油天然气行业及相关领域从事工程设计、技术研发、生产管理、安全环保、国际合作等工作，成为适应行业发展、服务国家能源战略的高素质国际化工程技术人才。

2. 本专业学生需修满教学计划要求的必修及选修课程，修满总学分 180，完成毕业设计（13 学分），实践环节考核合格，思想品德与综合素质评价合格，方可准予毕业并授予工学学士学位（石油工程专业）。且通过 HSK4 级，方可毕业。

3. 符合条件，授予工学学士学位。

4. 本专业学生应使用英语撰写毕业论文，但需有汉语论文摘要。

四、主干学科、专业核心课程

1. 主干学科

石油与天然气工程、地质资源与地质工程、力学、化学工程与技术

2. 专业核心课程

基础课：高等数学、线性代数、大学物理、大学化学、工程力学、流体力学、工程制图

专业基础课：地质学基础、油田开发地质学、油层物理、渗流力学、岩石力学、油田化学、应用物理化学

专业课：钻井工程、采油工程、油藏工程、气藏工程、测井方法及综合解释、石油工程 HSE、技术经济学、地质实习、专业实习、石油工程综合设计、毕业设计

五、特色课程（面向留学生 + 行业前沿）

汉语与中国文化类：初级汉语口语 / 精读、中级汉语、高级汉语、中国概况、道德与法律（支撑跨文化沟通与人文素养）

国际化安全环保：石油工程 HSE、天然气开采与安全（契合国际油气行业 HSE 标准）

提高采收率与开发技术：提高采收率原理、油气层保护技术、现代试井解释原理、油水井增产增注技术

钻井前沿技术：定向钻井理论与技术、钻井新技术、水射流理论与应用

数值模拟与智能化：程序设计、油藏数值模拟基础（强化现代工具与数字化能力）

工程实践综合训练：石油工程综合设计、地质实习、专业实习、毕业设计（强化工程实践与创新能力）

六、学分修读要求

1. 总学分要求

学生在校期间须修满 180 学分，通过 HSK4 级，方可毕业。

2. 各学年 / 学期学分

第一学年：18 + 27 = 45 学分

第二学年：17.5 + 23 + 2 = 42.5 学分

第三学年：22.5 + 27.5 + 5 = 55 学分

第四学年：22.5 + 20.5 = 37.5 学分

课程类别及学时学分统计表

课程类别	学分	所占比例	理论学时	实践学时	学时合计
通识必修课程	42.0	23.3%	672	0	672
大类基础课程	35.0	19.4%	526	58	584
专业必修课程	81.0	45.0%	804	92 + 25 周	896 + 25 周
专业选修课程	22.0	12.2%	432	8	440
毕业总学分（总学时）	180	100%	2434	158 + 25 周	2592 + 25 周
实践教学（含课内实验）	34.875	19.4%	-	158 + 25 周	158 + 25 周
集中性实践教学环节	25.0	13.9%	-	25 周	25 周

学期修读学分建议表

学期	1	2	S1	3	4	S2	5	6	S3	7	8
必修	18.0	27.0	0.0	17.5	23.0	2.0	22.5	25	5.0	5.0	13.0
专业选修	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	14.5	5.0
小计	18.0	27.0	0.0	17.5	23.0	2.0	22.5	27.5	5.0	19.5	18.0

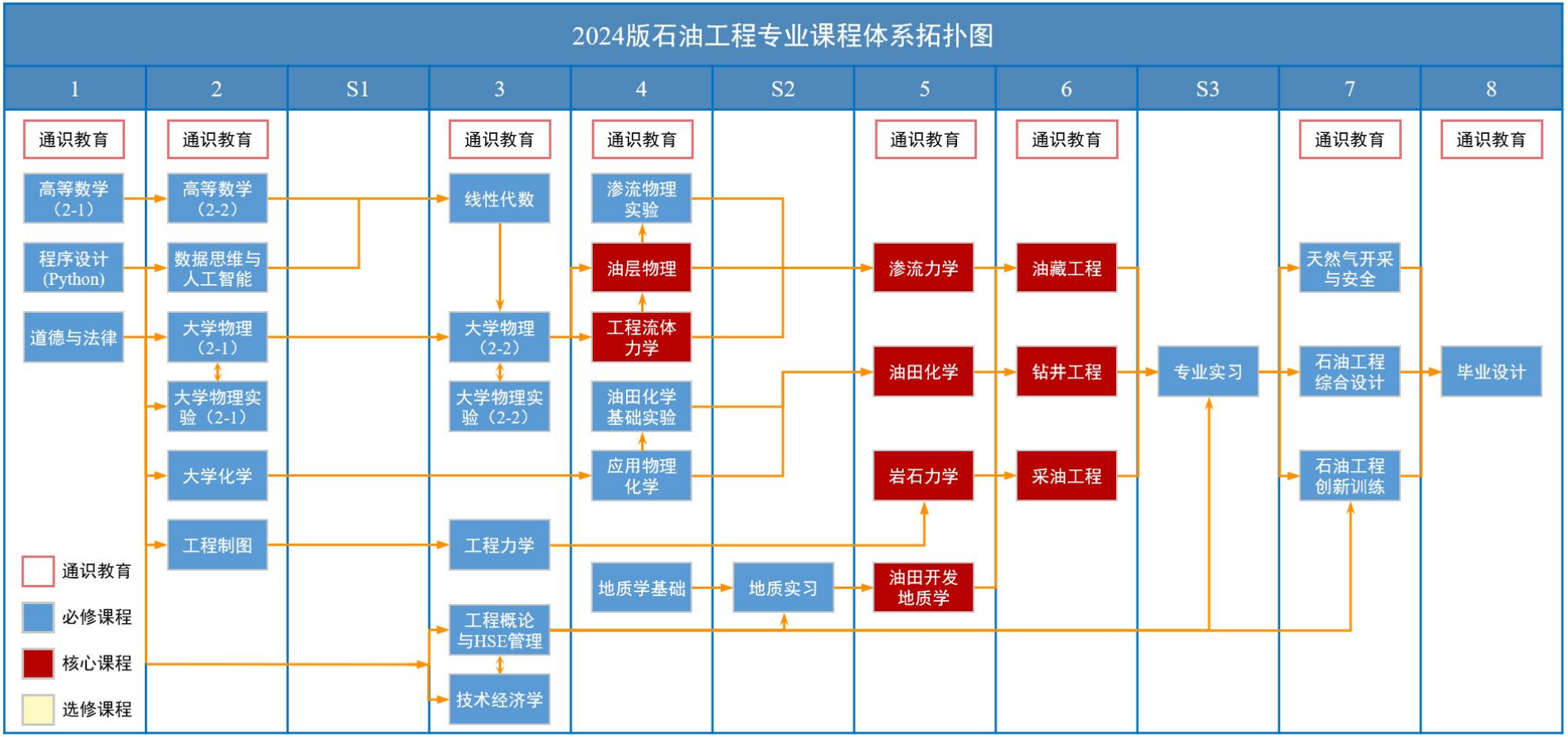
说明:

S2 = 第二学年夏季学期（地质实习）

S3= 第三学年夏季学期（专业实习）

毕业设计 13 学分计入第 8 学期必修。

七、课程体系拓扑图


2024版石油工程专业课程体系拓扑图
1
2
S1
3
4
S2
5
6
S3
7
8
通识教育
高等数学（2-1）
程序设计(Python)
道德与法律
大学物理实验（2-1）
大学化学
工程制图
高等数学（2-2）
数据思维与人工智能
大学物理（2-1）
线性代数
大学物理（2-2）
大学物理实验（2-2）
工程力学
工程概论与HSE管理
技术经济学
渗流物理实验
油层物理
工程流体力学
油田化学基础实验
应用物理化学
地质学基础
地质实习
渗流力学
油田化学
岩石力学
油田开发地质学
油藏工程
钻井工程
采油工程
专业实习
天然气开采与安全
石油工程综合设计
石油工程创新训练
毕业设计
通识教育
必修课程
核心课程
选修课程

Undergraduate Program of Petroleum Engineering (in English)

(Program Code: 081502 Duration: 4 years Degree: Bachelor of Engineering)

I. Educational Objectives

This program cultivates high-caliber, internationally-minded professionals who are equipped to meet the demands of the modern petroleum industry. Students acquire a solid foundation in the fundamental theories and specialized knowledge of petroleum and natural gas engineering, as well as the practical skills and innovative capabilities needed to solve complex engineering problems. Graduates should have an understanding of China and goodwill towards it, possess a global perspective, will be prepared to address the challenges of the new era's energy revolution and carbon neutrality initiatives. Upon graduation, they will be qualified to work in the global oil and gas industry in fields such as engineering design, scientific research and development, production operations, project management, and international cooperation. They will possess a spirit of independent innovation, cross-cultural communication skills, a commitment to sustainable development, a strong sense of engineering ethics, and a global perspective.

II. Graduation Requirements

Graduates are expected to master the following domains of knowledge and competencies:

1. Language Requirements: Students must pass the HSK Level 4 prior to graduation and possess basic Chinese listening, speaking, reading and writing skills, so as to meet the language requirements for their study, daily life and future career development in China. Students are required to complete the designated courses listed below and obtain passing grades: Survey of China (2-1), Survey of China (2-2), Elementary Chinese, Intermediate Chinese, Advanced Chinese.

2. Engineering Knowledge: Ability to apply mathematics, natural sciences, computing, foundational and specialized engineering knowledge to analyze and solve complex engineering problems in the field of oil and gas engineering.

3. Problem Analysis: Ability to apply fundamental principles of mathematics, natural sciences, and engineering to identify, articulate, and analyze complex engineering problems in the field of oil and gas engineering through literature review, while comprehensively considering sustainability requirements to arrive at effective conclusions.

4. Design/Development of Solutions: Ability to design and develop solutions for complex engineering problems in the field of oil and gas engineering; to design systems, units (components), or processes that meet specific requirements, demonstrating innovation; and to consider feasibility from the perspectives of health, safety, and the environment; full life-cycle costs and net-zero carbon requirements; and legal, ethical, social, and cultural considerations.

5. Research: Ability to conduct research on complex engineering problems in the oil and gas engineering field based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through the synthesis of information.

6. Modern Tool Usage: Ability to develop, select, and use appropriate technologies, resources, modern engineering tools, and information technology tools to address complex engineering problems in the field of petroleum and natural gas engineering, including the prediction and simulation of such problems, while understanding their limitations.

7. Engineering and Sustainability: When addressing complex engineering problems in the field of oil and gas engineering, students will be able to analyze and evaluate the impact of engineering practices on health, safety, the environment, legal considerations, and economic and social sustainability based on relevant engineering background knowledge, and understand the responsibilities they must assume.

8. Ethics and Professionalism: Possess a sense of duty to serve the nation through engineering and to benefit the public; demonstrate literacy in the humanities and social sciences and a sense of social responsibility; understand and practice engineering ethics; and adhere to professional ethics, standards, and relevant laws in oil and gas engineering practice while fulfilling responsibilities.

9. Individual and Teamwork: Be able to assume the roles of an individual, a team member, and a leader within teams characterized by diverse and multidisciplinary

backgrounds.

10. Communication Skills: Be able to effectively communicate and interact with industry peers and the general public regarding complex engineering issues in the field of petroleum and natural gas engineering, including writing reports and design documents, delivering presentations, clearly expressing or responding to instructions, and communicating in cross-cultural contexts while understanding and respecting linguistic and cultural differences.

11. Project Management: Understand and master management principles and economic decision-making methods related to engineering projects, and be able to apply them in multidisciplinary environments.

12. Lifelong Learning: Possess the awareness and ability for self-directed learning, lifelong learning, and critical thinking; be able to understand the impact of broad technological changes on engineering and society, and adapt to new technological developments.

Decomposition and Implementation for Graduation Requirement Indicators

Graduation Requirements	Performance Indicators	Courses
1. Engineering Knowledge: Demonstrate the ability to integrate mathematics, natural sciences, computing, fundamental engineering principles, and specialized knowledge to analyze and solve complex engineering challenges within the petroleum and natural gas engineering domain.	1.1 Acquire comprehensive foundational knowledge in mathematics, mechanics, and computing essential to petroleum and natural gas engineering, and proficiently apply this knowledge to address complex problems involving reservoir modeling and production dynamic simulation, drilling and production engineering equipment, as well as the kinematic and dynamic characteristics of rod and tubing strings.	Advanced Mathematics (2-1), Advanced Mathematics (2-2), Linear Algebra, Engineering Mechanics, Fluid Mechanics, Seepage Mechanics, Rock Mechanics, Programming, Fundamentals of Reservoir Numerical Simulation
	1.2 Possess mastery of the fundamental knowledge of physics and chemistry essential to the field of Petroleum and Natural Gas Engineering, and apply this knowledge to analyze and resolve complex engineering challenges such as the mechanisms and engineering design involved in enhancing oil and gas recovery by physical and chemical methods.	University Physics (2-1), University Physics (2-2), University Physics Laboratory (2-1), University Physics Laboratory (2-2), University Chemistry, Applied Physical Chemistry, Reservoir Physics, Oilfield Chemistry, Oilfield Development Geology, Enhanced Oil Recovery Principles

Graduation Requirements	Performance Indicators	Courses
	1.3 Possess mastery of fundamental engineering knowledge in Petroleum and Natural Gas Engineering, including petroleum geology, and apply this knowledge to analyze and solve complex engineering challenges such as flow physics, reservoir characterization, and the effects of rock and fluid properties on oil and gas recovery.	Fundamentals of Geology, Geological Internship, Oilfield Development Geology, Reservoir Physics, Seepage Mechanics, Rock Mechanics, Oilfield Chemistry, Logging Methods and Comprehensive Interpretation
	1.4 Acquire professional knowledge essential to the field of Petroleum and Natural Gas Engineering, enabling the analysis and resolution of complex engineering challenges including engineering design schemes, optimization of production and operational measures, as well as diagnosis and evaluation of production conditions and effectiveness.	Drilling Engineering, Oil Production Engineering, Reservoir Engineering, Gas Reservoir Engineering, Gas Production Engineering, Oil and Water Well Production Enhancement and Injection Technologies, Directional Drilling Theory and Technology, Artificial Lift Techniques, Enhanced Oil Recovery Principles, Oil and Gas Reservoir Protection Technology, Principles of Modern Well Testing Interpretation, New Drilling Technologies
2. Problem Analysis: Demonstrate the ability to apply fundamental principles of mathematics, natural sciences, and engineering science to identify, articulate, and analyze complex engineering challenges within the petroleum and natural gas engineering domain. This includes conducting literature-based research with comprehensive consideration of sustainable development requirements to derive valid conclusions.	2.1 Acquire an understanding of the current development status and emerging trends in the petroleum and natural gas engineering field; conduct research and analysis on the characteristics, operational mechanisms, and applicability of new technologies; and forecast their application outcomes to achieve efficient production.	Drilling Engineering, Oil Oil Production Engineering, Reservoir Engineering, Gas Reservoir Engineering, Natural Gas Extraction and Safety, New Drilling Technologies, Enhanced Oil Recovery Principles, Fundamentals of Reservoir Numerical Simulation, Oilfield Internship
	2.2 Demonstrate the ability to apply fundamental principles and engineering methodologies from mathematics, natural sciences, and engineering sciences to identify, formulate, and analyze complex engineering challenges within petroleum and natural gas engineering by means of literature review, while thoroughly integrating sustainable development considerations to derive valid and effective conclusions.	Advanced Mathematics, Linear Algebra, University Physics, Fluid Mechanics, Engineering Mechanics, Seepage Mechanics, Rock Mechanics, Reservoir Physics, Applied Physical Chemistry, Petroleum Chemistry, Geological Internship, Oilfield Internship

Graduation Requirements	Performance Indicators	Courses
3. Design and Development of Solutions: The ability to design and develop solutions addressing complex engineering challenges in the petroleum and natural gas engineering field by creating systems, units (components), or process flows that fulfill specific requirements, demonstrate innovation, and evaluate feasibility based on health, safety and environmental considerations, life cycle cost and net zero carbon criteria, legal and ethical standards, as well as social and cultural aspects.	3.1 The capability to conduct single-well engineering design focusing on critical stages and parameters associated with complex engineering challenges in petroleum and natural gas engineering.	Drilling Engineering; Production Engineering; Reservoir Engineering; Gas Reservoir Engineering; Integrated Petroleum Engineering Design; Directional Drilling Theory and Technology; Artificial Lift Techniques; Oil and Water Well Stimulation and Injection Technologies
	3.2 Demonstrate the ability to design and develop solutions addressing complex engineering challenges within Petroleum and Natural Gas Engineering, by creating systems, units (components), or process flows tailored to specific requirements derived from comprehensive oil and gas field development plans, while embodying innovation.	Drilling Engineering, Production Engineering, Reservoir Engineering, Natural Gas Engineering, Integrated Integrated Petroleum Engineering Design, Enhanced Oil Recovery Principles, Oil and Gas Reservoir Protection Technology, Fundamentals of Reservoir Numerical Simulation
	3.3 Evaluate feasibility during design and development stages from multiple perspectives including health, safety, and environment; life cycle cost and net-zero carbon objectives; legal and ethical considerations; and social and cultural factors.	Petroleum Engineering HSE, Natural Gas Extraction and Safety, Petroleum Chemistry, Engineering Economics, Oilfield Internship, Graduation Project
4. Research: Demonstrate the ability to investigate complex engineering challenges in the field of Petroleum and Natural Gas Engineering based on scientific principles and employing scientific methods, including experimental design, data analysis and interpretation, and deriving valid and effective conclusions through comprehensive information synthesis.	4.1 Demonstrate the ability to investigate complex engineering challenges in the field of Petroleum and Natural Gas Engineering based on scientific principles and employing scientific methods.	Drilling Engineering, Oil Oil Production Engineering, Reservoir Engineering, Seepage Mechanics, Rock Mechanics, Reservoir Physics, Oilfield Chemistry, Enhanced Oil Recovery Principles, Principles of Modern Well Testing Interpretation
	4.2 Demonstrate the ability to design and conduct relevant experiments, accurately collect data, and analyze and interpret experimental data.	University Physics Laboratory (2-1), University Physics Laboratory (2-2), Fluid Mechanics, Reservoir Physics, Petroleum Chemistry, Fundamentals of Geology, Geological Internship, Oilfield Internship
	4.3 Demonstrate the ability to synthesize research or experimental findings into well-founded and effective conclusions, and apply these conclusions to single-well	Integrated Integrated Petroleum Engineering Design, Graduation Project, Oilfield Internship, Fundamentals of Reservoir Numerical Simulation, Enhanced Oil Recovery

Graduation Requirements	Performance Indicators	Courses
	engineering design as well as the formulation of comprehensive oil and gas field development plans.	Principles
5. Ability to develop, select, and employ appropriate technologies, resources, modern engineering tools, and information technology tools to address complex engineering challenges in Petroleum and Natural Gas Engineering, including the prediction and simulation of such challenges, while comprehending their limitations.	5.1 Proficiency in the use of technical tools, including computers, the internet, databases, and engineering design.	Programming, university-level computer science, engineering drawing, Fundamentals of Reservoir Numerical Simulation.
	5.2 Capability to develop, select, and apply appropriate technologies, resources, modern engineering tools, and information technology tools to simulate and predict complex engineering challenges within Petroleum and Natural Gas Engineering, with an understanding of their limitations.	Fundamentals of Reservoir Numerical Simulation, Integrated Integrated Petroleum Engineering Design, the Graduation Project, and the Oilfield Internship
6. Engineering and Sustainable Development: Possessing the ability to analyze and assess the impacts of engineering practices on health, safety, environment, legal affairs, as well as economic and social sustainable development, based on relevant engineering knowledge, when solving complex engineering challenges in the field of Petroleum and Natural Gas Engineering, and understanding the associated responsibilities.	6.1 Demonstrates familiarity with health, safety, environmental, and legal issues potentially involved in Petroleum and Natural Gas Engineering practice and the resolution of complex engineering challenges, and comprehends the connotations and significance of economic and social sustainable development.	Petroleum Engineering HSE, Natural Gas Extraction and Safety, Petroleum Chemistry, Engineering Economics, Graduation Project, Oilfield Internship
	6.2 Demonstrate the ability to analyze and evaluate the impact of petroleum and natural gas engineering practices on health, safety, environment, legal studies, as well as economic and social sustainable development, grounded in engineering-related knowledge, and comprehend the corresponding responsibilities.	Geological Internship, Oilfield Internship, Petroleum Engineering HSE, Engineering Economics, Graduation Project
7. Engineering Ethics and Professional Ethics in Engineering: Cultivate a sense of serving the nation through engineering and benefiting society; possess literacy in humanities and social sciences as well as social responsibility; demonstrate the ability to understand and uphold engineering ethics, comply with professional ethics, standards, and relevant legal requirements in the practice of Petroleum and	7.1 Establish correct worldviews, outlooks on life, values, moral standards, and legal perspectives; comprehend the core socialist value system; and develop sound literacy in humanities and social sciences, moral integrity, and social responsibility.	Morality and Law, China Overview (2-1), China Overview (2-2), Intermediate Chinese Language, Advanced Chinese Language, Introduction to Management
	7.2 Demonstrate an awareness of serving the nation through engineering and contributing to the welfare of society; understand the fundamental principles of engineering ethics; be acquainted with the professional characteristics and social	Petroleum Engineering HSE, Oilfield Internship, Graduation Project, Introduction to Management

Graduation Requirements	Performance Indicators	Courses
Natural Gas Engineering, and fulfill professional responsibilities.	responsibilities of petroleum and natural gas engineers; and adhere to professional ethics, standards, and relevant legal requirements in engineering practice, thereby fulfilling one's responsibilities.	
8. Individual and Team: Able to perform as an individual contributor, team member, and leader within teams characterized by diversity and multidisciplinary backgrounds	8.1 Demonstrate a strong sense of teamwork, capable of fulfilling the roles of individual contributor, team member, and leader within teams of diverse and multidisciplinary composition	Geological Internship, Oilfield Internship, Graduation Project
	8.2 Exhibit organizational management and collaborative competencies, capable of effective communication and coordination with team members in diverse, multidisciplinary teams to successfully complete tasks	Integrated Integrated Petroleum Engineering Design, Graduation Project, Oilfield Internship, Introduction to Management
9. Communication: The ability to effectively communicate and engage with industry colleagues and the general public on complex engineering challenges within Petroleum and Natural Gas Engineering. This includes competencies in report writing and design documentation, oral presentation, clear articulation and response to instructions, as well as the capacity to communicate across cultural boundaries with an understanding and respect for language and cultural differences.	9.1 Demonstrate the capability to accurately articulate viewpoints on complex engineering challenges in Petroleum and Natural Gas Engineering through oral presentations and written documentation, and to effectively communicate with industry colleagues and the general public.	Oilfield Internship, Geological Internship, Intermediate Chinese Language, Advanced Chinese Language, Overview of China
	9.2 Able to compose research or design reports related to complex engineering challenges in Petroleum and Natural Gas Engineering, with the capability to present, communicate, and defend these reports in public forums	Integrated Integrated Petroleum Engineering Design, Graduation Project, Oilfield Internship
	9.3 Demonstrate good foreign language proficiency and a global outlook, capable of communication and interaction in a cross-cultural context, with an understanding and respect for language and cultural differences	Elementary Chinese Oral, Elementary Chinese Intensive Reading, Intermediate Chinese, Advanced Chinese, China Overview (2-1), China Overview (2-2)
10. Project Management: Comprehend and proficiently apply management principles and economic decision-making methods related to engineering projects, with demonstrated ability to implement them in multidisciplinary settings	10.1 Demonstrate the ability to comprehend and master management principles and economic decision-making methods pertinent to engineering projects	Technological Economics, Introduction to Management, Petroleum Engineering HSE
	10.2 Demonstrate the ability to apply management principles and economic decision-making methods related to engineering projects within multidisciplinary petroleum and natural gas engineering practices	Integrated Integrated Petroleum Engineering Design, Graduation Project, Oilfield Internship, Engineering Economics

Graduation Requirements	Performance Indicators	Courses
11. Lifelong Learning: Demonstrates awareness and ability for autonomous, lifelong learning and critical thinking, capable of comprehending the extensive technological changes affecting engineering and society, and adapting to emerging technologies	11.1 Demonstrates awareness and ability for autonomous learning, lifelong learning, and critical thinking	Oilfield Internship, Graduation Project, New Drilling Technologies, Enhanced Oil Recovery Principles, Principles of Modern Well Testing Interpretation
	11.2 Demonstrates the ability to comprehend extensive technological changes impacting engineering and society, and to adapt to emerging technologies	Oilfield Internship, Graduation Project, New Drilling Technologies, Enhanced Oil Recovery Principles, Fundamentals of Reservoir Numerical Simulation, Oil and Gas Reservoir Protection Technology

III. Graduate Requirements

1. Students in this program should possess sound moral character, humanistic literacy, an international perspective, and professional engineering ethics; they should be physically and mentally healthy and capable of communicating and collaborating in cross-cultural contexts. They should have a systematic grasp of mathematics, natural sciences, fundamental engineering principles, and specialized knowledge in the field of petroleum and natural gas engineering, and be able to comprehensively apply their knowledge to solve complex engineering problems in areas such as oil and gas exploration and development, drilling and production engineering, and oil and gas storage, transportation, safety, and environmental protection. They should possess competencies in engineering design, scientific research, the application of modern tools, teamwork, communication and expression, project management, and lifelong learning. Graduates will be qualified to engage in engineering design, technological R&D, production management, safety and environmental protection, and international cooperation within the oil and gas industry and related fields, emerging as high-caliber, internationally oriented engineering professionals capable of adapting to industry developments and serving the nation’s energy strategy.

2. Students in this program must complete all required and elective courses specified in the curriculum, earn a total of 185.5 credits, successfully complete the Graduation Project (13

credits), pass the practical training assessment, and receive a satisfactory evaluation of moral character and comprehensive qualities. Only then will they be granted a Bachelor of Engineering degree (Petroleum Engineering). Additionally, students must pass HSK Level 4 to graduate.

3. Upon meeting the requirements, students will be awarded a Bachelor of Engineering degree.

4. Students in this program must write their graduation thesis in English, but a Chinese abstract is required.

IV. Core disciplines and Core courses

1. Core Disciplines

Petroleum and Natural Gas Engineering, Geological Resources and Geological Engineering, Mechanics, Chemical Engineering and Technology

2. Core Courses

Foundation Courses: Advanced Mathematics, Linear Algebra, University Physics, College Chemistry, Engineering Mechanics, Fluid Mechanics, Engineering Drawing

Major Foundation Courses: Fundamentals of Geology, Oilfield Development Geology, Seepage Mechanics, Rock Mechanics, Petrophysics, Applied Physical Chemistry

Major Courses: Drilling Engineering, Oil Production Engineering, Reservoir Engineering, Gas Reservoir Engineering, Well logging and Comprehensive Interpretation, Petroleum Engineering HSE, Engineering Economics, Geological Internship, Oilfield Internship, Integrated Petroleum Engineering Design, Graduation Project

V. Characteristic Courses

Chinese Language and Culture: Elementary Spoken Chinese / Intensive Reading, Intermediate Chinese, Advanced Chinese, Survey of China, Ethics and Legal Studies (Supporting Cross-Cultural Communication and Humanistic Literacy)

International Safety and Environmental Protection: Petroleum Engineering HSE, Natural Gas Extraction and Safety (Aligned with International Oil and Gas Industry HSE Standards)

Enhanced Oil Recovery and Development Technologies: Enhanced Oil Recovery

Principles, Oil and Gas Reservoir Protection Technology, Principles of Modern Well Testing Interpretation, Technologies for Enhanced Production and Injection in Oil and Water Wells Advanced Drilling Technologies: Theory and Techniques of Directional Drilling, New Drilling Technologies, Water Jet Theory and Applications

Numerical Simulation and Intelligence: Computer Program Design, Fundamentals of Reservoir Numerical Simulation (Enhancing Modern Tools and Digital Competencies)

Comprehensive Engineering Practice Training: Integrated Petroleum Engineering Design, Geological Internship, Oilfield Internship, Graduation Project (Enhancing Engineering Practice and Innovation Capabilities)

VI. Credit Completion Requirements

1. Total Credit Requirement

Students are required to complete a minimum of 180 credits during their course of study to qualify for graduation.

2. Credits by Academic Year / Semester

First Academic Year: 18 + 27 = 45 credits

Second Academic Year: 17.5 + 23 + 2 = 42.5 credits

Third Academic Year: 22.5 + 27.5 + 5 = 55 credits

Fourth Academic Year: 22.5 + 20.5 = 37.5 credits

3. Composition of Credits by Course Type

General Education Courses: Chinese Language, Survey of China, Ideological and Political Education, Computer Program Design, etc., 42 credits

Foundation Courses: Mathematics, Linear Algebra, Physics and Chemistry, Computer Science, Engineering Drawing, etc., 35 credits

Major Core Courses: Engineering Mechanics, Geology, Applied Physical Chemistry, Oil Reservoir / Flow / Rock Mechanics, Drilling and Production, HSE, Management, Economics, etc., 81 credits

Practical Teaching Segments: Internship, Integrated Petroleum Engineering Design, Graduation Project, 34 credits

Elective / Characteristic Courses: 22 credits

Summary Table of Course Categories, Hours, and Credits

Course Category	Credits	Proportion	Theoretical Class Hours	Practical Class Hours	Total Class Hours
General Education Courses	42.0	23.3%	672	0	672
Foundation Courses	35.0	19.4%	526	58	584
Major Required Courses	81.0	45.0%	804	92 + 25 Weeks	896 + 25weeks
Elective Major Courses	22.0	12.2%	432	8	440
Total Credits/Hours	180	100%	2434	158 + 25 weeks	2592 + 25 weeks
Practical Training	34.875	19.4%	-	158 + 25 weeks	158 + 25 weeks
Centralized Practical Training	25.0	13.9%	-	25 weeks	25 weeks

Recommended Credit Load per Semester

Semester	1	2	S1	3	4	S2	5	6	S3	7	8
Required	18.0	27.0	0.0	17.5	23.0	2.0	22.5	25	5.0	5.0	13.0
Major Elective	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	14.5	5.0
Subtotal	18.0	27.0	0.0	17.5	23.0	2.0	22.5	27.5	5.0	19.5	18.0

Note:
S2 = Second Academic Year Summer Semester (Geological Internship)
S3 = Third Academic Year Summer Semester (Oilfield Internship)
Graduation Project, 13 credits, counted towards the 8th semester and is compulsory.

VII. Curriculum structure

课程类别 COURSE CATEGORY	课程编码 COURSE CODE	课程名称 COURSE NAME	学分 CREDITS	合计 TOTAL HOURS	讲授 LECTURE	实验 EXPERIMENT	上机 COMPUTER LAB	学期 SEMESTER
General education courses	2091199	初级汉语口语(2-1) Elementary Chinese Oral (2-1)	4.0	64	64			1
	2092199	初级汉语精读(2-1) Elementary Chinese Intensive Reading (2-1)	4.0	64	64			1
	2092099	道德与法律 Ethics and Legal Studies	1.0	16	16			1
	0711299	计算机程序设计 Computer Program Design	3.0	48	48			1
	2091299	Primary Oral Chinese（2-2） 初级汉语口语(2-2)	4.0	64	64			2
	2092299	初级汉语精读(2-2) Elementary Chinese Intensive Reading (2-2)	4.0	64	64			2
	2095199	中级汉语（2-1） Intermediate Chinese（2-1）	4.0	64	64			3
	2094199	中国概况（2-1） Survey of China (2-1)	3.0	48	48			2
	2094299	中国概况（2-2） Survey of China (2-2)	3.0	48	48			4
	2095299	中级汉语（2-2） Intermediate Chinese（2-2）	4.0	64	64			4
	2096199	高级汉语(2-1) Advanced Chinese（2-1）	4.0	64	64			5
	2096299	Advanced Chinese（2-2） 高级汉语(2-2)	4.0	64	64			6
Foundation courses	0911199	高等数学(2-1) Advanced Mathematics (2-1)	6.0	96	96			1
	0434199	工程制图 Engineering Drawing	4.0	64	64			2
	0911299	高等数学(2-2) Advanced Mathematics (2-2)	5.0	80	80			2
	0931199	大学物理(2-1) University Physics (2-1)	4.0	64	64			2
	0941199	物理实验(2-1) Physics Experiment (2-1)	1.0	24		24		2
	0960199	大学化学 College Chemistry	4.0	64	54	10		2
	0711399	大学计算机科学 University Computer Science	1.0	24	24			2
	0910399	线性代数 Linear Algebra	3.0	48	48			3
	0931299	大学物理(2-2) University Physics (2-2)	3.5	56	56			3
	0941299	大学物理实验(2-2) College Physics Experiment (2-2)	1.0	24		24		3

课程类别 COURSE CATEGORY	课程编码 COURSE CODE	课程名称 COURSE NAME	学分 CREDITS	合计 TOTAL HOURS	讲授 LECTURE	实验 EXPERIMENT	上机 COMPUTER LAB	学期 SEMESTER
	0201499	石油工程 HSE Petroleum Engineering HSE	2.5	40	40			6
Major required courses	0640199	工程力学 Engineering Mechanics	4.0	64	60	4		4
	0810599	技术经济学 Technological Economics	3.0	48	48			6
	0840199	Fundamentals of Management 管理概论	2.0	32	32			6
	0110699	地质学基础 Fundamentals of Geology	3.5	56	40	16		4
	0231499	应用物理化学 Applied Physical Chemistry	3.0	48	40	8		3
	0210999	岩石物理 Petrophysics	4.0	64	50	10		
	0222099	流体力学 Fluid Mechanics	4.5	72	68	4		4
	0540299	Electrical Engineering and Electronics 电工电子学	3.5	56	46	10		5
	0122999	Well Logging and Comprehensive Interpretation 测井方法及综合解释	3.0	48	48			5
	0191299	地质实习 Geological Internship	2.0	2WEEKS				S2
	0111499	油田开发地质学 Oilfield Development Geology	3.0	48	46	2		5
	0210899	渗流力学 Seepage Mechanics	3.0	48	48			5
	0211299	岩石力学 Rock Mechanics	2.5	40	40			5
	0230199	油田化学 Oilfield Chemistry	3.5	56	40	16		5
	0210399	采油工程 Production Engineering	4.5	72	66	6		6
	0210499	油藏工程 Reservoir Engineering	4.5	72	66	6		6
	0210299	钻井工程 Drilling Engineering	4.5	72	66	6		6
	0191299	Oilfield Internship 专业实习	5.0	5WEEKS				S3
	0290299	Integrated Petroleum Engineering Design 石油工程综合设计	5.0	5WEEKS				7

课程类别 COURSE CATEGORY	课程编码 COURSE CODE	课程名称 COURSE NAME	学分 CREDITS	合计 TOTAL HOURS	讲授 LECTURE	实验 EXPERIMENT	上机 COMPUTER LAB	学期 SEMESTER
	0299999	Thesis Design 毕业设计	13.0	13WEEKS				8
Major elective courses	0212699	Well Stimulation 油水井增产增注技术	2.5	40	40			7
	0211399	水射流理论与应用 Water Jet Theory and Application	2.5	40	40			6
	0219099	人工举升技术 Artificial Lift Techniques	2.5	40	40			7
	0230399	提高采收率原理 Principle of Enhanced Oil Recovery	2.5	40	40			7
	0212199	油藏数值模拟基础 Fundamentals of Reservoir Numerical Simulation	2.5	40	32		8	7
	0230499	Oil and Gas Reservoir Protection Technology 油气层保护技术	2.5	40	40			7
	0210599	Gas Reservoir Engineering 气藏工程	2.5	40	40			7
	0212899	Directional Drilling Principles and Techniques 定向钻井理论与技术	2.5	40	40			7
	0210699	Gas Production Engineering 天然气开采与安全	2.5	40	40			8
	0211699	New Drilling Technologies 钻井新技术	2.5	40	40			8
	0211599	Principles of Modern Well Testing Interpretation 现代试井解释原理	2.5	40	40			8
	修读要求 Requirements	Student should obtain at least 22 credits from the major elective courses						