能源学院

School of Energy Resources

新能源科学与工程专业培养方案

一、专业培养目标

本专业面向新能源产业，围绕国家能源发展和经济建设需要，培养德、智、体、美、劳全面发展，掌握新能源科学基础理论和地热能勘探与开发利用工程专业知识，具备分析和解决复杂问题、有效沟通和国际交流能力，理解工程与社会、环境、可持续发展的关系，具有创新创业与团队合作精神、职业道德，毕业后可在新能源科学与工程领域从事研发、设计、生产、经管等工作的高级复合型人才。经过 5 年实际工作，能够承担科研工作或胜任管理岗位。本专业学生毕业 5 年后应达到：

（1）具备成为新能源科学与工程专业领域执业工程师的能力。

（2）具备独立执行新能源勘探与开发实务及科学研究能力。

（3）具有良好团队协作、沟通交流、国际视野、多学科背景下工程管理和领导决策能力。

（4）具有良好的社会责任感，坚守职业道德规范，在工程实践中自觉重视法律、社会、环境、安全、文化、健康等因素。

（5）具有终身学习的意识和创新能力，不断更新专业知识，适应技术进步和社会发展。

二、毕业要求

贯彻落实德智体美劳为导向的人才培养理念，树立为国家富强、民族昌盛而奋斗的志向和责任感；养成良好的体育锻炼习惯，保持身心健康，达到大学生体质健康标准。树立正确、进步的审美观，具有一定的文学、艺术修养和人文科学素养；形成正确的劳动观念和劳动态度，具一定的劳动技能。通过专业相关课程的学习，掌握新能源科学与工程方面的基本理论和基本知识，受到新能源工程实践方面的基本训练，具备解决新能源科学与工程领域复杂工程问题的基本能力。毕业生应获得以下几方面的知识和能力：

（1）工程知识：掌握从事新能源科学与工程相关工作所需的数学、自然科学、工程基础和专业知识，并能将其应用于解决该领域复杂工程问题。具有扎实的数学基础知识，能够将数学语言用于工程问题表述；具有扎实的物理、化学、地球科学等自然科学基础知识，能够将自然科学知识用于工程问题表述和分析；具有宽厚的工程科学基础理论知识，能够用于新能源勘探和开发利用工程等相关专业所涉及的工程问题的分析和判别；具有新能源科学与工程专业所需的专业基础理论知识，能够针对新能源科学与工程复杂问题进行建模、推演和分析；具有新能源科学与工程专业知识和创新创业知识，能够将专业知识和基本理论应用于新能源勘探与开发复杂工程问题的解决方案的比较和综合。

（2）问题分析能力：能够应用数学、自然科学和工程科学的基本原理，提出、识别、表达、并通过文献研究分析新能源科学与工程领域的复杂工程问题，以获得有效的认识和结论。能够应用数学、自然科学、工程科学的基本原理，提出、识别和表达新能源勘探和开发利用有关的复杂工程问题；针对复杂新能源勘探开发工程问题，能够通过文献调研、技术资料收集和已有解决方案的获取，进而通过系统研究和分析评价，获得有效的认识和结论。

（3）设计／开发解决方案：能够设计针对新能源科学与工程领域复杂工程问题的解决方案，根据新能源资源特性和用户要求，设计开发利用方案，并能够体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。掌握新能源勘探与开发基本理论和应用技术；能够进行新能源勘探和开发利用等方案设计，满足相关工作流程和规范；在设计时能够体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

（4）研究：通过相关理论和实验实习等实践课程的学习，能够基于科学原理并采用科学方法对新能源科学与工程领域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。能够基于新能源科学原理，通过文献调研或相关方法，调研和分析新能源开发利用复杂工程问题的解决方案；根据研究对象特征，选择研究路线，提出创新性实验方案； 能

够针对实验方案构建实验系统，安全开展实验，科学采集并系统分析、研究实验数据，获取创新认识；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。

（5）使用现代工具：可通过相关专业基础课程，专业课程和实践环节的学习，能够利用计算机、网络和专业知识，开发、选择与使用相关技术、现代工程工具、信息技术工具、专业软件和仪器设备，对新能源科学与工程领域复杂问题进行解释、评价、模拟、预测，并能够理解其局限性。掌握计算机、网络等现代信息技术工具的原理和方法；掌握新能源科学与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；能够选择与使用恰当的仪器、信息资源、工程工具和专业模拟软件，对复杂工程问题进行分析、计算与设计；能够针对具体的对象，开发或选用满足特定需求的现代工具，模拟和预测新能源科学与工程专业问题，并能够分析其局限性。

（6）工程与社会：通过相关通识课程，专业课程和实习、实训等实践环节，能够基于工程相关背景知识对新能源科学与工程具体问题进行合理分析，评价新能源科学与工程专业的工程实践和复杂工程问题解决方案对社会、健康、安全、法律、环境以及文化的影响，并理解应承担的责任。了解新能源科学与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；能够分析和评价新能源领域的工程实践对社会、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。

（7）环境和可持续发展：通过相关课程和社会实践，了解与新能源行业和职业相关的研究、设计、生产、环境保护、可持续发展等方面的方针、政策和法律、法规，能够理解和评价新能源科学与工程专业工程实践对环境、社会可持续发展的影响，并理解应承担的责任。充分认识新能源工程问题解决过程中可能涉及的环境问题，知晓和理解该领域环境保护和可持续发展的理念和内涵；能够站在环境保护和可持续发展的角度思考新能源科学与工程专业的工程实践的可持续性，评价项目周期中可能对人类和环境造成的损害和隐患。

（8）职业规范：通过思想政治、人文艺术、工程伦理、法律、职业规范等课程，以及社会实践、社团活动等实践环节，具有人文社会科学素养、良好的思想道德修养和社会责任感，能够在新能源勘探与开发工程实践中理解并遵守职业道德和规范，履行责任。具有正确的人生观、价值观，理解个人与社会的关系，了解中国国情及国际地位，传承艰苦朴素、求真务实精神，具有良好的人文社会科学素养；具有社会责任感，理解工程师对公众的安全、健康和福祉的维护，以及对环境保护和社会的责任，能够在实践中自觉履行；具有爱岗敬业、诚实公正、诚信守则的工程职业道德和规范，能在实践中自觉履行责任。

（9）个人和团队：通过课内外各种教学活动、跨学科团队任务、合作性学习等活动，具有较强的团队意识和协作精神，能够在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。具有良好的团队合作意识，能够与团队成员有效沟通、合作共事；能够在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，能组织、协调和指挥团队开展工作。

（10）沟通：能够就新能源科学与工程问题与国内外业界同行及社会公众进行有效沟通和交流，包括撰写书面报告或设计文稿、陈述发言、清晰表达和回应指令等，并掌握一门外语，能阅读本专业的外文文献，具备一定的国际视野以及开展国际交流与沟通的基本能力。能够就新能源科学与工程专业问题准确表达自己的观点，能与国内外业界同行和社会公众进行有效沟通和交流；具备一定的国际视野，能够通过查阅外文文献等方式，了解资新能源科学与工程领域的国际发展趋势、研究热点，在跨文化背景下对新能源科学与工程专业等相关问题进行有效沟通。

（11）项目管理：通过涉及工程管理和经济决策知识的相关课程，以及设计类、研究类、实习实训类实践环节，理解并掌握新能源行业相关管理原理和经济评价、决策方法，并能在多学科环境的实际工作中应用。理解新能源工程项目中涉及的管理与经济决策方法；理解新能源工程及产品全周期、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；能在多学科环境下（包括模拟环境），在设计开发解决方案的过程中，运用工程管理与经济决策方法。

（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。能在社会发展的大背景下，认识到自主和终身学习的必要性；具有自主学习能力，包括对技术问题的理解能力，归纳总结能力和提出问题能力等；具有在工程实践、社会实践和创新创业中自主学习和适应发展的能力。

三、主干学科

石油与天然气工程。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

核心课程：新能源科学与技术原理、地热地质学（含水文地质学）、地热试井与测井、新能源人工智能、工程图学、地热流体力学、工程热力学、热储工程与数值模拟、地热发电、地热资源勘查与评价（含综合地质学）、地热钻井与完井工程、多能互补技术与利用、地热开发利用技术与应用。

实践课程：物理实验、周口店地质教学实习、北戴河地质认识实习、新能源工程认识实习、地热资源综合地球、新能源工程生产实习、专业综合设计、毕业设计（论文）。

Undergraduate Program in Science and Engineering of New Energy

1. Academic Objectives

This major is oriented to the new energy industry. Centering on the needs of national energy development and economic construction, it cultivates senior compound talents who are comprehensively developed in morality, intelligence, sports, aesthetic and labor. The students will learn the basic theory of new energy science, geothermal exploration and engineering knowledge, have the abilities to analyze and solve complex problems, to communicate effectively and international vision, understand the relationship between engineering and society, environment and sustainable development, possess the spirits of innovation, entrepreneurship, teamwork and professional ethics, can be engaged in research development, design, production, management and other work in the field of new energy science and engineering after graduation, and can undertake scientific research or competent management position after 5 years of practical work.

Five years after graduation, students in this major should achieve:

(1) Have the ability to become a licensed engineer in the field of new energy science and engineering.

(2) Have the ability to independently carry out new energy exploration and development practice and scientific research.

(3) Master good teamwork, communication skills, international vision, project management and leadership decision-making ability in a multidisciplinary context.

(4) Have a good sense of social responsibility, adhere to professional ethics, consciously pay attention to the law, society, environment, safety, culture, health and other factors in engineering practice.

(5) Have the consciousness of lifelong learning and the ability of innovation, constantly update professional knowledge, adapt to technological progress and social development.

2. Graduation Requirements

Implement the talent training concept of moral, intellectual, physical, aesthetic and labor oriented, and establish the ambition and sense of responsibility to strive for the prosperity of the country and the nation; Develop good physical exercise habits, maintain physical and mental health, to meet the physical health standards of college students. Set up correct and progressive aesthetic sense, have specific literary, artistic accomplishment and humanistic quality; have certain labor skills form the correct labor concept and labor attitude; master the basic theories and knowledge of new energy science and engineering through the study of relevant courses; receive the basic training of new energy engineering practice, and have the basic ability to solve complex engineering problems in the field of new energy science and engineering. Graduates should acquire the following knowledge and abilities:

(1) Engineering knowledge: Master the mathematics, natural science, engineering foundation and professional knowledge required for new energy science and engineering-related work, and be able to apply it to solve complex engineering problems in this field. Master solid basic mathematical knowledge, and be able to use mathematical language to describe engineering problems; Grasp solid basic knowledge of physics, chemistry, earth science and other natural sciences, and be able to apply the knowledge of natural science to the description and analysis of engineering problems; Have extensive basic theoretical knowledge of engineering science, and be able to use the knowledge to analyze and describe engineering problems involved in new energy exploration and development and utilization engineering and other related majors; Possess the professional basic theoretical knowledge required by the major of new energy science

and engineering, and be able to model, deduct and analyze complex problems of new energy science and engineering; Possess professional knowledge of new energy science and engineering and knowledge of innovation and entrepreneurship, and be able to apply professional knowledge and basic theories to the comparison and synthesis of solutions to complex engineering problems in new energy exploration and development.

(2) Problem analysis ability: Be able to apply the basic principles of mathematics, natural science and engineering science to identify, express, and analyze complex engineering problems in the field of new energy science and engineering through literature research, so as to obtain effective knowledge and conclusions. Be able to apply the basic principles of mathematics, natural science and engineering science to identify and express complex engineering problems related to the exploration, development and utilization of new energy; For complex new energy exploration and development engineering problems, be able to obtain effective conclusions through literature research, technical information collection and solution identification, and further systematic research, analysis, and evaluation.

(3) Design/development solution: Be able to make designs to solve complex engineering problems in the field of new energy science and engineering solutions, according to new energy resources features and user requirements, design development and utilization plan, and be able to reflect the sense of innovation, considering social, health, safety, legal, cultural and environmental factors. Master the basic theory and application technology of new energy exploration and development; Be able to design new energy exploration, development and utilization schemes to meet relevant workflow and specifications; Be able to reflect the sense of innovation in the design, taking into account social, health, safety, legal, cultural and environmental factors.

(4) Research: Through the study of relevant theoretical courses and experimental practical courses, be able to conduct research on complex engineering problems in the field of new energy science and engineering based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through information synthesis. Be able to investigate and analyze solutions to complex engineering problems in the development and utilization of new energy based on scientific principles of new energy and through literature research or related methods; Select the research route according to the characteristics of the research object and propose innovative experimental scheme; Be able to build experimental system according to experimental scheme, carry out experiments safely, collect and systematically analyze experimental data scientifically, and obtain innovative knowledge; Be able to analyze and interpret experimental results, and draw reasonable and effective conclusions through information synthesis.

(5) Use modern tools: By relevant professional foundation courses, professional courses, and the practice of learning, be able to use the computer, network and professional knowledge to develop, choose and use the relevant technology and modern engineering tools, information technology tools, professional software and equipment for interpretation, evaluation, simulation and prediction of a complex problem in new energy science and engineering, and understand its limitations. Master the principles and methods of modern information technology tools such as computer and network; Master the application principles and methods of modern instruments, information technology tools, engineering tools and simulation software commonly used in new energy science and engineering majors, and understand their limitations; Be able to select and use appropriate instruments, information resources, engineering tools and professional simulation software to analyze, calculate and design complex engineering problems; Be able to develop or select modern tools to meet specific needs for specific objects, to simulate and predict professional problems of new energy science and engineering, and to analyze their limitations.

(6) Engineering and Society: Through relevant general courses, specialized courses and training, practice, be able to analyze the specific problems in a reasonable manner based on engineering related background knowledge of new energy science and engineering analysis, be able to evaluate the engineering practice of the new energy science and engineering and complex engineering solutions to the problems of social, health, safety, legal, environmental and cultural influences, as well as be able to understand the related responsibility. Understand the technical standard systems, intellectual property rights, industrial policies, laws and regulations in the relevant fields of new energy science and engineering, and understand the influence of different social cultures on engineering activities; Be able to analyze and evaluate the impact of engineering practices in the field of new energy on society, health, safety, law and culture, as well as the impact of these constraints on project implementation, and understand the responsibilities to be assumed.

(7) The environmental and sustainable development: Based on the relevant courses and social practice, understand the guidelines, policies and laws and regulations for the research, design, production, environmental protection, sustainable development in new energy industry and related professionals; and be able to understand and to evaluate the impact of engineering practices of new energy science and engineering on the sustainable development of the environment and society, and understand the responsibilities to be assumed. Fully understand the environmental problems that may be involved in the process of solving new energy engineering problems, know the concept and connotation of environmental protection and sustainable development in this field; Be able to think about the sustainability of the engineering practice of new energy science and engineering from the perspective of environmental protection and sustainable development, and be able to evaluate the possible damages and hidden dangers to human beings and the environment during the project cycles.

(8) Professional ethics: Through ideological politics, the arts and humanities, engineering ethics, law and norms courses, as well as the social practice, community activities, such as practice, be able to achieve cultural and social science literacy, good ideological and moral cultivation and a sense of social responsibility, be able to understand and abide by the professional ethics and norms, fulfill the responsibility in the new energy exploration and exploitation engineering practice. Have a correct outlook on life and values, understand the relationship between the individual and the society, understand China's national conditions and international status, inherit the spirit of hard working and plain living, seeking truth and pragmatism, and have a good literacy in humanities and social sciences; Have a sense of social responsibility, understand the maintenance of public safety, health and well-being, environmental protection and social responsibilities of engineers, and be able to consciously perform in practice; With the engineering professional ethics and norms of love and dedication, honesty and justice, and good faith, consciously fulfill their responsibilities in the engineering practice.

(9) Individual and team: Through various teaching activities in and out of class, interdisciplinary team tasks, cooperative learning and other activities, cultivate strong senses of teamwork and collaboration spirit, be able to play the role of individual, team member and leader in a multi-disciplinary team. Have a good sense of team work, be able effectively communicate and cooperate with team members; Be able to act as an individual, a team member and a leader in a multidisciplinary team; be able to organize, coordinate and direct the team work.

(10) Communication: Be able to communicate and exchange effectively with industry colleagues at home and abroad and the social public concerning the new energy science and engineering problems, including writing a report or design documents, presentation speech, articulation, and response to the instructions, etc., and master a foreign language for reading the professional foreign language literature, have a specific international vision and the basic ability to conduct international exchange and communication.

Be able to accurately express their own views on new energy science and engineering professional issues, be able effectively communicate and exchange with domestic and foreign industry peers and the public; Have a certain international vision, be able to understand the international development trends and research hotspots in the field of new energy science and engineering by referring to foreign literature, and effectively communicate with the new energy science and engineering and other related issues in a cross-cultural context.

(11) Project Management: Through the courses related to project management and economic decision-making knowledge, as well as the practical links of design, research, practice and training, be able to understand and master the relevant management principles, economic evaluation and decision-making methods of the new energy industry, and be able to apply them in the practical work in a multidisciplinary environment. Understand the management and economic decision-making methods involved in new energy engineering projects; Understand the cost structure of the life-cycle and process of new energy projects and products, and understand the project management and economic decision-making issues involved; Be able to apply engineering management and economic decision-making methods in the process of designing and developing solutions in a multidisciplinary environment (including a simulation environment).

(12) Lifelong learning: Have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to development. Recognize the need for self-directed and lifelong learning in the context of social development; Have self-learning ability, including the ability to understand technical issues, the ability to conclude and summarize and the ability to put forward questions; Have the ability to learn independently and adapt to the development in engineering practice, social practice, innovation, and entrepreneurship.

3. Main disciplines

Oil and Natural Gas Engineering.

4. Length of Schooling and Degree

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Engineering when they have completed the required minimum credits and have met all other requirements.

5. Core Courses

Core courses: New energy science and technical principles, geothermal geology (including hydrogeology), geothermal well test and logging, new energy artificial intelligence, Engineering Graphics, geothermal fluid mechanics, engineering thermodynamics, thermal storage engineering and numerical simulation, geothermal power generation, geothermal resources exploration and evaluation (including integrated geology), geothermal drilling and completion engineering, multi-energy complementary technology and utilization, geothermal development and utilization technology and applications.

Main practical teaching: Physics experiment, Zhoukoudian geology teaching practice, Beidaihe geology understanding practice, new energy engineering understanding practice, geothermal resources integrated earth, new energy engineering production practice, professional comprehensive design, graduation project (thesis).

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course module	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	40	11	13		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	872	54	9	15		15	9		6				
	专业核心课程 Specialized Fundamental Courses	384	24							11	9		4	
	专业拓展课程 Specialized Development	96	6										6	
实践教育 Practical Education	课程实践 Course Practice	29 周 +128 学 时	28		5	5	1		5			6		6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				148										
选修课总学分 Elective course credits				24										
最低毕业总学分 Total Credits				170										

七、课程设置 (Curriculum)

1、**通识教育必修课程** (Required Courses of General Education)：730 学时 (730 Hours)，40 学分 (40 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48			考试 Exam	5	
GR181013	形 势 与 政 策 (1) Situation and Policy(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形 势 与 政 策 (2) Situation and Policy(2)	4	0.25	4			考查 Term Paper	2	
GR181015	形 势 与 政 策 (3) Situation and Policy(3)	4	0.25	4			考查 Term Paper	3	
GR181016	形 势 与 政 策 (4) Situation and Policy(4)	4	0.25	4			考查 Term Paper	4	
GR181017	形 势 与 政 策 (5) Situation and Policy(5)	4	0.25	4			考查 Term Paper	5	
GR181018	形 势 与 政 策 (6) Situation and Policy(6)	4	0.25	4			考查 Term Paper	6	
GR181019	形 势 与 政 策 (7) Situation and Policy(7)	4	0.25	4			考查 Term Paper	7	
GR181020	形 势 与 政 策 (8) Situation and Policy(8)	4	0.25	4			考查 Term Paper	8	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health (1)	16	1	16			考查 Term Paper	1	
GR303006	大学生心理素质教育（2） Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	3	
GR081071	大学英语（1） College English(1)	64	4	64			考试 Exam	1	
GR081072	大学英语（2） College English(2)	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32				2	
GR141005	体育（1）（系列课程） Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育（2）（系列课程） Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育（3）（系列课程） Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育（4）（系列课程） Physical Education(4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	40	492	222	16			

2、通识教育选修 (Selective Courses of General Education)：192 **学时** (192Hours)，12 **学分** (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online courses)	见附件 1	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分，其中，《大学生安全教育》（1 学分）必选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term Paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term Paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term Paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5、6	3	考查 Term Paper	2-8	选修 3 个学分，其中《新生研讨课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term Paper	2-4	
总计 Total			12			

3、**学科基础课程** (Disciplinary Fundamental Courses)：872 **学时**（872 Hours），54 **学分** (54 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR061395	地质类（能源方向）专业导论 Introduction to Geology(Energy Direction)	16	1	14	2		考查 Term Paper	1	
DR191003	高等数学 B（1） Advanced Mathematics B (1)	96	6	96			考试 Exam	1	
DR191004	高等数学 B（2） Advanced Mathematics B (2)	64	4	64			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR191008	大学物理（1） College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理（2） College Physics (2)	48	3	48			考试 Exam	3	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR011036	地球科学概论 Geosciences	64	4	32	32		考试 Exam	2	
DR021002	工程图学 Engineering Graphics	48	3	32		16	考试 Exam	3	
DR022029	工程力学 Engineering Mechanics	32	2	16	16		考试 Exam	3	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR062025	渗流力学 Seepage mechanics	32	2	24	8		考试 Exam	4	
DR062149	工程热力学（包括传热学） Engineering thermodynamics including heat transfer)	48	3	40	8		考试 Exam	3	
DR042127	电工电子技术 (B) Electrical and electronic technology(B)	32	2	24	8		考试 Exam	3	
DR062101	地热流体力学 Geothermal fluid mechanics	32	2	28	4		考试 Exam	4	
DR193049	数学物理方程 B Mathematical physical equation(B)	32	2	28		4	考试 Exam	4	
DR063146	地热测井与试井 Geothermal well test and logging	64	4	32	32		考试 Exam	4	
DR063102	地热地质学 Geothermal Geology	32	2	28		4	考试 Exam	5	
DR063147	新能源人工智能 New energy artificial intelligence	32	2	28		4	考试 Exam	5	
DR063148	高级程序设计语言 Advanced Programming Language	32	2	20		12	考试 Exam	5	
总计 Total		872	54	716	108	40	考试 Exam		

4、**专业核心课程** (Specialized Core Courses)：**384 学时**（384 Hours），**24 学分** (24 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR063103	新能源科学与技术原理 Principles of new energy science and technology	64	4	48	16		考试 Exam	5	
SR063104	地热能导论 Introduction to geothermal power	32	2	24	8		考试 Exam	5	
SR063105	地热资源勘查与评价 Geothermal resource exploration and evaluation	32	2	24	8		考试 Exam	5	
SR063106	热储工程及数值模拟 Geothermal reservoir engineering and numerical simulation	48	3	40	8		考试 Exam	5	
SR063107	干热岩与 EGS Dry hot rock and EGS	32	2	24	8		考试 Exam	6	
SR063108	地热钻井与完井工程 Geothermal Drilling and Completion of Engineering	32	2	24	8		考试 Exam	6	
SR063150	地热发电 Geothermal power generation	32	2	24	8		考试 Exam	6	
SR063109	地热开发利用技术与应用 Geothermal development utilization technology and applications	48	3	40	8		考试 Exam	6	
SR064110	新能源工程经济与管理 Engineering Economics and Management for New Energy	32	2	28	4		考试 Exam	7	
SR064111	专业英语 Professional English	32	2	32			考试 Exam	7	
总计 Total		384	24	308	76				

5、**专业拓展课程** (Specialized Development Courses)：**任选** 96 **学时** (96 Hours)，**任选** 6 **学分** (6 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS064112	能源与环境 Energy and environment	24	1.5	16	8		考查 Term Paper	7	
SS064152	学科前沿课 Discipline Frontiers	16	1	16			考查 Term Paper	7	
SS064113	新能源科学与技术新进展 Advances in new energy science and technology	24	1.5	16	8		考查 Term Paper	7	
SS064151	建筑环境与能源学 Building Environment and Energy	24	1.5	20	4		考查 Term Paper	7	
SS064114	多能互补技术与利用 Multi-energy complementary technology and utilization	24	1.5	20	4		考查 Term Paper	7	
SS064115	科技论文写作 Science and Technology Paper Writing	24	1.5	16	8		考查 Term Paper	7	
SS064153	工程伦理学 Engineering ethics	16	1	16			考查 Term Paper	7	
总计 Total		152	9.5	120	32				

6、**课程实践** (Course Practice)：29 **周** +128 **学时** (29 weeks and 128 hours)，28 **学分** (28 Credits)

课程代码 Course Code	课程名称 Course Name	周数（学时） Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考查 Term Paper	2	
PR191045	实验物理（1） Experiments Physics（1）	24 学时	1	考试 Exam	2	
PR192046	实验物理（2） Experiments Physics（2）	24 学时	1	考试 Exam	3	

课程代码 Course Code	课程名称 Course Name	周数（学时） Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR191047	实验化学 Chemistry Experiments	48 学时	2	考试 Exam	2	
PR012047	周口店地质教学实习 Geological Survey Field Trip in Zhoukoudian	4 周	4	考查 Term Paper	2 夏	
PR011044	北戴河地质实习 Beidaihe geology practice	2 周	2	考查 Term Paper	1 夏	
PR061116	新能源工程认识实习 New energy engineering understanding practice	2 周	2	考查 Term Paper	1 夏	
PR063154	地热资源综合地球物理勘查 Integrated geophysical exploration of geothermal resources	2 周	2	考查 Term Paper	3 夏	
PR063117	新能源利用综合设计实验 New Energy Comprehensive Utilization Design Experiment	2 周	2	考查 Term Paper	3 夏	
PR063042	专业实习 Professional Practice	2 周	2	考查 Term Paper	3 夏	
	金工实习 Metal Craft and Internship	1 周	1	考查 Term Paper	2 夏	
PR064155	毕业设计（论文） Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		29 周 +128 学时	28			

7、**课外实践** (Extracurricular practice)：6 **学分** (6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
工程知识	√		√		
问题分析		√	√		
工程设计		√	√		
研究与创新		√	√		
使用现代工具		√			√
工程与社会	√			√	
环境和可持续发展	√			√	
职业规范	√			√	
个人和团队			√		
沟通与交流		√	√		√
项目管理		√	√		
终身学习					√

九、课程与毕业要求关系矩阵

毕业要求 课程名称	(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
思想道德与法治								H				H
中国近现代史纲要						M						
马克思主义基本原理概论		H					L					M
毛泽东思想和中国特色社会主义理论体系概论		H				M						
习近平新时代中国特色社会主义思想概论		H					M					M
形势与政策		M					M					
大学生心理素质教育（1）										H	L	
大学生心理素质教育（2）										H	L	
军事理论									H			
大学英语一				H								M
大学英语二				H								H
大学生英语素质拓展课								L		H		
体育（1）									H	M		
体育（2）									H	M		
体育（3）									H	M		
体育（4）									H	M		
大学计算机			M		H						L	
程序设计基础 A		H		L								
大学生职业生涯规划与就业指导（1）		L				M			H			
大学生职业生涯规划与就业指导（2）		L				M			H			
高数 B（1）		H		M								
高数 B（2）		H		M								
线性代数		H										

毕业要求 课程名称	(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
概率论与数理统计			M									
大学物理（1）	M				L							
大学物理（2）	M				L							
大学化学				M			L					
地球科学概论	M											
工程图学	H				M							
工程力学	H											
渗流力学	H											
工程热力学（包括传热学）	H											
电工电子技术 (B)	H											
数学物理方程 B	H											
地热流体力学	H	M	M									
地热测井与试井	M			H								
地热地质学	M			H								
新能源人工智能	M			H								
高级程序设计语言					H							M
新能源科学与技术原理	H	H	M	H		H						
地热能导论	H	H		M		H	H					
地热资源勘查与评价	H	H		H		M	M					
热储工程及数值模拟	H	H		H	H	H	H					
干热岩与 EGS	M						M					
地热发电	H	H	H	H		H	H					
地热钻井与完井工程	H	H	H	H		H	H					
地热开发利用技术与应用	H	H	H	H		H	H					
新能源工程经济与管理								H	H	H	H	H
专业英语										H		H
能源与环境						H	H					

毕业要求 / 课程名称	(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
学科前沿课	M	M		H								
新能源科学与技术新进展	M	M		H								
建筑环境与能源学	H	M	H			H	H		M			
多能互补技术与利用	H	H	H	M		H	H		M			
科技论文写作				M	H					H		H
工程伦理学						H						M
军事理论及训练									M			L
思想政治社会实践								H				
实验物理（1）			H						L			
实验物理（2）			H						L			
周口店地质教学实习								M	L	L		
北戴河地质实习									L	L		
新能源工程认识实习	M					H	H					
地热资源综合地球物理勘查	H	H		H		M	M					
新能源利用综合设计实验	H	H	H		M	H	H					
专业实习	H	H				H	H					
金工实习	H											
毕业设计 (论文)	H	H	H	H	H	H	H	H	H	H	H	H
课外实践								H	H	H	H	H
人文社科类（含在线课程）								H				M
自然科学类（含在线课程）		M						M				M
自然文化类						H	H					H
体育与健康类									H			H
创新创业教育类								H			H	M
审美与艺术类									H			H

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

资源勘查工程专业（能源）专业培养方案

一、专业培养目标

本专业面向国家能源安全需求，围绕油气地质行业需要，培养具备社会主义核心价值观，德、智、体、美、劳全面发展（目标 1），适应社会发展需要，掌握资源勘查工程（能源矿产）基本理论、基本方法和基本技能（目标 2），具有创新精神和国际视野（目标 3），毕业后可在资源勘查领域从事能源矿产资源勘查、评价和管理工作的专业技术人才（目标 4）。经过 5 年的实际工作，能够胜任资源勘查工程师的要求，能在生产单位和科研团队中担任技术骨干或负责人（目标 5）。

二、毕业要求

资源勘查工程专业（能源）侧重于石油、天然气等化石能源的勘查、开发与管理等方面的培养，使学生具有解决化石能源的地质勘查与开发工程技术方面的知识和能力。为了达成人才培养目标，该专业既要求学生具有社会主义核心价值观，拥护中国共产党、拥护社会主义，服务祖国、服务人民的思想政治素质，又要求毕业生在工程知识和问题分析、设计／开发解决方案、分析与研究、使用现代工具、工程与社会、环境和可持续发展、职业规范、个人和团队、国际交流与沟通、项目管理、终身学习等方面达到中国工程教育专业认证协会工程教育认证通用标准。

具体包括：

（1）工程知识：掌握从事资源勘查工程工作所需的数学、自然科学、工程基础、基础地质、油气地质和地球物理等基础知识，并能将其应用于解决油气资源勘查中的复杂工程问题。（对应通用标准要求 1）；

（2)问题分析: 能够应用数学、自然科学、工程科学、基础地质、油气地质和地球物理的基本原理，识别、表达、分析、解决资源勘查工程中的复杂问题，并获得有效结论。（对应通用标准要求 2）；

（3）设计／开发解决方案：能够利用地质、地球化学、地球物理等现代勘查技术，设计针对复杂资源勘查工程问题的解决方案，设计满足资源勘查的工作流程和规范，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（对应通用标准要求 3）；

（4）研究：能够基于科学原理，并采用科学方法对资源勘查工程的复杂问题进行实验设计、信息采集、数据处理、信息综合、成果解释等分析和研究，最终获得合理有效的结论（对应通用标准要求 4）；

（5）使用现代工具：能够针对资源勘查工程复杂问题，开发、选择与使用相关技术、现代工程工具、信息技术工具和专业软件，包括模拟和预测，并能理解其局限性和适用范围（对应通用标准要求 5）；

（6）工程与社会：能够基于工程相关背景知识对资源勘查工程具体问题进行合理分析，评价资源勘查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（对用通用标准要求 6）；

（7）环境和可持续发展：了解与资源勘查行业和职业相关的研究、设计、生产、环境保护、可持续发展等方面的方针、政策和法规，能够理解和评价资源勘查与开发对环境、社会可持续发展的影响（对应通用标准要求 7）；

（8）职业规范：具有人文社会科学素养、社会责任感和良好的身体素质，能够在资源勘查工程实践中理解并遵守职业道德和规范（对应通用标准要求 8）；

（9）个人和团队：能够履行责任，能够在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，具有较强的团队合作能力（对应通用标准要求 9）；

（10）沟通：能够就复杂资源勘查工程问题与国内外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、清晰表达等; 具有一定的国际视野，能够开展国际交流与沟通（对用通用标准要求 10）；

（11）项目管理：理解并掌握资源勘查工程相关管理原理与经济决策方法，并能在多学科环境的实际工作中应用（对应通用标准要求 11）；

（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（对应通用标准要求 12）。

三、主干学科

地质资源与地质工程。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

专业核心课程：沉积环境和相、石油与天然气地质、地震勘探原理与解释、含油气盆地地质学、地球物理测井与解释、层序地层学、石油构造分析、油气储层地质学基础、油气田地下地质学、油气勘查与评价、地震地质解释技术及应用、石油技术经济评价、资源勘查工程（能源）专业英语等。

主要实践性教学环节：军事理论及训练、思想政治社会实践、北戴河地质实习、周口店地质教学实习、石油地质综合设计实习、油气田地下地质综合设计实习、地震资料解释课程设计实习、毕业（设计）论文、社会实践、科研训练、创新创业活动等。

Undergraduate Program in Resources Prospecting Engineering (Energy)

1. Academic Objectives

This major is oriented to the needs of national energy security and focuses on the needs of the oil and gas geology industry. It cultivates the comprehensive development of morality, intelligence, physical fitness, beauty and labor, adapts to the needs of social development. The student will be educated to have socialist core values. They will understand principal theories, basic approaches and fundamental skills of resource prospecting engineering (energy mineral resource), and obtain basic engineering training to become a resource prospection engineer. They will be trained to develop creativity, practical abilities and gain an international view on becoming a professional and technical personnel in mineral resource exploration, appraisal and management. The graduate will become a qualified geological engineer, principal investigator or team leader in a research-production unit after 5 years practical work.

2. Graduation Requirements

Resources Prospecting Engineering (Energy) places particular emphasis on education of oil and gas fossil fuel exploration, development and management to help student enable to have enough knowledge and capability working out geological survey of fossil fuel and development engineering and technology. To reach the goal of creating leaders and talents, this major requires students to not only pledge allegiance to the Chinese Communist Party (CCP), support socialism, and have a desire to serve our country and our people, but also to meet requirements as set forth by the Chinese Engineering Education Accreditation Association (CEEAA) in the 2015 version of its guidelines. Details are as follows:

(1)Engineering Knowledge: Possess and be able to utilise knowledge of mathematics, natural science, geology, geophysics and fundamental engineering. (Requirements #1).

(2)Problem Analysis: Be able to apply the basic principles of mathematics, natural sciences, engineering sciences, basic geology, oil and gas geology, and geophysics to identify, express, analyze, and solve complex problems in resource exploration engineering, and obtain effective conclusions. (Requirements #2).

(3)Designing and Developing Solutions: Be able to utilise modern exploration technologies including geological, geochemical, geophysical, etc. knowledge to design solutions for complex REE problems. The design shall satisfy the processes and regulations on REE, and be creative, and considerate of social, wellness, safety, legal, cultural, and environmental ramifications. (Requirement #3).

(4)Research: Using scientific mechanisms and processes to design, collect data, analyse data, combine data and understand conclusions of complex lab experiments in REE; conclusions should be reasonable and useful. (Requirement #4).

(5)Utilisation of Modern Tools: To develop, choose, and use relevant technologies to solve complex REE problems. Shall use modern engineering tools, information technological tools, and professional software, including modelling and projecting. Students shall understand the limitations and applicability of these tools. (Requirement #5).

(6)Engineering and Society: Basing on basic engineering knowledge, students shall analyse and understand the effects REE solutions can have on society, wellness, safety, legislation, and culture. They shall understand their responsibilities. (Requirement #6).

(7)Environment and Sustainability: To explore research, designs, production, environmental protection, sustainability, policies and legal issues surrounding the field of REE. To understand and critique the longterm impacts of Energy Exploration and Development on the environment and society. (Requirement #7).

(8)Professional standards: Cultivate students who have humanities and social science literacy, a sense of social responsibility and good physical fitness, and can understand and abide by professional ethics and norms in the practice of resource exploration engineering. (Requirement # 8).

(9)Individuals and teams: fulfill their responsibilities, be able to assume the roles of individuals, team members and leaders in a multidisciplinary team, and have strong teamwork skills.

(10)Communication: Be able to communicate effectively about complex REE problems with international peers and the general public through written reports, design documents, and public speeches. Need to possess a global view, and be capable at opening up international communication and exchange (Requirement #10).

(11)Project Management: Thoroughly understand the management mechanisms and economic decision-making tools relevant to REE, and be able to utilize such skills in a multi-disciplinary setting (Requirements #11) .

(12) Lifelong Learning: To possess innate desires for lifelong continuous learning and abilities to adapt to changes (Requirement #12).

3. Main disciplines

Geological Resources and Geological Engineering

4. Length of Schooling and Degree

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Engineering when they have completed the required minimum credits and have met all other requirements.

5. Core Courses

Core curriculum: Sedimentary Environment and Facies, Petroleum and Natural Gas Geology, Seismic Exploration Principle and Interpretation, Geology of Petroliferous Basins, Geophysical Well Logging and Interpretation, Sequence Stratigraphy, Petroleum Tectonics Analysis, Basis of Hydrocarbon Reservoir Geology, Subsurface Geology of Oil and Fields, Exploration & Evaluation for Hydrocarbon, Seismic Interpretation Technique and Its Application, Petroleum Technology and Economic Evaluation, English for Resource Prospecting Engineering.

Core practical teaching components: Military theories and training, ideological social practice, geological practice at Beidaihe, geological teaching practice at Zhoukoudian, practice of integrated petroleum geology design, practice of integrated subsurface geology of oil and gas filed design, seismic data interpretation course design, thesis, practical training, scientific research training, scientific and technological innovation, and innovative and entrepreneurial activities, etc.

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course module	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	40	11	13		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	896	60	9	11.5		16	16.5		4				
	专业核心课程 Specialized Fundamental Courses	448	28							10	14		4	
	专业拓展课程 Specialized Development	96	6										6	
实践教育 Practical Education	课程实践 Course Practice	29 周 +128 学时	28		5	4	1		5	1	1	6		6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				156										
选修课总学分 Elective course credits				24										
最低毕业总学分 Total Credits				180										

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education)：730 学时 (730 Hours)，40 学分 (40 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48			考试 Exam	5	
GR181013	形 势 与 政 策 (1) Situation and Policy(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形 势 与 政 策 (2) Situation and Policy(2)	4	0.25	4			考查 Term Paper	2	
GR181015	形 势 与 政 策 (3) Situation and Policy(3)	4	0.25	4			考查 Term Paper	3	
GR181016	形 势 与 政 策 (4) Situation and Policy(4)	4	0.25	4			考查 Term Paper	4	
GR181017	形 势 与 政 策 (5) Situation and Policy(5)	4	0.25	4			考查 Term Paper	5	
GR181018	形 势 与 政 策 (6) Situation and Policy(6)	4	0.25	4			考查 Term Paper	6	
GR181019	形 势 与 政 策 (7) Situation and Policy(7)	4	0.25	4			考查 Term Paper	7	
GR181020	形 势 与 政 策 (8) Situation and Policy(8)	4	0.25	4			考查 Term Paper	8	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health (1)	16	1	16			考查 Term Paper	1	
GR303006	大学生心理素质教育（2） Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	3	
GR081071	大学英语（1） College English（1）	64	4	64			考试 Exam	1	
GR081072	大学英语（2） College English（2）	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育（1）（系列课程） Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育（2）（系列课程） Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育（3）（系列课程） Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育（4）（系列课程） Physical Education（4）	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	40	492	222	16			

2、通识教育选修 (Selective Courses of General Education)：192 **学时** (192Hours)，12 **学分** (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online courses)	见附件 1	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分，其中，《大学生安全教育》（1 学分）必选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term Paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term Paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term Paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5、6	3	考查 Term Paper	2-8	选修 3 个学分，其中《新生研讨课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term Paper	2-4	
总计 Total			12			

3、**学科基础课程** (Disciplinary Fundamental Courses)：896 **学时**（896 Hours），56 **学分** (56 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191003	高等数学 B Advanced Mathematics (B)	96	6	96			考试 Exam	1	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR011036	地球科学概论 Introduction to Earth Sciences	64	4	32	32		考试 Exam	2	
DR191004	高等数学 B (2) Advanced Mathematics B(2)	64	4	64			考试 Exam	2	
DR191008	大学物理（1） College Physics (1)	48	3	48			考试 Exam	2	
DR012063	结晶学与矿物学 Crystallography and Mineralogy	64	4	30	34		考试 Exam	3	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192009	大学物理（2） College Physics (2)	48	3	48			考试 Exam	3	
DR192015	有机化学 C Organic Chemistry C	40	2.5	40			考试 Exam	3	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR012073	岩石学（含晶体光学） Petrology (crystal optics)	64	4	28	36		考试 Exam	3	
DR012007	古生物学与地史学 Paleontology and Historical Geology	64	4	44	20		考试 Exam	4	
DR012037	构造地质学 Structural Geology	64	4	32	32		考试 Exam	4	
DR062001	沉积岩石学 Sedimentary Rocks	48	3	36	12		考试 Exam	4	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	4	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR063003	油气地球化学 Petroleum Geochemistry	32	2	28	4		考试 Exam	5	
DR063027	油层物理学 Petrophyscis	32	2	26	6		考试 Exam	5	
总计 Total		896	56	704	192				

4、专业核心课程（Specialized Core Courses）：448 学时（448 Hours），28 学分 (28 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR063002	沉积环境和相 Sedimentary Environment and Facies	32	2	24	8		考试 Exam	5	
SR063118	石油与天然气地质学 Petroleum and Natural Gas Geology	64	4	54	10		考试 Exam	5	
SR103074	地震勘探原理与解释 Seismic Exploration Principle and Interpretation	32	2	32			考试 Exam	5	
SR103046	地球物理测井与解释 Geophysical Well Logging and Interpretation	32	2	32			考试 Exam	5	
SR063119	层序地层学 Sequence stratigraphy	32	2	28	4		考试 Exam	6	
SR063120	石油构造分析 Petroleum tectonics analysis	32	2	28	4		考试 Exam	6	
SR063121	油气储层地质学基础 Basis of Hydrocarbon Reservoir Geology	32	2	24	8		考试 Exam	6	
SR063122	油气田地下地质学 Subsurface Geology of Oil and Fields	32	2	28	4		考试 Exam	6	
SR064015	油气勘查与评价 Exploration & Evaluation for Hydrocarbon	32	2	32			考试 Exam	6	
SR063123	地震地质解释技术和应用 Seismic interpretation technique and its application	32	2	30	2		考试 Exam	6	
SR063124	含油气盆地地质学 Geology of Petroliferous Basins	32	2	26	6		考试 Exam	6	
SR064125	石油技术经济评价 Petroleum Technology and Economic Evaluation	32	2	32			考试 Exam	7	
SR064016	资源勘查工程（能源）专业英语 English for Resource Prospecting Engineering	32	2	32			考试 Exam	7	
总计 Total		448	28	402	46				

5、**专业拓展课程** (Specialized Development Courses)：**任选** 96 **学时** (96 Hours)，**任选** 6 **学分** (6 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS064126	油气地质大数据与机器学习 Machine learning and big data analytics of petroleum geology	16	1	12	4		考查 Term Paper	7	
SS060047	非常规油气储层：问题、挑战与技术方案 Unconventional petroleum reservoir: problem, challenge and technical proposal	16	1	16			考查 Term Paper	7	
SS060082	石油天然气地质与地球化学进展 Advances in petroleum geology and geochemistry	16	1	16			考查 Term Paper	7	
SS064127	能源开发与生态环境 Energy development and ecological environment	24	1.5	16	8		考查 Term Paper	7	
SS060083	细粒沉积学进展 Advances in Fine-grained Sedimentology	16	1	12	4		考查 Term Paper	7	
SS064128	全球大油气田导论 Introduction to Global Giant Oil and Gas Fields	32	2	32			考查 Term Paper	7	
SS064129	论文写作与制图 Thesis writing and graphics	24	1.5	14	10		考查 Term Paper	7	
总计 Total		144	9	118	26				

6、**课程实践** (Course Practice)：29 **周** +128 **学时** (29 weeks and 128 hours)，28 **学分** (28 Credits)

课程代码 Course Code	课程名称 Course Name	周数（学时）Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR191045	实验物理 (1) Physics Experiments（1）	24 学时	1	考试 Exam	2	
PR191047	实验化学 Chemistry Experiments	48 学时	2	考试 Exam	2	
PR311001	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1	
PR011044	北戴河地质实习 Geological Survey Field Trip in Beidaihe	2 周	2	考查 Term Paper	1 夏	

课程代码 Course Code	课程名称 Course Name	周数（学时） Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR192046	实验物理 (2) Physics Experiments（2）	24 学时	1	考试 Exam	3	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考查 Term Paper	1 夏	
PR012046	周口店地质教学实习 Geological Survey Field Trip in Zhoukoudian	5 周	5	考查 Term Paper	2 夏	
PR103071	测井资料解释课程设计 Interpretation of Geophysical Well Logging Design Practice	1 周	1	考查 Term Paper	5	
PR064018	地震资料解释课程设计实习 Geological Interpretation of Seismic Profile Design Practice	1 周	1	考查 Term Paper	6	
PR063020	石油地质综合设计实习 Petroleum Geology Design Practice	2 周	2	考查 Term Paper	3 夏	
PR063021	油气田地下地质综合设计实习 Subsurface Geology of Oil and Fields Design Practice	2 周	2	考查 Term Paper	3 夏	
PR063041	专业实习 Major Practice	2 周	2	考查 Term Paper	3 夏	
PR064019	毕业设计（论文） Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		29 周 +128 学时	28			

7、**课外实践** (Extracurricular practice)：6 **学分** (6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
毕业要求 1	√	√		√	
毕业要求 2	√			√	
毕业要求 3	√		√		√
毕业要求 4	√		√	√	
毕业要求 5	√	√		√	
毕业要求 6	√			√	√
毕业要求 7	√			√	
毕业要求 8	√				√
毕业要求 9	√			√	√
毕业要求 10	√		√	√	√
毕业要求 11	√	√			√
毕业要求 12	√	√	√	√	√

九、课程与毕业要求关系矩阵

毕业要求 / 课程名称	(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
思想道德与法治								H				H
中国近现代史纲要						M						
马克思主义基本原理		H					L					M
毛泽东思想和中国特色社会主义理论体系概论		H				M						
习近平新时代中国特色社会主义思想概论		H				M						
形势与政策		M					M					
大学生职业生涯规划与就业指导（1）		L				M			H			
大学生职业生涯规划与就业指导（2）		L				M			H			
大学生心理素质教育（1）										H	L	
大学生心理素质教育（2）										H	L	
军事理论								H	M			
大学英语（1）				H								M
大学英语（2）				H								H
大学生英语素质拓展课								L		H		
体育（1）（系列课程）									H	M		
体育（2）（系列课程）									H	M		
体育（3）（系列课程）									H	M		
体育（4）（系列课程）									H	M		
大学计算机			M		H						L	
程序设计基础 A		H		L								
人文社科类（含在线课程）								H				M
自然科学类（含在线课程）		M						M				M
自然文化类						H	H					H
体育与健康类									H			H
创新创业教育类								H			H	M

毕业要求 / 课程名称	(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
审美与艺术类									H			H
高等数学 B1		H		L								
高等数学 B2		H		L								
线性代数		H										
大学化学				M			L					
概率论与数理统计			M									
大学物理（1）	M				L							
大学物理（2）	M				L							
有机化学 C							L					
测量学 A			H		L							
地球科学概论		M					H					
结晶学与矿物学				M								
岩石学（含晶体光学）				M								
古生物学与地史学				M			L					
构造地质学		M		M								
沉积岩石学				H				M				
油气地球化学				H				M				
油层物理学	M	H		H	L							
沉积环境和相				H				M				
石油与天然气地质学				H				M				
地震勘探原理与解释	L			H				M				
地球物理测井与解释				H	H			M				
层序地层学				H				M				
石油构造分析				H				M				
油气储层地质学基础				H				M				
油气田地下地质学	L			H				M				
油气勘查与评价	H			H				M				
地震地质解释技术及其应用				H	H			M				
含油气盆地地质学				H				M				

毕业要求 课程名称	(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
石油技术经济评价								M			H	
资源勘查工程（能源）专业英语										H		H
非常规油气储层：问题、挑战与技术方案								M				
石油天然气地质与地球化学进展				L				M				
能源开发与生态环境							L	M				H
细粒沉积学进展								M				
全球大油气田导论								M				
测井资料解释课程设计		H	H		L				L	L		
油气地质大数据与机器学习					H			M				
论文写作与制图								M				H
军事理论及训练								M	M	H		
思想政治社会实践						H		L				
实验物理（1）	H	M	M									
实验物理（2）	H	M	M									
实验化学	H	M	M									
北戴河地质认识实习				H			M					
周口店地质教学实习				H			M					
地震资料解释课程设计	M		H									
测井资料解释课程设计	M		H									
石油地质综合设计实习											H	
油气田地下地质综合设计实习									L	L		
专业实习				H								
毕业设计 (论文)			M	H								
课外实践		M		H				L	M	M		

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

资源勘查工程（新能源地质与工程）专业培养方案

一、专业培养目标

本专业面向非常规油气资源勘探开发人才需求，围绕产业发展需要，培养德、智、体、美、劳全面发展，适应非常规油气资源勘查和工程设计人才培养需要，掌握资源勘查工程（常规和非常规油气资源）基本理论、方法和技能（理论、知识），具备实践能力、创新意识和国际视野（能力），具有奉献精神、社会责任感和职业道德（精神、素质），毕业后可在教学、科研、生产、管理等部门（行业、领域、部门）从事专业技术或管理工作的复合型工程技术人才。

本专业学生毕业 5 年应达到：

（1）能独立从事煤、油、气资源地质勘探与开发领域的工程设计、应用研究和生产管理工作；

（2）具备煤、油、气资源地质与工程领域实验设计、数据分析与解释、复杂地质和工程问题解剖与模拟等方面的科学研究能力；

（3）具有国际化视野、良好的团队合作和沟通交流能力，以及多学科背景下的管理决策能力；

（4）具有良好的社会责任感，坚守职业道德规范，在地质与工程实践中能够考虑法律、健康、安全、环境、经济、文化和社会等因素；

（5）能够通过继续教育或其它途径更新知识，提高运用现代工具解决实际问题能力，紧跟相关领域新理论和新技术的发展。

二、毕业要求

完成“德、智、体、美、劳”各项培养计划。掌握马克思主义基本原理和中国特色社会主义理论，具有一定的体育和军事基本知识；具备健康的心理和强健的体魄；具有良好的资源勘查工程职业道德、追求卓越的态度、爱国敬业和艰苦奋斗、求真务实精神、高度的社会责任感和较好的人文素养。通过专业相关课程的学习，掌握资源勘查基本理论和地质工程基本知识，受到资源勘查工程实践方面的基本训练，具备解决煤、油、气资源复杂地质与工程问题的基本能力。毕业生应获得以下几方面的知识和能力：

（1）工程知识：掌握从事常规和非常规油气资源勘探与开发所需的自然科学、工程理论、基础地质、煤油气地质和地球物理等基础知识，并能将其应用于解决该领域复杂工程问题。具有扎实的数学基础知识，能够将数学语言用于工程问题表述；具有扎实的物理和化学等自然科学基础知识，能够将自然科学知识用于工程问题表述和分析；具有宽厚的工程科学基础理论知识，能够用于资源勘查工程等相关专业所涉及的工程问题的分析和判别；具有资源勘查工程专业所需的专业基础理论知识，能够针对资源勘查工程复杂问题进行建模、推演和分析；具有资源勘查工程专业知识和创新创业知识，能够将专业知识和基本理论应用于常规和非常规油气资源勘探与开发复杂工程问题的解决方案的比较和综合。

（2）问题分析：能够应用自然科学、工程科学、基础地质、煤油气地质和地球物理的基本原理，识别、表达、分析、解决常规和非常规油气资源勘探与开发过程中复杂问题，并获得有效结论。能够应用自然科学、工程科学的基本原理，识别和表达资源勘查工程有关的力学、物理化学、热力学等复杂工程问题；能够应用资源勘查工程（新能源地质与工程）基础地质、煤油气地质和地球物理基础理论知识，对煤、油、气富集规律、资源综合评价、储层工程与开发方案设计等关键环节的复杂地质与工程问题进行识别和表达；针对复杂资源勘查工程问题，能够通过文献调研、技术资料认知和解决方案判识，通过系统研究和分析评价，获取针对资源勘查工程复杂问题的有效结论。

（3）设计 / 开发解决方案：能够利用地质、地球化学、地球物理等现代勘查技术，提出针对常规和非常规油气资源勘探与开发过程中的复杂问题的解决方案，设计满足资源勘探与开发的工作流程和规范，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、经济、文化以及环境等因素。掌握常规和非常规油气资源勘探与开发基本理论和应用技术；能够进行野外地质调查、

资源勘查等方案设计，满足相关工作流程和规范；能够利用地质、地球化学、地球物理等现代勘查技术，针对资源勘查过程中地质评价、烃源岩评价、储层评价、有利区评价、甜点区优选等特定需求提出创新性解决方案；在资源勘查工程方案设计时能考虑社会、健康、安全、法律、经济、文化以及环境等因素。

（4）研究：能够基于科学原理，并采用科学方法对常规和非常规油气资源勘探与开发复杂问题进行实验设计、信息采集、数据处理、信息综合、成果解释等分析和研究，最终获得合理有效的结论。掌握地球化学、地球物理资料综合解释的基本方法和技术原理；能够调研复杂资源勘查工程问题的解决方案，根据研究对象特征，提出创新性实验方案，安全开展实验，科学采集并系统分析、研究实验数据，获取创新认识；具有针对资源勘查工程复杂问题的数据处理、分析与解释能力；具有将地质现象解释、储层评价、成藏分析、选区评价的创新成果进行总结归纳，得到合理有效结论的能力。

（5）使用现代工具：能够利用计算机、网络和专业知识，开发、选择与使用相关技术、现代工程工具、信息技术工具、专业软件和仪器设备，对常规和非常规油气资源勘探与开发复杂问题进行解释、评价、模拟、预测，并能够理解其局限性。 掌握数学、计算机、网络等现代信息技术工具的原理和方法；掌握资源勘查工程专业常用软件、设备、仪器等现代工程工具的工作原理和使用方法；能够选择与使用信息技术工具和现代工程工具，针对沉积、构造、储层、成藏、选区、开发等复杂问题进行解释、评价、模拟与预测，并能够理解其局限性。

（6）工程与社会：能够基于工程相关背景知识对资源勘查工程具体问题进行合理分析，评价常规与非常规油气资源勘探和开发工程实践和复杂工程问题解决方案对社会、健康、安全、法律、环境以及文化的影响，并理解应承担的责任。具有资源勘查工程实践活动所涉及的社会、健康、安全、法律、环境以及文化方面的基础知识，理解国际社会文化对常规与非常规油气资源勘探和开发工程活动的影响；能够分析和评价资源勘查工程实践环节对社会、文化以及国际化影响，并理解应承担的责任。

（7）环境和可持续发展：了解与资源勘查行业和职业相关的研究、设计、生产、环境保护、可持续发展等方面的方针、政策和法规，能够理解和评价资源勘查与开发对环境、社会可持续发展的影响，并理解应承担的责任。充分认识资源勘查工程领域复杂地质与工程问题解决过程中可能涉及的环境问题，知晓和理解该领域环境保护和可持续发展的理念和内涵；在资源勘查与工程实践环节中能自觉考虑环境因素和社会可持续发展因素，了解相应的方针、政策和法规，理解应承担的责任。

（8）职业规范：具有人文社会科学素养、良好的思想道德修养和社会责任感，能够在常规和非常规油气资源勘探与开发工程实践中理解并遵守职业道德和规范，履行责任。具有正确的人生观、价值观，理解个人与社会的关系，了解中国国情及国际地位，传承艰苦朴素、求真务实精神，具有良好的人文社会科学素养；具有社会责任感，理解工程师对公众的安全、健康和福祉的维护，以及对环境保护和社会的责任，能够在地质与工程实践中自觉履行；具有爱岗敬业、诚实公正、诚信守则的工程职业道德和规范，能在地质与工程实践中自觉履行责任。

（9）个人和团队：具有较强的团队意识和协作精神，能够在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。具有良好的团队合作意识，能够与团队成员有效沟通、合作共事；能够在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，能组织、协调和指挥团队开展工作。

（10）沟通：能够就复杂资源勘查工程问题与国内外业界同行及社会公众进行有效沟通和交流，包括撰写书面报告或设计文稿、陈述发言、清晰表达和回应指令等，并掌握一门外语，能阅读本专业的外文文献，具备一定的国际视野以及开展国际交流与沟通的基本能力。能够就资源勘查工程专业问题准确表达自己的观点，能与国内外业界同行和社会公众进行有效沟通和交流；具备一定的国际视野，能够通过查阅外文文献等方式，了解资源勘查工程领域的国际发展趋势、研究热点，在跨文化背景下对资源勘查工程专业等相关问题进行有效沟通。

（11）项目管理：理解并掌握资源勘查工程、煤、油、气行业相关管理原理和经济评价、决策方法，并能在多学科环境的实际工作中应用。具备资源勘查和煤、油、气行业的经济评价、决策和工程管理等方面的基础知识；了解资源勘查及石煤、油、气工程领域各环节的成本构成，在复杂地质与工程问题方案解决中能充分应用工程管理原理和经济决策方法。

（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。对资源勘查工程、煤、油、气行业发展及社会发展规律有明确的认识，具有自主学习、终身学习和创新创业的意识；掌握终身学习的方法，针对复杂地质与工程实践中的具体问题，具备自主学习和扩展知识结构的能力；具有在工程实践、社会实践和创新创业中自主学习和适应发展的能力。

三、主干学科

地质资源与地质工程。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

专业核心课程：煤地质学、煤层气地质学、渗流力学、非常规天然气储层工程、新能源勘查工程、油气地球化学、地震勘探原理与解释、非常规能源流体地质学、地球物理测井与解释、岩石力学、石油技术经济评价、含油气盆地地质学、沉积环境与相、资源勘查工程（新能源）专业英语。

实践课程：军事理论及训练、思想政治社会实践、实验物理、实验化学、北戴河地质认识实习、周口店地质教学实习、地震资料解释课程设计、测井资料解释课程设计、非常规天然气地质综合设计实习、专业实习、非常规储层微观表征与评价、毕业设计（论文）等。

Undergraduate Program in Resource Prospecting Engineering (New Energy Geology and Engineering)

1. Academic Objectives

This major is oriented to the demand of unconventional oil and gas resources exploration and development talents, and focuses on the needs of industrial development to cultivate all-round development of morality, intelligence, sports, beauty and labor, and meet the training needs of unconventional oil and gas resources exploration and engineering design talents, and master the basic theories, methods and skills (theories and knowledge) of resource exploration engineering (conventional and unconventional oil and gas resources), and have practical ability, innovative consciousness, international vision (ability), dedication, social responsibility and professional ethics (spirit, quality)., the Students can work in teaching, scientific research, production, management and other departments (industry, field, Department) to engage in professional technology or management after graduation.

Five years after graduation, students of this major should achieve the following goals:

(1) Able to independently engage in engineering design, application research and production management in the field of geological exploration and development of coal, oil and gas resources;

(2) Have the scientific research ability of experimental design, data analysis and interpretation, complex geological and engineering problems dissection and simulation in the field of coal, oil and gas resources geology and engineering;

(3) Have international vision, good team work and communication skills, as well as multi-disciplinary background of management decision-making ability

(4) Have a good sense of social responsibility, adhere to professional ethics, and be able to consider legal, health, safety, environmental, economic, cultural and social factors in geological and engineering practice;

(5) Through continuing education or other ways to update knowledge, improve the ability to use modern tools to solve practical problems, and keep up with the development of new theories and technologies in related fields.

2. Graduation Requirements

The training programs of "morality, intelligence, physique, beauty and labor" should be completed. The graduates should learn the basic principles of Marxism and the theory of socialism with Chinese characteristics and they should have certain basic knowledge of sports and military affairs. They also have a healthy mind and strong body. More importantly, good professional ethics of resource exploration engineering, attitude of pursuing Excellence, patriotism and hard work, spirit of seeking truth and being pragmatic, high sense of social responsibility and good humanistic quality should be required.

Through the study of relevant professional courses, the basic theory of resource exploration and basic knowledge of geological engineering should be learned. Basic training in resource exploration engineering practice should be made them to have the basic ability to solve complex geological and engineering problems of coal, oil and gas resources.

The following knowledge and abilities should be acquired by the graduates:

(1) Engineering knowledge: mastering the basic knowledge of natural science, engineering theory, basic geology, coal and hydrocarbon geology and geophysics required for exploration and development of conventional and unconventional oil and gas resources, and applying them to solve complex engineering problems in this field. Having a deep understanding of basic knowledge of mathematics, and an ability

to use mathematical language to express engineering problems. Having a deep understanding of basic knowledge of natural science such as physics and chemistry, and an ability to use natural science knowledge to the expression and analysis of engineering problems. Having broad basic theoretical knowledge of engineering science, and an ability to use them to the analysis and discrimination of engineering problems involved in resource exploration engineering and other related majors. Having professional basic theoretical knowledge required by the major of resource exploration engineering, and an ability to use them to model, deduce and analyze complex problems of resource exploration engineering. Having professional knowledge of resource exploration engineering and innovation and entrepreneurship, and an ability to use professional knowledge and basic theory to the comparison and synthesis of solutions to complex engineering problems of conventional and unconventional oil and gas resources exploration and development.

(2) Problem analysis: having an ability to apply basic principles of natural science, engineering science, basic geology, coal and hydrocarbon geology and geophysics to identify, express, analyze and solve complex problems in the exploration and development of conventional and unconventional oil and gas resources, and obtain effective conclusions. Having an ability to apply basic principles of natural science and engineering science to identify and express complex engineering problems such as mechanics, physical chemistry and thermodynamics related to resource exploration engineering. Having an ability to apply basic geological knowledge of resource exploration engineering (new energy geology and engineering), coal and hydrocarbon geology and geophysics to identify and express complex geological and engineering problems in key links such as coal, oil and gas enrichment law, comprehensive evaluation of resources, reservoir engineering and development scheme design. Aiming at the complex problems of resource exploration engineering, they can obtain effective conclusions for the complex problems of resource exploration engineering through literature investigation, technical data cognition and solution identification, systematic research and analysis and evaluation.

(3) Design/development solutions: having an ability to use modern exploration technologies such as geology, geochemistry and geophysics to propose solutions to complex problems in the process of exploration and development of conventional and unconventional oil and gas resources, design workflow and specifications for resource exploration and development, and embody innovative consciousness in the design process, taking into account social, health, safety, legal, economic, cultural and environmental factors. Mastering the basic theory and application technology of conventional and unconventional oil and gas resources exploration and development. Having an ability to carry out field geological survey, resource exploration and other scheme design to meet relevant workflow and specifications. Having an ability to use modern exploration technologies such as geology, geochemistry and geophysics to propose innovative solutions for specific needs such as geological evaluation, source rock evaluation, reservoir evaluation, favorable area evaluation and dessert area optimization in the process of resource exploration; Social, health, safety, legal, economic, cultural and environmental factors can be considered in the design of resource exploration project scheme.

(4) Research: based on scientific principles and scientific methods, the graduates can analyze and study the complex problems of conventional and unconventional oil and gas resources exploration and development, such as experimental design, information collection, data processing, information synthesis, and results interpretation, and finally obtain reasonable and effective conclusions. Mastering the basic methods and technical principles of comprehensive interpretation of geochemical and geophysical data. Having an ability to investigate the solutions of complex resource exploration engineering problems, put forward innovative experimental schemes according to the characteristics of research objects, carry out experiments safely, scientifically collect and systematically analyze and study experimental data, and gain

innovative knowledge. Having an ability to do data processing, analysis and interpretation for complex problems of resource exploration engineering. Having an ability to summarize the innovative achievements of geological phenomenon interpretation, reservoir evaluation, reservoir formation analysis and constituency evaluation, and get reasonable and effective conclusions.

(5) Use of modern tools: having an ability to apply computers, networks and professional knowledge to develop, select and use related technologies, modern engineering tools, information technology tools, professional software and instruments and equipment, and explain, evaluate, simulate and predict the complex problems of conventional and unconventional oil and gas resources exploration and development, and understand their limitations. Mastering the principles and methods of modern information technology tools such as mathematics, computer and network. Mastering the working principle and usage of modern engineering tools such as software, equipment and instruments commonly used in resource exploration engineering. Having an ability to select and use information technology tools and modern engineering tools to explain, evaluate, simulate and predict complex problems such as sedimentation, structure, reservoir formation, reservoir selection and development, and understand their limitations.

(6) Engineering and society: having an ability to analyze specific problems of resource exploration engineering based on engineering related background knowledge, evaluate the impact of conventional and unconventional oil and gas resources exploration and development engineering practices and complex engineering problem solutions on society, health, safety, law, environment and culture, and understand the corresponding responsibilities. Having basic knowledge of society, health, safety, law, environment and culture involved in resource exploration engineering practice activities, and understanding the influence of international social culture on conventional and unconventional oil and gas resources exploration and development engineering activities. Having an ability to analyze and evaluate the impact of resource exploration engineering practice on society, culture and internationalization, and understand the responsibilities.

(7) Environment and sustainable development: understanding the principles, policies and regulations of research, design, production, environmental protection and sustainable development related to resource exploration industry and occupation, and understanding and evaluating the impact of resource exploration and development on the sustainable development of environment and society, and understanding the corresponding responsibilities. Fully understanding the environmental problems that may be involved in the process of solving complex geological and engineering problems in the field of resource exploration engineering, and knowing and understanding the concept and connotation of environmental protection and sustainable development in this field. In the resource exploration and engineering practice, the graduate should consciously consider environmental factors and social sustainable development factors, understand the corresponding guidelines, policies and regulations, and understand the corresponding responsibilities.

(8) Professional specification: having humanistic and social science literacy, good ideological and moral cultivation and social responsibility, and an ability to understand and abide by professional ethics and norms and fulfill responsibilities in the practice of conventional and unconventional oil and gas resources exploration and development projects. Having a correct outlook on life and values, understanding the relationship between individuals and society, understanding China's national conditions and international status, inheriting the spirit of hard work and simplicity, seeking truth and be pragmatic, and having good humanities and social sciences literacy. Having a sense of social responsibility, understanding the engineer's responsibility for public safety, health and well-being, environmental protection and society, and consciously performing in geological and engineering practice. Having the professional ethics and norms with dedication, honesty and fairness, and good faith code, and fulfilling responsibilities consciously in

geological and engineering practice.

(9) Individual and team: Having strong team consciousness and cooperative spirit, and an ability to assume the roles of individual, team member and person in charge in a multidisciplinary team. Having a good sense of teamwork, and an ability to communicate and work with team members effectively. Having an ability to assume the role of individual, team member and person in charge in a team under a multidisciplinary background, and organize, coordinate and direct the team to carry out the work.

(10) Communication: having an ability to communicate effectively with domestic and foreign industry peers and the public on complex resource exploration engineering issues, including writing written reports or design manuscripts, making statements, expressing clearly and responding to instructions, etc., and mastering a foreign language to read foreign language documents of this major, and having a certain international perspective and basic ability to carry out international communication. Having an ability to express their views accurately on the professional problems of resource exploration engineering, and communicate effectively with domestic and foreign industry peers and the public. Having a certain international perspective, and an ability to understand the international development trends and research hotspots in the field of resource exploration engineering by consulting foreign literature, etc., and effectively communicate with related issues such as resource exploration engineering under the cross-cultural background.

(11) Project management: understanding and mastering the relevant management principles, economic evaluation and decision-making methods of resource exploration engineering, coal, oil and gas industries, and applying them in the practical work of multidisciplinary environment. Having basic knowledge of resource exploration and economic evaluation, decision-making and project management of coal, oil and gas industries. Understanding the cost composition of each links in the field of resource exploration and stone coal, oil and gas engineering, and fully applying engineering management principles and economic decision-making methods in solving complex geological and engineering problems.

(12) Lifelong learning: having the consciousness of autonomous learning and lifelong learning, and having the ability of continuous learning and adapting to development. Having a clear understanding of the development of resource exploration engineering, coal, oil and gas industries and the law of social development, and having the awareness of independent learning, lifelong learning and innovation and entrepreneurship. Mastering the method of lifelong learning, and have an ability to learn independently and expand the knowledge structure according to the specific problems in complex geology and engineering practice. Having an ability to learn independently and adapt to development in engineering practice, social practice and innovation and entrepreneurship.

3. Main disciplines

Geological Resources and Geological Engineering.

4. Length of Schooling and Degree

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Engineering when they have completed the required minimum credits and have met all other requirements.

5. Core Courses

Specialized Fundamental: Coal Geology, Coalbed Methane Geology, Fluid Mechanics of Unconventional Oil and Gas, Unconventional Gas Reservoir Engineering, Unconventional Hydrocarbon Exploration Engineering, Petroleum Geochemistry, Principle and Geological Interpretation of Seismic

Exploration Engineering, Fluid Geology of Unconventional Energy Resource, Geophysical Well Logging and Interpretation, Rock Mechanics, Introduction of New Energy Resources, Geology of Petroliferous Basins, Sedimentary Environment and Facies, Specialized English of Resource Prospecting Engineering (New Energy Geology and Engineering), Discipline Frontiers.

Course Practice: Military Theory and Training, Political Social Practice, Physics Experiments (1), Physics Experiments (2), Chemistry Experiments, Geological Survey Field Trip in Beidaihe, Geological Survey Field Trip in Zhoukoudian, Geological Interpretation of Seismic Profile Design Practice, Interpretation of Geophysical Well Logging Design Practice, Unconventional Gas Geology and Comprehensive Design Practice, Professional Practice, Microscopic Characterization and Appraisal of Unconventional Reservoir, Graduation Design (Thesis).

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course module	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	40	11	13		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	976	60	9	14		12	19		8				
	专业核心课程 Specialized Fundamental Courses	464	29							8	14		6	
	专业拓展课程 Specialized Development	96	6										6	
实践教育 Practical Education	课程实践 Course Practice	29 周 +128 学时	28		5	3	1		5	1	1	6		6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				157										
选修课总学分 Elective course credits				24										
最低毕业总学分 Total Credits				181										

七、课程设置 (Curriculum)

1、**通识教育必修课程** (Required Courses of General Education)：730 **学时** (730 Hours)，40 **学分** (40 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48			考试 Exam	5	
GR181013	形 势 与 政 策 (1) Situation and Policy(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形 势 与 政 策 (2) Situation and Policy(2)	4	0.25	4			考查 Term Paper	2	
GR181015	形 势 与 政 策 (3) Situation and Policy(3)	4	0.25	4			考查 Term Paper	3	
GR181016	形 势 与 政 策 (4) Situation and Policy(4)	4	0.25	4			考查 Term Paper	4	
GR181017	形 势 与 政 策 (5) Situation and Policy(5)	4	0.25	4			考查 Term Paper	5	
GR181018	形 势 与 政 策 (6) Situation and Policy(6)	4	0.25	4			考查 Term Paper	6	
GR181019	形 势 与 政 策 (7) Situation and Policy(7)	4	0.25	4			考查 Term Paper	7	
GR181020	形 势 与 政 策 (8) Situation and Policy(8)	4	0.25	4			考查 Term Paper	8	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health (1)	16	1	16			考查 Term Paper	1	
GR303006	大学生心理素质教育（2） Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	3	
GR081071	大学英语（1） College English（1）	64	4	64			考试 Exam	1	
GR081072	大学英语（2） College English（2）	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育（1）（系列课程） Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育（2）（系列课程） Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育（3）（系列课程） Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育（4）（系列课程） Physical Education（4）	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	40	492	222	16			

2、**通识教育选修** (Selective Courses of General Education)：192 **学时** (192Hours)，12 **学分** (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online courses)	见附件 1	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分，其中，《大学生安全教育》（1 学分）必选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term Paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term Paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term Paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5、6	3	考查 Term Paper	2-8	选修 3 个学分，其中《新生研讨课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term Paper	2-4	
总计 Total			12			

3、**学科基础课程** (Disciplinary Fundamental Courses)：976 **学时**（976 Hours），60 **学分** (60 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191003	高等数学 B（1） Advanced Mathematics B (1)	96	6	96			考试 Exam	1	
DR191004	高等数学 B（2） Adcanced Mathematics B (2)	64	4	64			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR191008	大学物理（1） College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理（2） College Physics (2)	48	3	48			考试 Exam	3	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR192015	有机化学 C Organic Chemistry C	40	2.5	40			考试 Exam	3	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	3	
DR011036	地球科学概论 Geosciences	64	4	32	32		考试 Exam	2	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR012063	结晶学与矿物学 Crystallography and Mineralogy	64	4	30	34		考试 Exam	3	
DR012073	岩石学（含晶体光学） Petrology (Inc. Crystal Optics)	64	4	28	36		考试 Exam	3	
DR012007	古生物学与地史学 Palaeontology and Geohistroy	64	4	44	20		考试 Exam	4	
DR012037	构造地质学 Structural Geology	64	4	32	32		考试 Exam	4	
DR062001	沉积岩石学 Sedimentary Rocks	48	3	36	12		考试 Exam	4	
	沉积岩石学课程大实习 Course Practice training of Sedimentary Petrology	16	1		16		考查 Term paper	4	
DR063027	油层物理学 Petrophysics	32	2	26	6		考试 Exam	5	
DR063145	石油与天然气地质学 Petroleum and Natural Gas Geology	64	4	54	10		考试 Exam	5	
DR063130	新能源概论 New Energy Introduction	32	2	30	2		考试 Exam	5	
总计 Total		976	60	760	200				

4、专业核心课程（Specialized Core Courses）：464 **学时**（464 Hours），29 **学分** (29 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR063131	煤地质学 Coal Geology	32	2	28	4		考试 Exam	5	
SR063046	煤层气地质学 Coalbed Methane Geology	32	2	32			考试 Exam	6	
SR063132	非常规油气流体力学 Fluid Mechanics of Unconventional Oil and Gas	32	2	26	6		考试 Exam	5	
SR063133	非常规天然气储层工程 Unconventional Gas Reservoir Engineering	32	2	22	10		考试 Exam	6	
SR064134	新能源勘查工程 Unconventional Hydrocarbon Exploration Engineering	32	2	22	10		考查 Term paper	7	
DR063003	油气地球化学 Petroleum Geochemistry	32	2	28	4		考试 Exam	6	
SR063006	地震勘探原理与解释 Principle and Geological Interpretation of Seismic Exploration Engineering	32	2	32			考试 Exam	5	
SR063045	非常规能源流体地质学 Fluid Geology of Unconventional Energy Resource	32	2	30	2		考试 Exam	6	
SR103046	地球物理测井与解释 Geophysical Well Logging and Interpretation	32	2	32			考试 Exam	6	
SR063135	岩石力学 Rock Mechanics	32	2	26	6		考试 Exam	6	
SR064146	石油技术经济评价 Introduction of New Energy Resources	32	2	24	8		考试 Exam	7	
SR063124	含油气盆地地质学 Geology of Petroliferous Basins	32	2	26	6		考试 Exam	6	
DR063002	沉积环境和相 Sedimentary Environment and Facies	32	2	24	8		考试 Exam	5	
SR064050	资勘新能源专业英语 Specialized English of Resource Prospecting Engineering (New Energy Geology and Engineering)	32	2	32			考试 Exam	7	
总计 Total		464	29	400	64				

5、**专业拓展课程** (Specialized Development Courses)：96 **学时** (96 Hours)，6 **学分** (6 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS064136	论文写作与软件应用 Essay writing and software application	16	1	9	7		考查 Term paper	7	
SS064137	资源勘查与环境保护 Resource Prospecting and Environmental Protection	32	2	24	8		考查 Term paper	7	
SS060047	非常规油气储层：问题、挑战与技术方案 Unconventional petroleum reservoir: problem, challenge and technical proposal	16	1	16			考查 Term paper	7	
SS060082	石油天然气地质与地球化学进展 Advances in petroleum geology and geochemistry	16	1	16			考查 Term paper	7	
SS060083	细粒沉积学进展 Advances in Fine-grained Sedimentology	16	1	12	4		考查 Term paper	7	
SS064126	油气地质大数据与机器学习 Machine learning and big data analytics of petroleum geology	16	1	12	4		考查 Term paper	7	
SS064127	能源开发与生态环境 Energy development and ecological environment	24	1.5	16	8		考查 Term paper	7	
SS064128	全球大油气田导论 Introduction to Global Giant Oil and Gas Fields	32	2	32			考查 Term paper	7	
总计 Total		168	10.5	137	31				

6、**课程实践** (Course Practice)：29 **周** +128 **学时** (29 weeks and 128 hours)，28 **学分** (28 Credits)

课程代码 Course Code	课程名称 Course Name	周数（学时） Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考查 Term Paper	1 夏	
PR191045	实验物理（1） Physics Experiments（1）	24 学时	1	考试 Exam	2	
PR192046	实验物理（2） Physics Experiments（2）	24 学时	1	考试 Exam	3	
PR191047	实验化学 Chemistry Experiments	48 学时	2	考试 Exam	2	
PR011044	北戴河地质认识实习 Geological Survey Field Trip in Beidaihe	2 周	2	考查 Term Paper	1 夏	
PR012046	周口店地质教学实习 Geological Survey Field Trip in Zhoukoudian	5 周	5	考查 Term Paper	2 夏	
PR064018	地震资料解释课程设计 Geological Interpretation of Seismic Profile Design Practice	1 周	1	考查 Term paper	5	
PR103071	测井资料解释课程设计 Interpretation of Geophysical Well Logging Design Practice	1 周	1	考查 Term paper	6	
PR063053	非常规天然气地质综合设计实习 Unconventional Gas Geology and Comprehensive Design Practice	2 周	2	考查 Term paper	3 夏	
PR063042	专业实习 Professional Practice	2 周	2	考查 Term paper	3 夏	
PR063052	非常规储层微观表征与评价 Microscopic Characterization and Appraisal of Unconventional Reservoir	2 周	2	考查 Term paper	3 夏	
PR064051	毕业设计 (论文) Graduation Design (Thesis)	12 周	6	考查 Term paper	8	
总计 Total		29 周 +128 学时	28			

7、课外实践 (Extracurricular practice)：6 **学分** (6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
毕业要求 1	√	√		√	
毕业要求 2	√			√	
毕业要求 3	√		√		√
毕业要求 4	√		√	√	
毕业要求 5	√	√		√	
毕业要求 6	√			√	√
毕业要求 7	√			√	
毕业要求 8	√				√
毕业要求 9	√			√	√
毕业要求 10	√		√	√	√
毕业要求 11	√	√			√
毕业要求 12	√	√	√	√	√

九、课程与毕业要求关系矩阵（工程教育认证类专业参考）

毕业要求 课程名称	(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
思想道德与法治								H				H
中国近现代史纲要						M						
马克思主义基本原理		H					L					M
毛泽东思想和中国特色社会主义理论体系概论		H				M						
习近平新时代中国特色社会主义思想概论		H				M						
形势与政策		M					M					
大学生职业生涯规划与就业指导（1）		L				M			H			
大学生职业生涯规划与就业指导（2）		L				M			H			
大学生心理素质教育（1）										H	L	
大学生心理素质教育（2）										H	L	
军事理论								H	M			
大学英语（1）				H								M
大学英语（2）				H								H
大学生英语素质拓展课								L		H		
体育（1）（系列课程）									H	M		
体育（2）（系列课程）									H	M		
体育（3）（系列课程）									H	M		
体育（4）（系列课程）									H	M		
大学计算机			M		H						L	
程序设计基础 A		H		L								
人文社科类（含在线课程）								H				M
自然科学类（含在线课程）		M						M				M
自然文化类						H	H					H
体育与健康类									H			H
创新创业教育类								H			H	M
审美与艺术类									H			H

毕业要求 / 课程名称	(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
高数 B（1）		H		M								
高数 B（2）		H		M								
线性代数		H										
概率论与数理统计			M									
大学物理（1）	M				L							
大学物理（2）	M				L							
大学化学				M			L					
有机化学 C							L					
测量学 A			H		L							
地球科学概论		M					H					
结晶学与矿物学				M								
岩石学（含晶体光学）				M								
古生物学与地史学				M			L					
构造地质学		M		M								
沉积岩石学				H				M				
沉积岩石学课程大实习		M		H	H							
油层物理学	M	H		H	L							
石油与天然气地质学				H				M				
新能源概论	L			M			H		M	L		
煤地质学		H		M	M		L					
煤层气地质学		H		M	M		L					
非常规油气流体力学	H	M	M									
非常规天然气储层工程	M	M	H	M								
新能源勘查工程			H	L	L	M						
油气地球化学				H				M				
地震勘探原理与解释	M	M	M									
非常规能源流体地质学				M	L	M	H					
地球物理测井与解释				M	H			M				
岩石力学	H	M	M									
石油技术经济评价		H	L						M			

毕业要求 课程名称	(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
含油气盆地地质学				H				M				
沉积环境与相				H				M				
资勘新能源专业英语	M									H		M
论文写作规范与软件应用								H			M	M
资源勘查与环境保护		L				M	H				M	
非常规油气储层：问题、挑战与技术方案			H	L	L	M						
石油天然气地质与地球化学进展		M	M	H								
细粒沉积学进展				M			M					
油气地质大数据与机器学习					H			M				
能源开发与生态环境							L	M				H
全球大油气田导论								M				
军事理论及训练								M	M	H		
思想政治社会实践						H		L				
实验物理（1）	H	M	M									
实验物理（2）	H	M	M									
实验化学	H	M	M									
北戴河地质认识实习				H			M					
周口店地质教学实习				H			M					
地震资料解释课程设计	M		H									
测井资料解释课程设计	M		H									
非常规天然气地质综合设计实习						M	M					
专业实习				H								
非常规储层微观表征与评价	M			H								
毕业设计 (论文)			M	H								
课外实践		M		H				L	M	M		

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

石油工程专业培养方案

一、专业培养目标

本专业面向国家油气工业和社会经济发展需求，培养德、智、体、美、劳全面发展、适应石油工业可持续发展的复合创新型人才。掌握油气开采领域的地质、工程与管理等专业知识，具备分析和解决石油工程复杂问题、团队合作、国际交流能力及创新意识，毕业后可在石油、地矿等行业从事地质工程一体化的工程设计与管理、生产运营、科学研究等工作。经过 5 年的实际工作，能够承担石油工程及相关领域工程设计管理、施工、应用与研究等工作的专门技术人才。本专业学生毕业 5 年后应达到：

（1）能够就开发地质、油气开发与开采领域的工程问题进行分析和设计解决方案，组织方案实施。

（2）具备综合利用专业知识和现代化工具、解决复杂石油工程问题的科学研究能力。

（3）具有良好的团队协作、沟通交流能力、国际视野与多学科背景下的工程管理决策能力。

（4）具有良好的人文科学素养、社会责任感，坚守职业道德规范，在工程实践中自觉重视法律、社会、健康、安全、环境、经济等因素。

（5）具有终身学习的意识和创新能力，不断更新专业知识，适应技术进步和社会发展。

二、毕业要求

贯彻落实德智体美劳为导向的人才培养理念，树立为国家富强、民族昌盛而奋斗的志向和责任感；养成良好的体育锻炼习惯，保持身心健康，达到大学生体质健康标准。树立正确、进步的审美观，具有一定的文学、艺术修养和人文科学素养；形成正确的劳动观念和劳动态度，具一定的劳动技能。通过专业相关课程的学习，掌握石油与天然气工程方面的基本理论和基本知识，受到石油工程实践方面的基本训练，具备解决石油与天然气领域复杂工程问题的基本能力。

（1）工程知识：将数学、自然科学、工程基础和专业知识用于解决复杂石油工程问题。掌握数学类基础知识，为未来工程问题的描述奠定基础；将数学、自然科学知识用于石油工程专业复杂工程问题的合理描述；针对石油工程专业的复杂工程问题建立合适的数学物理模型；解决石油工程专业复杂工程问题的分析、设计和优化。

（2）问题分析：应用基本原理，识别、表达和分析复杂石油工程问题。利用数学、物理、化学等基本原理明确复杂石油工程问题的关键点；识别和表达石油工程问题的影响因素和过程；通过查阅文献，分析复杂石油工程问题的特征，并获得有效结论。

（3）工程设计： 能够应用石油工程的专业知识提出解决复杂石油工程问题的优化和创新方案。将石油工程专业知识用于复杂石油工程问题的解决方案；针对石油工程中的问题提出工程技术方案，并进行优选和论证；设计石油工程工艺系统及处理单元，考虑社会、健康、安全、法律、文化等因素，体现创新意识。

（4）研究与创新： 有创新意识，能运用科学方法对复杂石油工程问题进行研究。具有一定的创新精神和技术革新意识，具备设计、分析等科学研究技能；通过信息综合得到合理有效的结论；将最新的理论研究成果和技术运用于工程设计，并撰写论文或报告。

（5）使用现代工具：能够使用恰当的现代工具进行分析、模拟及预测。运用现代信息技术和网络平台，获取石油工程专业相关信息和知识；运用计算机辅助软件等现代工具，正确分析和表达石油工程问题；对复杂石油工程问题进行分析、模拟和预测，并能够理解所使用方法和技术的局限性。

（6）工程与社会： 有实践经历，熟悉行业法律规范，理解应承担的社会责任。具有石油工程相关实习和社会实践经历；熟悉石油工程领域施工的相关技术标准、规范、产业政策和法律法规；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。

（7）环境和可持续发展：能在规划和工程项目中，评价对环境和可持续发展的影响。理解环

境保护和可持续发展的内涵和意义；针对规划和工程项目，评价其在资源开发利用、污染处理处置、生态保护等方面对环境、社会可持续发展的影响。

（8）职业规范：树立核心价值观，在实践中理解并遵守工程职业道德和规范。理解社会主义核心价值观，了解国情，具备科学的世界观、人生观和价值观，具有人文科学素养和社会责任感；理解石油工程师的职业性质和责任，在工程实践中能自觉遵守职业道德和规范，具有法律意识。

（9）个人和团队：理解并体现个人价值和团队合作的重要性。理解团队合作的意义，具有个人诚信和团队合作意识；能在多学科背景下的团队中发挥相应的作用，工作能力得到充分体现。

（10）沟通与交流： 能实现跨文化背景的专业交流和有效沟通。通过工程图纸、报告等形式，沟通和交流设计思想和技术方案；就复杂石油工程问题的解决方案与同行及公众进行有效沟通； 至少掌握一门外语，能够在跨文化背景下进行沟通。

（11）项目管理：理解并掌握工程管理原理与经济决策方法，能在多学科环境中应用。熟悉工程管理的方法和程序；将相关工程管理原理与经济决策方法应用于多学科环境中。

（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。在发展的大背景下，认识不断学习的必要性，具有终身和自主学习的意识；能针对个人或职业发展的需求，采用合适的方法，自主学习，适应发展。

三、主干学科

石油与天然气工程。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

石油与天然气地质学、钻井与完井工程、采油工程、油藏工程、地球物理测井与解释、油气田开发地质学、油藏数值模拟、油藏描述基础、提高采收率原理、石油技术经济评价、石油工程专业英语。

Undergraduate Program in Petroleum Engineering

1. Academic Objectives

Petroleum Engineering is oriented to the demands of the national oil and gas industry together with social and economic development. Our program aims to cultivate the compound talents with comprehensive development in morality, intelligence, physique, aesthetics, and labour, and keeps pace with the sustainable development of the oil industry. Students are required to have sufficient knowledge of geology, engineering and management, etc. In addition, the ability of analyzing and solving complex problems in petroleum engineering, teamwork and international communication will be enhanced in our program, and innovation consciousness will be encouraged. After graduation, the student can start their career in petroleum, and geological and mineral industries, and engaged in the work such as engineering design and management of geological engineering integration, production operation, and scientific research. After 5 years of work, the graduates are expected to become specialized technical talents, who can undertake engineering design and management, construction, application, and research in petroleum engineering and related fields. Five years after graduation, students in this major are expected to achieve the objective that are listed as follows:

(1) Have the ability to analyze and solve complex engineering problems in the fields of development geology, oil and gas development, and exploitation, and organize the implementation of the plan.

(2) Have the ability to comprehensively utilize professional knowledge and modern tools to solve complex petroleum engineering problems.

(3) Have good teamwork and communication skills, international perspective and engineering management decision-making ability in a multidisciplinary background.

(4) Have a good sense of humanities literacy and social responsibility, adhere to professional ethics, and consciously attach importance to factors such as law, society, health, safety, environment, and economy in engineering practice.

(5) Have the awareness of lifelong learning and the ability to innovate, constantly update professional knowledge to adapt to technological progress and social development.

2. Graduation Requirements

To act on the vision for talents cultivation with the goal of morality, intelligence, physique, aesthetics, and labour, students are encouraged to establish the ambition to strive for the prosperity of the country and the nation, foster sense of responsibility, develop good physical exercise habits and focus on mental health to pass physical tests. Besides, A sound and progressive aesthetic, literacy of art and the humanities, positive attitudes to labor as well as basic labor skills are necessary to students. During the professional courses, students should have a good command of the basic theories of petroleum and natural gas engineering, carry out basic practices of petroleum engineering and develop the capabilities to solve complex problems in the field of petroleum and natural gas.

(1)Engineering knowledge: Be able to apply mathematics, science, and engineering to complex petroleum engineering problems. Master the basic theories of mathematics to lay the foundation for engineering modeling; Be able to use mathematics and natural sciences to rationally describe complex engineering problems in petroleum engineering; Be able to establish rational mathematical physics models for complex engineering problems in petroleum engineering; Be able to analyze, design, and optimize complex engineering problems in petroleum engineering.

(2)Problem analysis: Apply the fundamental principles to identify, describe and analyze complex petroleum engineering problems. Be able to identify the key points of complex petroleum engineering problems utilizing mathematics, physics, and chemistry. Be able to identify the influencing factors and describe the processes in petroleum engineering. Be able to characterize complex petroleum engineering problems and obtain useful conclusions by reviewing literature.

(3)Engineering design: Apply the professional knowledge of petroleum engineering to propose optimized and innovative solutions to complex petroleum engineering problems. Be able to apply petroleum engineering expertise to the solutions of complex petroleum engineering problems; Be able to propose engineering technical solutions to problems in petroleum engineering, and conduct the optimization and demonstration; Be able to design process system of petroleum engineering and processing unit base on society, health, safety, law, culture and other factors, in which innovation should be reflected.

(4)Research and innovation: Be innovative, and able to use scientific methods to study complex petroleum engineering problems. Have a certain spirit of innovation and awareness of technological innovation, and have scientific research skills such as design and analysis; Be able to make reasonable and useful conclusions through information synthesis; Be able to apply the latest theoretical research results and techniques to engineering design, and write papers or reports.

(5)Modern tools using: Employ proper modern tools to analyze, simulate and predict. Be able to use modern information technology and network platform to obtain the relevant information and knowledge of petroleum engineering; Be able to utilize modern tools such as computer aided software to accurately analyze and describe petroleum engineering problems; Be able to analyze, simulate and predict the complex petroleum engineering problems, and understand the limitations of the current methods and techniques.

(6)Engineering and society: Have practical experience, be familiar with industry laws and regulations, and undertake social responsibilities. Have the internship and social practice experiences related to petroleum engineering; Be familiar with the relevant technical standards, specifications, industrial policies, laws and regulations in the field of petroleum engineering; Realize the impacts of petroleum engineering on society, health, safety, law and culture, and assume the responsibilities.

(7)Environment and sustainable development: Be able to evaluate the impact of planning and engineering projects on the environment and sustainable development. Understand the connotation and significance of environmental protection and sustainable development; Be able to evaluate the influence of planning and engineering projects on the environment and sustainable development of society in terms of resource development and utilization, pollution treatment and disposal, ecological protection, etc..

(8)Professional norms: Establish core values, understand and abide by engineering professional ethics and norms in practice. Understand the Core socialist values and the national conditions, have a scientific outlook on the world, life and values, and have the humanities literacy and social responsibility; Understand the professional nature and responsibilities of petroleum engineers, consciously abide by professional ethics and norms in engineering practice, and have legal awareness.

(9)Individuals and teams: Discover individual values and understand the importance of teamwork. Understand the meaning of teamwork, have personal integrity and teamwork awareness; Be able to play a role in a team under the multi-disciplinary background and fully show work abilities.

(10)Communication and exchange: Realize the professional and effective communication across cultural backgrounds. Be able to exchange ideas and technical solutions in the form of engineering drawings and reports. Be able to communicate effectively with peers and the public on the solutions of complex petroleum engineering problems; Master at least one foreign language and be able to communicate in a cross-cultural context.

(11)Project management: understand and master the engineering management principles and economic decision-making methods, and apply them in a multi-disciplinary environment. Be familiar with the methodology and procedures of the project management. Apply the relevant engineering management principles and economic decision-making methods to a multi-disciplinary environment.

(12)Lifelong learning: Have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to development. Recognize the necessity of continuous learning, and have the consciousness of lifelong and independent learning under the context of development. Be able to adopt proper methods to learn independently and adapt to development on the basis of personal or career development plans.

3. Main disciplines

Petroleum and natural gas engineering.

4. Length of Schooling and Degree

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Engineering when they have completed the required minimum credits and have met all other requirements.

5. Core Courses

Oil and Natural Gas Geology, Drilling and Completion Engineering, Oil Production Engineering, Reservoir Engineering, Geophysical Well Logging and Interpretation, Oil–gas Fields Development Geology, Reservoir Numerical Simulation, Reservoir Description, Enhanced Oil Recovery, Petroleum Technical Economics, Specialty English for Petroleum Engineering.

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course module	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	40	11	13		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	1168	73	9	15		19	15		11			4	
	专业核心课程 Specialized Fundamental Courses	320	20							9	9		2	
	专业拓展课程 Specialized Development	96	6											
实践教育 Practical Education	课程实践 Course Practice	32 周 +128 学 时	31		3	5	1		5			8	3	6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				164										
选修课总学分 Elective course credits				24										
最低毕业总学分 Total Credits				188										

七、课程设置 (Curriculum)

1、**通识教育必修课程** (Required Courses of General Education)：730 **学时** (730 Hours)，40 **学分** (40 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48			考试 Exam	5	
GR181013	形 势 与 政 策 (1) Situation and Policy(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形 势 与 政 策 (2) Situation and Policy(2)	4	0.25	4			考查 Term Paper	2	
GR181015	形 势 与 政 策 (3) Situation and Policy(3)	4	0.25	4			考查 Term Paper	3	
GR181016	形 势 与 政 策 (4) Situation and Policy(4)	4	0.25	4			考查 Term Paper	4	
GR181017	形 势 与 政 策 (5) Situation and Policy(5)	4	0.25	4			考查 Term Paper	5	
GR181018	形 势 与 政 策 (6) Situation and Policy(6)	4	0.25	4			考查 Term Paper	6	
GR181019	形 势 与 政 策 (7) Situation and Policy(7)	4	0.25	4			考查 Term Paper	7	
GR181020	形 势 与 政 策 (8) Situation and Policy(8)	4	0.25	4			考查 Term Paper	8	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health (1)	16	1	16			考查 Term Paper	1	
GR303006	大学生心理素质教育（2） Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	3	
GR081071	大学英语（1） College English (1)	64	4	64			考试 Exam	1	
GR081072	大学英语（2） College English (2)	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育（1）（系列课程） Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育（2）（系列课程） Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育（3）（系列课程） Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育（4）（系列课程） Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	40	492	222	16			

2、通识教育选修 (Selective Courses of General Education)：192 **学时** (192Hours)，12 **学分** (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online courses)	见附件 1	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分，其中，《大学生安全教育》（1 学分）必选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term Paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term Paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term Paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5、6	3	考查 Term Paper	2-8	选修 3 个学分，其中《新生研讨课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程（Fundamental Professional Courses）：1168 **学时**（1168 Hours），73 **学分** (73 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191003	高等数学 B（1） Advanced Mathematics B (1)	96	6	96			考试 Exam	1	
DR191004	高等数学 B（2） Advanced Mathematics B (2)	64	4	64			考试 Exam	2	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistics	48	3	48			考试 Exam	4	
DR011036	地球科学概论 Introduction to Earth Science	64	4	36	28		考试 Exam	2	
DR012039	综合地质学 Synthetic Geology	64	4	32	32		考试 Exam	3	
SR062055	热动力学原理 Principles of Thermodynamics	32	2	32			考试 Exam	3	
DR192015	有机化学 C Organic Chemistry C	40	2.5	40			考试 Exam	3	
DR021002	工程图学 Engineering Graphics	48	3	48			考试 Exam	3	
DR042127	电工电子技术 (B) Electrical and Electronic Technology (B)	48	3	40	8		考试 Exam	3	

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR021029	工程力学 Engineering Mechanics	56	3.5	52	4		考试 Exam	3	
DR062001	沉积岩石学 Sedimentary Petrology	48	3	36	12		考试 Exam	4	
DR062023	计算方法 Computational Algorithm	32	2	32			考试 Exam	4	
DR193049	数学物理方程 B Mathematical physical equation B	32	2	32			考试 Exam	4	
DR062022	工程流体力学 Engineering Fluid Mechanics	32	2	32			考试 Exam	4	
DR063026	油层物理学 Petrophysics	48	3	40	8		考试 Exam	4	
DR062024	油田化学 Oilfield Chemistry	48	3	40	8		考试 Exam	5	
DR063025	渗流力学 Porous Flow Mechanics	48	3	40	8		考试 Exam	5	
DR063004	石油与天然气地质学 Oil and Gas Geology	48	3	48			考试 Exam	5	
SR103046	地球物理测井与解释 Geophysical Well Logging and Interpretation	32	2	32			考试 Exam	5	
DR064138	石油技术经济评价及 HSE Petroleum Technical Economic Appraisal and HSE	32	2	30	2		考试 Exam	7	
SR064033	石油工程专业英语 Professional English for Petroleum Engineering	32	2	32			考试 Exam	7	
总计 Total		1168	73	1058	110				

4、**专业核心课程** (Core Professional Courses)：320 **学时**（320 Hours)，20 **学分** (20 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR063032	钻井与完井工程 Drilling and Completion Engineering	48	3	40	8		考试 Exam	5	
SR063028	采油工程 Oil Production Engineering	48	3	40	8		考试 Exam	5	
SR063029	油藏工程 Reservoir Engineering	48	3	40	8		考试 Exam	6	
SR063031	油气田开发地质学 Oil–Gas Fields Development Geology	48	3	40	8		考试 Exam	5	
SR063056	天然气开发工程 Gas Development Project	32	2	28	4		考试 Exam	6	
SR063030	油藏数值模拟 Reservoir Numerical Simulation	32	2	24	8		考试 Exam	7	
SR064035	油藏描述基础 Reservoir Description Fundamentals	32	2	24	8		考试 Exam	6	
SR064034	提高采收率原理 Enhanced Oil Recovery	32	2	32			考试 Exam	6	
总计 Total		320	20	268	52				

5、**专业拓展课程** (Development Professional Courses)：**任选 96 学时** (96 Hours)，**任选 6 学分** (6 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS060044	碳酸盐岩油藏开发进展及新技术探讨 Development Progress and New Technology of Carbonate Reservoir	16	1	16			考查 Term Paper	7	
SS064139	石油开采中的应用化学基础 Fundamentals of Applied Chemistry in Petroleum Exploration	16	1	16			查 Term Paper	7	
SS060046	非常规油气储层裂缝识别方法与表征 Identification Method and Characterization of Unconventional Oil and Gas Reservoir Fractures	16	1	16			查 Term Paper	7	
SS064140	非常规储层水力压裂进展 Advances in Hydraulic Fracturing of Unconventional Reservoirs	16	1	12	4		查 Term Paper	7	
SS060081	能源的未来 —— 地热 The Future of Energy -- Geothermal	16	1	16			查 Term Paper	6	
SS064141	MATLAB 在石油工程中应用 Application of MATLAB in Petroleum Engineering	16	1	4	12		查 Term Paper	8	
SS064142	石油工程中的人工智能 Artificial Intelligence in Petroleum Engineering	16	1	12	4		查 Term Paper	7	
SS064143	深层 / 超深层钻井技术 Deep/Ultra-deep Drilling Technology	16	1	16			查 Term Paper	8	
SS064144	油藏数值模拟软件应用 Application of Reservoir Numerical Simulation Software	16	1	4	12		查 Term Paper	8	
总计 Total		144	9	112	32				

6、课程实践（Practice Course）：32 周 +128 学时 (32 weeks and 128 hours)，31 学分 (31 Credits)

课程代码 Course Code	课程名称 Course Name	周数（学时） Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR011044	北戴河地质实习 Geological Survey Field Trip in Beidaihe	2 周	2	考查 Term Paper	1 夏	
PR191045	实验物理 (1) Experiment Physics (1)	24 学时	1	考试 Exam	2	
PR192046	实验物理 (2) Experiment Physics (2)	24 学时	1	考试 Exam	3	
PR191047	实验化学 Experiment Chemistry	48 学时	2	考试 Exam	2	
PR012047	周口店地质教学实习 Geological Survey Field Trip in Zhoukoudian	4 周	4	考查 Term Paper	2 夏	
PR063017	专业实习 Professional Internship	2 周	2	考查 Term Paper	3 夏	
PR063040	油气田开发地质综合设计 Comprehensive Geological Design for oil and Gas Field Development	2 周	2	考查 Term Paper	3 夏	
PR063039	石油工程设计 (1) Petroleum Engineering (1)	2 周	2	考查 Term Paper	3 夏	
PR064037	油藏描述与地质建模实践 Reservoir Description and Geological Modeling Practice	2 周	2	考查 Term Paper	3 夏	
PR064036	石油工程设计 (2) Petroleum Engineering (2)	3 周	3	考查 Term Paper	7	
PR064038	毕业设计（论文） Graduation Design (Thesis)）	12 周	6	考查 Term Paper	8	
PR022099	金工实习 Metal Craft and Internship	1 周	1	考试 Exam	2 夏	
总计 Total		32 周 +128 学时	31			

7、课外实践（Extracurricular practice）：6 **学分** (6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
工程知识	√		√		
问题分析		√	√		
工程设计		√	√		
研究与创新		√	√		
使用现代工具		√			√
工程与社会	√			√	
环境和可持续发展	√			√	
职业规范	√			√	
个人和团队			√		
沟通与交流		√	√		√
项目管理		√	√		
终身学习					√

九、课程与毕业要求关系矩阵（工程教育认证类专业参考）

毕业要求 课程名称	(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
思想道德与法治			L			M		H				
中国近现代史纲要								L		M		H
马克思主义基本原理							H	L				
毛泽东思想和中国特色社会主义理论体系概论								M				L
习近平新时代中国特色社会主义思想概论								M				L
形势与政策						H	M	L				
大学生心理素质教育								M		H		
军事理论								M	H			
大学英语					L					H		M
大学英语素质拓展课					L					H		M
体育									H			M
大学计算机					H							
程序设计基础 A					H							
大学生职业生涯规划与就业指导								L				H
人文社科类（含在线课程）						L	L	M	H			
自然科学类（含在线课程）	H	M					L					
自然文化类						L	H	M				
体育与健康类								H	M	L		M
创新创业教育类									M		H	L
审美与艺术类		L						H		M		M
高等数学 B	H	L		M	L							
大学物理	H	M		L								
大学化学	H	M		L								
线性代数	H	L		M	L							
概率论与数理统计	H	L		M	L							
地球科学概论	M	H					L					
综合地质学	M	H										

毕业要求 课程名称	(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
热动力学原理	H	M	L									
有机化学 C	M	H										
工程图学			H		M					L		
电子电工技术 B	H		M									
金属工艺及实习		L				H			M			
工程力学	H		M									
沉积岩石学	H	M	L									
计算方法	H											
数学物理方程 B	H											
工程流体力学	H	M	L									
油田化学		H	M	L								
油层物理学	H	M	L									
渗流力学	H	M	L									
石油与天然气地质学		H	M									
钻井与完井工程	H	M		L				L	M			
采油工程	H	M		L				L	M			
油藏工程	M	M	M	H								
天然气开发工程	M	M		H								
地球物理测井与解释	H	M	L									
油气田开发地质学	L	M	H									
油藏数值模拟	M	M	H		L							
油藏描述基础	L	H	M									
提高采收率原理			M	H								
石油技术经济评价及 HSE							M				H	
石油工程专业英语					L					H		M
碳酸盐岩油藏开发进展及新技术探讨	H	M	H									
石油开采中的应用化学基础	M	M					L					
非常规油气储层裂缝识别方法与表征	H	H	M									

毕业要求 课程名称	(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
能源的未来 —— 地热	M			H			M					
MATLAB 在石油工程中应用	L		H		H							
石油工程中的人工智能	M			M	H							
深层 / 超深层钻井技术	H	M	M									
油藏数值模拟软件应用		H	M		H							
军事技能训练								M	H			
思想政治社会实践								M	H			
北戴河地质认识实习		L				H			M			
实验物理				H			M					
实验化学				H			M					
周口店地质教学实习		L				H			M			
专业实习						H	M	L				
油田开发地质综合设计			H		M					L		
石油工程设计			H		M		L		L	M		
油藏描述与地质建模实践			H		M				L			
毕业设计（论文）			H	M	L				L			
课外实践						L			H	M	L	L

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。