Academic Program Description

University Name: University of Mosul

College/Institute: College of Petroleum and Mining Engineering

Scientific Department: Department of Petroleum Reservoir Engineering

Name of the Academic or Professional Program: Bachelor of Petroleum Reservoir Engineering

Name of the Final Certificate: Bachelor of Science in Petroleum Reservoir Engineering

Study System: Bologna and Semester System

Description Preparation Date: 01/04/2024

File Filling Date: 02/04/2024

Signature:

Head of Department Name:

Dr. Y. H. Qaddo

Date: 4/4/2024

Signature:

Scientific Assistant Name:

Dr. M. A. Alrashedi

Date: 4/4/2024

File Reviewed by

Quality Assurance and University Performance Division

Name of the Head of Quality Assurance and University Performance Division: **Dr. Asmaa Mowafaq**

Date: 4/4/2024

Signature:

Approval of the Dean:

Assist. Prof. M. H. Almajid

1. Program Vision:

The Department of Petroleum Reservoir Engineering aims to produce highly skilled engineers specializing in petroleum reservoir engineering, following the latest internationally accredited curricula. The objective is to undertake various engineering projects required by the country and to establish an advanced and robust scientific institution that will support the nation's future development and scientific advancement.

2. Program Mission:

1. To graduate distinguished engineers in various petroleum reservoir engineering specializations, including drilling and oil production engineering, and to equip them with the necessary skills for innovation and creativity in engineering fields while keeping pace with scientific advancements.
2. To provide students with practical and applied opportunities to acquire scientific and engineering knowledge through the establishment of laboratories and engineering workshops equipped with the latest technologies and equipment, as well as organizing scientific visits to various national sectors and oil facilities.
3. To provide students with the necessary resources to develop their leadership abilities by teaching them the principles of effective teamwork, encouraging their active participation in student activities, and fostering creativity and innovation to meet the community's need for specialized engineers.
4. To organize seminars, conferences, and training courses for government employees and institutions in the petroleum sectors to inform them about the latest scientific and technological developments, with the aim of enhancing the efficiency and capabilities of engineering personnel working in various sectors.

3. Program Goals:

1. **Provide Fundamental Knowledge:** Equip students with essential knowledge in geology, physics, and chemistry necessary to understand the nature and composition of oil and gas reservoirs.
2. **Enhance Design and Analysis Skills:** Train students in using advanced technologies and engineering software to analyze and design effective methods for oil and gas extraction.
3. **Develop Problem-Solving Abilities:** Enable students to develop innovative solutions to technical and operational challenges faced by the oil and gas industry.
4. **Encourage Effective Collaboration:** Encourage students to work within multidisciplinary teams and promote cooperation and understanding among various engineering disciplines.
5. **Commitment to Environmental and Ethical Responsibility:** Emphasize the importance of adhering to environmental and ethical standards in all aspects of exploration and extraction operations to preserve the environment.
6. **Promote Lifelong Learning:** Inspire students to continuously develop their skills and knowledge after graduation to keep up with technological advancements in the industry.
7. **Focus on Practical Training:** Provide practical training opportunities through summer internships and field visits to enhance the practical understanding of theoretical concepts and their application in real-world scenarios.

4. Program Accreditation:

None

5. Other External Influences:

None

6. Program Structure

Component	Number of Courses	Credit Hours	Percentage	Notes
Core Courses	4	9	5%	**Basic**
College Requirements	7	46	26%	
Department Requirements	45	120	69%	
Summer Training				**Available**
Others				

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			Theoretical	**Practical**
First Year (Bologna Track)	PRE 111	Geology for Engineers 1	3	3
	PRE 112	Engineering Mechanics 1	4	---
	PRE 113	Mathematics 1	4	---
	UOM 102	English Language (Reading and Writing)	2	---
	PRE 115	Engineering Drawing	---	3
	UOM 104	Human Rights and Democracy	2	---
	PRE 121	Geology for Engineers 2	2	3
	PRE 122	Engineering Mechanics 2	4	---
	PRE 123	Mathematics 2	4	---
	UOM 101	Arabic Language	2	---
	PRE 125	Engineering Drawing with Computer	2	2
	PRE 126	Fundamentals of Petroleum Engineering	3	---
	UOM 103	Fundamental of Computer	1	2

Second Year / Semester	PRE 211	Gravitational and Magnetic Exploration	2	2
	PRE 212	Computer Applications	2	3
	PRE 213	Geology for Engineers	2	3
	PRE 214	Principles of Reservoir Engineering	3	---
	PRE 215	Engineering Statistics	3	---
	PRE 216	Numerical Analysis	2	---
	PRE 217	Fluid Mechanics	4	2
	PRE 218	Crimes of the Ba'ath Party	2	---
	PRE 218	Engineering Surveying	2	2
	PRE 221	Principles of Reservoir Engineering 2	3	---
	PRE 222	Thermodynamics	3	---
	PRE 223	Engineering Analysis	2	2
	PRE 224	Strength of Materials	3	---
Third Year / Semester	PRE 311	Seismic Reflection (Operations and Interpretation)	3	2
	PRE 312	Well Logging	3	2
	PRE 313	Drilling Engineering 1	3	---
	PRE 314	Rock Mechanics	3	2
	PRE 315	Production Engineering 1	3	---
	PRE 316	Applied Reservoir Engineering 1	3	2
	PRE 317	Drilling Engineering 2	3	---
	PRE 318	Applied Reservoir Engineering 2	3	2
	PRE 319	Petroleum Production Engineering 2	3	---
	PRE 320	Natural Gas Technology	3	---
	PRE 321	Seismic Interpretation	3	2
	PRE 322	Formation Evaluation	2	2
Fourth Year / Semester	PRE 411	Enhanced Oil Recovery 1	3	---
	PRE 412	Reservoir Characterization	3	2
	PRE 419	Petroleum System Modeling	3	2
	PRE 414	Advanced Reservoir Engineering	3	2
	PRE 415	Core Analysis	2	2
		Engineering Graduation Project	3	1
	PRE 417	Enhanced Oil Recovery 2	3	---
	PRE 418	Reservoir Simulation	2	2
	PRE 413	Petroleum Economics	2	---
	PRE 420	Well Testing	3	2
	PRE 421	Reservoir Management	2	2

8. Expected Learning Outcomes

Knowledge

A1- Mastering the theoretical foundations of reservoir engineering, including geology, reservoir physics, and fluid dynamics.
A2- Comprehensive knowledge of the latest techniques and methods used in oil and gas extraction from underground reservoirs.
A3- The ability to analyze reservoir data and create models to predict reservoir behavior and evaluate different strategies for managing it.
A4- Understanding the environmental impacts of oil extraction processes and developing strategies for sustainable extraction.

Skills

B1- The ability to analyze complex technical problems and develop effective solutions based on data and scientific knowledge.
B2- Proficiency in using specialized engineering software to design and analyze reservoir models.
B3- Effective communication: The ability to present and explain technical information clearly to colleagues, specialists, and non-specialists.
B4- Teamwork and leadership: The ability to work effectively within multidisciplinary teams and lead engineering projects.

Values

C1- A strong commitment to ethical standards in all stages of engineering work, including integrity and transparency.
C2- Awareness of the importance of environmental protection and contributing to sustainable development.
C3- Commitment to continuous learning and constant updating of knowledge and skills to keep up with technological developments.
C4- Promoting mutual understanding and respect between different cultures and working effectively in multinational environments.

9. Teaching and Learning Strategies

- Theoretical lectures.
- Discussion sessions.
- Laboratory experiments
- Computer labs.
- Graduation projects.
- Industrial training.

10. Assessment Methods

- Practical exams and homework.
- Oral presentations.
- Quizzes, midterm, and final exams.
- Reports.

11. Faculty Staff

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
Lecturer	Geologist	Paleontology and Stratigraphy		1	
Lecturer	Geologist	Geophysics		2	
Lecturer	Geologist	Sedimentology		2	
Lecturer	Mechanical Engineering	Production Mechanics		1	
Lecturer	Geologist	Petroleum Geology		1	
Lecturer	Geologist	Geochemistry		1	
Lecturer	Chemical Engineering	Petroleum Operations		1	
Assistant Lecturer	Mechanical Engineering	Thermal Power		2	
Assistant Lecturer	Civil Engineering	Structures		1	
Assistant Lecturer	Statistics	Operations Research		1	
Assistant Lecturer	English Literature	Translation		1	

12. Professional Development

Guidance for New Faculty Members

- Teaching methods courses.
- Continuing education courses.
- Training courses.
- Scientific seminars and workshops.

Professional Development for Faculty Members

A plan to develop the skills of the teaching staff in the Petroleum Reservoir Engineering Department through the participation of the largest possible number in local and international conferences, continuing education courses, scientific seminars, and workshops held inside and outside the university.

13. Admission Criteria

1. Iraqi nationality.
2. Holding an Iraqi high school certificate endorsed by the Directorate General of Education in the governorate or an equivalent certificate.
3. Born in 1999 or later.
4. Passing the medical examination according to the specific conditions for each study. Blind students meeting the conditions are allowed to apply for humanities studies through central admission.
5. Full-time study is required; combining a job and study simultaneously is not allowed in morning colleges and institutes. All government employees must obtain a study leave from their departments to continue their studies. Combining two studies is also not allowed; if proven otherwise, the acceptance will be canceled. Students with two different admissions for the same year must choose one.
6. Graduates of:
7. a. The current academic year.
8. b. The previous academic year, not admitted centrally to any college or institute, will be admitted under the channel for graduates of the previous academic year according to the minimum limits of their graduation year, provided they have not enrolled in evening studies, private education, or any college affiliated with the religious endowments or institutes affiliated with other ministries.
9. International students for the academic year (2022/2023) can apply through the electronic portal of the Directorate of Studies, Planning, and Follow-up via their specific electronic form. Electronic submission will be adopted after bringing a temporary equivalency certificate from the Ministry of Education, Directorate of Equivalency and Certificates. Previous year graduates apply through the Central Admission Department, Foreign Students Section.
10. Non-Iraqi students holding an Iraqi high school certificate and centrally admitted must be informed in writing to review the Central Admission Department / Foreign Students Section to determine their exemption or payment of tuition fees in foreign currency according to the seventh chapter of the Student Affairs Procedures Manual.

14. Main Sources of Information about the Program

- Textbooks and reference materials available in: Free education, department library, college library, central library.
- Scientific sources available on the internet.

15. Program Development Plan

To develop the program, a comprehensive plan focusing on improving academic quality, enhancing collaboration with industry, and developing the necessary skills for students to face future challenges in the energy sector is put in place, focusing on:

1. Updating Curricula
   - Reviewing courses: Regularly evaluate and review courses to ensure they keep up with the latest developments in petroleum reservoir engineering.
   - Adding new courses: Introduce courses covering new and innovative technologies, such as digital oil extraction and the use of artificial intelligence in reservoir analysis.
2. Industry Collaboration
   - Industrial partnerships: Develop partnerships with oil and gas companies and technology firms to provide training opportunities and research collaborations.
   - Joint projects: Encourage students to participate in joint research projects with the industry to apply what they have learned in real work environments.
3. Enhancing Infrastructure and Resources
   - Advanced laboratories: Upgrade laboratories and provide advanced equipment to conduct realistic experiments and simulations of oil extraction processes.
   - Access to data and software: Provide access to industry databases and modern engineering software to enhance students' learning and research capabilities.
4. Developing Student Skills
   - Workshops and seminars: Organize regular workshops and seminars with industry experts to introduce students to the latest challenges and innovations in the field.
   - Special skills development: Offer programs to develop special skills such as leadership, communication, and teamwork to prepare students to work within multidisciplinary teams.
5. Performance Evaluation and Monitoring
   - Continuous evaluation system: Develop a system for regular evaluation of the program's performance, focusing on feedback from students and faculty members.

16. Program Skills Outline

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First Year (Bologna Track)	PRE 111	Geology for Engineers 1	Basic	•	•										
	PRE 112	Engineering Mechanics 1	Basic	•				•							
	PRE 113	Mathematics 1	Basic	•											
	UOM 102	English Language (Reading and Writing)	Basic							•					
	PRE 115	Engineering Drawing	Basic												
	UOM 104	Human Rights and Democracy	Basic					•	•						
	PRE 121	Geology for Engineers 2	Basic									•	•		
	PRE 122	Engineering Mechanics 2	Basic	•	•										
	PRE 123	Mathematics 2	Basic	•				•							
	UOM 101	Arabic Language	Basic							•					
	PRE 125	Engineering Drawing with Computer	Basic					•	•						
	PRE 126	Fundamentals of Petroleum Engineering	Basic		•	•									
	UOM 103	Fundamental of Computer	Basic		•										

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Year/Level	**Course Code**	**Course Name**	**Basic or optional**	**Knowledge**				**Skills**				**Ethics**			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
Second Year / Semester	PRE 211	Gravitational and Magnetic Exploration	**Basic**	•		•									
	PRE 212	Computer Applications	**Basic**						•						
	PRE 213	Geology for Engineers	**Basic**	•	•										
	PRE 214	Principles of Reservoir Engineering	**Basic**		•	•									
	PRE 215	Engineering Statistics	**Basic**	•											
	PRE 216	Numerical Analysis	**Basic**	•				•							
	PRE 217	Fluid Mechanics	**Basic**	•		•		•							
	PRE 218	Crimes of the Ba'ath Party	**Basic**									•			
	PRE 219	Engineering Surveying	**Basic**					•			•				
	PRE 221	Principles of Reservoir Engineering 2	**Basic**		•	•									
	PRE 222	Thermodynamics	**Basic**	•		•									
	PRE 223	Engineering Analysis	**Basic**	•				•							
	PRE 224	Strength of Materials	**Basic**	•		•		•							

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Year/Level	**Course Code**	**Course Name**	**Basic or optional**	**Knowledge**				**Skills**				**Ethics**			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
Third Year / Semester	PRE 311	Seismic Reflection (Operations and Interpretation)	**Basic**	●		●									
	PRE 312	Well Logging	**Basic**	●		●			●						
	PRE 313	Drilling Engineering 1	**Basic**		●			●	●						
	PRE 314	Rock Mechanics	**Basic**	●		●		●							
	PRE 315	Production Engineering 1	**Basic**		●	●			●						
	PRE 316	Applied Reservoir Engineering 1	**Basic**		●	●			●						
	PRE 317	Drilling Engineering 2	**Basic**		●			●	●						
	PRE 318	Applied Reservoir Engineering 2	**Basic**		●	●			●						
	PRE 319	Petroleum Production Engineering 2	**Basic**		●	●			●						
	PRE 320	Natural Gas Technology	**Basic**		●	●									
	PRE 321	Seismic Interpretation	**Basic**	●		●			●						
	PRE 322	Formation Evaluation	**Basic**		●	●									

16. Program Skills Outline

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Fourth Year / Semester	PRE 411	Enhanced Oil Recovery 1	Basic		•	•			•						
	PRE 412	Reservoir Characterization	Basic		•	•			•						
	PRE 419	Petroleum System Modeling	Basic		•	•			•						
	PRE 414	Advanced Reservoir Engineering	Basic		•	•			•						
	PRE 415	Core Analysis	Basic		•	•			•						
		Engineering Graduation Project	Basic					•		•	•				
	PRE 417	Enhanced Oil Recovery 2	Basic		•	•			•						
	PRE 418	Reservoir Simulation	Basic		•	•			•						
	PRE 413	Petroleum Economics	Basic	•									•		
	PRE 420	Well Testing	Basic		•	•			•						
	PRE 421	Reservoir Management	Basic		•	•			•						