

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



Academic Program and Course Description

Petroleum Engineering Department

2025-2026

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extracurricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name:Basrah.....

Faculty/Institute:Engineering Collage.....

Scientific Department: Oil and Gas engineering dept.

Academic or Professional Program Name: BSC...

Final Certificate Name:BSC.....

Academic System: ...Courses (4 Stage)

Description Preparation Date:20/9/2026.....

File Completion Date:20/9/2026.....

Signature: *Z.M.N. Hassen*

Head of Department Name:

Zaher M. N. Hassen

Date: 20/9/2026

Signature: *M.A. I smu*

Scientific Associate Name:

Date: *21/9/2026*

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: *20-9-2026*

Dr. Ali K. Marzook

Signature: *[Signature]*

Approval of the Dean

Prof. Dr. [Signature]
Dean Office
T-Rasheed



1. Program Vision

The Department of Petroleum Engineering's ambition is to graduate competent petroleum engineers, according to the latest internationally accredited curricula, with the goal of implementing various engineering projects currently needed by the country. This is achieved by providing a high-quality engineering, educational, and research environment in petroleum engineering to build and serve their country, and by highlighting the role of petroleum engineers in serving their country, in civilizational development, and in scientific progress.

2. Program Mission

The department seeks to provide a pioneering environment based on the distinguished engineering expertise of its faculty members, in addition to its administrators, and facilities that meet the needs of students and, consequently, the entire community. It also aims to provide students with a contemporary educational and scientific experience that enriches their skills, enabling them to excel in their professional life and postgraduate studies. It also aims to graduate engineers with a comprehensive knowledge of the fundamentals of petroleum engineering, enabling them to innovate and excel in this creative profession.

3. Program Objectives

1. Preparing and qualifying specialized engineers to meet the demands of the labor market in both the private and public sectors in computer engineering by diversifying learning and teaching methods and training students to apply acquired knowledge and skills to solve real-life problems.
2. Providing distinguished academic programs in the field of computer engineering, both theoretical and practical, that comply with international standards for academic quality and meet the needs of the labor market.
3. Encouraging and developing scientific research in the fields of computer engineering in general, and in the fields of artificial intelligence, robotics, computer software, computer networks, communications, and control in particular.
4. Creating a stimulating environment for faculty members to develop their educational and research knowledge and skills.
5. Building and developing partnerships with governmental and private sectors and the community with all its various institutions.

The educational objectives of the Department of Petroleum Engineering are to prepare students to solve problems in a scientific, ethical, and economic manner

by: Providing them with a sufficient education in the basics of mathematics, engineering sciences, and engineering techniques, in addition to their specific specialization in the field of petroleum technology, with the aim of applying this knowledge in the profession. Help them develop skills relevant to the design process, including problem formulation, creative thinking, effective communication, information analysis, and teamwork. Help them understand the importance of their professional and ethical responsibilities.

4. Program Accreditation

Thank God, we have obtained accreditation from the Iraqi Council for Accreditation of Engineering Education, with some comments.

5. Other external influences

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	4	4	% 7.084	
College Requirements	7	16	%15.41	
Department Requirements	47	140	%77.5	
Summer Training	1			
Other				

*This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
Year 4 Semester 1	E402	Engineering Project I	1	2
Year 4 Semester 1	PeE411	Numerical Methods	2	-
Year 4 Semester 1	PeE412	Petroleum Reservoir Engineering III	2	2
Year 4 Semester 1	PeE413	Petroleum Drilling Engineering III	2	2
Year 4 Semester 1	PeE414	Petroleum Production Engineering III	2	2
Year 4 Semester 1	PeE415	Secondary Oil Recovery I	2	2
Year 4 Semester 1	PeE416	Gas Technology I	2	-
Year 4 Semester 1	PeE417	Reservoir Management	2	-
Year 4 Semester 2	E403	Engineering Project II	1	2
Year 4 Semester 2	PeE421	Reservoir Simulation	2	-
Year 4 Semester 2	PeE422	Petroleum Reservoir Engineering IV	2	2
Year 4 Semester 2	PeE423	Petroleum Drilling Engineering IV	2	2
Year 4 Semester 2	PeE424	Petroleum Production Engineering IV	2	2
Year 4 Semester 2	PeE425	Secondary Oil Recovery II	2	2
Year 4 Semester 2	PeE426	Gas Technology II	2	-
Year 4 Semester 2	PeE427	Petroleum Management	2	-

8. Expected learning outcomes of the program

Knowledge

1. Engineering Knowledge & Scientific Foundation

The graduate will be able to:

- Apply advanced knowledge of mathematics (calculus, differential equations, statistics), physics (fluid mechanics, thermodynamics, mechanics), and chemistry (organic, petroleum chemistry) to engineering problems.
- Understand the basic properties of rocks and fluids present in petroleum reservoirs.
- Understand the entire oil field life cycle: from exploration, appraisal, drilling, production, through turnaround to final abandonment.

2. Analysis & Design of Oil & Gas Systems

The graduate will be able to:

- Analyze and design drilling operations, including the selection of drilling equipment and drilling fluids, and the design of a safe and sound well. Evaluate reservoir performance and estimate reserves using various methods and mathematical modeling.
- Design and operate surface and subsurface production systems (such as deep well pumps (ESPs) and surface oil, gas, and water separation facilities).
- Design and optimize enhanced oil recovery (EOR) methods to increase reservoir recovery rates.
- Apply reservoir engineering principles to optimize hydrocarbon recovery.

Skills

The graduate will be able to:

Design and conduct laboratory experiments related to rock and fluid properties (such as porosity, permeability, and pressure measurements).

Analyze and interpret well data, including well logs and pressure tests.

Use models and simulations to study the behavior of reservoirs and production systems under various conditions.

4. Modern Tool Usage

The graduate will be able to:

	<ul style="list-style-type: none"> · Proficiently use software specialized in the oil and gas industry, such as: · Simulation modeling software (such as Eclipse, CMG). · Well data interpretation software (such as Techlog, IP). · Design and production software (such as PIPESIM, PROSPER, MBAL). · Computer-aided design (CAD) software. · Apply artificial intelligence and big data analysis concepts to optimize petroleum operations. <p>5. General Engineering & Professional Skills</p> <p>The graduate will be able to:</p> <ul style="list-style-type: none"> · Solve complex problems: Identify, formulate, and solve complex engineering problems in the field of petroleum engineering using analytical and logical methodologies. · Design under constraints: Design systems, processes, or components to meet specific needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. · Teamwork: Work effectively within a multidisciplinary team (with geologists, chemists, mechanical engineers, and others) to achieve a common goal. · Effective Communication: Communicate effectively in writing and speaking to specialist and non-specialist audiences, such as writing technical reports and clearly presenting results. · Economic and Management Understanding: Understand economic principles, project management, and lifecycle costing to make sound technical and financial decisions.
Ethics	
	<p>The graduate will be able to:</p> <ul style="list-style-type: none"> · Understand professional, ethical, and legal responsibilities in engineering practice. · Evaluate the impact of engineering solutions within their global, economic, environmental, and societal context (sustainability). · Strictly apply Health, Safety, and Environmental (HSE) standards in all operations to reduce risks and protect the environment.

9. Teaching and Learning Strategies

1. Explanation and clarification through lectures.
2. Methods for presenting scientific materials using projectors: data shows, smart boards, plasma screens.
3. Self-learning through homework and mini-projects within lectures.
4. Laboratories.

5. Graduation projects.
6. Scientific visits.
7. Seminars held in the department.
- 8- Summer training.

10. Evaluation methods

1. Quizzes.
2. Homework.
3. Midterm and final exams for theoretical and practical subjects.
4. Mini-projects within the class.
5. Interaction within the lecture.
6. Reports.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
Prof.	1	0		1	
Ass. Prpf.	1	0		1	
Lecturer	6	0		6	
Ass. Lecturer	14	0		14	

Professional Development

Mentoring new faculty members

Academic Guidance

- Curriculum development and industry relevance.
- Design and implementation of laboratory experiments.
- Effective teaching strategies.

Research Guidance

- Writing research proposals and obtaining funding.
- Publishing scientific papers in prestigious journals.
- Laboratory and research project management.

- Collaborating with international researchers.

Industrial Guidance

- Understanding current industry terminology and issues.
- How to apply academic theories to real-world problems.
- Mechanisms for collaboration with companies (consultations, joint research).
- Safety and Environmental (HSE) standards in industry.

Professional development of faculty members

1- Academic & Research Development

- Keeping up with modern curricula: Attending workshops and training courses focused on developing educational content to align with the latest technologies in the industry, such as:
 - Applications of artificial intelligence and data analysis in petroleum engineering.
 - Advanced reservoir modeling and simulation.
- Teaching and learning: Developing teaching skills using active learning strategies, project-based learning, and technology-enhanced learning in the classroom.
- Scientific research: Encouraging:
 - Publishing research in prestigious scientific journals and international conferences.
 - Obtaining research grants from national and international bodies.
 - Research collaboration with researchers from world-renowned universities.
 - Co-supervising graduate students with international universities.

2. Industrial & Professional Development

- Industrial Secondments: Spending a semester or a full year working with a major oil company (such as Schlumberger, Halliburton, or BP) allows the instructor to gain firsthand insight into:
 - The real-world challenges facing the industry.
 - The latest equipment and technologies used in drilling and production.
 - Work culture, quality, and safety standards in the field.
- Field Visits and Summer Training: Regular visits to oil and gas fields, drilling platforms, and company laboratories are organized, not only for students but also for faculty members themselves, to keep up with the latest developments.

12. Acceptance Criterion

Average: Not less than 90%

Age: Not more than 25 years

Number: Up to 100 students per year

13. The most important sources of information about the program

1. Websites of Iraqi and foreign universities.
2. Workshops held by the Ministry of Higher Education, in addition to the Ministry's standards.

14. Program Development Plan

Strategic Development Plan Axes:

- 1: Curriculum and Study Plan Development
- 2: Faculty and Staff Development

- 3: Technical Development and Infrastructure
- 4: Industrial Partnerships and Applied Research
- 5: Quality Assurance and Academic Accreditation

Program Skills Outline	
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Year 4 Semester 2	PeE422	Petroleum Reservoir Engineering IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
Year 4 Semester 2	PeE423	Petroleum Drilling Engineering IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
Year 4 Semester 2	PeE424	Petroleum Production Engineering IV	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
Year 4 Semester 2	PeE425	Secondary Oil Recovery II	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
Year 4 Semester 2	PeE426	Gas Technology II	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
Year 4 Semester 2	PeE427	Petroleum Management	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Course Description Form

1. Course Name:	
Drilling Engineering III	
2. Course Code:	
PeE413	
3. Semester / Year:	
1 st Semester / 4 th Year	
4. Description Preparation Date:	
1/9/2024	
5. Available Attendance Forms:	
In Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours Theory / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ethar Hisham Khalil Email: ethar.khalil@uobasrah.edu.iq	
8. Email: Course Objectives	
Course Objectives	<ul style="list-style-type: none">● The student understands the concept of drilling engineering and its importance to petroleum engineering.● The student becomes familiar with drilling systems, their components, and characteristics.● Knowledge of the types of drilling fluids and their significance in the oil well drilling process.● The student describes the main types of rock formations encountered in Iraqi fields.● The student becomes familiar with the major Iraqi oil fields, their characteristics, and drilling challenges.
9. Teaching and Learning Strategies	

Strategy	<p>Direct Theoretical Lectures: Simplifying fundamental concepts (drilling phases, rig components, well pressures).</p> <p>Practical Learning: Using drilling laboratories and drill simulators for training on real-life situations.</p> <p>Case Studies: Analyzing real incidents (kick/blowout) and linking them to preventive measures.</p> <p>Group Projects: Preparing reports or presentations on modern techniques (e.g., directional drilling).</p> <p>Field Visits: To drilling sites to strengthen the practical aspect.</p> <p>Use of Technology: Employing specialized software (Landmark, WellPlan) for pressure calculations and well path design.</p> <p>Problem-Based Learning: Presenting operational scenarios for students to propose solutions.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Hook Load Calculation	Drill Stem-I	Lecture and Tutorial	Brain Storming and Discussion
2	4	Advanced Hook Load Calculation	Drill Stem-II	Lecture and Tutorial	Brain Storming and Discussion
3	4	Buckling Types	Buckling Phenomenon	Lecture and Tutorial	Brain Storming and Discussion
4	4	How to avoid Buckling	Buckling Calculations	Lecture and Tutorial	Brain Storming and Discussion and Quiz
5	4	Pressure Losses Calculations	Drilling Hydraulics-I	Lecture and Tutorial	Brain Storming and Discussion

6	4	Pressure Losses Profile	Drilling Hydraulics-II	Lecture and Tutorial	Brain Storming and Discussion
7	4	Lifting Capacity and Hole Cleaning	Drilling Hydraulics-III	Lecture and Tutorial	Brain Storming and Discussion
8	4	Optimum Operating Parameters	Optimization	Lecture and Tutorial	Brain Storming and Discussion
9	4	Optimum Operating Parameters	Optimization	Lecture and Tutorial	Brain Storming and Discussion
10	4	Stuck Pipe	Hole Problems	Lecture and Tutorial	Brain Storming and Discussion and Quiz
11	4	Differential Sticking	Hole Problems	Lecture and Tutorial	Brain Storming and Discussion
12	4	Lost Circulation	Hole Problems	Lecture and Tutorial	Brain Storming and Discussion
13	4	Fishing Operation	Hole Problems	Lecture and Tutorial	Brain Storming and Discussion

14	4	Cost Effect of Non-Productive Time	Hole Problems	Lecture and Tutorial	Brain Storming and Discussion
15	4	Fina Review and Exam	Intensive Review		Brain Storming and Discussion

11. Course Evaluation

Classroom interaction
Homework and reports
Quizzes
Midterm and final exams

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Applied Drilling Engineering, By Bourgoyne et al.
Main references (sources)	Well Engineering & Construction, by Hussain Rabia
Recommended books and references (scientific journals, reports...)	Fundamental of Drilling Engineering, by Mitchel and Miska
Electronic References, Websites	1. PetroWiki: www.petrowiki.org 2. OnePetro: https://www.onepetro.org/

Course Description Form

This course addresses restricted and unrestricted well production, including the effect of various parameters on well performance using the diffusivity equation. It includes the application of Horner solutions, analysis of skin factor effects on well testing, and evaluation of performance tests influenced by impermeable barriers in bounded reservoirs. The course also covers gas lift systems and stimulation operations such as acidizing and hydraulic fracturing. In addition to the well testing analysis (draw-down and buildup tests).

1. Course Name: Petroleum Production Engineering	
2. Course Code: PeE424	
3. Semester / Year: 2nd Semester / 4th Year	
4. Description Preparation Date: 2025	
5. Available Attendance Forms: Daily attendance	
6. Number of Credit Hours (Total) / Number of Units (Total) Theoretical: 2 hrs/week Practical: 2 hrs/ week 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name:	
Email:	
8. Email: Course Objectives	
Course Objectives	<ul style="list-style-type: none">• Analyze restricted and unrestricted production behavior in oil wells.• Apply the diffusivity equation to evaluate well performance under various conditions.• Understand the application of Horner solutions in well test analysis.

	<ul style="list-style-type: none"> • Evaluate the impact of skin factor on production efficiency. • Analyze draw-down and buildup tests to assess reservoir and well behavior. • Understand gas lift systems and stimulation operations such as acidizing and hydraulic fracturing.
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9. Teaching and Learning Strategies

Strategy	<ul style="list-style-type: none"> • Classroom Lectures • Class Discussions • Independent Study and Reading Assignments • Problem-Solving Sessions • Student Presentations • Case Studies
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Differentiate between restricted and unrestricted production.	Prediction of restricted and unrestricted production.	Lecture + Discussion	Quiz
2	4	To analyze the reservoir pressure	Derivation and solution of diffusivity equation.	Lecture + Examples	Assignment
3	4	Analyze the well test	Application of Horner's solution.	Lecture + Discussions	Assignment
4	4	Effect skin factor on production	Skin Factor	Lecture + Case study	Report
5	4	Well testing analysis	Principle of Superposition	Lecture + Field Case Study	Field Report

6	4	Well testing analysis	Bounded reservoirs	Lecture	Discussion
7	4	Oil recovery	Introduction of the Artificial Lift Methods	Lecture + Video	Quiz
8	4	Well analysis	Methods of the Well Testing	Lecture + Discussion	Report
9	4	Well evaluation	Build up Test	Data Analysis	Assignment
10	4	Well evaluation	Draw down Test	Lecture + Practical Example	Field Report
11	4	Well analysis	Field Data Analysis	Lecture + Discussion	Presentation
12	4	Well stimulation	Acidizing	Lecture + Examples	Quiz
13	4	Well stimulation	Hydraulic Fracturing	Lecture + Discussion	Presentation

14	4	Wellbore issues	Production Issues	Lecture + Discussion	Field case study
15	4		Final Review	Questions and Answers	Quiz

11. Course Evaluation

- In-class participation.
- Homework and reports.
- Quizzes.
- Midterm and final exams.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	<ol style="list-style-type: none"> 1. Mukherjee, H. and Brill, J.P., 1999. Multiphase flow in wells. Society of Petroleum Engineers of AIME. 2. Guo, B., 2011. Petroleum production engineering, a computer-assisted approach. Elsevier. 3. Beggs, H.D., 2003. Production Optimization Using Nodal (TM) Analysis. Ogc. 4. Ahmed, T., 2018. Reservoir engineering handbook. Gulf professional publishing. 5. Economides, M.J., 2013. Petroleum production systems. Pearson education. 6. Brown, K.E., 1977. Technology of artificial lift methods. Volume 1. Inflow performance, multiphase flow in pipes, the flowing well. 7. Lee, J., 1982. Well testing. 8. Bourdarot, G., 1998. Well testing: Interpretation methods.
Recommended books and references (scientific journals, reports...)	<ul style="list-style-type: none"> • Reliable websites. • Library websites at some international universities.
Electronic References, Websites	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Secondary Oil Recovery		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	BEP414			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level		Semester of Delivery		2
Administering Department	Type Dept. PE	College	Type College Code	
Module Leader	Ali Nooruldeen Abdulkareem		e-mail	Lec.ali.nooruldeen@uobasrah.edu.iq
Module Leader's Acad. Title	Asst. Lecturer	Module Leader's Qualification	Ms.c.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Reservoir Engineering	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	<p>The aim of a module for university students can generally be summarized as follows:</p> <p>Provide comprehensive knowledge and understanding of the subject matter.</p> <p>Develop critical thinking, research, and analytical skills.</p> <p>Apply theoretical knowledge to practical scenarios.</p> <p>Enhance communication skills, both oral and written.</p> <p>Foster independent learning and self-motivation.</p> <p>Encourage collaboration and teamwork.</p> <p>Assess student progress and provide feedback.</p> <p>Support personal and professional development.</p> <p>These aims aim to provide students with a well-rounded education and equip them with the necessary skills and knowledge to succeed academically and professionally.</p>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ul style="list-style-type: none"> ● Knowledge and Understanding: Acquire a solid understanding of key concepts, theories, and principles within the subject area of the module. ● Critical Thinking and Analysis: Develop the ability to critically evaluate and analyze information, arguments, and evidence related to the module's subject matter.

	<ul style="list-style-type: none"> ● Practical Application: Apply theoretical knowledge to practical scenarios or real-world situations, employing appropriate methodologies and techniques. ● Research Skills: Demonstrate proficiency in conducting research, including locating, evaluating, and synthesizing information from various sources. ● Communication Skills: Effectively communicate ideas, concepts, and findings related to the module's subject matter, both orally and in writing. ● Problem-Solving: Develop problem-solving skills by identifying and analyzing problems within the subject area and proposing appropriate solutions. ● Collaboration and Teamwork: Engage in collaborative activities or projects, working effectively with peers to achieve common goals. ● Ethical and Professional Behavior: Adhere to ethical standards and exhibit professional conduct within the subject area. ● Self-Reflection and Lifelong Learning: Engage in self-reflection, identify areas for personal improvement, and demonstrate a commitment to lifelong learning. <p>These learning outcomes provide students with a clear understanding of the expected knowledge, skills, and abilities they should gain upon completing the module</p>
Indicative Contents المحتويات الإرشادية	<p>These indicative contents provide a concise overview of the topics covered in the module on Secondary Oil Recovery (SOR), including waterflooding, gas injection, thermal methods, tertiary recovery, optimization, monitoring, case studies, ethics, and assessment.</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

- Lectures and Presentations: Instructors deliver lectures to provide foundational knowledge of SOR principles.
- Case Studies and Problem-Based Learning: Analyzing real-world cases and problem scenarios to apply SOR concepts.
- Interactive Discussions: Facilitating discussions for active engagement and critical analysis of SOR approaches.
- Practical Work and Simulations: Hands-on exercises and simulations to understand SOR techniques.
- Group Projects and Collaboration: Assigning group projects to foster teamwork and tackle SOR challenges.
- Field Trips and Guest Speakers: Visiting oilfields or inviting experts to provide real-world insights into SOR practices.
- Multimedia and Visualization Tools: Using visual aids and tools to enhance understanding of SOR processes.
- Feedback and Assessment: Providing feedback and assessments to monitor progress and understanding.
- Independent Research and Literature Review: Encouraging independent research to explore SOR advancements.
- Online Learning and Resources: Utilizing online platforms for supplementary materials and interactive learning.
- These strategies support students in acquiring knowledge, applying SOR techniques, engaging in critical analysis, and collaborating with peers, ultimately preparing them for SOR challenges and developments.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)

الحمل الدراسي المنتظم للطالب خلال الفصل

150

Structured SWL (h/w)

الحمل الدراسي المنتظم للطالب أسبوعيا

63

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to SOR Overview of SOR methods and their importance in oil recovery Discussion on the need for secondary recovery techniques
Week 2	Water flooding Techniques Buckley-Leverett method for water displacement

	<p>Calculation of fractional flow and saturation profiles</p> <p>Analysis of water flooding efficiency using Welge and Stiles methods</p>
Week 3	<p>Gas Injection Techniques</p> <p>Immiscible gas injection (Tarnier method)</p> <p>Estimating oil recovery through immiscible gas displacement</p> <p>Introduction to miscible gas injection (Muskat method)</p>
Week 4	<p>Thermal Recovery Methods</p> <p>Steam injection for thermal recovery</p> <p>Heat flow through rocks and its impact on oil viscosity</p> <p>In-situ combustion as a thermal recovery technique</p>
Week 5	<p>Tertiary Oil Recovery</p> <p>Surfactant flooding for enhanced oil recovery</p> <p>Solvent injection techniques and their application in SOR</p> <p>Polymer flooding to improve sweep efficiency</p> <ul style="list-style-type: none"> Quiz
Week 6	<p>Optimization of SOR Methods</p> <p>Factors influencing the selection of SOR techniques</p> <p>Strategies for optimizing water flooding, gas injection, and thermal recovery</p> <p>Considerations for economic viability and reservoir characteristics</p>
Week 7	<p>Monitoring and Evaluation in SOR</p> <p>Importance of monitoring SOR operations</p> <p>Analysis of production data, pressure profiles, and fluid flow rates</p> <p>Evaluation of sweep efficiency and displacement efficiency</p>
Week 8	<p>Case Studies and Industry Practices in SOR</p> <p>Analysis of real-world SOR projects and their outcomes</p> <p>Examination of industry best practices and lessons learned</p>
Week 9	<p>Ethical and Environmental Considerations in SOR</p> <p>Discussion on ethical issues and responsibilities in SOR operations</p> <p>Considerations for sustainable practices and environmental impact assessment</p>
Week 10	<p>Review and Midterm Assessment</p>

Week 11	Advanced Water flooding Techniques
	Numerical simulation methods for water flooding optimization
	Discussion on smart water injection and advanced reservoir engineering techniques
Week 12	Advanced Gas Injection Techniques
	Analysis of compositional simulation and reservoir modeling for gas injection
	Evaluation of nitrogen (N ₂) and carbon dioxide (CO ₂) injection strategies
Week 13	Advanced Thermal Recovery Methods
	Examination of steam-assisted gravity drainage (SAGD) and cyclic steam stimulation (CSS)
	Review of in-situ combustion optimization techniques
Week 14	Emerging Technologies in SOR
	Overview of innovative technologies such as chemical flooding and nanoparticle-enhanced oil recovery
	Discussion on the future of SOR and potential advancements
Week 15	<ul style="list-style-type: none"> Final Project and Exam Preparation Completion of the project
	<ul style="list-style-type: none"> Exam preparation and review
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites		

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Gas Technology		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Basic			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Name :HAYFAA L.SWADI		e-mail	hyfaa.swadi@uobasrah.edu.iq
Module Leader's Acad. Title	Lecture		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	

Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To introduce and develop an understanding of the natural gas fundamental 2. Understanding the basic concepts of natural gas processing 3. Provide an insight to what is known as Gas to Liquids Technology 4. Provide practice at developing critical thinking skills, solving open ended Problems and to work in teams.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ul style="list-style-type: none"> • Knowledge and Understanding. • Develop a deep understanding of issues related to the natural gas formation, resources, and properties • Familiarize students with the basic concepts of natural gas processing • Provide the students with the concepts and methods of design for the main gas processing units • Analyze the different processes comprising a typical gas processing plant • Apply the basic concepts of chemical engineering to design a certain gas treating unit.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Develop a deep understanding of issues related to the natural gas formation resources, and properties 2. Familiarize students with the basic concepts of natural gas processing. 3. Provide the students with the concepts and methods of design for the main gas processing units 4. Analyze the different processes comprising a typical gas processing plant. 5. Apply the basic concepts of chemical engineering to design a certain gas treating unit.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering the module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Gaseous fuels, Natural gas fundamentals: Natural gas origin and composition, Ability to classify and identify the importance of gaseous fuels. Be familiar with natural gas origin and composition
Week 2	Be familiar with natural gas resources, phases behavior
Week 3	Ability to predict the physical properties of natural gas
Week 4	Understand the Natural gas process modules
Week 5	Processing objectives: Analyze the processing objectives Basic concepts of natural gas processing.
Week 6	Understand the principals of gravity separators and multistage separators Phase Separation Gravity and multistage separators
Week 7	Mid-term Exam
Week 8	Analyze the high efficiency liquid gas coalesces Phase Separation.
Week 9	Basics of stabilization processes :Ability to understand the basics of stabilization processes Condensates stabilization
Week 10	Fractionation Condensates :Ability to distinguish between flash vaporization and Stabilization by stabilization: Flash vaporization, fractionation
Week 11	Acid Gas Treating: Amine processes understand the fundamentals of the Amine processes and their design aspects

Week 12	Acid Gas Treating: Analyze the sulfur recovery processes sulfur recovery processes
Week 13	Natural Gas Dehydration: Glycol dehydration process Ability to understand the basics of Glycol dehydration process and its design aspects
Week 14	Ability to understand the basics of solid bed dehydration process and its design aspects Natural Gas Dehydration: Solid bed dehydration processes
Week 15	Understand the principals of NGLs recovery and separation Natural Gas Liquids Recovery and Ability to understand the Lignification and conversion of gas to liquids technologies LN and GTL Processes
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> o Lecturers Books o Arthur J Kidnay & W. R. Parrish "Fundamentals of Natural Gas Processing" (2006) Other support books o Saeid Mokhatab, W. A. Poe and James G. Speight, "Handbook of Natural Gas Transmission and Processing" 2006. o Xiuli W. XGAS "Advanced Natural Gas Engineering" 2009. 	Yes
Recommended Texts		No
Websites		

Course Description Form

This course focuses on understanding reservoir types and radial flow behavior in reservoirs, with an emphasis on the inflow performance relationship (IPR). It covers productivity index concepts, effects of stratification and water cut, and introduces key models such as Vogel, Fetkovich, and Al-Sadoon. Flow pattern analysis and mathematical and physical principles for pressure drop calculations are discussed, along with techniques such as Poettmann and Carpenter methods, Dukler method, working charts, and choke performance analysis.

1. Course Name: Petroleum Production Engineering	
2. Course Code: PeE414	
3. Semester / Year: 1st Semester / 4th Year	
4. Description Preparation Date: 2025	
5. Available Attendance Forms: Daily attendance	
6. Number of Credit Hours (Total) / Number of Units (Total) Theoretical: 2 hrs/week Practical: 2 hrs/ week 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name:	
Email:	
8. Email: Course Objectives	
Course Objectives	<ul style="list-style-type: none"> Understand reservoir types and radial fluid flow behavior. Analyze the inflow performance relationship (IPR) between reservoir pressure and production rate. Apply productivity index tests and interpret their results. Utilize Vogel, Fetkovich, and Al-Sadoon models for well performance analysis. Calculate pressure drop using mathematical and physical principles. Evaluate choke performance using theoretical analysis and working charts.

			<ul style="list-style-type: none">Distinguish between flow patterns and their impact on production efficiency.		
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none">Classroom LecturesClass DiscussionsIndependent Study and Reading AssignmentsProblem-Solving SessionsStudent PresentationsCase Studies			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Petroleum production engineering	Introduction to Production Engineering	Lecture + Discussion	Quiz
2	4	Reservoir type s and flow mechanisms	Types of reservoirs and radial flow in reservoirs.	Lecture + Examples	Assignment
3	4	Well performance	Inflow performance relationship (IPR) and productivity index.	Lecture + Discussions	Assignment
4	4	Well performance	Effect of stratification and water cut on IPR.	Lecture + Case study	Report
5	4	Well performance	Productivity index test.	Lecture + Practice	Field Report

6	4	Well performance	Vogel method.	Lecture + Model Application	Quiz
7	4	Well performance	Standing's method.	Lecture + Data Analysis	Field test
8	4	Well performance	Fetkovich method.	Lecture + Data Analysis	Exercise
9	4	Well performance	Al-Saadoon method	Theoretical Lecture	Assignment
10	4	Estimate the pressure drop using mathematical models	Principles for pressure drop calculations.	Lecture + Math Examples	Quiz
11	4	Distinguish between flow regime in tubing	Flow Patterns Analysis	Lecture + Discussion	Presentation
12	4	Pressure analysis and optimization	Poettmann and Carpenter method.	Lecture + Discussion	Quiz
13	4	Pressure analysis and optimization	Dukler method	Lecture + Discussion	Presentation

14	4	Pressure analysis and optimization	Working Charts	Lecture + Data analysis	Field case study
15	4		Final Review	Questions and Answers	Quiz
11. Course Evaluation					
<ul style="list-style-type: none"> • In-class participation. • Homework and reports. • Quizzes. • Midterm and final exams. 					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)					
Main references (sources)			9. Mukherjee, H. and Brill, J.P., 1999. Multiphase flow in wells. Society of Petroleum Engineers of AIME. 10. Guo, B., 2011. Petroleum production engineering, a computer-assisted approach. Elsevier. 11. Beggs, H.D., 2003. Production Optimization Using Nodal (TM) Analysis. Ogc. 12. Ahmed, T., 2018. Reservoir engineering handbook. Gulf professional publishing. 13. Economides, M.J., 2013. Petroleum production systems. Pearson education.		
Recommended books and references (scientific journals, reports...)			<ul style="list-style-type: none"> • Reliable websites. • Library websites at some international universities. 		
Electronic References, Websites					

وصف المقرر

١.م المقرر	
Reservoir Management	
٢.مز المقرر	
٣.نصل / السنة	
First session/fourth year	
٤. تاريخ إعداد هذا الوصف	
1/9/2025	
٥. أشكال الحضور المتاحة	
Attendance	
٦. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي)	
100/3	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: Mustafa Kamil Al-Jasim الأيميل mustafakamil20172018@gmail.com	
٨. اهداف المقرر	
<ol style="list-style-type: none"> 1. Understand Reservoir Characterization 2. Production forecasting and performance analysis 3. Develop skills in reservoir simulation 4. Formulate and evaluate field development plans 5. Utilities data analytics 	
٩. استراتيجيات التعليم والتعلم	
<ol style="list-style-type: none"> 1 - Explanation and recommendations during the lecture 2 - View scientific materials using projectors. 3 - Self-learning through assignments and small projects inside the class. 4 - Graduation projects. 5 - Scientific visits. 6 - Seminars held in the department. 7 - Summer training. <p>Evaluation methods:</p> <ol style="list-style-type: none"> 1. Quiz. 2. Homework. 3. Semester and final exams. 4. Interaction in the lecture. 5. Small projects within the lesson. 6. Reports. 	الاستراتيجية

١٠. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
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طريقة التقييم	طريقة التعليم	اسم الوحدة / أو الموضوع	مخرجات التعلم المطلوبة	الساعات	الأسبوع
Questions and discussion	Theoretical	Introduction	Introduction to reservoir management and reservoir engineering concepts	4	First
Questions, discussion and quiz	Theoretical	Subsurface data from geological and engineering sources	Integrated data from reports of Scal and RCA	4	Second
Questions and discussion	Theoretical	Subsurface data from geological and engineering sources	porosity and permeability correlation	4	Third
Questions, discussion and quiz	Theoretical	Subsurface data from geological and engineering sources	Averaging permeability and determination of water cut off values	4	Fourth
Questions and discussion	Theoretical	Method of STOIP determination	Traditional and simulation methods for oil in place calculation	4	Fifth
Questions and discussion	Theoretical	Fluid properties	PVT data analysis	4	Sixth
Questions and discussion	Theoretical and tutorials	Relative permeability analysis	Normalisation of core permeability data	4	Seventh
Questions, discussion and quiz	Theoretical and tutorials	Relative permeability analysis	De-Normalisation of core permeability data	4	Eighth
Questions and discussion	Theoretical and tutorials	Capillary pressure analysis	Averaging capillary pressure data	4	Ninth
Questions and discussion	Theoretical	Capillary pressure analysis	Averaging capillary pressure data	4	Tenth
Questions and discussion	Theoretical	Introduction to reservoir simulation	Types of data needed for simulator inputs	4	Eleventh

Questions and discussion	Theoretical and tutorials	Introduction to reservoir simulation	Types of data needed for simulator inputs	4	Twelfth
Questions, discussion and quiz	Theoretical	workshop and tutorial	workshop and tutorial	2	Thirteenth
Questions and discussion	Theoretical	workshop and tutorial	workshop and tutorial	2	Fourteenth
Questions and discussion	Theoretical	workshop and tutorial	workshop and tutorial	2	Fifteenth

١١. تقييم المقرر	
Distribution of the score out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written and reporting exams.	
١٢. مصادر التعلم والتدريس	
	الكتب المقررة المطلوبة (المنهجية أن وجدت)
	المراجع الرئيسية (المصادر)
Advance reservoir management and engineering	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
المواقع الالكترونية الرصينة مواقع المكتبات في الجامعات العالمية	المراجع الإلكترونية ، مواقع الانترنت

Course Description Form

This course addresses restricted and unrestricted well production, including the effect of various parameters on well performance using the diffusivity equation. It includes the application of Horner solutions, analysis of skin factor effects on well testing, and evaluation of performance tests influenced by impermeable barriers in bounded reservoirs. The course also covers gas lift systems and stimulation operations such as acidizing and hydraulic fracturing. In addition to the well testing analysis (draw-down and buildup tests).

1. Course Name: Petroleum Production Engineering	
2. Course Code: PeE424	
3. Semester / Year: 2nd Semester / 4th Year	
4. Description Preparation Date: 2025	
5. Available Attendance Forms: Daily attendance	
6. Number of Credit Hours (Total) / Number of Units (Total) Theoretical: 2 hrs/week Practical: 2 hrs/ week 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name:	
Email:	
8. Email: Course Objectives	
Course Objectives	<ul style="list-style-type: none"> Analyze restricted and unrestricted production behavior in oil wells. Apply the diffusivity equation to evaluate well performance under various conditions. Understand the application of Horner solutions in well test analysis. Evaluate the impact of skin factor on production efficiency. Analyze draw-down and buildup tests to assess reservoir and well behavior. Understand gas lift systems and stimulation operations such as acidizing and hydraulic fracturing.

9. Teaching and Learning Strategies

Strategy	<ul style="list-style-type: none"> • Classroom Lectures • Class Discussions • Independent Study and Reading Assignments • Problem-Solving Sessions • Student Presentations • Case Studies
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Differentiate between restricted and unrestricted production.	Prediction of restricted and unrestricted production.	Lecture + Discussion	Quiz
2	4	To analyze the reservoir pressure	Derivation and solution of diffusivity equation.	Lecture + Examples	Assignment
3	4	Analyze the well test	Application of Horner's solution.	Lecture + Discussions	Assignment
4	4	Effect skin factor on production	Skin Factor	Lecture + Case study	Report
5	4	Well testing analysis	Principle of Superposition	Lecture + Field Case Study	Field Report
6	4	Well testing analysis	Bounded reservoirs	Lecture	Discussion

7	4	Oil recovery	Introduction of the Artificial Lift Methods	Lecture + Video	Quiz
8	4	Well analysis	Methods of the Well Testing	Lecture + Discussion	Report
9	4	Well evaluation	Build up Test	Data Analysis	Assignment
10	4	Well evaluation	Draw down Test	Lecture + Practical Example	Field Report
11	4	Well analysis	Field Data Analysis	Lecture + Discussion	Presentation
12	4	Well stimulation	Acidizing	Lecture + Examples	Quiz
13	4	Well stimulation	Hydraulic Fracturing	Lecture + Discussion	Presentation
14	4	Wellbore issues	Production Issues	Lecture + Discussion	Field case study

15	4		Final Review	Questions and Answers	Quiz
11. Course Evaluation					
<ul style="list-style-type: none"> • In-class participation. • Homework and reports. • Quizzes. • Midterm and final exams. 					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)					
Main references (sources)			14. Mukherjee, H. and Brill, J.P., 1999. Multiphase flow in wells. Society of Petroleum Engineers of AIME. 15. Guo, B., 2011. Petroleum production engineering, a computer-assisted approach. Elsevier. 16. Beggs, H.D., 2003. Production Optimization Using Nodal (TM) Analysis. Ogc. 17. Ahmed, T., 2018. Reservoir engineering handbook. Gulf professional publishing. 18. Economides, M.J., 2013. Petroleum production systems. Pearson education. 19. Brown, K.E., 1977. Technology of artificial lift methods. Volume 1. Inflow performance, multiphase flow in pipes, the flowing well. 20. Lee, J., 1982. Well testing. 21. Bourdarot, G., 1998. Well testing: Interpretation methods.		
Recommended books and references (scientific journals, reports...)			<ul style="list-style-type: none"> • Reliable websites. • Library websites at some international universities. 		
Electronic References, Websites					

Course Description Form

1. Course Name:	
Drilling Engineering IV	
2. Course Code:	
PeE423	
3. Semester / Year:	
2 nd Semester / 4 th Year	
4. Description Preparation Date:	
1/2/2025	
5. Available Attendance Forms:	
In Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours Theory / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ethar Hisham Khalil Email: ethar.khalil@uobasrah.edu.iq	
8. Email: Course Objectives	
Course Objectives	<ul style="list-style-type: none"> ● The student understands the concept of drilling engineering and its importance to petroleum engineering. ● The student becomes familiar with drilling systems, their components, and characteristics. ● Knowledge of the types of drilling fluids and their significance in the oil well drilling process. ● The student describes the main types of rock formations encountered in Iraqi fields. ● The student becomes familiar with the major Iraqi oil fields, their characteristics, and drilling challenges.
9. Teaching and Learning Strategies	
Strategy	<p>Direct Theoretical Lectures: Simplifying fundamental concepts (drilling phases, rig components, well pressures).</p> <p>Practical Learning: Using drilling laboratories and drill simulators for training on real-life situations.</p> <p>Case Studies: Analyzing real incidents (kick/blowout) and linking them to preventive measures.</p>

	<p>Group Projects: Preparing reports or presentations on modern techniques (e.g., directional drilling).</p> <p>Field Visits: To drilling sites to strengthen the practical aspect.</p> <p>Use of Technology: Employing specialized software (Landmark, WellPlan) for pressure calculations and well path design.</p> <p>Problem-Based Learning: Presenting operational scenarios for students to propose solutions.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to Directional Drilling – Concept and Importance	Introduce the student to the concept of directional drilling and the reasons for its use	Lecture and Tutorial	Brain Storming and Discussion
2	4	Directional Drilling Applications – I	Analyze field applications such as multilateral wells	Lecture and Tutorial	Brain Storming and Discussion
3	4	Directional Drilling Applications – II	Analyze field applications such as sidetracking	Lecture and Tutorial	Brain Storming and Discussion
4	4	Directional Drilling Applications – III	Analyze field applications such as relief wells	Lecture and Tutorial	Brain Storming and Discussion and Quiz
5	4	Types of Directional Wells (J-Type, S-Type, Horizontal Wells)	Compare well trajectories and select the most suitable based on conditions	Lecture and Tutorial	Brain Storming and Discussion
6	4	BHA Design in Directional Drilling	Identify the components of BHA and their role in trajectory control	Lecture and Tutorial	Brain Storming and Discussion

7	4	Deflection Tools – Bent Sub	Explain the mechanism and application of bent sub	Lecture and Tutorial	Brain Storming and Discussion
8	4	Deflection Tools – Downhole Motors	Explain the mechanism and application of downhole motors	Lecture and Tutorial	Brain Storming and Discussion
9	4	Deflection Tools – RSS	Explain the mechanism and application of rotary steerable systems (RSS)	Lecture and Tutorial	Brain Storming and Discussion
10	4	Well Survey – Basic Principles	Learn about survey methods (Magnetic, Gyro, Inclinometer)	Lecture and Tutorial	Brain Storming and Discussion and Quiz
11	4	Survey Methods (Tangential, Balanced Tangential, MWD/LWD)	Distinguish between methods and evaluate their accuracy	Lecture and Tutorial	Brain Storming and Discussion
12	4	Dog Leg Severity (DLS) Calculation	Perform DLS calculations and assess its impact on design	Lecture and Tutorial	Brain Storming and Discussion
13	4	Deviation and Trajectory Control	Apply strategies to adjust well path during drilling	Lecture and Tutorial	Brain Storming and Discussion
14	4	Directional Drilling Problems and Solutions	Analyze issues such as torque & drag, hole cleaning, and BHA failure	Lecture and Tutorial	Brain Storming and Discussion

15	4	Case Studies in Directional Drilling	Analyze real operational cases and link them to theory	Lecture and Tutorial	Brain Storming and Discussion
11. Course Evaluation					
Classroom interaction Homework and reports Quizzes Midterm and final exams					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)		Applied Drilling Engineering, By Bourgoyne et al.			
Main references (sources)		Well Engineering & Construction, by Hussain Rabia			
Recommended books and references (scientific journals, reports...)		Fundamental of Drilling Engineering, by Mitchel and Miska Directional Drilling by Ingles			
Electronic References, Websites		1. PetroWiki: www.petrowiki.org 2. OnePetro: https://www.onepetro.org/			

نموذج وصف المقرر

١.م المقرر	
Reservoir Management	
٢.مز المقرر	
٣.نصل / السنة	
Second session/fourth year	
٤. تاريخ إعداد هذا الوصف	
1/9/2025	
٥. أشكال الحضور المتاحة	
Attendance	
٦. عدد الساعات الدراسية (الكلية) / عدد الوحدات (الكلية)	
100/3	
٧. اسم مسؤول المقرر الدراسي (إذا أكثر من اسم يذكر)	
الاسم: Mustafa Kamil Al-Jasim الأيميل mustafakamil20172018@gmail.com	
٨. اهداف المقرر	
<ol style="list-style-type: none"> 1. Introduction to reservoir management and surveillance 2. Deep learning of reservoir pressure measurement and calculation methods 3. Familiarize with well testing objectives and analysis 4. understanding reservoir heterogeneity and connectivity 5. Basic knowledge of reservoir Stimulation 	
٩. استراتيجيات التعليم والتعلم	
<p>8 - Explanation and recommendations during the lecture</p> <p>9 - View scientific materials using projectors.</p> <p>10 - Self-learning through assignments and small projects inside the class.</p> <p>11 - Graduation projects.</p> <p>12 - Scientific visits.</p> <p>13 - Seminars held in the department.</p> <p>14 - Summer training.</p> <p>Evaluation methods:</p> <p>7. Quiz.</p> <p>8. Homework.</p> <p>9. Semester and final exams.</p> <p>10. Interaction in the lecture.</p> <p>11. Small projects within the lesson.</p> <p>12. Reports.</p>	<p>الاستراتيجية</p>

١٠. بنية المقرر					
طريقة التقييم	طريقة التعلم	اسم الوحدة او الموضوع	مخرجات التعلم المطلوبة	الساعات	الأسبوع

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / أو الموضوع	طريقة التعليم	طريقة التقييم
First	4	Introduction to reservoir engineer tasks and responsibilities	Responsibilities of reservoir engineer	Theoretical	Questions and discussion
Second	4	reservoir and well surveillance	Introduction to reservoir surveillance	Theoretical	Questions, discussion and quiz
Third	4	reservoir and well surveillances	Introduction to reservoir surveillance	Theoretical	Questions and discussion
Fourth	4	SGS and FGS tests	Pressure measurement	Theoretical	Questions, discussion and quiz
Fifth	4	ESP pressure calculations	Pressure measurement	Theoretical	Questions and discussion
Sixth	4	ESP pressure calculations	Pressure measurement	Theoretical	Questions and discussion
Seventh	4	MDT and RFT analysis	pressure measurement	Theoretical and tutorials	Questions and discussion
Eighth	4	Using pressure data from new wells to describe reservoir connectivity	eservoir heterogeneity	Theoretical and tutorials	Questions, discussion and quiz
Ninth	4	types of well testing	Introduction to well testing	Theoretical and tutorials	Questions and discussion
Tenth	4	PBU and PDD principles	well testing	Theoretical	Questions and discussion
Eleventh	4	types of well damage, skin effect and measurements	Introduction to reservoir and well stimulation	Theoretical	Questions and discussion
Twelfth	4	Principles of reservoir stimulation	Reservoir stimulation	Theoretical and tutorials	Questions and discussion
Thirteenth	2	workshop and totutorial	workshop and totutorial	Theoretical	Questions, discussion and quiz

Questions and discussion	Theoretical	workshop and totutorial	workshop and totutorial	2	Fourteenth
Questions and discussion	Theoretical	workshop and totutorial	workshop and totutorial	2	Fifteenth

١١. تقييم المقرر	
Distribution of the score out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written and reporting exams.	
١٢. مصادر التعلم والتدريس	
	الكتب المقررة المطلوبة (المنهجية أن وجدت)
	المراجع الرئيسة (المصادر)
Advance reservoir management and engineering	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير)
المواقع الالكترونية الرصينة مواقع المكتبات في الجامعات العالمية	المراجع الإلكترونية ، مواقع الانترنت