



University of Mosul
College of Petroleum and Mining Engineering
Department of Petroleum and Refining Engineering

Course Description
Fourth stage/ (Annual)

Dr. Ahmad A. Aabid
Head of Department

1.Course Title and Academic Level: Petroleum Pollution	
2. Course Code: <i>PRE401</i>	
3. Semester / Academic Year: Annual	
4. Date of Description Preparation: September 1, 2025	
5. Available Attendance Modes: In-person Attendance	
6. Total Credit Hours / Units: 4 total hours / 2 credit units	
7.Course Coordinator Name and Academic Title (if more than one, all should be listed):	
Course Coordinator: Dr. Liqaa Majdal – l.ides.saaed@uomosul.edu.iq	
8. Course Objectives	
Course Objectives (Specialized for Petroleum Engineering Students) This course is designed to equip petroleum engineering students with a comprehensive and application-oriented understanding of pollution challenges arising specifically from petroleum operations. The course will: • Critically examine the sources, classifications, and chemical behaviors of petroleum-derived pollutants across upstream, midstream, and downstream operations. • Analyze the short- and long-term environmental and public health impacts of petroleum contamination with a focus on high-risk zones such as refineries, pipelines, and offshore platforms. • Investigate remediation technologies and engineering controls used to treat	

petroleum-contaminated media (water, air, and soil), emphasizing their design principles and operational challenges. • Evaluate mitigation strategies, industry-specific regulations, and environmental compliance frameworks applicable to the petroleum sector, both in Iraq and globally.	
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9. Teaching and Learning Strategies:

To support experiential and systems-level learning, this course employs: • Technical lectures grounded in environmental chemistry, petroleum processing, and contamination modeling. • Multimedia case simulations and 3D visualizations to illustrate spill dynamics, leak propagation, and cleanup methodologies in real-world petroleum sites. • Problem-solving workshops and team-based discussions on case scenarios drawn from major oil-producing regions. • Field visits to refineries, water treatment plants, or contaminated industrial zones for first-hand observation and sampling technique training. • Capstone-style student projects focused on pollution control solutions specific to Iraq's petroleum infrastructure.	
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10. Course Structure

Week	Hours	Learning Outcome	Topic	Method	Assessment
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1	2	Define petroleum pollution scope in engineering context	Intro to Petroleum Pollution	Lecture	Diagnostic Quiz
2	2	Identify major emission/discharge sources in oil operations	Sources of Pollution	Lecture	Class Participation
3	2	Distinguish between types of pollutants and their physical forms	Classification of Petroleum Pollutants	Lecture + Video	Quiz
4	2	Map pollution risks across the petroleum lifecycle	Life Cycle of Petroleum Contamination	Lecture	Homework
5	2	Assess spill scenarios and marine oil dispersion	Water Pollution & Oil Spills	Lecture + Case Study	Quiz
6	2	Evaluate gas emissions from combustion and venting operations	Air Pollution and Gaseous Emissions	Lecture	Report
7	2	Analyze soil permeability and hydrocarbon retention	Soil Contamination Mechanisms	Lecture + Presentation	Quiz
8	2	Implement field sampling for soil and water testing	Environmental Sampling and Analysis	Lab Activity	Practical Evaluation
9	2	Assess toxicity and exposure pathways	Environmental and Health Impacts	Lecture + Discussion	Report
10	2	Understand ISO, EPA, and local regulatory mechanisms	Pollution Regulations and Compliance	Lecture	Quiz
11	2	Describe microbial remediation in petroleum contexts	Bioremediation Technologies	Lecture	Quiz
12	2	Compare adsorption, filtration, oxidation, and other methods	Cleanup Techniques	Lecture + Practice	Homework
13	2	Evaluate membrane, thermal, and chemical advanced processes	Advanced Remediation Technologies	Lecture	Quiz
14	2	Review emergency oil spill response planning	Oil Spill Management	Lecture + Case Study	Theoretical Assessment
15	2	Learn environmental data logging and remote sensing	Monitoring and Data Logging	Lecture	Quiz
16	2	Create site-specific control and mitigation plans	Pollution Control Planning	Lecture	Homework
17	2	Study waste stream management in production fields and refineries	Waste Handling and Disposal	Lecture + Video	Quiz
18	2	Analyze major international case studies	Global Case Studies	Group Discussion	Report
19	2	Discuss regulatory influence of NGOs	NGO Roles and Environmental Policy	Lecture	Quiz

20	2	Critique sustainability frameworks in oil operations	Sustainable Practices	Presentation	Group Evaluation
21	2	Apply concepts to localized industry scenarios	Case Studies in Iraq	Group Work	Homework
22	2	Reflect on ethical decision-making in petroleum pollution cases	Ethics in Environmental Management	Lecture	Quiz
23	2	Analyze accidents (e.g., Exxon Valdez, Deepwater Horizon)	Major Spill Events	Lecture + Case Study	Report
24	2	Develop site emergency and safety plans	Emergency Preparedness	Discussion + Presentation	Oral Evaluation
25	2	Introduce breakthrough technologies in green oil engineering	Emerging Clean Technologies	Lecture	Quiz
26	2	Explore long-term challenges (e.g., carbon intensity, ESG)	Future Challenges in Pollution Control	Lecture	Research Assignment
27	2	Predict regulatory and technological trends	Environmental Forecasting	Forecasting Discussion	Partial Final Exam
28	2	Use AI-driven risk models for remediation decision-making	Machine Learning for Risk Assessment	Review Session	Report
29	2	Prepare professional portfolios	Careers in Environmental Protection	Workshop + Discussion	Final Evaluation
30	2	Compare AI-based monitoring vs traditional methods	AI in Monitoring and Leak Detection Systems	Presentation	Group Discussion

11. Course Assessment and Grading Breakdown

The total score (out of 100) is distributed based on the student's assigned tasks, including daily preparation, quizzes, oral and written exams, monthly tests, reports, and other activities, as follows:

- **Attendance and Participation:** 10%
 - **Midterm Assessments** (daily, monthly, oral): 20%
 - **Reports and Practical Projects:** 10%
 - **Final Exam:** 60%
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12. Learning and Teaching Resources

Prescribed Textbooks (Core Curriculum, if applicable) Nelson, L. (2020), Environmental Pollution Control in Petroleum Operations.

Primary References (Sources)

Recommended Supporting Books and References (Scientific journals, reports, etc.)

- Jafarinejad, Shahryar. Petroleum waste treatment and pollution control. Butterworth-Heinemann, 2016.
- Fingas, M. (2016), Oil Spill Science and Technology.
- Tchobanoglous, G. & Kreith, F. (2017), Handbook of Solid Waste Management.

Electronic References and Websites

Curriculum/Description Update Rate:

10%

1. Course Name:	
Petroleum Production Engineering 2	
2. Course Code:	
PRE 402	
3. Semester / Year:	
First and Second/ Fourth	
4. Description Preparation Date:	
25/9/2024	
5. Available Attendance Forms:	
In-person attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
6/120	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Muhamad A. Jassim	
Email: muhamed.aswad@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	•Teaching the student the basics of petroleum production engineering 2..... •Knowing the reservoir pressure and its relationship to production. • Draw the IPR shape •Mathematical methods for calculating production coefficients.....
9. Teaching and Learning Strategies	
Strategy	Acquire the scientific concepts and foundations that can distinguish the student as a petroleum production engineer II, identify the most

	important mathematical methods for calculating the productivity factor and study its impact on the PR diagram, as well as identify the most important problems facing petroleum engineers in terms of pressure drop during the production process.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	3	Types Reservoirs	Petroleum Production Engineering II	Theory	General questions and discussion
Second and third	6	Productivity Index (PI)	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion exam
Fourth	3	Radial flow in the reservoirs	Petroleum Production Engineering II	Theory	General questions and discussion
Fifth and Sixth	6	Inflow performance Relationship (IPR)	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
Seventh	3	Effect of Stratification and water cut on IPR	Petroleum Production Engineering II	Theory	General questions and discussion

Eighth	3	Productivity index test	Petroleum Production Engineering II	Theory	General questions and discussion
Ninth and tenth	6	Vogel Method	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
Eleventh and twelfth	6	Standing Method	Petroleum Production Engineering I	Theoretical& Practical	General questions and discussion
thirteenth and fourteen	6	Couto Method	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
Fifteenth and sixteen	6	Sadoon Method	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
seventeenth and eighteenth	6	Fetkovich Method	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
nineteenth and twentieth	6	Mathematical and physical principles of pressure drop	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
twenty-first and twenty-second	6	Flow pattern and its relation with pressure	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion

twenty-third and twenty-fourth	6	Multi rates test	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
twenty-fifth and twenty-sixth	6	Build up test	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
twenty-seventh and twenty-eighth	6	Draw down test	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion
twenty-ninth and thirtieth	6	Stimulation operations	Petroleum Production Engineering II	Theoretical& Practical	General questions and discussion

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Petroleum Reservoir Engineering Handbook, T Ahmed, 4 th edition 2010
Main references (sources)	Petroleum Production Engineering
Recommended books and references (scientific journals, reports...)	Principles of Petroleum Production Engineering 1
Electronic References, Websites	8%

1. Course Name:	
Reservoir Modeling and Simulation	
2. Course Code:	
PRE403	
3. Semester / Year:	
Year– Forth level	
4. Description Preparation Date:	
9/9/2024	
5. Available Attendance Forms:	
Attendance+Classroom	
6. Number of Credit Hours (Total) / Number of Units (Total):	
6/120	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr.Nabhan Abdulkareem Hamdon Email: nabhanabdul@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	● Reservoir Characterization. ● Fluid behavior and rock properties. ● Grid Design. ● Principles of Finite Difference. ● Application of Finite Difference (Summary of Various Finite Difference, Discretization of a Single Phase System, Block–Centered and Point Centered Grids, Dirichlet and Neumann Boundary Conditions. ● Derivative the partial differential equations that governing the flow in porous media. ● Solving numerically the partial differential equations that governing the flow in porous media.

	● How this course deals with the basic concept of reservoir engineering, Physics, Computer programing and numerical solution.				
9. Teaching and Learning Strategies					
Strategy	Strategies of reservoir simulation: Reservoir simulation is a crucial tool in the oil and gas industry for predicting the behavior and performance of hydrocarbon reservoirs. It involves creating numerical models of the subsurface reservoir and simulating fluid flow to understand how the reservoir will respond to production strategies. Delivering this 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 and by considering types of simple experiments involving some sampling activities that are interesting to the students and 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 and by considering types of simple experiments involving some sampling activities that are interesting to the students.				
10. Course Structure					
Week	Hours /week	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2		Introduction to Reservoir Modelling and Simulation (Defintions)	Attendance	General questions a discussion
Week 2			Geological Model: A detailed description of the reservoir's geology, including its structure, lithology, and stratigraph	Attendance	General questions a discussion

Week 3			Petrophysical Properties: Important rock and fluid properties such as porosity, permeability, saturation, and compressibility.	Attendance	General questions and discussion
Week 4			Fluid Properties: Properties of the fluids present in the reservoir, including oil, gas, and water(part 1)	Attendance	General questions and discussion + quiz
Week 5			Fluid Properties: Properties of the fluids present in the reservoir, including oil, gas, and water(part 2)	Attendance +Classroom	General questions and discussion
Week 6			Basic Equations of Fluid Flow in Porous Media (Part 1)	Attendance	Exam
Week 7			Basic Equations of Fluid Flow in Porous Media (Part 2)	Attendance +Classroom	General questions and discussion
Week 8			Principles of Finite Difference Approximation (Finite Difference Scheme & Discretization) (Part 1)	Attendance	General questions and discussion + quiz
Week 9			Principles of Finite Difference Approximation (Finite Difference Scheme &	Attendance	Exam

			Discretization) (Part 2)		
Week 10			Methods of Solving Systems of Linear Equations	Attendance	General questions and discussion
Week 11			Introduction to Types of Boundary Conditions and Grid Systems	Attendance	General questions and discussion+ quiz
Week 12			Simple 1D Linear Flow with Sources/Sinks (part 1)	Attendance +Classroom	Exam
Week 13			Simple 1D Linear Flow with Sources/Sinks (part 2)	Attendance	General questions and discussion
Week 14			Introduction to the numerical simulation of multi- phase flow through porous media (Part 1)	Attendance +Classroom	General discussion and Preparatory week before the Mid. Exam
Week 15			Mid. Exam	Attendance	Exam.
Week 16			Introduction to the numerical simulation of multi- phase flow through porous media (Part 2)	Attendance	General questions and discussion
Week 17			Dervative of 2D- Cartesian flow equation (part 1)	Attendance +Classroom	General questions and discussion
Week 18			Dervative of 2D Cartesian flow equation (part 2)	Attendance	General questions and discussion

Week 19			Boundary Conditions and Grid Systems (part 1)	Attendance	General questions and discussion+ quiz
Week 20			Boundary Conditions and Grid Systems (part 2)	Attendance	General questions and discussion
Week 21			Dervative of 3D- Cartesian flow equation (part 1)	Attendance +Classroom	Discussion +Exam
Week 22			Dervative of 3D- Cartesian flow equation (part 2)	Attendance	General questions and discussion+ quiz
Week 23			Dervative of 3D- Cartesian flow equation (part 3)	Attendance	General questions and discussion
Week 24			Numerical simulation of a 3D- fluid flow equ. through porous media (Part 1)	Attendance +Classroom	Discussion +Exam
Week 25			Numerical simulation of a 3D- fluid flow equ. through porous media (Part 2)	Attendance	General questions and discussion+ quiz
Week 26			Numerical simulation of a 3D- fluid flow equ. through porous media (part 3)	Attendance	General questions and discussion
Week 27			Introduction to the numerical simulation of multi-phase flow through	Attendance +Classroom	Discussion +Exam

			porous media (Part 1)		
Week 28			Introduction to the numerical simulation of multi-phase flow through porous media (Part 2)	Attendance	General questions and discussion
Week 29			Preparatory week before the final Exam	Attendance	Preparatory week before the final Exam
Week 30			Final Exam.	Attendance	Final Exam

1. Course Name:	
Technology of Petroleum Refinery	
2. Course Code:	
PER404	
3. Year:	
4	
4. Description Preparation Date:	
2025/9/1	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
100/4	
7. Course administrator's name (mention all, if more than one name)	
Maher Obaid Ahmed,	
8. Course Objectives	
Cours e Object ives	1. To understand Definition of petrochemicals, Source of Petrochemicals, Classification of Petrochemicals to understand Composition and properties of crude oil. 2. This course deals with Crude oil evaluation, Crude oil distillation, Catalytic processes in petroleum refinery, Catalytic Hydrodesulphurization process, Steam cracking of hydrocarbons, Catalytic Reforming process, Steam reforming of hydrocarbons (Synthesis gas, H₂, & Carbon oxides).
9. Teaching and Learning Strategies	

Strategy	The main strategy that will be adopted in delivering this module; Encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, The practical application, interactive tutorials, the displaying of industrial reportages, and alternative quizzes.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9	4 4	General information Fundamental petroleum	<u>Composition and properties of crude oil:</u> Definition of crude oil, Elemental analysis of crude oil, Composition of crude oil, crude oil properties, classification of crude oil, characterization factor and API gravity, Sulfur content, Cloud and Pour Points, Carbon Residue, Salt Content, Flash point, Aniline point, Refinery flow and major refinery products. <u>Crude oil evaluation:</u> Distillation curves, ASTM distillation, True boiling point,		

10		m	Equilibrium or		
11		refi	flash		
12		ner	vaporization		
13		y	curve, Property		
14			curves, cut		
15		Advance petroleu m refinery	point, Typical finished products. <u>Crude oil</u> <u>Preparation for</u> <u>refining:</u> Degassing of crude oil, Stabilization of crude oil, Desalting of crude oil, Continuous Settler design. <u>Crude oil</u> <u>distillation:</u> Introduction, Atmospheric distillation, Vacuum distillation, Material & heat balance, Types of reflux, column temperatures, Column diameter, The main equipments in topping units (Heat exchanger, Furnace). <u>Catalytic</u> <u>processes in</u> <u>petroleum</u> <u>refinery:</u>		

		Fluidized bed Catalytic cracking (FCC): Definition, Flow diagram and process description, Cracking reactions, FCC catalyst, Equipment. Catalytic Hydrodesulphurization process: Introduction, Reactions, Catalyst, process flow diagram, Operating conditions. Catalytic Reforming process: Definition and purpose, Feed stocks, Reactions, Catalyst system, Process flow diagram (Fixed bed semiregenerative reforming), Reactor performance and operating conditions.		
11. Course Evaluation				<u>Crude oil evaluation:</u>

		Distillation curves, ASTM distillation, True boiling point, Equilibrium or flash vaporization curve, Property curves, cut point, Typical finished products
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc		<u>Crude oil Preparation for refining:</u> Degassing of crude oil, Stabilization of crude oil, Desalting of crude oil, Continuous Settler design.
12. Learning and Teaching Resources The detailed of a petroleum refinery such as Composition and properties of crude oil: Definition of crude oil, Elemental		<u>Crude oil distillation:</u> Introduction,

analysis of crude oil, Composition of crude oil, crude oil properties, classification of crude oil, characterization factor and API gravity, Sulfur content, Cloud and Pour Points, Carbon Residue, Salt Content, Flash point, Aniline point, Refinery flow and major refinery products. Introduction, Atmospheric distillation, Vacuum distillation, Material & heat balance, Types of reflux, column temperatures, Column diameter, The main equipments in topping units (Heat exchanger, Furnace). Definition, Flow diagram and process description, Cracking reactions, FCC catalyst, Equipment. Definition and purpose, Feed stocks, Reactions, Catalyst system, Process flow diagram (Fixed bed semiregenerative reforming), Reactor performance and operating conditions.		Atmospheric distillation, Vacuum distillation, Material & heat balance, Types of reflux, column temperatures, Column diameter, The main equipments in topping units (Heat exchanger, Furnace).
Required textbooks (curricular books, if any)	<u>Fundamentals of Petroleum Refining</u> 1st Edition - November 19, 2009 Authors: Mohamed A. Fahim, Taher A. Al-Sahhaf, Amal Elkilani Hardback ISBN: 9780444527851 9 7 8 - 0 - 4 4 4 - 5 2 7 8 5 - 1 eBook ISBN: 9780080931562.	<u>Catalytic processes in petroleum refining</u> <u>Y:</u> Fluidized bed Catalytic cracking (FCC): Definition, Flow diagram and process description,

			Crackin g reactio ns, FCC catalyst , Equipm ent.
Main referen ces (source s)	Fahim, M.A.; Al-Shahhaf, T.A. and Elkilani, A.S., <i>Fundamentals of Petroleum Refining</i> , Elsevier.		Catalyt ic Hydro desulp hurizat ion process : Introdu ction, Reactio ns, Catalys t, process flow diagra m, Operati ng conditi ons.
Recom mende d books and referen ces (scientif ic journals , reports. ..)	Nelson, W.L., <i>Petroleum Refinery Engineering</i> , McGraw-Hill.		Catalyt ic Refor ming process : Definiti on and purpose , Feed stocks, Reactio ns, Catalys t system, Process flow diagra m (Fixed bed semireg enerati ve

			reformi ng), Reactor perfor mance and operati ng conditi ons.
Electroni c Referenc es, Website s	https://sakura03.files.wordpress.com/2012/03/chemical-engineering-design-fourth-edition-chemical-engineering-volume-6-coulson-amp-richardson-039-s-chemical-engineering.pdf		Exam.

1. Course Name:
Reservoir Management and Petroleum Economics
2. Course Code:
PRE 405
3. Semester / Year:
Fourth academic year - 2024-2025
4. Description Preparation Date:
202-9-15
5. Available Attendance Forms:
3 hours in attendance
6. Number of Credit Hours (Total) / Number of Units (Total):
90 hr/ 4 units
7. Course administrator's name (mention all, if more than one name)
Name: Zahraa Ghanim younis Al-alaf

Email: zahraalmajidi@uomosul.edu.iq

8. Course Objectives

Course Objectives	1. Explain the nature of the petroleum economy and the most important related concepts. 2. Explore the origins of petroleum and the theories explaining its existence. 3. Explain the types of oil and their measurements. 4. Understand the stages of the petroleum industry. 5. Learn about reserves, storage, oil markets, and prices. 6. The most important policies, theories, and strategies related to the depletable resource. 7. Learn about and study licensing rounds. 8. Contracting with companies, how to write petroleum contracts, and dealing with banks.
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9. Teaching and Learning Strategies

Strategy	Delivering the lecture, adopting the discussion and exploratory method, using modern methods to clarify the lecture, brainstorming, and using educational videos.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	3	Basic Concepts	Definition of oil, its history, and origin	Theoretical	General Questions and Discussion
Second	3	Identify Types of Oil	Types of oil, its scale, and density	Theoretical	Homework
Third	3	Importance of the Oil Economy	Definition of petroleum economics	Theoretical	General Questions and Discussion
Fourth	3	Characteristics of the Oil Industry	The petroleum industry and its characteristics	Theoretical	Homework
Fifth	3	Understand Horizontal and Vertical Integration of the Oil Industry	Stages of the petroleum industry	Theoretical	Homework
Sixth	3	Extractive Industry	Source	Theoretical	Homework
Seventh	3	Processing Industry	Destination	Theoretical	General Questions and Discussion
Eighth	3	Importance of Reserves and Influencing Factors	Oil reserves and their classification	Theoretical	On-the-Go Exam

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Ninth	3	Understand Product Behavior	Reserves and the critical path for extraction	Theoretical and Exercises	Homework
Tenth	3	Depleting Resource Cycle	Hibert's study	Theoretical	General Questions and Discussion
Eleventh	3	Importance of Inventory and Influencing Factors	Types of oil storage and their impact on oil price fluctuations	Theoretical	General Questions and Discussion
Twelfth	3	Importance of Inventory and Influencing Factors	Types of oil storage and their impact on oil price fluctuations	Theoretical	Homework
Thirteenth	3	Oil Market	Global oil prices	Theoretical	Homework
Fourteenth	3	Oil Market	Global oil prices	Theoretical	
Fifteenth	End-of-Semester Exam	End-of-Semester Exam	Theoretical	Exam	
Sixteenth	3	Review	Review	Theoretical	Homework
Seventeenth	3	Seminar on Economic Feasibility for Engineering Projects		Project Presentation	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Eighteenth	3	Economic Feasibility for Engineering Projects Seminar		Project Presentation	
Nineteenth	3	Licensing Rounds	Theoretical	Theoretical	Homework
Twenty	3	Licensing Rounds	Theoretical	Theoretical	Homework
Twenty-One	3	Licensing Rounds	Theoretical	Theoretical	Homework
Twenty-Two	3	OPEC Policy	OPEC and the Production Quota System	Project Presentation	Homework
Twenty-Three	3	OPEC Policy	OPEC and the Production Quota System	Project Presentation	
Twenty-Four	3	Presentation of a Seminar on How to Deal with Oil Markets		Exam	
Twenty-Five	3	Presentation of a Seminar on How to Deal with Oil Markets		Theoretical	
Twenty-Six	3	Second Semester Exam		Theoretical	
Twenty-Seven	3	Natural Gas and Oil Fields		Review	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Twenty-Eight	3	Natural Gas and Oil Fields			
Twenty-Nine	3	Review			
Thirty	3				Final Exam

11. Course Evaluation

1. Midterm Exam: 15
2. Core Exams: 5
3. Oral Questions and Direct Assessment: 10
4. Classroom Participation: 5
5. Activity Presentations: 5
6. Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curriculum books, if any)	1. د. احمد حسين الهيتي، مقدمة في اقتصاديات النفط، مطبعة جامعة الموصل، 1994.
Main references (sources)	1. د. احمد حسين الهيتي، اقتصاديات النفط، مطبعة جامعة الموصل، 2000. 2. Electronic lectures by Professor Hussein Rabia
Recommended books and references (scientific journals, reports...)	https://sa.investing.com/commodities/brent-oil https://sa.investing.com/commodities/crude-oil
Electronic Websites	Referend %5

Engineering design	
13. Course Code:	
PRE406	
14. Year:	
4	
15. Description Preparation Date:	
25/9/2025	
16. Available Attendance Forms:	
17. Number of Credit Hours (Total) / Number of Units (Total)	
100/4	
18. Course administrator's name (mention all, if more than one name)	
Maher Obaid Ahmed,	
19. Course Objectives	
Course Objectives	3. To develop solving skills and an understanding of design for petroleum units. 4. To understand the pumps, piping systems and relation of volumes, pressures, and operation condition for during different states and procedures. 5. This course deals with the basic concept of engineering design. 6. It deals with Tanks, Vessels & Drums – Sizing, Gas Liquids Separators design, Distillation design. 7. To understand petroleum unit's equations problems.

	8. To understand the calculation of engineering design for petroleum unit.
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20. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module; 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, the displaying of industrial reportages, and alternative quizzes.
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21. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	General information Fundamental design	Introduction to design		
2	4		Design Information and Data		
3			Pumps & Piping Systems:		
4			1: Valve selection. 2- Pipe size selection.3-Optimum pipe diameter. 4- Pipe Wall thickness.		
5					
6					
7			Tanks, Vessels & Drums – Sizing.		
8			Gas Liquids Separators (horizontal and vertical separator)		
9					

10112131415		Advance desing	Heat-Transfer Equipment: Heat Exchanger Design Separation column: Continuous Distillation (Vapour-Liquid Equilibrium, Flash or equilibrium distillation). The McCabe-Thiele Method. Calculation of the theoretical number of plates of the continuous distillation column by McCabe-Thiele Method (graphically), Minimum Reflux ratio, Minimum number of stages). Exam.		
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22. Course Evaluation				Design Information and Data
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc				Pumps & Piping Systems:

			1: Val ve sele ctio n. 2- Pip e size sele ctio n.3- Opt imu m pip e dia met er. 4- Pip e Wal l thic kne ss.
23. Learning and Teaching Resources			Tan ks, Ves sels & Dru ms – Sizi ng.

Required textbooks (curricular books, any)	Coulson & Richardson's CHEMICAL ENGINEERING VOLUME 6.	Gas Liquids Separators (horizontal and vertical separator)
Main references (sources)	Handbook of Pumps and Pumping: Pumping Manual International by Brian Nesbitt.	Heat-Transfer Equipment : Heat Exchanger Design
Recommended books and references (scientific journals, reports...)	Fluid Mechanics, Heat Transfer, and Mass Transfer: Chemical Engineering Practice 1st Edition by K. S. Raju	Separation column: Continuous Distillation (Vapour-Liquid Equilibrium, Flash or equilibrium)

			distillation).
Electronic References, Websites	https://sakura03.files.wordpress.com/2012/03/chemical-engineering-design-fourth-edition-chemical-engineering-volume-6-coulson-amp-richardson-039-chemical-engineering.pdf		The McCabe-Thiele Method.
Curriculum/Description Update Rate:	%8		Exam

24. Course Name:	
Enhanced oil Recovery	
25. Course Code:	
PRE407	
26. Semester / Year:	
4 th stage	
27. Description Preparation Date:	
25-9-2024	
28. Available Attendance Forms:	
Attendance time for students	
29. Number of Credit Hours (Total) / Number of Units (Total)	
(60)/(4)	
30. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Majid Majdi Abdel Al- Majeed Al-Mutwali	
Email: majidmutwaly@uomosul.edu.iq	
31. Course Objectives	
Course Objectives	It aims to teach the student everything related to methods for improving oil production (primary, secondary and tertiary methods), which include injection liquids, gases or chemicals and everything related to these methods for the purpose of obtaining the highest possible oil production from oil fields.
32. Teaching and Learning Strategies	
Strategy	Identify the most important methods used to improve oil production from low-production fields • Study and understand everything related to these methods,

	according to the nature of each oil field • Raising the ability of the petroleum engineer to think about the nature of using means to improve production • Knowing the conditions affecting the field during the injection of liquids, gases, or chemicals A complete understanding of production ratios before and after using production improvement methods.
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33. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 st	2	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Oil recovery processes Primary oil recovery	theoretical	General Question and discussion
2 nd 3 rd	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Principal influences on efficiency of enhanced Recovery	Theoretical	General Question and discussion
4 th -5 th	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Secondary oil recovery Injection well location	theoretical	General Question and discussion
6 th 7 th	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Oil displacement efficiency Water injection	Theoretical	General Question and discussion
8 th 9 th	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Optimum time to waterflood Practical considerations water injection projects	theoretical	General Question and discussion

10+11	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Displacement mechanisms	Theoretical	General Question and discussion
12+13	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Water injection in regular developed homogeneous reservoirs	theoretical	General Question and discussion
14+15	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Water injection performance calculations	Theoretical	General Question and discussion
16+17	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Production well completion Treatment methods	theoretical	General Question and discussion
18+19	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Combined gas and water injection	Theoretical	General Question and discussion
20+21	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Gas recycling in condensate reservoirs	theoretical	General Question and discussion
22	2	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	The thermodynamics of recycling	Theoretical	General Question and discussion
23+24	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Sweep efficiency	theoretical	General Question and discussion
25+26	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Well locations	Theoretical	General Question and discussion

27+28	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Production control	theoretical	General Question and discussion
29+30	4	Raise the student's ability to improve oil recovery primary, secondary and Tertiary methods	Polymers for Enhanced Oil Recovery Technology	theoretical	General Question and discussion

34. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

35. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Enhanced Oil Recovery 1980:Marcel Latil, Charles Bardon, Jacques Bur and Pierre Sourieau , Institut Francais Du Petrole , 23
Recommended books and references (scientific journals, reports...)	<i>Alvarado, V. and Manrique,</i> 'Enhanced Oil Recovery: An Update Review', <i>Energies</i> , 3 (2010), 152 1575
Curriculum/Description Update Rate:	%6

Course Name:

