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 Guide

Al-Ayen Iraqi University

2024

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: This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

Program Vision: Leadership in engineering education, scientific research, and community partnership to achieve sustainable development within an ethical framework

Program Mission: The college is dedicated to preparing outstanding graduates capable of competing, innovating, and serving society in the field of engineering at the regional and global levels, while also upholding ethical values to achieve sustainable development

Program Objectives Objective 1: Supporting Institutional Capacity

– Enhance the efficiency of institutional performance to strengthen the college's competitive position.

– Regularly improve and upgrade the college's infrastructure and laboratories.

– Strengthen partnerships with the community and support sustainable development projects.

– Develop the capabilities of staff members.

– Enhance administrative authority.

– Continuously improve data and information technologies and systems to meet the demands of digital transformation and cybersecurity.

Objective Two: Enhancing Teaching and Learning

– The Academy has secured recognition from the Iraqi Accreditation Council.

– Providing standardized academic programs across various specializations that meet labor market demands.

– Supporting the development of strategies for teaching, learning, and evaluation.

– Increase the competitiveness of college students.

Objective Three: Excellence in Scientific Research and Creativity

– Increase research output and capacity.

– Focused on developing capabilities in scientific research.

– Promote scientific research as a means to achieve social development within the community.

Objective Four: Implementation of Quality Standards and Accreditation

– Adhering to local quality standards on a regular basis.

– Ensure compliance with educational effectiveness standards periodically.

– Continuously update our internal systems to align with quality standards and technological advancements, while also linking them to labor market needs.

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:

1- Possess the skill of applying appropriate engineering methods and ethical professionalism in petroleum engineering

2- Participate in professional development initiatives to learn new skills and explore adaptable career options in petroleum engineering

.

3- Participate in volunteer work within the community to enhance leadership skills

Teaching and learning strategies: 1- Focusing on the theoretical side on the study of scientific problems according to a logical scientific

method aimed at understanding the problem and working to find solutions to it.

2- Focusing on the practical side on acquiring skills in conducting experiments and using them in scientific

research

3- Learning in the theoretical and scientific aspects is achieved through cooperation between the

professor and the student to achieve the optimum benefit by overcoming the obstacles facing the student

and impeding the achievement of the desired goals.

4- Encouraging students to broadcast information from books and scientific articles on the Internet

Academic Program Description Form

University Name: Al-Ayen University

Faculty/Institute: Engineering

Scientific Department: Petroleum department

Academic or Professional Program Name: .....

Final Certificate Name: Bachelor in Petroleum Engineering

Academic System: Yearly

Description Preparation Date: 9/9/2024

File Completion Date: 15/10/2024

Signature:

Head of Department Name:

Date: 22/10/2024

Signature:

Scientific Associate Name:

Date: 22/10/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 22/10/2024

Signature:

وزارة التعليم العالي والبحث العلمي
جامعة العين العراقية
مكتب عميد كلية الهندسة

Approval of the Dean

Prof Dr Firas Faeq Kadhim

1. Program Vision

Leadership in engineering education, scientific research, and community partnership to achieve sustainable development within an ethical framework .

2. Program Mission

The college is dedicated to preparing outstanding graduates capable of competing, innovating, and serving society in the field of engineering at the regional and global levels, while also upholding ethical values to achieve sustainable development.

3. Program Objectives

1-Possess the skill of applying appropriate engineering methods and ethical professionalism in petroleum engineering

2-Participate in professional development initiatives to learn new skills and explore adaptable career options in petroleum engineering

3-Participate in volunteer work within the community to enhance leadership skills

4. Program Accreditation

Not existed

5. Other external influences

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution	8(pologna)+	18ECTS(450HOURS)+	8.2%+	BASI

Requirements	**0(yearly system)**	**0**	**0%**	**C**
College Requirements	**1(pologna)+3(yearly system**	**5ECTS(125HOURS)+ 330 HOURS**	**2.3%+ 6%**	**BASIC**
Department Requirements	**19(pologna) +15(yearly system)**	**97ECTS(2425HOURS) + 2130HOURS**	**44.4%+ 39%**	**BASIC**
Summer Training	**1**	**One month in field**	**Pass (graduation requirement)**	**BASIC**
Other				

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

7. Program Description

Level/Year	Course or Module Code	Course or Module Title	Credit Hours

			Practical	Theoretical
Third Year	**PE300**	**Petroleum Reservoir Eng.1**	4	6
Third Year	**PE302**	**Petroleum Drilling Eng.1**	4	6
Third Year	**PE304**	**Petroleum Production Eng.1**	0	4
Third Year	**PE306**	**Well Logging**	0	6
Third Year	**PE308**	**Petroleum Engineering Economics**	0	4
Third Year	**GE302**	**Engineering Mathematics**	0	6
Third Year	**GE310**	**Technical English**	0	4
Third Year	**PE301**	**Geophysics**	0	2
Third Year	**GE303**	**Engineering Statistics**	0	2
Fourth Year	**PE400**	**Petroleum Reservoir Eng.2**	0	6
Fourth Year	**PE402**	**Petroleum Drilling Eng.2**	0	6
Fourth Year	**PE404**	**Petroleum Production Eng.2**	0	6
Fourth Year	**PE406**	**Secondry Oil Recovry**	0	6
Fourth Year	**PE408**	**Numerical Methods and Rservoir Simulation**	4	4
Fourth Year	**PE410**	**Engineering Project**	4	2
Fourth Year	**PE401**	**Gas Technology**	0	3

Fourth Year	**PE403**	**Optimization**	0	3
Fourth Year	**PE405**	**Integrated Reservoir Management**	1	2

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	1. An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics. 2. An ability to produce engineering designs that meet desired needs within certain constraints by applying both analysis and synthesis in the design process. 3. An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty.
Skills	
Learning Outcomes 2	4. An ability to skillfully communicate or ally with a gathering of people and in writing with various managerial levels. 5. An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly. 6. An ability to create and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences.
Ethics	
Learning Outcomes 3	7. An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological and societal considerations.

9. Teaching and Learning Strategies

Power point
White board
Brain storming
Team working
Presentation
Discussion
Tutorial and graphic
Problem solving
Interactive groups
Cooperation work

10. Evaluation methods

1- Quizzes
2- Mid-term Exam
3- Laboratory Exam
4- Final Exam

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer

Asst. Prof. Dr. Firas Faiq Kazem						
Asst. Prof. Dr. Asaad Shakir Hamid						
Asst. Prof. Dr. Najeah Yousif Al-Ali						
. Dr. Murtadha Dghaem Abdullah						
Dr. Abdulhussain Naamah						
Dr. Ismail Abdulhussain Radhi						
Asst. Prof. Dr. Raed Hamid Allawi						
Dr. Alaa Shihan Awad						

Professional Development
Mentoring new faculty members
Professional development of faculty members

12. **Acceptance Criterion**

13. **The most important sources of information about the program**
International standard references Global considerable sites

International universities syllabus

14. Program Development Plan
Enhancing and modifying laboratories program Supporting class hale with modern voice systems Providing laboratories with new devices Adding new and modern syllabus

Program Skills Outline																
				Required program Learning outcomes												
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	
Third year	PE300	Petroleum Reservoir Eng.1 -	B	✓	✓	✓	✓	+	+	+		+	+			
	PE302	Petroleum Drilling Eng.1	B	✓	✓	✓	✓	+	+	+		+	+			
	PE304	Petroleum Production Eng.1	B	✓	✓	✓		+	+			+				
	PE306	Well Logging	B	✓	✓			+	+			+	+			
	PE308	Petroleum Engineering Economics	B	✓	✓			+	+			+				
	GE302	Engineering Mathemtis	B	✓	✓			+	+			+	+			
	GE310	Technical English	B	✓	✓			+	+			+				

	PE301	**Geophysis**	**B**	✓	✓			**+**	**+**			**+**				
	GE303	**Engineerig Statistics**	**B**	✓	✓			**+**				**+**				
Fourth year	**PE400**	**Petroleum Reservoir Eng.2**	**B**	✓	✓			**+**	**+**			**+**	**+**			
	PE402	**Petroleum Drilling Eng.2**	**B**	✓	✓			**+**	**+**			**+**	**+**			
	PE404	**Petroleum Production Eng.2**	**B**	✓	✓			**+**	**+**			**+**				
	PE406	**Secondry Oil Recovry**	**B**	✓	✓			**+**	**+**			**+**				
	PE408	**Numerical Methods and Rservoir Simulation**	**B**	✓	✓	✓		**+**	**+**	**+**		**+**				
	PE410	**Engineering Project**	**B**	✓	✓			**+**	**+**			**+**				
	PE401	**Gas Technology**	**B**	✓	✓			**+**		**+**		**+**	**+**			
	PE403	**Optimization**	**B**	✓	✓			**+**		**+**		**+**	**+**			

	PE405	**Integrated Reservoir Management**	**B**	✓	✓	✓		**+**		**+**		**+**	**+**		

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

Course Description Form

1. Course Name:
Drilling Engineer 1
2. Course Code:
3. Semester / Year:
2024-2025
4. Description Preparation Date:
18/12/2024
5. Available Attendance Forms:
presence
6. Number of Credit Hours (Total) / Number of Units (Total)
90
7. Course administrator's name (mention all, if more than one name)
Name: Dr. mohammad Hweree Email : mhweree@albaath-univ.edu.sy
8. Course Objectives

Course Objectives	• **Identify the parts of the drilling rig and how each device works independently.** • **Study the systems that make up the device, and how each system works independently.** **• Knowing how the different drilling gas systems work in an integrated manr to complete the well.** **• Knowledge of the drill bit, its types, and how each type works.** **• Learn how to evaluate the drill head and determine the possibility of returning it to work or coordinating it.** **• Identify drilling fluid and its types.** • **Identify the types of casing, its types, diameters, and specifications.** **• Knowing the methods for choosing casing and its relationship to the diameter of the well.** **• recognizing the important of well casing and their objectives.**

	• **Identifying the equipment that helps in the naming process.** • **Identify the types of cement used and the specifications and conditions using each type.**

9. Teaching and Learning Strategies

Strategy	- Giving lectures to students. - Using illustrative means, models, video clips, etc.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student learns	Introduction to drilling engineering	- lecture - discussion	Interim testing - Asking questions - Projects, laboratory - Final test
2	3	The student learns	Drilling methods	- lecture - discussion	Interim testing - Asking questions - Projects, laboratory - Final test
4+3	6	The student learns	Bit	- lecture - discussion	- Interim testing - Asking questions - Projects, laboratory - Final test
5-21	66	The student learns	Mud	- lecture - discussion	- Interim testing - Asking questions - Projects, laboratory - Final test
22	3	The student learns	Will Stag	- lecture - discussion	- Interim testing - Asking questions - Projects, laboratory - Final test
3-25	15	The student learns	Casing	- lecture - discussion	- Interim testing - Asking questions - Projects, laboratory - Final test
6-30	15	The student learns	Cementing	- lecture - discussion	- Interim testing - Asking questions - Projects, laboratory - Final test.

11. Course Evaluation

- Weekly tests, jobs, activities:	5 marks (during each semester)
- Quizzes every two weeks.	10 marks (during each semester)
- Main interim exam (first semester, second semester).	10 marks (during each semester)
- Final practical test.	10 marks
- A theoretical final test.	40 degrees

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Well Engineering and construction, Hussain Rabia. - Baker Hughes INTEQ - Drilling Fluids Reference Manual. -halliburton-red-book-cementing-drilling manual
Main references (sources)	
Recommended books and references (scientific journals, reports…)	- Drilling Formulas, GlobalSantaFe, 2002-Drill Stri Design. - DRILCO_Drilling-Assembly-Hndbk_WIS-BR-MKT 021_r2_ELEC. - drilling Engineering - heriot watt institute. - Halliburton-Petroleum-Well Construction. - IADC/SPE 72290
Electronic References, Websites	-https://t.me/+e9uigwz12D4wmzzk -www.scientificamerican.com - https://www.researchgate.net/publication /42387314

1. Course Name:
Oil production 1
2. Course Code:
3. Semester / Year:
2024-2025
4. Description Preparation Date:
18/12/2024
5. Available Attendance Forms:
presence
6. Number of Credit Hours (Total) / Number of Units (Total)
90
7. Course administrator's name (mention all, if more than one name)
Name: Dr. mohammad Hweree Email : mhweree@albaath-univ.edu.sy
8. Course Objectives

Course Objectives	**• Introduction to production processes.** **• Introducing the production engineer's tasks from the beginning until the well is abandoned.** **• Definition of termination processes and their methods.** **• Definition of methods for extracting liquid from the reservoir** **• Introducing the payment systems present within the reservoir** **• Identify problems in production processes.** **• Identify production equipment** **• Identify production methods**

9. Teaching and Learning Strategies

Strategy	- Giving lectures to students. - Using illustrative means, models, video clips, etc.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	9	The stude learns	Introduction of production	- lecture. - discussion.	-Interim testing -Asking questions - Final test
4-8	15	The stude learns	Stratified fluid flow systems	- lecture. - discussion.	Interim testing -Asking questions - Final test
9-11	9	The stude learns	Completion operations	- lecture. - discussion.	Interim testing -Asking questions - Final test
12-14	9	The stude learns	Surface Equipment	- lecture. - discussion.	Interim testing -Asking questions - Final test
14-20	21	The stude learns	Collection, separation and storage operations	- lecture. - discussion.	Interim testing -Asking questions - Final test
20-23	12	The stude learns	Tubing design	- lecture. - discussion.	Interim testing -Asking questions - Final test
24-30		The stude learns	Production process problems and solution methods	- lecture. - discussion.	Interim testing -Asking questions - Final test

11. Course Evaluation

- Weekly tests, jobs, activities: 5 marks (during each semester).
- Quizzes every two weeks. 5 marks (during each semester).
- Main interim exam (first semester, second semester). 10 marks (during each semester).
- Final practical test. 10 degrees .
- A theoretical final test. 50 degrees.

12. Learning and Teaching Resources	
Required textbooks (curricular books any)	-Petroleum Engineering Handbook- Larry W. Lake, Editor-in-Chief- U. of Texas at Austin. -Petroleum production Engineering - ISBN: 0750682701- Publisher: Elsevier Science & Technology Books- • Pub. Date: February 2007.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	-OIL AND GAS, PRODUCTION. HANDBOOK, An introduction to oil and gas production- Håvard Devold- © 2006 ABB ATPA Oil and Gas.
Electronic References, Websites	-https://t.me/+e9uigwz12D4wmzzk -www.scientificamerican.com -https://www.researchgate.net/publication/423873

Course Description Form

13. Course Name:	
Petroleum economics	
14. Course Code:	
PE308	
15. Semester / Year:	
2025-2024	
16. Description Preparation Date:	
2024-12-18	
17. Available Attendance Forms:	
Weekly	
18. Number of Credit Hours (Total) / Number of Units (Total)	
60	
19. Course administrator's name (mention all, if more than one name)	
Name: muayad abdulhusien galtae Email: muayad535@gmail.com	
20. Course Objectives	
Course Objectives	**• The aim of the unit is to prepare the student deal with petroleum economics topics. In addition to teaching the student the basics of petroleum economic** **• knowing the markets of petroleum** **• Knowing how to open petroluem markets**
21. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this u is to encourage student participation in petrole economics activities, while at the same time improving a expanding their critical thinking skills. This will be achiev through classroom and laboratory settings and considering the type of external research that includes so petroleum economical problems that interest the student.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
3–1	6	Student understand	Introduction (Review of Fundamental Concepts of Economic of Petroleum Eegineering)	Theoretical	Quizzes, monthly exams, final exan
8-4	8	Student understand	Oil and gas reserve	Theoretical	Quizzes, monthly exams, final exan
15-9	12	Student understand	Types of oil and gas reserve.	Theoretical	Quizzes, monthly exams, final exan
18-16	6	Student understand	Organization of exporting and importing Countries	Theoretical	Quizzes, monthly exams, final exan
21-19	6	Student understand	Classification of Petroleum	Theoretical	Quizzes, monthly exams, final exan
24-21	8	Student understand	OPEC international oil exporting organization concurrent force	Theoretical	Quizzes, monthly exams, final exan

23. 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

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Handbook/ Tarek Ahmed
Recommended books and references (scientific	• Reservoir Engineering

journals, reports…)	• Handbook/ Tarek Ahmed • Enhanced Oil Recovery, Second Edition • by Paul Willhite (Author), Don Green (Author) • Mechanics of Secondary Oil Recovery Hardcover • by Charles Robert Smith (Author
Electronic References, Websites	– www.scientificamerican.com

Course Description Form

25. Course Name:	
Technical English	
26. Course Code:	
GE301	
27. Semester / Year:	
2024–2025	
28. Description Preparation Date:	
18/12/2024	
29. Available Attendance Forms:	
presence	
30. Number of Credit Hours (Total) / Number of Units (Total)	
90	
31. Course administrator's name (mention all, if more than one name)	
Name: Ali Falah Hasan Email: alifalah916@gmail.com	
32. Course Objectives	
Course Objectives	**1. Health, safety and Environment (HSE)** **2. Introduction of Petroleum Engineering** **3. Oil Companies** **4. Oil formation** **5. Geophysics Methods in Petroleum Exploration.** **6. Oil Exploration Methods.** **7. Oil Extraction.** **8. Reservoir Rock Properties.** **9. Formation Evaluation.** **10. Life of a well.** **11. Types Of Wells.** **12. Introduction of Drilling.** **13. Casing & Cementing** **14. Pipeline Construction.** **15. Oil Storage.** **16. Oil Refinery** **17. Impact of Mining and oil Extraction on the Environment** **18. Impact of Chemical Elements on Human Organism** **19. The Economy of Petroleum Industry.**

33. Teaching and Learning Strategies	
Strategy	- Giving lectures to students. - Using illustrative means, models, video clips, etc.

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The stude learns	Health, safety a Environment (HSE)	- lecture. - discussion.	-Interim testing -Asking questions - Final test
2	2	The stude learns	Introduction of Petroleum Engineering	- lecture. - discussion.	Interim testing -Asking questions - Final test
3	2	The stude learns	Oil Companies	- lecture. - discussion.	Interim testing -Asking questions - Final test
4	2	The stude learns	Oil formation	- lecture. - discussion.	Interim testing -Asking questions - Final test
5	2	The stude learns	Geophysics Methods in Petroleum Exploration.	- lecture. - discussion.	Interim testing -Asking questions - Final test
6	2	The stude learns	Oil Exploration Methods.	- lecture. - discussion.	Interim testing -Asking questions - Final test
7	2	The stude learns	Oil Extraction.	- lecture. - discussion.	Interim testing -Asking questions - Final test
8	2	The stude learns	Reservoir Rock Properties.	- lecture. - discussion.	Interim testing -Asking questions - Final test
9	2	The stude learns	Formation Evaluation.	- lecture. - discussion.	Interim testing -Asking questions

					- Final test
10	2	The stude learns	Life of a well .	- lecture. - discussion.	Interim testing -Asking questions - Final test
11	2	The stude learns	Types Of Wells.	- lecture. - discussion.	Interim testing -Asking questions - Final test
12	2	The stude learns	Introduction of Drilling .	- lecture. - discussion.	Interim testing -Asking questions - Final test
13	2	The stude learns	Casing & Cementing	- lecture. - discussion.	Interim testing -Asking questions - Final test
14	2	The stude learns	Pipeline Construction.	- lecture. - discussion.	Interim testing -Asking questions - Final test
15	2	The stude learns	Oil Storage.	- lecture. - discussion.	Interim testing -Asking questions - Final test
16	2	The stude learns	Oil Refinery	- lecture. - discussion.	Interim testing -Asking questions - Final test
17	2	The stude learns	Impact of Mining and oil Extraction on the Environment	- lecture. - discussion.	Interim testing -Asking questions - Final test
18	2	The stude learns	Impact of Chemical Elements on Human Organism	- lecture. - discussion.	Interim testing -Asking questions - Final test
19	2	The stude learns	The Economy of Petroleum Industry.	- lecture. - discussion.	Interim testing -Asking questions - Final test
20	2	The stude learns	Production & Costs	- lecture. - discussion.	Interim testing -Asking questions - Final test

35. Course Evaluation

- Weekly tests, jobs, activities: 5 marks (during each semester).
- Quizzes every two weeks. 5 marks (during each semester).
- Main interim exam (first semester, second semester). 10 marks (during each semester).
- Final practical test. 10 degrees .
- A theoretical final test. 50 degrees.

36. Learning and Teaching Resources	
Required textbooks (curricular books any)	• Petroleum Engineering Teachers Book Л.М. Болсуновской, Р.Н. Абрамовой, И.А. Матвеенко. • Technical English , David Bonamy.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-https://t.me/+e9uigwz12D4wmzzk -www.scientificamerican.com -https://www.researchgate.net/publication/423873

Course Description Form

1. Course Name:
Engineering Mathematics
2. Course Code:
GE302
3. Semester / Year:
2025−2024
4. Description Preparation Date:
18−12−2024
5. Available Attendance Forms:
weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
90
7. Course administrator's name (mention all, if more than one name)
Name: muayad abdulhusien galtae Email: muayad535@gmail.com
8. Course Objectives

Course Objectives	**• The aim of the unit is to prepare the student to dea with** **• How to solve differential equations in several ways** **• Knowing partial differential equations and how to solve t**

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this unit is to encou critical thinking skills. This will be achieved through classroom and labo that interest the student.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method

1-3		Student v understanc	Concepts differential Equations, General f of solution	Theoretical	
4-8		Student v understanc	First-degree first-order equations, Separable-variable Exact equations	Theoretical	
9-12		Student v understanc	Inexact, integrating factors Linear equations	Theoretical	
13-16		Student v understanc	Homogenec Isobaric Bernoulli's equations	Theoretical	
17-20		Student v understanc	Problems applications	Theoretical	
21-24		Student v understanc	Solution f complemen function particular integral Laplace transform method	Theoretical	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparatio, dail

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	"Mathematical Methods in the Physical Sciences"
Recommended books and references (scientific journals, reports…)	Mathematic stack exchange Mathematical Methods for Physics and Engineering" "Mathematical Methods in the Physical Sciences"
Electronic References, Websites	https://ar.wikipedia.org/wiki/%D9%85%D8%B9

Course Description Form

1. Course Name:
Secondary recovery
2. Course Code:
3. Semester / Year:
2024-2025
4. Description Preparation Date:
18/12/2024
5. Available Attendance Forms:
presence
6. Number of Credit Hours (Total) / Number of Units (Total)
90
7. Course administrator's name (mention all, if more than one name)
Name: Dr. mohammad Hweree Email : mhweree@albaath-univ.edu.sy
8. Course Objectives

Course Objectives	**• Introduction to recovery processes.** **• Definition of Reservoir Drive Mechanisms.** **• Definition of all recovery methods.** **• Choose the appropriate recovery method for each reservoir.** **• Knowledge of all recovery methods, especially modern ones.** **• Knowing the possibility of combining more than one recovery method.** **• Determine the ideal time to start applying recovery methods.** **• Thinking about new methods of recovery.**

9. Teaching and Learning Strategies

Strategy	- Giving lectures to students. - Using illustrative means, models, video clips, etc.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	The stude learns	Introduction to Secondary recovery	- lecture. - discussion.	-Interim testing -Asking questions - Final test
2	3	The stude learns	Drive Mechanisms	- lecture. - discussion.	- Interim testing -Asking questions - Final test
3-6	12	The stude learns	Water injection	- lecture. - discussion.	Interim testing -Asking questions - Final test
7-10	9	The stude learns	CO_2 injection	- lecture. - discussion.	- Interim testing -Asking questions - Final test
11-12	6	The stude learns	Acidizing	- lecture. - discussion.	Interim testing -Asking questions - Final test
13-15	12	The stude learns	Hydraulic Fracturing	- lecture. - discussion.	Interim testing -Asking questions - Final test
16-18		The stude learns	Hydraulic Fracturing with Acid	- lecture. - discussion.	- Interim testing -Asking questions - Final test
19-21	9	The stude learns	Thermal method	- lecture. - discussion.	- Interim testing -Asking questions - Final test
22-23	6	The stude learns	Bacteria method	- lecture. - discussion.	- Interim testing -Asking questions - Final test
24-28	15	The stude learns	Modern method	- lecture. - discussion.	- Interim testing -Asking questions - Final test
29-30	6	The stude learns	Use many methods	- lecture. - discussion.	- Interim testing -Asking questions - Final test.

11. Course Evaluation	
- Weekly tests, jobs, activities: - Quizzes every two weeks. - Main interim exam (first semester, second semester). - Final practical test. - A theoretical final test.	5 marks (during each semester). 5 marks (during each semester). 10 marks (during each semester). 10 degrees . 50 degrees.
12. Learning and Teaching Resources	
Required textbooks (curricular books any)	-microbial enhancement of oil recovery - recent advances proceedings of the 1992 international conference on microbial enhanced oil recovery -Petroleum Engineering Handbook- Larry W. Lake, Editor-in-Chief- U. of Texas at Austin. -Petroleum production Engineering - ISBN: 0750682701- Publisher: Elsevier Science & Technology Books- • Pub. Date: February 2007.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	-OIL AND GAS, PRODUCTION. HANDBOOK, An introduction to oil and gas production- Håvard Devold- © 2006 ABB ATPA Oil and Gas.
Electronic References, Websites	-https://t.me/+e9uigwz12D4wmzzk -www.scientificamerican.com -https://www.researchgate.net/publication/423873

Course Description Form

37. Course Name: Numerical Methods and Reservoir Simulation	
38. Course Code: PE408	
39. Semester / Year: Academic year 2024/2025	
40. Description Preparation Date:27/12/2024	
41.Available Attendance Forms: Online, classrooms and labs	
42.Number of Credit Hours (Total) / Number of Units (Total)	
48 Theoretical hours+48 lab hours=96 Hs	
43. Course administrator's name (mention all, if more than one name)	
Name: Hasan Ali Azeez Email: Hasan.Ali@alayen.edu.iq	
44. Course Objectives	
Course Objectives	• **Understanding the derivation of partial different equations that govern flow in porous media.** • **Acquiring skills to numerically solve partial differential equations related to porous media flow.**
45. Teaching and Learning Strategies	

Strategy	• Lectures • Discussions, dialogues, and questions • Group tasks • Quizzes • Monthly exams • Homework • Evaluation of laboratory performance • Final exam

46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 lecture + 2 lab	Understand and apply interpolation techniques such as Lagrange and Least Square methods.	Linear, Lagrange, Least Square Method (Linear & Polynomial Equations)	Theoretical lecture & computer lab applications	Quizzes, monthly exams , homework, lab performance evaluation, and final exam.
2	2 lecture + 2 lab	Analyze and manipulate matrices, including determinants and inverse.	Review of Matrix Properties, Determinants, Inverse of Matrix	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
3	2 lecture + 2 lab	Identify and outline the objectives and key components of reservoir characterization.	Key Steps in Reservoir Simulation Study: Clear Objectives, Reservoir Characterization	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
4	2 lecture + 2 lab	Develop and validate simulation models and predict reservoir performance.	Model Selection, Model Construction, Validation, Predictions	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
5	2 lecture + 2 lab	Explain the types of fluids and flow regimes and their impact on reservoir simulations.	Types of Fluids, Flow Regimes, Flow Geometry, Number of Flowing Fluids	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
6	2 lecture + 2 lab	Derive and solve basic equations governing fluid flow in porous	Basic Equations of Fluid Flow in Porous Media	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.

		media.	(Part 1)		
7	2 lecture + 2 lab	Apply equations to unsteady-state single-phase flow problems in porous media.	Basic Equations of Fluid Flow in Porous Media (Part 2)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
8	2 lecture + 2 lab	Understand and apply finite difference schemes for solving partial differential equations.	Principles of Finite Difference Approximation (Finite Difference Scheme & Discretization)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
9	2 lecture + 2 lab	Apply explicit finite difference methods to model single-phase flow in reservoirs.	Principles of Finite Difference Approximation (Explicit Approximation)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
10	2 lecture + 2 lab	Implement implicit finite difference methods and analyze their stability.	Principles of Finite Difference Approximation (Implicit Approximation)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
11	2 lecture + 2 lab	Solve linear equations using direct methods, including Gaussian elimination.	Methods of Solving Systems of Linear Equations (Part 1)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
12	2 lecture + 2 lab	Understand and apply iterative methods for solving linear systems, including the Jacobi method.	Methods of Solving Systems of Linear Equations (Part 2)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
13	2 lecture + 2 lab	Compare iterative and direct methods for solving linear systems in reservoir simulation.	Methods of Solving Systems of Linear Equations (Part 3)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
14	2 lecture + 2 lab	Use advanced algorithms, such as Gauss-Seidel, for solving linear systems.	Methods of Solving Systems of Linear Equations (Part 4)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
15	2 lecture + 2 lab	Model and analyze linear flow in homogeneous reservoirs with sources and sinks.	Simple 1D Linear Flow with Sources/Sinks (Part 1)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.

16	2 lecture + 2 lab	Evaluate the impact of reservoir heterogeneity on flow with sources and sinks.	Simple 1D Linear Flow with Sources/Sinks (Part 2)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
17	2 lecture + 2 lab	Explain the types and applications of boundary conditions in reservoir simulation models.	Introduction to Types of Boundary Conditions and Grid Systems	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
18	2 lecture + 2 lab	Incorporate Dirichlet and Neumann boundary conditions into block-centered grid systems.	Incorporation of Boundary Conditions in the System of Block-Centered Grid	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
19	2 lecture + 2 lab	Incorporate Dirichlet and Neumann boundary conditions into point-centered grid systems.	Incorporation of Boundary Conditions in the System of Point-Centered Grid	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
20	2 lecture + 2 lab	Apply finite difference approximations to 2D and 3D systems for reservoir simulation.	Application of Finite Difference Approximation in 2D and 3D Systems (Part 1)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
21	2 lecture + 2 lab	Solve 2D and 3D flow problems using block-centered and point-centered grid systems.	Application of Finite Difference Approximation in 2D and 3D Systems (Part 2)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
22	2 lecture + 2 lab	Analyze the impact of grid ordering schemes on reservoir simulation results.	Application of Finite Difference Approximation in 2D and 3D Systems (Part 3)	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
23	2 lecture + 2 lab	Compute flowing pressure in wells using numerical models and Peaceman's model.	Well Modelling	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.
24	2 lecture + 2 lab	Understand two-phase flow in porous media and apply the IMPES method for simulation.	Introduction to the Numerical Simulation of Multi-Phase Flow through Porous Media	Theoretical lecture & computer lab applications	Quizzes, monthly exams, homework, lab performance evaluation, and final exam.

			(Part 1)		

47. Course Evaluation

Quizzes 10%
Lab 30%
Monthly exams 20%
Final exam 40%

48. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1.Petroleum Reservoir Simulation A Basic Approach by Abou-Kassem J. H., Farouq Ali S. M. and Islam M. R. 2.Basic Applied Reservoir Simulation by Ertekin T., Abou-Kassem J.H. and King G. R 3.Petroleum Reservoir Simulation by Aziz K. and Settari A. 4. Heriot-Watt University. Reservoir Simulation. Edinburgh, Scotland: Heriot-Watt University (2016)
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Production Eng II

2. Course Code: **XX404**

3. Semester / Year: Four

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

3

7. Course administrator's name (mention all, if more than one name)

Name: Raed H. Allawi
Email: raed.Allawi@alayen.edu.iq

8. Course Objectives

Course Objectives	**These course objectives ensure that students in the petrole engineering program are equipped with the necessary techn expertise, analytical skills, and practical experience to succeed their careers.**

9. Teaching and Learning Strategies

Strategy	By combining traditional lectures with hands-on experiences, real-wo applications, and collaborative learning opportunities, the teach strategies ensure students in the petroleum engineering program deve the competencies required to excel in the industry.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

30	90	The **learning outcomes** define t knowledge, skills, and competencies students are expected to gain upon successfu completion of a petroleum engineering program. These outcomes align with industry needs, academic standards, and professional expectations.	Each unit contributes to developing a w rounded understanding petroleum extraction, production, and management.		

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)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Reservoir Engineering II
2. Course Code:
PE400
3. Semester / Year:
2024-2025
4. Description Preparation Date:
18/12/2024
5. Available Attendance Forms:
presence
6. Number of Credit Hours (Total) / Number of Units (Total)
120
7. Course administrator's name (mention all, if more than one name)
Name: Ali Falah Hasan Email: alifalah916@gmail.com
8. Course Objectives

Course Objectives	**• Understand reservoir flow systems.** **• Learn techniques for deriving and solving fluid flow equations in porous media.** **• Apply various techniques for finding pressure distribution in oil and gas reservoi** **• Predict the performance of oil and gas reservoirs.** **• Use graphs to determine the properties of fluids in a reservoir.** **• Draw graphs to find various parameters used in reservoir engineering.**

9. Teaching and Learning Strategies

Strategy	- Giving lectures to students. - Using illustrative means, models, video clips, etc.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	9	The stude	Introduction (Revi	- lecture.	-Interim testing

		learns	of Basic Concepts Reservoir Engineering Part 1)	- discussion.	-Asking questions - Final test
4-8	15	The stude	Primary recovery mechanisms	- lecture. - discussion.	Interim testing -Asking questions - Final test
9-11	9	The stude	Material Balance Applied to Oil Tanks (Part One)	- lecture. - discussion.	Interim testing -Asking questions - Final test
12-14	9	The stude	Material Balance Applied to Oil Tanks (Part II)	- lecture. - discussion.	Interim testing -Asking questions - Final test
14-20	21	The stude	Steady Flow of Reservoir Fluids (Part 1)	- lecture. - discussion.	Interim testing -Asking questions - Final test
20-23	12	The stude	Steady Flow of Fluids Tank (Part 2)	- lecture. - discussion.	Interim testing -Asking questions - Final test
24-30		The stude	Unsteady Flow of Fluids Reservoirs (Part 1)	- lecture. - discussion.	Interim testing -Asking questions - Final test

11. Course Evaluation

- Weekly tests, jobs, activities: 5 marks (during each semester).
- Quizzes every two weeks. 5 marks (during each semester).
- Main interim exam (first semester, second semester). 10 marks (during each semester).
- Final practical test. 10 degrees .
- A theoretical final test. 50 degrees.

12. Learning and Teaching Resources

Required textbooks (curricular books any)	-1.Reservoir Engineering Handbook by Tarek Ahmed -

Main references (sources)	
Recommended books and references (scientific journals, reports…)	-OIL AND GAS, PRODUCTION. HANDBOOK, An introduction to oil and gas production- Håvard Devold- © 2006 ABB ATPA Oil and Gas.
Electronic References, Websites	-https://t.me/+e9uigwz12D4wmzzk -www.scientificamerican.com -https://www.researchgate.net/publication/423873

Course Description Form

1. Course Name: Integrated Reservoir management
2. Course Code:
3. Semester / Year: 2024/2025
4. Description Preparation Date: 17/12/2024
5. Available Attendance Forms: attendance
6. Number of Credit Hours (1) / Number of Units (32)
7. Course administrator's name (mention all, if more than one name)
Name: Alaa Shihan Awad Email: alrikabyalaa@gmail.com

8. Course Objectives

Course Objectives	**• The ability to distinguish, identify, defi formulate and manage hydrocarbon reservoirs an integrated manner.** **• Preserving and exploiting hydrocarbon wea in a manner consistent with the requireme and global market.** **• Knowledge of rock and fluid properties and changes that occur to them.**

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this unit is encourage student participation in reservoir activities, while at t same time improving and expanding their critical thinking skills. Th will be achieved through classroom and laboratory settings and considering the type of external research that includes sor mathematical problems that interest the student.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
32	32				

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	Basic Applied Reservoir Simulation
Main references (sources)	SPE
Recommended books and references (scientific journals, reports…)	Direct Science, SPE
Electronic References, Websites	Basic Applied Reservoir Simulation