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

2026

Academic Program Description Form

University Name: Tikrit University

Faculty/Institute: Petroleum Process Engineering

Scientific Department: Petroleum and Gas Refining Engineering

Academic or Professional Program Name: Undergraduate - Bachelor of Science in Petroleum and Gas Refining Engineering

Final Certificate Name: Bachelor of Science in Petroleum and Gas Refining Engineering

Academic System: Annual

Description Preparation Date: 8/ 3 /2026

File Completion Date: 8 / 3 / 2026

Signature:

Head of Department name:

Asst. Prof. Qahtan Adnan Mahmood

Date: 11 / 3 / 2026

Signature:

Scientific Associate name:

lect. Hamad Khudhair Mohammed

Date: 11/ 3 / 2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Lect. Adnan Ibrahim Ahmed

Date: 11 / 03 / 2026

Signature:

Asst. Prof. Ghassan H. Abdullah

Date: 11 / 3 / 2026

Approval of the Dean

1. Program Vision
Improving the department's educational level using the most recent ways.
2. Program Mission
Providing community service by developing the Petroleum sector in the governorate and across the nation.
3. Program Objectives
1- Providing students with the fundamentals of scientific knowledge in the field of Petroleum and gas refining engineering, as well as developing their professional skills in the areas of analytical and creative thinking through the use of information technologies, data analysis, and modern experimental methods in problem formulation and solution. 2- Preparing well-qualified engineers to enhance petroleum process engineering operations and handle dealings with them in all aspects of life, particularly in the petroleum industry. 3- Conducting academic research to stay up with the world scientific process, as well as applied research to turn engineering knowledge and ideas into practical reality by solving the country's challenges in all domains. 4- Contributing to the country's reconstruction in the petroleum and petrochemical industries sectors by providing engineering consultations, preparing economic feasibility studies, project designs, and technical services. 5- Implementing scientific sobriety as a characteristic of this department in line with international rules and standards.
4. Program Accreditation
N. A.
5. Other external influences

(Only different state institutions provide summer internship for third-year students.)

6 Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews•
Institution Requirements	7	18	11%	/
College Requirements	9	32	20%	/
College Requirements	22	112	69%	/
Summer internship	1	/	/	/
Others	/	/	/	/

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
Four years	BSc-PGR	Bachelor of Science in Petroleum and Gas Refining Engineering	176	56

8. Expected learning outcomes of the program

Knowledge

A1- Broad education to understand the impact of engineering solutions globally and economically.

A2: The ability to collaborate in interdisciplinary teams.

A3- The ability of applying cognitive sciences such as mathematics, as well as applied and pure sciences.

A4- The ability to use modern methods, skills, and engineering tools in the petroleum and petrochemical sectors.

A5- The ability to build petroleum and petrochemical facilities that satisfy the necessary requirements while remaining within realistic cost limits.

A6- The ability to develop and perform experiments, analyze data, and translate them practically.

Skills

B1- Developing and enhancing the student's ability to utilize design programs in their area of specialty.

B2- Developing and improving the student's ability to cope with new technology relevant to the course terminology.

B3- Improving the student's ability to face challenges and dilemmas and find acceptable answers to them.

B4- Developing and improving the student's ability to apply academic knowledge in real-world situations.

Ethics

C1- The ability to make decisions.
C2- Student-driven innovation methods.
C3: The student's ability to think.
C4- Collecting the necessary data to complete a certain subject.
C5. Encouraging students' creative thinking and keeping up with the most recent scientific approaches for teaching and learning.

9. Teaching and Learning Strategies

1. Introducing course syllabus to students (lectures). 2. Numerous examples are provided to demonstrate the basic principles. 3. A standardized problem-solving approach that can be applied to any problem. 4. Use figures, drawings, and graphs to offer extensive explanations and reinforce what the learner is reading. 5. At the conclusion of each chapter, self-assessment exams with answers are provided to measure learning progress. 6. Discussing and solving many problems in tutorial sessions, which enables collaboration with one or more colleagues to share ideas and debate the content. 7. Assigning activities, such as drafting research papers, to help students develop self-learning and presenting abilities. 8. Conducting quizzes. 9. Taking semester and final examinations on the designated dates. 10. Informing students about how grades are calculated for students during the semester and their exam results, and discussing failures and successes. 11. Informing students of the textbooks and reference books they need in the course and make a questionnaire for previous years in order to improve the curriculum, improve the performance of teaching staff, and raise the scientific level of the student. 12. Training students in various state institutions (third stage).
10. Evaluation methods
1. Monthly and final exams. 2. Short assessment and classroom involvement. 3. Submitting homework, research papers, and scientific reports. 4. Laboratory work.

11. Faculty						
Faculty Members						
Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	**Lecturer**
Professor	1	2			1	2
Assistant Professor	1	5			6	-
Lecturer	-	10			8	2
Assistant Lecturer	4	4			8	-

Professional Development
Mentoring new faculty members
Preparation programs in the form of open lectures and seminars with training workshops that include: 1. Introducing new faculty members to the university's vision, mission, organizational structure, policies and procedures. 2. Enabling new faculty members to obtain a better understanding of their rights and obligations in addition to the rights and duties of students. 3. Providing new faculty members with detailed information about the facilities and services of the university, college, and department. 4. Introducing new faculty members to the quality of the academic program and program accreditation. 5. Introducing new faculty members to learning resources and scientific research programs.
Professional development of faculty members
1. Using current teaching methods and techniques. 2. Sharing experiences with academics from various institutions and universities. 3. Help evaluate, construct, and analyze the curriculum. 4. Continuous course assessment based on comments from instructors and students. 5. Be open to new experiences.

12. Acceptance Criterion
1. High school graduates (applied branch). 2. Admission is open to both male and female. 3. The Central Admissions Department of the Ministry of Higher Education and Scientific Research determines the minimal acceptance grades. 4. The desire of the student or guardian to study in the department.
13. The most important sources of information about the program
1. textbooks. 2. The teaching staff. 3. Workshops, seminars and conferences. 4. Websites and electronic library. 5. The local market and its needs.
14. Program Development Plan
1. Continuously updating the curriculum to keep pace with the curricula of international and established universities and the needs of the local market. 2. Increase interest in the practical aspect by providing modern educational laboratory equipment and opening new laboratories. 3. Providing modern textbooks and reference books from international publisher to the department's library. 4. Incorporating scientific and technological developments at the global level into school curricula and practical experiences. 5. Design and implement development programs in the form of open lectures and seminars with training workshops for teaching and professional staff. 6. Make memorandums of understanding with state institutions in the field of exchanging experiences and conducting scientific research and studies.

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
4	PPE	Petroleum pollution and its control	basic	*	*	*	*	*	*	*	*	*	*	*	*
	405														

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

الوصف الاكاديمي
المرحلة الرابعة

Course Description Form

1. Course Name:
English language IV
2. Course Code:
PPE 409
3. Semester / Year:
first and second semester
4. Description Preparation Date:
20/4/2025
5. Available Attendance Forms:
In person
6. Number of Credit Hours (TOTAL) / Number of Units (TOTAL)
60 hours – 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Mahmood Shihab Email: ahmed.m.shihab@tu.edu.iq
8. Course Objectives

Course Objectives	•Expand vocabulary knowledge and develop learning strategies. • Enhance all four language skills: reading, writing, listening and speaking. • Expose students to different cultures and perspectives

9. Teaching and Learning Strategies	
Strategy	**Discussion**: students exchange opinions and thoughts about certain subject. **Cooperative learning**: students work in team to complete assignment. **Problem – Solving**: students apply critical thinking skills to solve the problem.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2 hours	General tense, compound words, applying for hobs.	No place like home	Theoretical	Class participation
2	2 hours	General tense, compound words, applying for hobs	No place like home	Theoretical	Quizzes
3	2 hours	Present perfect, hot verbs, exclamations	Been there, done that!	Theoretical	Self-assessment
4	2 hours	Present perfect, hot verbs, exclamations	Been there, done that!	Theoretical	Direct questions
5	2 hours	Narrative tense, showing interest and surprise.	What a story!	Theoretical	Self-assessment
6	2 hours	Narrative tense, showing interest and surprise.	What a story!	Theoretical	Class participation
7	2 hours	Question and negative, prefixes, linking ideas	Nothing but the truth	Theoretical	Quizzes
8	2 hours	Question and negative, prefixes, linking ideas	Nothing but the truth	Theoretical	Self-assessment
9	2 hours	Form future, hot verbs, telephone conversation	An eye to the future	Theoretical	Direct questions
10	2 hours	Exam	Exam	Theoretical	Exam
11	2 hours	Form future, hot verbs, telephone conversation	An eye to the future	Theoretical	Class participation
12	2 hours	Expressions of quantity, business expressions	Making it big	Theoretical	Quizzes
13	2 hours	Expressions of quantity, business expressions	Making it big	Theoretical	Self-assessment
14	2 hours	Model verbs, hot verbs, exaggeration and understatement	Getting on together	Theoretical	Direct questions
15	2 hours	Exam	Exam	Theoretical	Exam
16	2 hours	Model verbs, hot verbs, exaggeration and understatement	Getting on together	Theoretical	Class participation
17	2 hours	Relative clause, adverbs, describing places	Going to extremes	Theoretical	Quizzes
18	2 hours	Relative clause, adverbs, describing places	Going to extremes	Theoretical	Self-assessment
19	2 hours	Expressions habit, homonymous, make your point	Things ain't what they used to be!	Theoretical	Direct questions
20	2 hours	Expressions habit, homonymous, make your point	Things ain't what they used to be!	Theoretical	Exam

21	2 hours	Medal auxiliary, synonyms,	Risking life and limb	Theoretical	Class participation
22	2 hours	Medal auxiliary, synonyms,	Risking life and limb	Theoretical	Quizzes
23	2 hours	Hypothesizing, word pairs, have you ever wondered	In your dreams	Theoretical	Self-assessment
24	2 hours	Hypothesizing, word pairs, have you ever wondered	In your dreams	Theoretical	Direct questions
25	2 hours	Articles, hot words	It's never too late	Theoretical	Self-assessment
26	2 hours	Articles, hot words	It's never too late	Theoretical	Class participation
27	2 hours	Writing skills	Writing skills	Theoretical	Quizzes
28	2 hours	General	Grammar	Theoretical	Self-assessment
29	2 hours	Pronunciation, vocabulary	Speaking skills	Theoretical	Direct questions
30	2 hours	Exam	Exam	Theoretical	Exam

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily exams, reports ……..	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Headway Plus upper intermediate – Student Book and Activity
Main references (sources)	Grammar in use
Recommended books and references (scientific journals, reports …)	Grammar in use
Electronic References, websites	https://www.youtube.com/watch?v=l85akX7Pu60

Course Description Form

1. Course Name:
Process control
2. Course Code:
PPE403
3. Semester / Year:
year
4. Description Preparation Date:
20/4/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
(5 hr) in each semester / (6 units)
7. Course administrator's name (mention all, if more than one name)
Name: qahtan adnan Mahmood Email: qahtan.adnan@tu.edu.iq
8. Course Objectives

Course Objectives	1. Provide the students with the required basics principles of Laplace Transform 2. Study dynamic behavior of first order system 3. Determine time constant and steady state constant for system 4. Understand dynamic behavior of interacting and non-interacting system 5. Study dynamic behavior of first order system 6. Understand block diagrams of system 7. Determine parameters of controller 8. Understand behavior of all types of controller and affect them on system 9. Study the stability of the system with controller

	10- Deal with frequency response analysis and bode diagrams

9. Teaching and Learning Strategies

Strategy	I divided the students into groups to encourage student's participation in the exercises and discussion during solving the problems. Make a report concerning the subject of the lectures, and do seminars to present the work. Show movies to simplify the understanding of materials and make science visits to oil refinery

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Laplace Transform of many function	Laplace Transform	Theoretical + practical	Exam + reports
2	5	Inversion by Partial Fractions	Inversion by Partial Fractions	Theoretical + practical	Exam + reports
3	5	Further Properties of Transforms	Further Properties of Transforms	Theoretical + practical	Exam + reports
4	5	Forcing functions	Forcing functions	Theoretical + practical	Exam + reports
5	5	Dynamic behavior of level tank	Dynamic behavior of first order system	Theoretical + practical	Exam + reports
6	5	Dynamic behavior of heating tank and CSTR	Dynamic behavior of first order system	Theoretical + practical	Exam + reports
7	5	Physical Examples of First Order System	Physical Examples of First Order System	Theoretical + practical	Exam + reports
8	5	How to calculate the time constant (τ) for first order system	How to calculate the time constant (τ) for first order system	Theoretical + practical	Exam + reports
9	5	Response of first order systems in series	Response of first order systems in series	Theoretical + practical	Exam + reports
10	5	Interacting and Non-Interacting System	Interacting and Non-Interacting System	Theoretical + practical	Exam + reports
11	5	Linearization of non-linear systems	Linearization of non-linear systems	Theoretical + practical	Exam + reports
12	5	Time delay system	Time delay system	Theoretical + practical	Exam + reports
13	5	Second order system	Second order system	Theoretical + practical	Exam + reports
14	5	Response of second order system	Response of second order system	Theoretical + practical	Exam + reports
15	5	Process dynamic by computer - MATLAB	Process dynamic by computer - MATLAB	Theoretical + practical	Exam + reports

16	5	The Control System	The Control System	Theoretical + practical	Exam + reports
17	5	Development of block Diagram	Development of block Diagram	Theoretical + practical	Exam + reports
18	5	Controllers and Final Control Element	Controllers and Final Control Element	Theoretical + practical	Exam + reports
19	5	Classification of industrial automatic controller	Classification of industrial automatic controller	Theoretical + practical	Exam + reports
20	5	Proportional controller (P)	Proportional controller (P)	Theoretical + practical	Exam + reports
21	5	Proportional-Integral controller (PI)	Proportional-Integral controller (PI)	Theoretical + practical	Exam + reports
22	5	Proportional-Integral-Derivative (PID) controller	Proportional-Integral-Derivative (PID) controller	Theoretical + practical	Exam + reports
23	5	Overall transfer function of a closed- loop control system	Overall transfer function of a closed- loop control system	Theoretical + practical	Exam + reports
24	5	Block Diagram Reduction	Block Diagram Reduction	Theoretical + practical	Exam + reports
25	5	Stability Analysis	Stability Analysis	Theoretical + practical	Exam + reports
26	5	Frequency Response Analysis	Frequency Response Analysis	Theoretical + practical	Exam + reports
27	5	Bode Diagrams	Bode Diagrams	Theoretical + practical	Exam + reports
28	5	The Instrumentation and Control Diagrams	The Instrumentation and Control Diagrams	Theoretical + practical	Exam + reports
29	5	Methods of Tuning Controller	Methods of Tuning Controller	Theoretical + practical	Exam + reports
30	5	The Control System	The Control System	Theoretical + practical	Exam + reports

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)	Process Systems Analysis and Control, Third Edition, Donald R. Coughanowr Steven E. LeBlanc
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Unit operation
2. Course Code:
PPE 407
3. Semester/ Year:
Annual
4. Description Preparation Date:
20/4/2025
5.AvailableAttendanceForms:
Weekly attendance
6.Number of Credit Hours(Total)/Number of Units (Total)
150 hr / 6 units
7.Courseadministrator'sname(mention all ,if more than one name)
Name: Dr. Hiba alla abdolkarem Email : hiba.all@tu.edu.iq
8. Course Objectives

Course Objectives	1- The course's objectives include Recognize how the unit works. Recognize the benefits of the technique and the particle size reduction. experiment with emulsification at a petroleum refinery. Understand how fluid flows via packed columns and granular beds, how to treat waste water from refineries using the sedimentation process, and how to design sedimentation basins. Knowing the agitation and mixing process can help you construct the mixer tank that the petroleum sector uses. Understand the fluidization . Understand the filtration process, Membrane Separation processes. Centrifugal separations process from fundamentals to industrial application.. Drying process. Crystallization process

9. Teaching and Learning Strategies

Strategy	1. Presenting the course vocabulary to the students (lectures). 2. Assigning students assignments, such as writing research papers, so that students acquire skills for self-learning and presentation. 3. Conducting sudden exams. 4. Oral exams via e-learning platforms. 5. Conducting the semester and final exams on the specified dates. 6. Informing students of how students' grades are calculated during the semester, their exam results, and discussing failures and successes. 7. Informing students of the curriculum books and auxiliary books that they

	need in the course vocabulary during a questionnaire for the previous years to improve the curriculum, improve the performance of the teachers, and raise the level of the student.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Introduction of unit operation	Introduction of unit operation	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
2	5	Introduction of particle size reduction and enlargement, different ways of size reduction, criteria for size reduction, theories of size reduction / milling	Particle Size Reduction and Enlargement ,Emulsification	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
3	5	Advantages of size reduction, factors related to nature of raw materials affecting size reduction, emulsification	Particle Size Reduction and Enlargement ,Emulsification	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
4	5	Introduction of motion of particles in a fluid, drag coefficients	Motion of Particles in a Fluid	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
5	5	Total force on a particle , terminal falling velocities ,	Motion of Particles in a Fluid	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments

6	5	Drag coefficient & terminal velocity, Trial and error method for determination of terminal velocity , terminal velocity in Stokes law range and Newton's law range, example	Motion of Particles in a Fluid	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
7	5	Introduction in Flow of fluid through granular beds and packed columns, Pressure drop in laminar flow	Flow of fluid through granular beds and packed columns	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
8	5	Turbulent flow, Friction factor, General Equation	Flow of fluid through granular beds and packed columns	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
9	5	Non – spherical particles,example of flow fluid through granular beds, Darcy's law and permeability	Flow of fluid through granular beds and packed columns	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
10	5	Introduction in sedimentation, objective & application ,theory for sedimentation , mechanics of particle motion in fluids , frictional drag coefficient , Sphere object , Terminal or Settling Velocity	Sedimentation	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
11	5	Stokes settling velocity ,Stoke’s law has several limitations ,settling velocity of dust particles,hindered settling, flocculating particles , sedimentation basins, collecting efficiency, typical design values for sedimentation basins	Sedimentation,	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments

12	5	Example of sedimentation tank design, advantages of circular basin, disadvantages of circular basin, sedimentation tank components, details of influent structure,example of design tank	Sedimentation,	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
13	5	Introduction in agitation and mixing, purpose of agitation,factors affecting the designing of the agitator flow patterns in agitated ves agitator	Agitation and mixing	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
14	5	Agitation of liquids, tank with impeller and baffle, design considerations, example in mixing tank design	Agitation and mixing	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
15	5	Types of impeller, power number curves for various type of impeller, power consumption,example	Agitation and mixing	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
16	5	Introduction in fluidization, Pressure , minimum fluidizing velocity	Fluidization	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
17	5	Example of fluidization of solid by gas, advantages and disadvantages of fluidization	Fluidization	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
18	5	Types of fluidization , condition for fluidization ,application of fluidization	Fluidization	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments

19	5	Introduction in filtration, types of operation, filtration theory	Filtration	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
20	5	Flow of filtrate through the cloth and cake combined, washing of the filter cake, types of filtration equipment	Filtration	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
21	5	Gravity filtration equipment, discontinuous pressure filter, advantages and disadvantages of pressure filter,example of filtration design	Filtration	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
22	5	Introduction in membrane separation processes, classification of membrane, the nature of synthetic membranes	Membrane Separation Processes	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
23	5	General equation , cross-flow microfiltration,example of membrane design	Membrane Separation Processes	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
24	5	Desalination, osmosis, reverse osmosis, advantages and limitations / disadvantages, membrane modules and plant configuration ,example of membrane	Membrane Separation Processes	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
25	5	Introduction in centrifugal separations, using of centrifuge, centrifugal pressure	Centrifugal Separations	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments

26	5	Separation of immiscible liquids of different densities,sedimentation in a centrifugal field ,example in centrifugal separations processes	Centrifugal Separations	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
27	5	Introduction in drying, purposes of drying, general methods of drying,vapor pressure of water& humidity	Drying	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
28	5	Rate of drying , example of drying processes	Drying	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
29	5	Equipment for drying, selection of dryers	Drying	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments
30	5	Introduction in crystallization, crystallization fundamentals , phase equilibria ,solubility and saturation, example of Crystallization processes	Crystallization	Theoretical and practical	Timely questions ,extra-curricular assignments, quizzes and monthly exams and do laboratory experiments

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily exams, reports ……..	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Chemical Engineering – volume 2, Fifth Edition 2008 , Particle Technology and Separation Processes
Main references (sources)	Chemical Engineering Design volume 6. Fourth Edition ,Coulson and Richardson's
Recommended books and references (scientific journals, reports …)	Unit operations of chemical engineering Fifth Edition .Peter Harriott
Electronic References, websites	

Course Description Form

1. Course Name:
Management and economics of petroleum projects.
2. Course Code:
PPE 404
3. Semester / Year: The fourth
4. Description Preparation Date:
20/4/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
7. Course administrator's name (mention all, if more than one name)
Name: Luay Ahmed khamees E-mail: luaykhamees75@tu.edu.iq
8. Course Objectives

Course Objectives	• Preparing students with basic knowledge about the oil industry. • Preparing students with a wide knowledge of oil projects. • Preparing students who possess the skill of choosing the appropriate oil operations and making the appropriate decision.

9. Teaching and Learning Strategies	
Strategy	

10. Course Structure

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

1	2	World supply and demands	Introduction	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
2	2	Properties of crude oils and properties of petroleum, and statement of properties affecting the prices of crude oil and petroleum	Oil Economics	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
3	2	Fundamentals of the oil economy	Oil Economics	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
4	2	Principles, methods and techniques in engineering economics analysis	Engineering Economics	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
5	2	Principles, methods and techniques in engineering economics analysis	Engineering Economics	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
6	2	Principles, methods and techniques in engineering economics analysis	Engineering Economics	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
7	2	Optimization techniques and their use in the oil industry	Project Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

8	2	Costs and alternatives to drilling and exploration	Project Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
9	2	Statement of economic costs in drilling oil and gas wells	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
10	2	Oil reserves and methods of calculation	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
11	2	Oil reserves and methods of calculation	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
12	2	Description of the types of oil extraction and production, the most economical cost	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
13	2	Description of the types of oil extraction and production, the most economical cost	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
14	2	Conventional and unconventional oil operations	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

15	2	Crude oil and petroleum prices and their impact on the selection of oil operations	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
16	2	Production processes and how to choose the optimal method	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
17	2	Production processes and how to choose the optimal method	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
18	2	The oil facility on which crude oil passes after leaving the well.	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
19	2	Gas separation and crude oil processing equipment in the field	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
20	2	The most important natural gas processing operations and its relationship to its market value	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
21	2	Natural Gas Processing: Recovery, Separation and Fractionation of NGL	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

22	2	Distribution of oil fields in Iraq and mentioned the greatest production and reserves.	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
23	2	Distribution of oil refineries in Iraq and statement of the quantities of production of each of them.	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
24	2	Crude Oil Refining: Physical Separation	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
25	2	Crude Oil Refiner: Chemical Conversion	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
26	2	Introducing the operations carried out on oil in order to improve its Properties and improve its price in the global market.	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
27	2	Introducing the operations carried out on oil in order to improve its Properties and improve its price in the global market.	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
28	2	Comparison of oil and gas transport routes	Petroleum Projects Management	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

29	2	Oil industries and the challenge of preserving the environment	Economics and management of oil projects	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
30	2	The most important exporting and importing countries of crude oil And introducing the most important international oil companies	Oil economy	theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

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	

Required textbooks (curricular books, if any)	Petroleum Economics and Engineering
Main references (sources)	1- Plant design and economics. 2- Properties of Petroleum Fluids/ McCain. Fourth Edition. 3- Characterization of petroleum products by Riazi
Recommended books and references (scientific journal, report)	1-Handbook of Petroleum Refining Processes by Meyers 2- Fundamentals of Petroleum Refining by Fahim
Electronic References , Websites	/https://www.arab-oil-naturalgas.com https://www.sciencedirect.com/search?qs=oil

Course Description Form

1. Course Name:
Petroleum pollution and its control
2. Course Code:
PPE 405
3. Semester / Year:
year
4. Description Preparation Date:
20/4/2025
5. Available Attendance Forms:
Theoretical lectures in a class
6. Number of Credit Hours (Total) / Number of Units (Total)
60 / 4
7. Course administrator's name (mention all, if more than one name)
Name: muzher Mahdi ibrahem Email:samuzhermahdi@tu.edu.iq
8. Course Objectives

Course Objectives	• gain knowledge about pollutants of petroleum industry • gain knowledge about the treatment methods of petroleum industry • gain knowledge about the design of the treatment units

9. Teaching and Learning Strategies	
Strategy	Lectures. Daily exams. Reports. Guizes. Home work. Final exam

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1	Introduction to petroleum pollution	Theoretical lecture	Short assessment and classroom involvement
2	2	A1	Measurement of pollutants and their concentrations	Theoretical lecture	Short assessment and classroom involvement
3	2	A1	Particulate matters and methods of measuring their concentration	Theoretical lecture	Short assessment and classroom involvement
4	2	A2	Particle size distribution and treatment devices	Theoretical lecture	Submitting homework, research papers, and

					scientific reports.
5	2	A2 A3 A4	Gravitational settling chamber	Theoretical lecture	Short assessment and classroom involvement
6	2	A2 A3 A4	Gravitational settling chamber	Theoretical lecture	Short assessment and classroom involvement
7	2	A2 A3 A4 A5 A6	cyclones	Theoretical lecture	Monthly exams.
8	2	A2 A3 A4 A5 A6	Scrubbers	Theoretical lecture	Short assessment and classroom involvement
9	2	A2 A3 A4 A5 A6	Scrubbers	Theoretical lecture	Submitting homework, research papers, and scientific reports.
10	2	A2 A3 A4 A5 A6	Scrubbers	Theoretical lecture	Short assessment and classroom involvement
11	2	A2 A3 A4 A5 A6	Filters	Theoretical lecture	Short assessment and classroom involvement
12	2	A2 A3 A4 A5 A6	Filters	Theoretical lecture	Submitting homework, research papers, and scientific reports.
13	2	A2 A3 A4 A5 A6	ESP	Theoretical lecture	Short assessment and classroom involvement
14	2	A2 A3 A4 A5 A6	Gaseous polltants	Theoretical lecture	Monthly exams
15	2	A2 A3 A4 A5 A6	Incineration	Theoretical lecture	Short assessment and classroom involvement
16	2	A2 A3 A4 A5 A6	Design of combustion chamber	Theoretical lecture	Short assessment and classroom involvement
17	2	A2 A3 A4 A5 A6	Dispersion of air pollutants	Theoretical lecture	Short assessment and classroom involvement
18	2	A2 A3 A4 A5 A6	Dispersion of air pollutants	Theoretical lecture	Short assessment and classroom involvement
19	2	A2 A3 A4 A5 A6	Adsorption	Theoretical lecture	Submitting homework, research papers, and scientific reports.
20	2	A2 A3 A4 A5 A6	Absorption	Theoretical lecture	Short assessment and classroom involvement
21	2	A2 A3 A4 A5 A6	Nitrogen oxides removal	Theoretical lecture	Monthly exams
22	2	A2 A3 A4 A5 A6	Sulfer oxides removal	Theoretical lecture	Short assessment and classroom involvement
23	2	A2 A3 A4 A5 A6	Sulfer oxides removal	Theoretical lecture	Short assessment and classroom involvement
24	2	A2 A3 A4 A5 A6	Chemical treatment of water	Theoretical lecture	Short assessment and classroom involvement
25	2	A2 A3 A4 A5 A6	DAF and API	Theoretical lecture	Submitting homework, research papers, and scientific reports.
26	2	A2 A3 A4 A5 A6	filtration	Theoretical lecture	Monthly exams
27	2	A2 A3 A4 A5 A6	Biological treatment units	Theoretical lecture	Short assessment and classroom involvement
28	2	A2 A3 A4 A5 A6	Biological treatment units	Theoretical lecture	Submitting homework, research papers, and scientific reports.
29	2	A2 A3 A4 A5 A6	Oil spill	Theoretical lecture	Short assessment and classroom involvement
30	2	A2 A3 A4 A5 A6	Disasters of petroleum industry	Theoretical lecture	Final exam

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 text book (curricural books, if any	Wastewater Engineering: Treatment and Resource Recovery 5th Edition. by Inc. Metcalf & Eddy (Author), George Tchobanoglous (Author), H. Stensel (Author), Ryujiro Tsuchihashi (Author), Franklin Burton (Author)
Main references (sources)	Air Pollution, Its Origin and Control Book by Cecil Francis Warner and Kenneth Wark. Harber and Row publisher. New yourk (Author), Ryujiro Tsuchihashi (Author), Franklin Burton (Author)
Recommended books and references(scientific journals, reports…)	Air Pollution Control Theory by Martin Crawford (Author). McGraw-Hill, 1976. Air Pollution Control Equipment: Selection, Design, Operation and Maintenance (Environmental Science and Engineering). by Louis Theodore and Anthony J. Buonicore Basic principles of wastewater treatment, Marcos Von Sperling. IWA publishing
Electronic references, websites	

Course Description Form

1. Course Name:
Specilized Peroleum Processses
2. Course Code:
PPE 401
3. Semester/ Year:
Annual
4. Description Preparation Date:
20/4/2025
5.Available Attendance Forms:
Weekly attendance
6.Number of Credit Hours(Total)/Number of Units (Total)
120 hr / 6 units
7.Courseadministrator'sname(mention all ,if more than one name)
Name: Lec. Rafa jamal Email : Rafa jamal @tu.edu.iq
8. Course Objectives

Course Objectives	**1. Providing students with the basics of scientific knowledge in the field of petroleum processes and improving their professional abilities in the direction of analytical and creative thinking through the use of information technologies, data analysis and modern experimental methods in formulating and solving problems.** **2. Preparing well-qualified engineers to advance the activities of Petroleum and Gas Refining Engineering and the ability to manage dealing with them in all aspects of life, especially in the field of petroleum refining industry.** **3. Conducting scientific research of an academic nature to keep pace with the global scientific march and research of an applied nature to translate engineering knowledge and its theories into action by addressing the problems that the country suffers from in the field of petroleum refining industry.** **4. Contribute in one way or another in terms of design, supervision, follow-up and advice for the reconstruction of the country in the petroleum refining industry, with the provision of engineering consultancy, the preparation of economic feasibility studies, project**

	designs and the provision of technical services. 5. Rooting scientific sobriety and making it a feature of this department in accordance with international controls and standards. 6. Providing students with the basics of scientific knowledge about different units of petroleum refining processes like Hydrogenation, Hydrocracking, Alkylation, Ctalaytic Reforming and other processes 7. Preparing well-qualified engineers to understand, operate, and develop of different units in petroleum refineries.

9. Teaching and Learning Strategies

Strategy	The teaching and learning strategy was developed in order to obtain comprehensive information to cover educational applications and thus achieve the basic objective of the targeted curriculum: 1. Present the course content to students. 2. Assign homework to students and demand it in a structured manner. 3. Conduct pop-up exams during lectures. 4. Conduct midterm and final exams on the specified dates. 5. Inform students of how grades are calculated during the semester, their exam results, and discuss successes and failures. 6- Informing students of the textbooks and auxiliary books they need for the curriculum, with regular curriculum development through a survey of previous years to improve the curriculum, enhance faculty performance, and raise student achievement. 7- Showing scientific films related to the curriculum materials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction of petroleum processes units	Introduction of petroleum processes	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
2	4	Learn about the naphtha reforming process, including operating conditions and facilitating factors.	Naphtha reforming process 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

3	4	Learn about the naphtha reforming process, including specialized equipment and devices.	Naphtha reforming process 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
4	4	Learn about the isomerization process and its operating conditions.	Isomerization process 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
5	4	Learn about the isomerization process, including its catalysts, specialized devices and equipment. ,	Isomerization process 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
6	4	Learn about the steam reforming process, including operating conditions, auxiliary factors, and specialized devices and equipment.	Steam reforming process	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
7	4	Learn about the hydrogenation process and its operating conditions.	Hydrotrating process 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
8	4	Learn about the hydrogenation process, including its catalysts, specialized devices and equipment.	Hydrotrating process 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
9	4	Learn about alternative desulfurization processes to hydrogenation, such as oxidation and extraction.	Alternative desulfurization processes to hydrogenation 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

10	4	Learn about alternative desulfurization processes to hydrogenation, such as adsorption, biological processes, and others.	Alternative desulfurization processes to hydrogenation 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
11	4	Learn about the hydrocracking process, including its operating conditions.	Hydrocracking process 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
12	4	Learn about the hydrocracking process, including its catalysts, specialized equipment, and devices.	Hydrocracking process 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
13	4	Learn about the fluidized catalytic cracking process, including operating conditions, catalysts, and specialized equipment and devices.	Fluidized catalytic cracking process	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
14	4	Identify the types of thermal cracking operations, including operating conditions, specialized equipment, and devices.	Thermal cracking process	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
15	4	Learn about the thermal cracking process by delayed cocking, including operating conditions and specialized equipment.	Thermal cracking process by delayed cocking	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
16	4	Learn about the fluid cocking process, including operating conditions, specialized equipment, and devices.	Thermal cracking process by fluid cocking	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

17	4	Learn about the flexi cocking process, including operating conditions, specialized equipment, and devices.	Thermal cracking process by flexi cocking	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
18	4	Learn about the hydrogen production process, including operating conditions	Hydrogen production processes 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
19	4	Learn about the hydrogen production process, including auxiliary factors, and specialized equipment and devices.	Hydrogen production processes 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
20	4	Learn about the alkylation process, including its different types and operating conditions.	Alkylation process	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
21	4	Learn about the alkylation process using sulfuric acid, including operating conditions, specialized devices and equipment.	Alkylation process using sulfuric acid	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
22	4	Learn about the alkylation process using hydrofluoric acid, including operating conditions, specialized equipment, and devices.	Alkylation process using hydrofluoric acid	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
23	4	Learn about the alkylation process using a solid catalyst, including operating conditions, specialized equipment, and devices.	Alkylation process using a solid catalyst (Alkyclean process)	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

24	4	Learn about the polymerization process, including operating conditions, catalysts, and specialized equipment and devices.	Polymerization process	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
25	4	Learn about modern clean fuel production technologies, including operating conditions, enabling factors, and specialized equipment and devices.	Clean fuel production technologies	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
26	4	Identify the processes of removing aromatic compounds from kerosene and improving its specifications, including operating conditions, auxiliary factors, and specialized devices and equipment.	Processes of removing aromatic compounds from kerosene	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
27	4	Learn about the processes of producing lubricating oils and removing asphalt compounds from them, including operating conditions, auxiliary factors, and specialized devices and equipment.	Processes of producing lubricating oils (deasphalting process)	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
28	4	Learn about the processes of producing lubricating oils and removing wax compounds from them, including operating conditions, auxiliary factors, and specialized devices and equipment.	Processes of producing lubricating oils (dewaxing process)	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams
29	4	Identify the upgrading processes of residue and heavy oil, including the types of processes and operating conditions.	Residue and heavy oil upgrading processes 1	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

30	4	Learn about residue and heavy oil upgrading processes, including equipment, devices, and process designs.	Residue and heavy oil upgrading processes 2	Theoretical	Real-time questions, extracurricular assignments, quizzes and monthly exams

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily exams, reports ……..	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Text book: Fundamentals of petroleum refining by Fahim, 2010.
Main references (sources)	1- Petroleum refining & economics by Gary 2- Petroleum refining by Parakash 3- Petroleum Refining Engineering by Nelson
Recommended books and references (scientific journals, reports …)	Fuel Journal Journal of Fuel Processing Technology
Electronic References, websites	**s://www.arab-oil-naturalgas.com/?amp=1**, **https://www.elsevier.com/**

Course Description Form

1. Course Name:	
Plant & Equipment Design	
2. Course Code:	
PPE 402	
3. Semester / Year:	
Year	
4. Description Preparation Date:	
20/4/2025	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
(150 hr) total semester/ (6 units)	
7. Course administrator's name (mention all, if more than one name)	
Name: Amer Talal Nawaf **Email:** Amer.talal@tu.edu.iq	
10. Course Objectives	
• Ability to read oil process flow diagrams and piping and instrumentation diagrams (P&IDs). • Capability to draw oil process flow diagrams, piping diagrams, and control schematics. • Performing fixed and operational cost calculations for oil plants, in addition to profitability analysis. • Conducting design calculations for oil equipment and utility systems. • Preparing comprehensive design reports, including both basic design and detailed designs of oil equipment.	**Course Objectives**
10. Teaching and Learning Strategies	
An educational strategy has been developed to ensure that students acquire comprehensive knowledge covering the curriculum prepared for the subject, and to achieve the primary objective of the syllabus. The strategy is detailed as follows: 1- Presenting the course syllabus to the students. 2- Assigning homework to students and systematically collecting it. 3- Conducting surprise quizzes during lectures. 4- Administering midterm and final exams on scheduled dates. 5- Informing students about the grading criteria throughout the semester, sharing their exam results, and discussing both	Strategy

shortcomings and successes. 6- Providing students with the required core textbooks and supplementary materials related to the course syllabus, alongside periodic curriculum updates based on surveys from previous years to enhance the curriculum, improve instructors' performance, and raise the students' academic level. 7- Showing educational films relevant to the course materials.	

10. Course Structure

Assessment Method	Learning Method	Unit or Topic Name	Expected Learning Outcomes	Hours	Week
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Introduction to Plant Design	Identifying the Steps of Laboratory Design	3	First
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Process Flow Diagrams (PFDs)	Identifying the Types of Drawings Used in Petroleum Operations and the Methods of Creating Them	3	Second
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Control and Operation of Oil Refineries	Understanding the Control and Operation of Oil Refineries	3	Third
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Services Used in Oil Refineries	Understanding the Services Utilized in Oil Refineries	3	Fourth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Equipment Location in Oil Projects	Understanding the Methods for Equipment Location in Oil Projects	3	Fifth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	General Design Considerations	Understanding General Design Considerations	3	Sixth
Pop Quizzes, Homework Assignments,	Theory + Discussion	How to Select the Location of an Oil	Understanding the Methods for Selecting the	3	Seventh

Short Tests, and Monthly Exams		Project	Location of an Oil Project		
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Optimal Design	Understanding Optimal Design	3	Eighth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Computer-Aided Design (CAD)	Understanding Design Methods Using Computer-Aided Tools	3	Ninth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Pilot Plants	Understanding the Benefits of Pilot Plants	3	Tenth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Selection of Manufacturing Materials for Oil Projects	Understanding the Selection of Manufacturing Materials for Oil Projects	3	Eleventh
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design Reports	Understanding How to Prepare Design Reports	3	Twelfth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Economic Feasibility Studies	Understanding How to Prepare Economic Feasibility Studies for Oil Projects	3	Thirteenth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Cost Estimation for Oil Projects	Understanding How to Estimate Costs for Oil Projects	3	Fourteenth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Designs of Pipes and Pumps	Understanding the Designs of Pipes and Pumps	3	Fifteenth
Pop Quizzes,	Theory +	Designs of Pipes and	Understanding	3	Sixteenth

Homework Assignments, Short Tests, and Monthly Exams	Discussion	Pumps	Pipe and Pump Designs		
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Pipe Specifications and Connections	Understanding Pipe Specifications and Their Connections	3	Seventeenth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Types of Pumps and Their Performance	Understanding the Types of Pumps and Their Performance	3	Eighteenth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Oil Tanks and Their Types	Understanding Oil Tanks and Their Types	3	Nineteenth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Principles of Tank Design	Understanding the Principles of Tank Design	3	Twentieth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design of Gas-Liquid Separator Tank	Understanding How to Design Gas-Liquid Separator Insulation	3	Twenty-first
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design of Heat Transfer Equipment – Furnaces	Understanding the Design of Heat Transfer Equipment – Furnaces	3	Twenty-second
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Condenser Design	Understanding How to Design a Condenser	3	Twenty-third
Pop Quizzes, Homework Assignments, Short Tests, and Monthly	Theory + Discussion	Types and Design of Boilers	Understanding the Types and Design of Boilers	3	Twenty-fourth

Exams					
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design Data Sheets	Understanding Design Data Sheets	3	Twenty-fifth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design Considerations for Distillation Towers	Understanding the Design Considerations for Distillation Towers	3	Twenty-sixth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Principles of Evaporation	Understanding the Principles of Evaporation	3	Twenty-seventh
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design of Absorption Tower	Understanding the Designs of Absorption Towers	3	Twenty-eighth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Design of Stripping Towers	Understanding the Design of Stripping Towers	3	Twenty-ninth
Pop Quizzes, Homework Assignments, Short Tests, and Monthly Exams	Theory + Discussion	Safety in the Oil Industry	Understanding Safety in the Oil Industry	3	Thirtieth

11. Course Evaluation	
Monthly Exams: 25% **Daily Quizzes, Homework (in-class and take-home): 10%** **Laboratory Work and Case Studies: 15%** **Final Exam: 50%**	
12. Teaching and Learning Resources	
Text book: 1- Chemical Engineering Vol.6, Coulson and Richards. **2-** Chemical Engineering Vol.2, Coulson and Richards	1. Books Required reading:

1- Perry's Chemical Engineering Handbook 2- Fundamentals of Heat and Mass Transfer - Incropera/DeWitt/others - Sixth Edition. 3- Mass Transfer: Fundamentals & Applications by Yunus Cengel and Afshin Ghajar.	2. Main references (sources)
1- Heat and Mass transfer by Shandra. 2- Process heat transfer by Kern. 3- International Journal of Heat and Mass Transfer. 4- International Journal of Heat and Fluid Flow. 5-International Communications in Heat and Mass Transfer. 6-Experimental Thermal and Fluid Science. 7-Previews of Heat and Mass Transfer.	A- Recommended books and references (scientific journals, reports…).
/https://www.pinterest.com/pin/331436853811137117 https://www.amazon.com/Fundamentals-Heat-Transfer-Frank-Incropera/dp/0471457280	B-Electronic references, Internet sites…

Course Description Form

1. Course Name:
Gas Technology
2. Course Code:
PPE 408
3. Semester/ Year:
Annual
4. Description Preparation Date:
20/4/2025
5.Available Attendance Forms:
Weekly attendance
6.Number of Credit Hours (Total)/Number of Units (Total)
60 hr / 4 units
7.Course administrator's name (mention all, if more than one name)
Name: Lect. Farah Qahtan
8. Course Objectives

Course Objectives	This course aims to provide students with the fundamental scientific knowledge in the field of gas technology and to enhance their professional capabilities toward analytical and creative thinking. This is achieved through the use of information technologies, data analysis, and modern experimental methods in formulating and solving engineering problems. • To prepare qualified engineers capable of contributing to petroleum and gas refining activities, and equipped with the skills to manage and operate within various aspects of the gas industry. • To conduct scientific research of both academic and applied nature, keeping pace with global scientific progress and translating engineering knowledge and theories into practical applications that address national challenges in the gas industry. • To contribute, directly or indirectly, to the design, supervision, monitoring, and consulting processes for the reconstruction and development of the national gas industry, including the provision of engineering consultations, feasibility studies, project designs, and other technical services. • To establish and promote scientific rigor as a defining characteristic of the department, in accordance with international standards and regulations.

	• To provide students with fundamental scientific knowledge regarding gas composition, types of gases, gas production, properties, and industrial applications. • To familiarize students with the scientific and technical fundamentals of various gas plant units, including gas-oil separation, acid gas treatment, dehydration, and natural gas liquids (NGL) recovery units. • To prepare well-qualified engineers capable of understanding, operating, and developing different processing units in gas treatment facilities.

9. Teaching and Learning Strategies	
Strategy	The main strategy to be adopted aims to encourage student participation in class exercises while simultaneously enhancing and expanding their critical thinking skills. This will be achieved through interactive classroom sessions and educational programs. The following steps will be implemented to strengthen learning strategies: • Employing appropriate teaching methods that suit the students' level and allow for open discussion and participation. • Utilizing modern and advanced instructional tools to deliver the maximum amount of knowledge to students. • Presenting the course topics and content through structured lectures. • Assigning students various tasks—such as writing research papers—to help them develop self-learning and presentation skills. • Conducting unannounced quizzes to encourage consistent study habits. • Holding oral examinations through e-learning platforms. • Administering midterm and final examinations according to the academic schedule. • Informing students about the grading criteria throughout the semester, discussing exam results, and addressing both achievements and shortcomings. • Introducing students to the main textbooks and supplementary references required for the course topics.

10. Course Structure

Week	Hours	required Learning Outcomes	Unit or Subject Name	Learning Method	Evalution Method
1	2	Explain the historical evolution of the gas industry and its technological progress.	Historical Overview of Gas Engineering and Its Development	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly

					reports.
2	2	Identify different natural gas sources, compositions, and production methods.	General Definitions, Natural Gas Sources, Composition, and Production	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
3	2	Distinguish between various classifications and types of natural gas.	Classification of Natural Gas	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
4	2	Describe the main uses, advantages, and economic importance of natural gas.	Uses, Advantages, and Economic Aspects of Natural Gas	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
5	2	Identify the physical and chemical properties of natural gas and LPG.	Properties of Natural Gas and LPG (Part 1)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
6	2	Apply gas property knowledge through practical examples.	Properties of Natural Gas and LPG (Part 2)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.

7	2	Interpret the phase behavior and equilibrium characteristics of natural gas systems.	Phase Behavior of Natural Gas	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
8	2	Understand the principles and key concepts of gas processing operations.	Basic Concepts of Natural Gas Processing	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
9	2	Explain the fundamentals of gas–oil separation processes.	Gas–Oil Separation (Part 1)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
10	2	Analyze different types and designs of gas separators.	Gas–Oil Separation (Part 2)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
11	2	Describe vaporization processes used in condensate stabilization units.	Condensate Stabilization (Part 1)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
12	2	Explain fractionation operations and their role in condensate stabilization.	Condensate Stabilization (Part 2)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.

13	2	Understand chemical absorption processes (amines and carbonate) for gas sweetening.	Acid Gas Treatment (Part 1)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
14	2	Describe physical absorption methods and design considerations.	Acid Gas Treatment (Part 2)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
15	2	Explain hybrid absorption methods (e.g., Sulfinol process) and their applications.	Acid Gas Treatment (Part 3)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
16	2	Understand solid adsorption methods (iron sponge, molecular sieves, ZnO) for gas purification.	Acid Gas Treatment (Part 4)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
17	2	Explain membrane-based and cryogenic gas treatment techniques.	Acid Gas Treatment (Part 5)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
18	2	Describe Claus and SCOT processes for sulfur recovery and associated design aspects.	Sulfur Recovery Processes	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.

19	2	Determine the water content of natural gas using analytical methods.	Natural Gas Dehydration (Part 1)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
20	2	Explain hydrate formation and prevention techniques in gas systems.	Natural Gas Dehydration (Part 2)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
21	2	Understand absorption dehydration (glycol process) and design parameters.	Natural Gas Dehydration (Part 3)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
22	2	Describe adsorption dehydration (solid bed systems) and design considerations.	Natural Gas Dehydration (Part 4)	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
23	2	Explain the main processes used for natural gas liquids (NGL) recovery.	NGL Recovery	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
24	2	Analyze gas flaring systems, operation, and flare design in refineries.	Gas Flaring in Refineries	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.

25	2	Describe storage methods and design aspects for natural gas and petroleum products.	Gas and Petroleum Products Storage	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
26	2	Explain transportation methods and safety considerations for gas and petroleum products.	Gas and Petroleum Products Transportation	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
27	2	Understand gas compression principles, operation, and design.	Natural Gas Compression	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
28	2	Identify and evaluate environmental risks associated with gas processing operations.	Environmental Aspects of Gas Processing	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
29	2	Apply safety principles and procedures in natural gas and LPG facilities.	Safety Guidelines for Gas and LPG Plants	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.
30	2	Recognize cylinder types, safety measures, and explosion limits of compressed gases.	Compressed Gas Cylinder Safety and Explosion Limits	Theoretical	Instant questions, out of class assignments, short quizzes and monthly exams and Quarterly reports.

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily exams, reports ……..	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Handbook of Natural Gas Transmission and Processing Principles and Practices Fourth Edition 2019, Saeid Mokhatab, William A. Poe, John Y. Mak
Main references (sources)	• Fundamentals of Natural Gas Processing, Third Edition 3rd Edition, 2019by Arthur J. Kidnay, William R. Parrish, Daniel G. McCartney. • Advanced Natural Gas Engineering Xiuli Wang, XGAS, Michael Economides
Recommended books and references (scientific journals, reports …)	• Journal of natural gas science and engineering • Natural gas industry B • Energy and fuels • Fuel • Fuel processing technology
Electronic References, websites	https://www.arab-oil-naturalgas.com/category/arabic-natural-gas-articles/