

**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

2024–2025

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

University Name: **University of Mosul**

Faculty/Institute: **College of Petroleum and Mining Engineering**

Scientific Department: **Department of Petroleum and Refining Engineering**

Academic or Professional Program Name: **Bachelor of Petroleum and Refining Engineering Education**

Final Certificate Name: **Bachelor of Petroleum and Refining Engineering**

Academic System: **Bologna system (First & Second Level) and Yearly system (Third & Fourth Stage)**

Date of preparation of the description: **17-4-2025**

File filling date: **24-4-2025**



Signature:

Head of Department Name:

Dr. Ahmad A. Aabid

Date: **6/5/2025**

Signature:

Scientific Associate Name:

Assist. Prof. Dr. M. M. Mohammed

Date: **8/5/2025**

Checked the file by:

Department of Quality Assurance and Performance Evaluation

Name of the Director of the Department of Quality Assurance and Performance Evaluation:

Mrs. Sarah Jamal Halata

Date: **8/5/2025**

Signature:

Approval of the Dean

1. Program Vision

Here are a few points:

- To be the leading center of excellence in refining and gas processing engineering, renowned for producing highly skilled graduates, groundbreaking research, and innovative solutions that shape the future of the energy industry.
- To pioneer sustainable refining and gas processing technologies, minimizing environmental impact and maximizing resource efficiency, while educating future generations of engineers committed to responsible energy practices.
- To drive innovation in refining and gas processing through cutting-edge research and development, fostering a culture of creativity and entrepreneurship, and preparing engineers to lead the industry's transformation.
- To be the premier resource for refining and gas processing expertise in Iraq, contributing to economic growth and energy security through world-class education, research, and industry partnerships.
- To shape the future of energy through advancements in refining and gas processing engineering.

2. Program Mission

Here are some examples, highlighting different aspects:

- To provide high-quality education and conduct cutting-edge research in refining and gas processing engineering, preparing graduates to excel in the energy industry and contribute to technological advancements.
- To equip students with the practical skills and theoretical knowledge necessary to succeed in the refining and gas processing industry, fostering strong industry partnerships and promoting experiential learning.
- To advance sustainable refining and gas processing technologies through innovative research and education, addressing the evolving energy needs of society while minimizing environmental impact.
- To serve as a hub for collaborative research and education in refining and gas processing, fostering a vibrant learning community and engaging with industry and government partners to address critical energy challenges.
- To educate and inspire the next generation of refining and gas processing engineers, driving innovation and shaping the future of energy.

3. Program Targets

Objectives for a Refining of Oil and Gas Engineering define the specific, measurable, achievable, relevant, and time-bound (SMART) goals that the department aims to accomplish. They describe what graduates are expected to be able to do after completing the program. Here are some points of program objectives, categorized for clarity:

I. Technical Competence:

- * Apply fundamental principles: Graduates will be able to apply fundamental principles of mathematics, science, and engineering to solve problems related to refining and gas processing.
- * Design and analyze processes: Graduates will be able to design, analyze, and optimize refining and gas processing operations, considering technical, economic, and environmental factors.

* Utilize modern tools: Graduates will be proficient in using modern engineering tools and software relevant to the refining and gas processing industry (e.g., process simulators, CAD software).

* Understand unit operations: Graduates will have a comprehensive understanding of various unit operations involved in refining and gas processing, such as distillation, separation, and reaction.

II. Professional Skills:

* Problem-solving: Graduates will be able to identify, formulate, and solve complex engineering problems related to refining and gas processing.

* Critical thinking: Graduates will be able to critically evaluate information and data, and make informed decisions based on sound engineering judgment.

* Communication: Graduates will be able to communicate effectively, both orally and in writing, with technical and non-technical audiences.

* Teamwork: Graduates will be able to work effectively in teams, collaborating with others to achieve common goals.

* Lifelong learning: Graduates will be committed to lifelong learning and professional development, staying current with advancements in the field.

III. Professional Ethics and Responsibility:

* Ethical practice: Graduates will adhere to the highest ethical standards in their professional practice.

* Environmental awareness: Graduates will demonstrate an understanding of environmental issues related to refining and gas processing and will be committed to sustainable practices.

* Safety consciousness: Graduates will prioritize safety in all aspects of their work, promoting a safe working environment.

* Social responsibility: Graduates will recognize the broader societal impact of their work and will act responsibly.

IV. Career Readiness:

* Industry preparedness: Graduates will be prepared for successful careers in the refining and gas processing industry or related fields.

* Leadership potential: Graduates will demonstrate leadership potential and will be able to take on leadership roles in their profession.

* Graduate studies: Graduates will be prepared for pursuing graduate studies in refining and gas processing or related fields, if they choose.

4. Program Accreditation

Nothing.

5. Other External Influences

The sponsor is the Deanship of the College of Petroleum and Mining Engineering.

6. Program Structure

Program Structure	Number of Courses	Unit of study	Percentage	Notes
Requirements of the Institution	7	18	%16	Basic
College Requirements	12	60	%28	Basic
Department Requirements	24	87	%56	Basic

Summer Training	1	Fulfillment	-	Basic
Other	-	-	-	-

* Notes can include whether the course is basic or elective.

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			Theoretical	Practical
First / First	PRE101	Mathematics (1)	4	-
First / First	PRE102	Engineering Mechanics (1)	4	-
First / First	UOM1031	Computer Programming (1)	2	2
First / First	UOM1021	English	2	-
First / First	PRE105	Engineering Drawing (1)	1	3
First / First	PRE106	General Geology (1)	3	2
First/Second	PRE107	Mathematics (2)	4	-
First/Second	PRE108	Engineering Mechanics (2)	4	-
First/Second	PRE109	Analytical Chemistry	2	2
First/Second	UOM104	Democracy and Human Rights	2	-
First/Second	PRE111	Engineering Drawing (2)	1	3
First/Second	PRE112	General Geology (2)	3	2
First/Second	UOM101	Arabic Language	2	-
Second/First	PRE211	Engineering Mathematics I	4	-
Second/ First	PRE212	Fluid Flow I	2	2
Second/ First	PRE213	Thermodynamic I	2	2
Second/ First	UOM2032	Computer II	2	1
Second/ First	PRE214	Petroleum chemistry	2	2
Second/ First	PRE215	Material Engineering & Corrosion	3	-

Second/ First	UOM2022	English Language II	2	-
Second/ Second	PRE221	Engineering Mathematics II	4	-
Second/ Second	PRE222	Fluid Flow II	2	2
Second/ Second	PRE223	Thermodynamic II	2	2
Second/ Second	UOM2012	Arabic Language II	2	-
Second/ Second	UOM2050	جرائم نظام البعث	2	-
Second/ Second	PRE224	Properties of Petroleum & Product	3	2
Second/ Second	PRE225	Electrical Technology	2	2
Third / Yearly	PRE301	Petroleum Production Engineering (1)	4	-
Third / Yearly	PRE302	Reservoir Engineering	3	2
Third / Yearly	PRE303	Industrial Chemistry	3	-
Third / Yearly	PRE304	Rock Mechanics	2	2
Third / Yearly	PRE305	Well Logging engineering	2	2
Third / Yearly	PRE306	Well Drilling Engineering	3	-
Third / Yearly	PRE307	Natural Gas Technology	3	-
Third / Yearly	PRE308	Numerical analyses	2	-
Fourth / Yearly	PRE401	Oil pollution	2	-
Fourth / Yearly	PRE402	Petroleum Production Engineering (2)	4	-
Fourth / Yearly	PRE403	Simulation and Reservoir Modeling	2	2
Fourth / Yearly	PRE404	Oil Refining Technology	2	2
Fourth / Yearly	PRE405	Reservoir Management and Oil Economics	3	-
Fourth / Yearly	PRE406	Engineering Design	3	-
Fourth / Yearly	PRE407	Enhanced Oil recovery Methods	3	-
Fourth / Yearly	PRE408	Engineering Graduation Project	1	3

8. Expected learning outcomes of the program

Knowledge

1. Ability to recognize, identify, define, formulate and solve engineering problems by applying the principles of engineering, science and mathematics.
2. The ability to produce engineering designs that meet the required needs within certain constraints by applying both analysis and synthesis in the design process.
3. Ability to recognize the constant necessity for the growth of professional knowledge and how to find, evaluate, assemble and apply it correctly.

Skills

An ability to properly perform and test measurements with quality assurance, analyze and interpret results, and use judgmental engineering conclusions.

Ability to communicate skillfully verbally with a group of people and in writing with different administrative levels.

Ability to work adequately in teams, set goals, plan activities, meet deadlines, and manage risk and uncertainty.

Values

1. Ability to recognize ethical and professional responsibilities in engineering issues and make ingenious decisions while considering consequences in financial, environmental, and social considerations.
2. Ability to work adequately in teams, set goals, plan activities, meet deadlines, manage risk and uncertainty.

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

- Theoretical lectures using power point
- Discussion Sessions
- Laboratory experiments
- Computer Labs
- Video Lectures
- Group duties
- Case study
- Distance education

10. Evaluation methods

- Semester and final exams.
- Short exams
- Reports
- Practical exams
- Projects & Research

11. Faculty Staff

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
professor	Earth Sciences	Stratigraphy and Paleontology			1	
Assistant Professor	Physics	Plasma Physics			1	
Assistant Professor	Mechanical Engineering	Thermal Power			1	
Assistant Professor	Earth Sciences	Petroleum Geology			1	
Assistant Professor	Chemical Sciences	Industrial Chemistry			1	
Lecture	Earth Sciences	Geochemistry			1	
Lecture	Earth Sciences	Sedimentology			1	
Lecture	Chemical Engineering	Oil process			1	
Lecture	Chemical Sciences	Industrial Chemistry			1	
Assistant Lecturer	Civil Engineering	Structure			1	
Assistant Lecturer	Dams and Water Resources Engineering	Hydraulic			1	
Assistant Lecturer	Dams and Water Resources Engineering	Irrigation			1	
Assistant Lecturer	Chemical Engineering	Control of Oil Operations			1	

Professional Development

Mentoring new faculty members

The academic program of the Department of Petroleum and Refining Engineering is designed to enhance the comprehensive knowledge and skills of new faculty members in diverse educational fields. The program begins with a focus on providing faculty members with the basic ability to effectively

manage their tasks. It then progresses to include the processes and procedures necessary to ensure that targeted learning outcomes are successfully achieved in various programs. To achieve these goals, the program includes the following key components:

- * Educational courses: New faculty members participate in educational courses aimed at improving the quality of the education process. These courses cover a range of topics, including: Teaching Methods Training: Teaching effective strategies to grab student attention and deliver course content.
- * Recent Trends in University Teaching: Exploring Innovative Approaches to Teaching and Learning in Higher Education.
- * Student Assessment: Scientific courses and workshops for new members on the process of evaluating student performance and understanding.
- * Test Preparation: Strategies for Preparing Fair Tests
- * University Policies: Learn about relevant laws, regulations, instructions and e-learning platforms.
- * Ongoing Assessment: Faculty, whether full-time or part-time, undergo ongoing evaluation to determine the areas they need to develop throughout their educational careers. This process helps ensure that faculty are continuously improving and adapting to meet the evolving needs of the student and the university.
- * Professional Development Opportunities: Faculty members are encouraged to participate in faculty development courses offered by.
- * Faculty members to improve their artem and stay in the department or continuing education unit at the university. These courses provide opportunities to keep abreast of trends in teaching and learning, and to collaborate with colleagues.

Professional development of faculty members

Faculty in the Department of Petroleum Engineering and Refining have links with Iraq's two main ministries: the Ministry of Higher Education and Scientific Research and the Ministry of Oil. Many seminars have been organized in the department during the past years under the supervision of the Ministry of Higher Education and Scientific Research. The topics of the seminars were challenges in modern techniques and methods in oil extraction, refining and export operations. These connections provide faculty members with hands-on experience. In this context, the Continuing Education Committee in the Department of Petroleum and Refining Engineering has organized lectures and workshops for faculty members in various fields during the past third academic years, as follows:

- . Developing teaching and e-learning methods
- . Scientific Publications
- . Accreditation
- . Various seminars in the field of petroleum and refining engineering
- . Participation in conferences, seminars, workshops and training courses outside Iraq
- . Participation in conferences, seminars, workshops and training courses inside Iraq

12. Acceptance Criterion

The absorptive capacity of the Department of Petroleum Engineering and Refining is determined within the admission plan and according to the capacity of the department in admission, where the Scientific Committee determines the number required to accommodate new students and then sends it to the Deanship, then the university and then the Ministry to obtain official approvals. To be eligible for admission to the Department of Petroleum and Refining Engineering at the undergraduate level,

applicants must meet certain conditions. The admission process is overseen by the Ministry of Higher Education and Scientific Research, which manages and allocates their high school grades. Here are some of the main conditions for student admission to government institutions and colleges

- a- Iraqi nationality and year of birth: Applicants must be of nationality
- b- Iraqi Secondary School Certificate: Applicants need to possess a certificate issued by an Iraqi high school accredited by the Ministry of Education.
- c- Medical certificate: Applicants must submit a medical certificate to ensure that they meet the necessary health conditions
- d- Full-time enrollment: Applicants must commit to be full-time students, dedicating their time to their studies in the department
- e- Refusal to continue studying at another college
- f- non-Iraqi students (arrivals) who have obtained a certificate from an Iraqi high school are admitted according to the central admission.
- g- Accepting 10% of the best graduates of technical institutes.
- h- Gifted Student Admission

13. The most important sources of information about the program

- University Directory
- College Website:
[https://uomosul.edu.iq/petroleumengineering /](https://uomosul.edu.iq/petroleumengineering/)

14. Program Development Plan

To enhance the quality of education, raise graduate outcomes, and meet the required competencies, the Department Council decided to adopt the "Bologna System of Education". This system includes the European Transfer and Accumulation System of Units of Study (ECTS) instead of the approved system, in line with the department's commitment to continuous improvement. The new system is implementing as of 2024-2023. The adoption of the Bologna Process is expected to bring several benefits:

- . Student-oriented learning: The system places the student at the heart of the learning process, strengthening the overall educational system
- . Increased classroom interaction: Continuous interaction between teachers and students fosters a more dynamic learning environment
- . Emphasis on professional and practical skills: emphasis is placed on acquiring practical skills relevant to professional development
- . Opportunity for continuous learning: The student will have the opportunity to learn, evaluate and keep feedback
- . Bi-annual performance evaluation: The system allows the student's performance to be evaluated twice a year, providing more comprehensive feedback
- . Deepening understanding of topics: The system is expected to contribute to deepening the student's understanding of the topics

Program Skills Outline											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics	
				A1	A2	A3	B1	B2	B3	C1	C2
First / First	PRE101	Mathematics (1)	Basic			•			•		•
	PRE102	Engineering Mechanics (1)	Basic					•	•	•	•
First / First	UOM103	Computer Programming (1)	Basic			•		•	•	•	•
	UOM102	English	Basic		•		•		•		
First / First	PRE105	Engineering Drawing (1)	Basic		•			•	•		•
	PRE106	General Geology (1)	Basic	•	•	•		•	•		•
First/Second	PRE107	Mathematics (2)	Basic								•
	PRE108	Engineering Mechanics (2)	Basic					•			•
First/Second	PRE109	Analytical Chemistry	Basic					•			•

	UOM10 4	Democracy and Human Rights	Basic		•						•
First/Second	PRE111	Engineering Drawing (2)	Basic					•			•
	PRE112	General Geology (2)	Basic								•
	UOM10 1	Arabic Language	Basic	•			•				
Second/First	PRE211	Engineering Mathematics I	Basic					•	•	•	•
Second/First	PRE212	Fluid Flow I	Basic	•	•	•	•	•	•	•	•
Second/First	PRE213	Thermodynamic I	Basic	•	•	•	•	•	•	•	•
Second/First	UOM203 2	Computer II	Basic			•		•	•		•
Second/First	PRE214	Petroleum chemistry	Basic	•	•	•		•	•		•
Second/First	PRE215	Material Engineering & Corrosion	Basic	•	•		•		•	•	•
Second/First	UOM202 2	English Language II	Basic		•	•	•				
Second/Second	PRE221	Engineering Mathematics II	Basic					•	•	•	•

Second/Second	PRE222	Fluid Flow II	Basic	•	•	•	•	•	•	•	•
Second/Second	PRE223	Thermodynamic II	Basic	•	•	•	•	•	•	•	•
Second/Second	UOM2012	Arabic Language II	Basic	•			•				
Second/Second	UOM2050	جرائم نظام البعث	Basic		•		•				
Second/Second	PRE224	Properties of Petroleum & Product	Basic	•	•	•		•	•		•
Second/Second	PRE225	Electrical Technology	Basic			•				•	•
Third / Yearly	PRE301	Petroleum Production Engineering (1)	Basic	•	•	•	•	•	•	•	•
	PRE302	Petroleum Reservoir Engineering	Basic	•	•	•		•	•	•	•
Third / Yearly	PRE303	Industrial Chemistry	Basic	•	•	•		•	•	•	•
	PRE304	Rock Mechanics	Basic	•	•	•		•	•	•	•
Third / Yearly	PRE305	Well Logging Engineering	Basic	•	•	•		•	•	•	•
	PRE306	Well Drilling Engineering	Basic	•	•	•		•	•	•	•

Third / Yearly	PRE307	Natural Gas Technology	Basic	•	•			•	•	•	•
	PRE308	Numerical analyses	Basic					•	•		•
Fourth / Yearly	PRE401	Oil Pollution	Basic	•	•			•	•	•	•
	PRE402	Petroleum Production Engineering (2)	Basic	•	•	•		•	•	•	•
Fourth / Yearly	PRE403	Simulation and Reservoir Modeling	Basic	•	•	•	•	•	•	•	•
	PRE404	Oil Refining Technology	Basic	•	•	•	•	•	•	•	•
Fourth / Yearly	PRE405	Reservoir Management and Oil Economics	Basic	•	•	•	•	•	•		•
	PRE406	Engineering Design	Basic	•	•	•	•	•	•	•	•
Fourth / Yearly	PRE407	Enhanced Oil Recovery Methods	Basic	•	•	•	•	•	•	•	•
	PRE408	Engineering Graduation Project	Basic	•	•	•	•	•	•	•	•

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