

# University of Mosul



## College of Petroleum and Mining Engineering

### *Bachelor's degree (B.Sc.) in Petroleum and Refining Engineering*



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## 1. **Mission & Vision Statement**

### ***Vision Statement***

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.

### ***Mission Statement***

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.

## 2. **Program Specification**

|                        |                       |                              |           |
|------------------------|-----------------------|------------------------------|-----------|
| <b>Programme code:</b> | BSc-PE                | <b>ECTS</b>                  | 240       |
| <b>Duration:</b>       | 4 levels, 8 Semesters | <b>Method of Attendance:</b> | Full Time |

Program Overview : The Petroleum and Refining Engineering program focuses on providing students with a comprehensive understanding of petroleum exploration, production, refining, and processing. It equips students with the knowledge and skills necessary for a career in the oil and gas industry.

Duration: The program typically spans four years, divided into eight semesters

### **3. Program Objectives**

Program objectives for a Refining of Oil and Gas Engineering program define the specific, measurable, achievable, relevant, and time-bound (SMART) goals that the program 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. **Student Learning Outcomes**

have introductory information about petroleum and refinery. learn the history of refinery development and composition of petroleum. learn the refinery products, test methods and petroleum properties. recognize the characteristics of petroleum refinery process. recognize the distillation processes. learn solvent treating and extraction processes. learn fluid mechanics. learn combustion, vaporization and condensation. learn fractionation and towers. have information about heat and cracking. learn heat transfer and exchangers. learn Thermal cracking. learn catalytic cracking and reforming. learn typical design calculation and economics of design.

#### Knowledge and Understanding:

- \* Understanding of crude oil composition and properties: Students should be able to analyze and characterize different types of crude oil, understanding their physical and chemical properties.

- \* Knowledge of refining processes: Students should be familiar with various refining processes such as distillation, cracking, reforming, and hydro-treating, and understand the principles behind each process.

- \* Understanding of product specifications: Students should be able to identify and understand the specifications for various refined products, such as gasoline, diesel, and jet fuel.

- \* Knowledge of refinery equipment: Students should be familiar with the different types of equipment used in refineries, such as distillation columns, reactors, absorber, and heat exchangers.

- \* Understanding of environmental and safety regulations: Students should be aware of the environmental and safety regulations that govern the refining industry.

#### Skills:

- \* Process design and optimization: Students should be able to design and optimize refining processes to meet desired product specifications and maximize efficiency.

- \* Troubleshooting and problem-solving: Students should be able to troubleshoot problems that may arise in refinery operations and develop solutions to address them.

- \* Data analysis and interpretation: Students should be able to analyze data from refinery operations and interpret the results to make informed decisions.

- \* Communication and teamwork: Students should be able to communicate effectively and work collaboratively in teams to complete projects and solve problems.

#### Application of Knowledge:

\* Applying knowledge to real-world scenarios: Students should be able to apply their knowledge to real-world scenarios in the refining industry, such as designing a new refinery or optimizing an existing one.

\* Conducting research: Students should be able to conduct research on current topics in the refining industry and contribute to the body of knowledge in the field.

\* Problem-solving: Students should be able to use their knowledge and skills to solve problems that may arise in refinery operations.

Additional Learning Outcomes:

\* Critical thinking: Students should be able to think critically about the refining industry and its impact on the environment and society.

\* Ethics: Students should be aware of the ethical considerations involved in the refining industry.

\* Lifelong learning: Students should be prepared for lifelong learning in the refining industry, as technology and regulations are constantly evolving.

## 5. Academic Staff

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## 6. Credits, Grading and GPA

### **Credits**

Mosul University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

### **Grading**

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

#### GRADING SCHEME

مخطط الدرجات

| Group                                                                                                                                                                                                                                                                                                                                                                    | Grade            | التقدير             | Marks (%) | Definition                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|-----------|---------------------------------------|
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                              | A - Excellent    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                          | B - Very Good    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                          | C - Good         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                          | D - Satisfactory | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                          | E - Sufficient   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                   | FX – Fail        | راسب - قيد المعالجة | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                          | F – Fail         | راسب                | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                          |                  |                     |           |                                       |
| Note:                                                                                                                                                                                                                                                                                                                                                                    |                  |                     |           |                                       |
| Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |           |                                       |

### ***Calculation of the Cumulative Grade Point Average (CGPA)***

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$CGPA = [ (1^{st} \text{ module score} \times ECTS) + (2^{nd} \text{ module score} \times ECTS) + ..... ] / 240$$

## **7. Curriculum/Modules**

**Semester 1 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                  | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|-------------------------|------|-------|------|------|-------------|
| PRE111  | Mathematics I           | 63   | 87    | 6.00 | B    |             |
| PRE122  | Engineering Mechanics I | 63   | 37    | 4.00 | B    |             |
| UOM1031 | Computer Programming I  | 63   | 37    | 4.00 | B    |             |
| UOM1021 | English Language        | 33   | 67    | 4.00 | S    |             |
| PRE113  | Engineering Drawing I   | 63   | 87    | 6.00 | B    |             |
| PRE114  | General Geology I       | 78   | 72    | 6.00 | B    |             |

**Semester 2 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                     | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|----------------------------|------|-------|------|------|-------------|
| PRE121  | Mathematics II             | 63   | 87    | 6.00 | B    |             |
| PRE122  | Engineering Mechanics II   | 63   | 37    | 4.00 | B    |             |
| PRE123  | Analytical Chemistry       | 63   | 62    | 5.00 | B    |             |
| UOM1040 | Democracy and Human Rights | 33   | 17    | 2.00 | S    |             |
| PRE124  | Engineering Drawing II     | 63   | 87    | 6.00 | B    |             |
| PRE125  | General Geology II         | 78   | 47    | 5.00 | B    |             |
| UOM1011 | Arabic Language            | 33   | 17    | 2.00 | S    |             |

**Semester 3 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                             | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|------------------------------------|------|-------|------|------|-------------|
| PRE 211 | Engineering mathematics I          | 59   | 91    | 5.00 | B    |             |
| PRE 212 | Fluid flow I                       | 59   | 66    | 5.00 | C    |             |
| PRE213  | Thermodynamic I                    | 59   | 66    | 5.00 | C    |             |
| UOM2032 | Computer II                        | 45   | 30    | 3.00 | S    |             |
| PRE 215 | Petroleum chemistry                | 59   | 91    | 6.00 | C    |             |
| PRE 216 | Material engineering and Corrosion | 45   | 55    | 4.00 | B    |             |
| UOM2022 | English Language II                | 27   | 23    | 2.00 | S    |             |

**Semester 4 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                             | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|------------------------------------|------|-------|------|------|-------------|
| PRE221  | Engineering mathematics II         | 59   | 66    | 5.00 | B    |             |
| PRE 222 | Fluid flow II                      | 87   | 63    | 6.00 | B    |             |
| PRE 223 | Thermodynamic II                   | 59   | 66    | 5.00 | B    |             |
| UOM2012 | Arabic language II                 | 26   | 24    | 2.00 | S    |             |
| PRE 224 | Properties of Petroleum & Products | 63   | 87    | 6.00 | B    |             |
| PRE 225 | Electrical Technology              | 40   | 60    | 4.00 | B    |             |
| UOM2050 | جرائم حزب البعث                    | 20   | 30    | 2.00 | S    |             |

**Semester 5 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                       | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|------------------------------|------|-------|------|------|-------------|
| PRE 311 | Engineering Analysis I       | 59   | 41    | 4.00 | C    |             |
| PRE 312 | Mass transfer I              | 59   | 66    | 5.00 | C    |             |
| PRE 313 | Petroleum refining process I | 73   | 77    | 6.00 | C    |             |
| PRE 314 | Reactor design               | 59   | 66    | 5.00 | C    |             |
| PRE 315 | Heat transfer I              | 59   | 41    | 4.00 | B    |             |
| PRE 316 | Petrochemical engineering    | 59   | 91    | 6.00 | C    |             |

**Semester 6 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                             | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|------------------------------------|------|-------|------|------|-------------|
| PRE 321 | Engineering Analysis II            | 59   | 41    | 4.00 | B    |             |
| PRE 322 | Mass transfer II                   | 59   | 66    | 5.00 | C    |             |
| PRE 323 | Petroleum refining process II      | 73   | 77    | 6.00 | C    |             |
| PRE 324 | Catalysts in petroleum refinery    | 59   | 66    | 5.00 | C    |             |
| PRE 325 | Heat transfer II                   | 87   | 63    | 6.00 | C    |             |
| PRE 326 | Numerical methods and optimization | 59   | 41    | 4.00 | B    |             |

**Semester 7 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                     | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|----------------------------|------|-------|------|------|-------------|
| PRE 411 | Special petroleum process  | 59   | 66    | 5.00 | C    |             |
| PRE 412 | Plant design and utilities | 73   | 77    | 6.00 | C    |             |
| PRE 413 | Process dynamic            | 73   | 52    | 5.00 | C    |             |
| PRE 414 | Unit operation I           | 87   | 63    | 6.00 | C    |             |
| PRE 415 | Petroleum pollution        | 59   | 66    | 5.00 | C    |             |
| PRE 416 | Project I                  | 45   | 30    | 3.00 | C    |             |

**Semester 8 | 30 ECTS | 1 ECTS = 25 hrs**

| Code    | Module                                         | SSWL | USSWL | ECTS | Type | Pre-request |
|---------|------------------------------------------------|------|-------|------|------|-------------|
| PRE 421 | Gas technology                                 | 59   | 66    | 5.00 | C    |             |
| PRE 422 | Equipment design                               | 73   | 77    | 6.00 | C    |             |
| PRE 423 | Process control                                | 73   | 52    | 5.00 | C    |             |
| PRE 424 | Management and economics of petroleum projects | 59   | 66    | 5.00 | C    |             |
| PRE 425 | Unit operation II                              | 87   | 63    | 6.00 | C    |             |
| PRE 426 | Project II                                     | 45   | 30    | 3.00 | C    |             |

## 8. **Contact**

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