



Program Specification Document of Mineral Resources and Rocks

Introduction

The idea of establishing the Faculty of Petroleum and Natural Resources stemmed from the need to restructure the Department of Earth and Environmental Sciences into a specialized faculty capable of effectively serving the community, producing highly skilled cadres to meet the demands of the labor market, and contributing to the overall development of the country. The faculty's focus would be on the exploitation of oil, minerals, and other valuable natural resources, such as those used in the cement and glass industries. This is in addition to the utilization of industrial rocks, including oils, marble, and decorative stones. Given Sana'a University's status as the oldest and largest university in the country, the lack of specialized departments in petroleum and minerals stood in stark contrast to the presence of such departments in private universities established within the past ten years. This disparity served as a compelling factor that drove the university leadership to embark on the establishment of new specialized faculties, including this particular faculty.

Basic Information about the Program

1	Program Title and Final Award:	BSc in Mineral Resources and Rocks
2	Awarding Body/Institution (Faculty/Center)	Faculty of Petroleum and Natural Resources
3	Teaching Institution/Responsible Department:	Earth Science
4	Total Credit Hours Required for Program Completion:	135
5	Other Departments Involved in Teaching the Program:	--
6	Medium of Instruction:	English - Arabic
7	Program Start Year (for Newly Specified Programs):	2021-2022
8	Study Mode (Regular/ Distance Learning):	(Full-time) Regular
9	System of Study (Credit Hours, Semester-based, Annual):	Semester-based
10	Place of Study (On-Campus/ Off-Campus):	Faculty of Petroleum and Natural Resources Building
11	Duration of the Program (Number of Years and Semesters):	Eight Semesters - 4 Years
12	Possible Future Career Options for Graduates:	Geologist - Mineral Exploration Engineer
13	Prerequisite Qualifications:	High School Certificate (Scientific Section) or its equivalent

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14	Required GPA/ Grade for Admission (%):	75%
15	Other Requirements:	Admission Exam
16	Program Coordinator:	Dr. Tarik Alhebshi
17	Date of Program Specification/ Latest Accreditation:	2020

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University Vision, Mission, and Aims

▪ University Vision

Sana'a University (SU) aspires to achieve a national leading role in teaching, learning, scientific research and community service; and to be among the best regional universities and the foremost house of expertise and think tank in Yemen.

▪ University Mission

To contribute to the sustainable development efforts by providing an accredited higher education environment and excellent research services within a fruitful national partnership based on transparency, professionalism and creativity.

▪ University Aims

Sana'a University aims to:

- 1- To provide specialized and in-depth academic opportunities for students in different fields of knowledge to meet the country's needs of specialists, technicians and experts.
- 2- To cherish Arabic language, its teaching and development; and mainstream its use as the language of science and education in various arenas of knowledge, as a vehicle for cultural meanings, values and ethics of the Arab-Islamic civilization.
- 3- To develop knowledge through engaging in multidisciplinary research, both individually and collectively, and directing them towards serving the community needs and development plans.
- 4- To nurture the development of technology and its utilization in the community development.
- 5- To promote the activities of authorship, translation and publishing in various fields of knowledge with special emphasis on the Yemeni heritage.
- 6- To contribute to the promotion of arts, literature and the advancement of sciences.
- 7- To offer an academic atmosphere conducive to the freedom of thought, expression and publication in a way that does not contradict with the lofty values and elevated ideals of Islam.
- 8- To strengthen relations with universities and public and private institutions in the country to ensure a mutual and constructive interaction of knowledge, expertise, resources and participation that will guarantee effective contribution to the comprehensive development of the country.
- 9- To strengthen scientific and cultural ties with Arab and foreign universities, scientific bodies, and research and development centers, with a view to developing Sana'a University and enhancing its prominence.
- 10- To offer technical and specialized studies and consultations for various public and mixed-sector institutions.
- 11- To contribute to the development of policies and ways of work in institutions of both public and private sectors, providing models and innovative experiments to solve various problems.
- 12- To promote the efficiency of employees in public and private institutions and agencies,



by contributing to the development of in-service preparation and qualification programs.

Faculty Vision, Mission, Values and Aims

Faculty Vision

Attaining local leadership and regional excellence in the field of petroleum and natural resources sciences and contributing to sustainable development.

Faculty Mission

Preparing qualified cadres in the field of petroleum and natural resources, capable of competing in the local and regional labor market, by providing distinguished educational, research, and community services in a stimulating learning environment that encourages creativity and innovation.

Faculty Aims:

The faculty aims to:

- 1- Providing high-quality education to keep pace with the developments in the fields of petroleum and natural resources;
- 2- Qualifying specialized, highly proficient graduates capable of competing in local, regional, and global markets;
- 3- Building capacities and attracting specialized teaching staff to enhance educational performance;
- 4- Promoting partnerships with relevant institutions and companies;
- 5- Contributing to community service and providing consultations and technical and research studies;
- 6- Promoting scientific research and offering targeted postgraduate programs.

▪ Faculty Values

- Belonging
- Quality and excellence
- Professionalism and Integrity
- Transparency and Clarity
- Collaboration and Joint Responsibility
- Equality and Justice
- Accountability
- Academic Freedom

Department Mission and Aims

▪ Department Mission:

Preparing graduates equipped with the knowledge and skills to become productive members of their communities, capable of efficiently exploring the natural resources of the earth at both local and regional levels, innovating solutions to societal problems, and contributing to the support of

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the national economy.

▪ **Department Aims:**

1. Discovering subsurface resources in alignment with sustainable development.
2. Equipping students with technological skills that enable them to comprehend and apply cutting-edge techniques.
3. Developing the scientific and applied capabilities of students through collaboration with scientific and applied institutions.
4. Providing consultancy services to both the public and private sectors in various geological specializations.
5. Developing the capacities of the teaching staff and their assistants to enhance the educational process.
6. Pursuing excellence in the educational process and actively supporting and encouraging scientific research that contributes to addressing societal problems.

Program Mission and Aims:

▪ **Program Mission**

Preparing graduates equipped with the knowledge and skills to become productive members of their communities, capable of efficiently exploring the earth's resources of mineral ores and industrial rocks at both local and regional levels, innovating solutions to societal problems, and contributing to the support of the national economy.

▪ **Program Aims:**

1. Discovering the earth's resources of mineral ores and industrial rocks in support of sustainable development.
2. Equipping students with technological skills that enable them to comprehend and apply cutting-edge techniques.
3. Providing consultancy services to both the public and private sectors in the fields of exploration and mineral extraction.
4. Enhancing graduates' skills in creating geological maps, exploring and evaluating ore deposits manually and under the microscope.
5. Contributing to the advancement of knowledge in the field of mineral and rock resources through training courses designed to foster new developments in this field.



Program Benchmarks

1. Standard Manual – Level (1) – (Beginning) – (2013) - Council for Academic Accreditation and Quality Assurance of Higher Education in the Republic of Yemen.
2. The Accreditation Board for Engineering and Technology (ABET) for Bachelor degree in Petroleum Engineering published by the Engineering Accreditation Commission
3. The British Geological Society. UK
4. Other programs in Arab, regional and international universities as follows:
 - King Abdul-Aziz University, Saudi Arabia.
 - The university of Adelaide, Australia
 - Colorado School of Mines, USA
 - The Copperbelt University, Zambia
 - Al- Hikmah University
 - Zambia University, Zambia
5. Document of the academic program specifications prepared by the Academic Accreditation Council and the quality assurance of higher education in the Republic of Yemen

[Annex \(1\) Academic Standards of the Program According to the International Accreditation Board](#)

[Annex \(2\) A Survey of Similar Programs](#)

[Annex \(3\) A Survey of the Learning Outcomes of Similar Programs](#)

[Annex \(4\) A Survey of Credit Hours of Similar Programs](#)

[Annex \(5\) A Survey of Academic Courses of Similar Programs](#)

Program Intended Learning Outcomes (PILOs)

First: Knowledge and Understanding:

Upon successful completion of the program, the graduates will be able to:

A1.	Explain key biological, chemical and physical Earth structures, processes, the interactions between them, and the roles that they play in determining the state of the Earth system.
A2.	Describe and identify geological materials and their properties at a range of scales and reach informed conclusions about their possible identity and origins. This includes the investigation of sediments, rocks, minerals and fossils.
A3.	Utilize geological observations and measurements to solve problems involving the timing of geological events in Earth history.
A4.	Acquire knowledge of the country culture.

Second: Cognitive/ Intellectual Skills

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Upon successful completion of the program, the graduates will be able to:

B1.	Apply knowledge of mathematics, science, and engineering to geological and mineral exploration problems.
B2.	Integrate field and laboratory evidence with theory, following the sequence from observation to recognition and evaluation of mineral reserves or ores.
B3.	Think critically and analyze effectively.

Third: Practical and Professional Skills

Upon successful completion of the program, the graduates will be able to:

C1.	Become familiar with new geological methods and technologies.
C2.	Design and conduct experiments, as well as analyze and interpret data.
C3.	Undertake field and laboratory investigations in a responsible and safe manner, paying due attention to risk assessment, rights of access, relevant health and safety regulations, and sensitivity to the impact of investigations on the environment and stakeholders.

Fourth: General and Transferable Skills:

Upon successful completion of the program, the graduates will be able to:

D1.	Communicate and disseminate clearly and effectively in both written and oral forms.
D2.	Outline broad concepts in scientific research methods and ethical principles of scientific research and be able to write research proposals.
D3.	Utilize information and communication technology to access databases in geosciences.

Annex (6): Alignment of Program Aims with the Program Intended Learning Outcomes (PILOs)

Annex (8) Alignment of PILOs with International Reference Standards.

Teaching Strategies and Assessment Methods

Program Intended Learning Outcomes (PILOs)		Teaching and Learning Skills	Assessment Methods
A1.	Explain key biological, chemical and physical Earth structures and processes, the interactions between them, and the roles that they play in determining the state of the Earth system.	<ul style="list-style-type: none"> - Interactive Lectures, - Discussion 	<ul style="list-style-type: none"> - Written Exams, - assignment work, - Observation
A2.	Describe and identify geological materials and their properties at a range of scales and reach informed conclusions about their possible identity and origins. This includes the investigation of sediments, rocks, minerals and fossils.		
A3.	Utilize geological observations and measurements to solve problems involving the timing of geological events in Earth history.		
A4.	Acquire knowledge of the country culture.		

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B1.	Apply knowledge of mathematics, science, and engineering to geological and mineral exploration problems.	- Discussion - Tutorial, - case study	- Project - written exam, - assignment work
B2.	Integrate field and laboratory evidence with theory, following the sequence from observation to recognition and evaluation of mineral reserves or ores.		
B3.	Think critically and analyze effectively.		
C1.	Become familiar with new geological methods and technologies.	- Lab and practical work,	- Lab exam,
C2.	Design and conduct experiments, as well as analyze and interpret data.	- Group work, - case study	- Practical exam, - assignment work
C3.	Undertake field and laboratory investigations in a responsible and safe manner, paying due attention to risk assessment, rights of access, relevant health and safety regulations, and sensitivity to the impact of investigations on the environment and stakeholders.	- Intensive use of computer packages	- computer- based exam - submission of reports
D1.	Communicate and disseminate clearly and effectively in both written and oral forms.	- Self-study, - group work,	- practical exam, - project display
D2.	Outline broad concepts in scientific research methods and ethical principles of scientific research and be able to write research proposals.	- Intensive use of computer packages	- submission of reports or project
D3.	Utilize information and communication technology to access databases in geosciences.		

Curriculum Map (Alignment of Course Intended Learning Outcomes (CILOs) to the Program Courses)

Annex (9) Program Main and Sub-Themes and Their Relative Weights

Annex (10) Coding of Courses and Their Alignment with PILOs

Annex (11) Matrix of Mapping PILOs with Courses (Curriculum Map)

Teaching Strategies:

SN	Teaching Strategy	Description of Usage
1	Interactive Lecture	An <i>interactive lecture</i> , which is also known as a lecturing method, is a traditional but widely-used teaching approach across all educational levels. Many instructors frequently resort to it due to the dense content of the curriculum and the limited time allocated for study. Lecturing involves the transfer of knowledge from the instructor to the students through verbal communication and explanation. During this process, students are expected

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		to listen attentively to the instructor's speech, respond to posed questions, follow provided instructions, and engage mentally. <i>Interactive lectures</i> transition students from a state of passive reception of information to a state of active thinking, thereby enhancing their deep understanding. They incorporate a variety of well-selected activities that help develop the different characteristics of active learners, including the ability to inquire, analyze issues, and solve problems.
2	Discussion	This method involves a dynamic exchange of ideas between the instructor and students, centered on a specific topic introduced during the lecture. Students actively participate by expressing their opinions and perspectives on the issue, while the instructor provides feedback and guidance. This method effectively enhances students' personal development by encouraging them to articulate their thoughts and opinions confidently.
3	Practical and Laboratory Work	It stands as one of the most significant teaching strategies, forming an integral component of effective instruction. Under this strategy, the instructor encourages students to independently discover scientific principles and laws through active involvement in conducting experiments. Students perform experiments, record observations accurately, and use these observations to draw conclusions.
4	Fieldwork	<i>Fieldwork</i> is a teaching strategy that utilizes field trips and site visits to assist students in connecting theoretical knowledge with practical applications in geology and petroleum engineering.
5	Teamwork	It is also known as collaborative learning. It involves dividing learners into small groups, typically consisting of 3 to 4 members. Each group is assigned specific tasks (shared goals) that require them to collaborate and exchange knowledge and skills to achieve the desired outcome.
6	Intensive Use of Computer Packages	The intensive use of computer packages is a teaching strategy that focuses on introducing and demonstrating the application of modern technology in the field of petroleum engineering, equipping learners with the necessary computer skills in various aspects of the oil and gas industry.

Assessment Strategies:

SN	Assessment Strategies:	Description (courses in which it is used and frequency of use)
1	Written Exams	They serve as a valuable method to assess the students' comprehension and understanding of the theoretical and practical topics covered in the courses through written answers to questions on midterm or final exams.
2	Oral Exams	They serve as a valuable method to assess the students' comprehension and understanding of the theoretical and practical topics covered in the courses through oral answers to questions posed to them.
3	Practical Exams	For the professional skills courses that involve a laboratory, the use and control of equipment, or the development of physical and psychomotor dexterity skills, it is evident that such work must be assessed through practical experiments of some kind. There are two methods of practical assessment: 1. Continuous Observation: Continuous observation stands as the preferred method for courses emphasizing practical or motor skills, which constitute the majority of intended learning outcomes. By assessing each performance or product, instructors can attain a more comprehensive understanding of student performance and capabilities. In addition, timely and immediate feedback can be provided for improvement purposes



		whenever possible. This type of formative continuous assessment is particularly well-suited for practical skills courses. 2. Formative Presentation: This method involves demonstrating practical skills to an examiner. This assessment method resembles written closed-book exams in many respects, albeit with a practical orientation. However, it may pose challenges for students prone to test anxiety. Yet, many professional qualifications necessitate proficiency tests of this nature, underscoring the importance of thorough student preparation.
4	Observation	<i>Observation</i> is a method used in the assessment process to assess the student's mastery of presentation, delivery, communication, and proficiency in the use of information technology.
5	Reports or Graduation Research	<i>Reports or graduation research</i> are one of the methods used to assess students' ability to conduct field and desk studies in the field of business administration by assigning them to prepare research, whether individual or group research. This enables students to familiarize themselves with the principles of scientific research, such as conducting survey studies to identify research problems, reviewing previous studies, setting objectives, formulating hypotheses, and understanding research methodology.

Program Structure

Annex (9) Program Themes and their Relative Weights and Alignment with PILOs

Requirements		Credit Hours	Relative Weight (%)
1- University Requirements	Compulsory	19	14.1%
	Elective	0	
2- Faculty Requirements	Compulsory	40	29.6%
	Elective	0	
3- Program Requirements	Compulsory	76	56.3%
	Elective	0	
Total credit hours		135	100%

Course Distribution for Program Requirements

Annex (10) Coding of Courses and Their Alignment with PILOs
Annex (11) Matrix of Mapping PILOs with Courses (Curriculum Map)
Annex (12) Program Study Plan
Annex (13) Program Course Description

1. University Requirements (19 credit hours)

Course Title	Course Code	CREDIT HOURS				Level/semester	PREREQUISITES
		Theo.	Practl.	Tut. / Tr.	Total		
1 Arabic (1)	U 101	3	0	0	3	L1/ S1	

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2	Arabic (2)	U 102	3	0	0	3	L1/ S2	
3	English (1)	U 103	3	0	0	3	L1/ S2	
4	English (2)	U 104	3	0	0	3	L1/ S2	
5	Islamic Culture	U 105	3	0	0	3	L1/ S1	
6	National Culture	U 106	2	0	0	2	L1/ S2	
7	Arab-Israeli Conflict	U 107	2	0	0	2	L1/ S1	
Total credit hours			19	0	0	19		

2- Faculty Requirements (40 credit hours)

2. 1- Faculty Compulsory Requirements (40 credit hours)

	Course Title	Course Code	CREDIT HOURS				Level / Semester	PREREQUISITES
			Theo.	Practl.	Tut. / Tr.	Total		
1	General Geology (1)	PNR 111	2	1	0	3	L1/ S1	
2	General Geology (2)	PNR112	2	1	0	3	L1/ S2	
3	General Mathematics	PNR 113	2	0	1	3	L1/ S1	
4	General Chemistry	PNR 114	2	1	0	3	L1/ S2	
5	General Physics	PNR 115	2	1	0	3	L1/ S2	
6	Fundamentals of Environmental Science	PNR 116	2	0	0	2	L1/ S2	
7	Computer Programming	PNR 211	2	1	0	3	L2/ S2	
8	Sedimentology and Stratigraphy	PNR 212	2	1	0	3	L2/ S1	
9	Geophysics	PNR 213	2	1	0	3	L2/ S1	
10	Statistics	PNR 214	2	0	1	3	L2/ S2	
11	Principles of Engineering Geology	PNR 215	2	0	0	2	L2/ S1	
12	Structural Geology	PNR 311	2	1	0	3	L3/ S1	
13	Remote Sensing and GIS	PNR 312	2	1	0	3	L3/ S2	
14	Geology of Yemen	PNR 313	2	1	0	3	L3/ S2	
Total credit hours			28	10	2	40		

3- Program Requirements

3. 1- Compulsory Courses (78 credit hours)

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Course Title	Course Code	CREDIT HOURS				Level/ semester	PREREQUISITES	
		Theo.	Practl.	Tut. / Tr.	Total			
1	Geomorphology	GEOS231	2	1	0	3	L2/ S1	PNR 111
2	Mineralogy and Crystallography	GEOS222	2	1	0	3	L2/ S2	PNR 111
3	Differential Equations	GEOS241	2	0	1	3	L2/ S1	PNR 113
4	Environmental Geology	GEOS232	2	0	0	2	L2/ S1	
5	Soil Mechanics	EG241	2	1	0	3	L2/ S2	PNR 215
6	Optical Mineralogy	GEOS2241	0	2	0	2	L2/ S2	GEOS222
7	Economics of Natural Resources	EG251	2	0	0	2	L2/ S2	
8	Igneous and Metamorphic Rocks	GEOS321	2	1	0	3	L2/ S2	GEOS2241
9	Sedimentary Rocks	GEOS 322	2	1	0	3	L3/ S1	GEOS2241
10	Petroleum Geology	GEOS3231	2	1	0	3	L3/ S2	
11	Hydrogeology	GEOS335	2	1	0	3	L3/ S1	
12	Rock Mechanics	EG343	2	1	0	3	L3/ S2	PNR 215
13	Field Geology and Survey	GEOS3251	2	1	0	3	L3/ S1	
14	Industrial Minerals and Rocks	MINR 341	2	1	0	3	L4/ S2	
15	Principles of Geochemistry	GEOS333	2	0	1	3	L3/ S1	
16	Geophysical Exploration	GEOS334	2	1	0	3	L3/ S2	
17	Economic Geology	MINR 451	2	1	0	3	L3/ S1	
18	Geological and Geochemical Exploration	MINR 431	2	1	0	3	L4/ S1	
19	Ore Mineralogy	MINR 452	2	1	0	3	L4/ S1	
20	Volcanology	MINR 442	2	1	0	3	L4/ S1	
21	Ore Microscopy	MINR 453	2	1	0	3	L3/ S2	
22	Geochemistry of Mineral Deposits	MINR 454	2	0	1	3	L4/ S1	
23	Mineral Resources of Yemen	MINR 441	2	1	0	3	L4/ S2	
24	Mining Geology	MINR 455	2	1	0	3	L4/ S2	
25	Geoscience and Computers	MINR 463	2	1	0	3	L4/ S2	
26	Graduation Project (1)	MINR 461	2	0	0	2	L4/ S1	
27	Graduation Project (2)	MINR 462	2	0	0	2	L4/ S2	

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Total credit hours	52	21	3	76		
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Program Study Plan

First year First Semester							
	Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
			Theo.	Practl.	Tut. / Tr.	Total	
1	Islamic Culture	U 105	3	0	0	3	
2	Arabic (1)	U 101	3	0	0	3	
3	English (1)	U 103	3	0	0	3	
4	General Geology (1)	PNR 111	2	1	0	3	
5	General Mathematics	PNR 113	2	0	1	3	
6	Arab-Israeli Conflict	U 107	2	0	0	2	
Total credit hours			15	1	1	17	

First year Second Semester							
	Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
			Theo.	Practl.	Tut. / Tr.	Total	
1	Arabic (2)	U 102	3	0	0	3	
2	English (2)	U 104	3	0	0	3	
3	General Geology (2)	PNR 112	2	1	0	3	
4	General Chemistry	PNR 114	2	1	0	3	
5	General Physics	PNR 115	2	1	0	3	
6	Fundamentals of Environmental Science	PNR 116	2	0	0	2	
7	National Culture	U 106	2	0	0	2	
Total credit hours			16	3	0	19	

Second Year First Semester							
	Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
			Theo.	Practl.	Tut. / Tr.	Total	
1	Geomorphology	GEOS231	2	1	0	3	
2	Mineralogy and Crystallography	GEOS222	2	1	0	3	
3	Differential Equations	GEOS241	2	1	0	3	
4	Geophysics	PNR 213	2	1	0	3	
5	Sedimentology and Stratigraphy	PNR 212	2	1	0	3	PNR 112
6	Principles of Engineering Geology	PNR 215	2	0	0	2	
Total credit hours			12	5	0	17	

Second Year Second Semester

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Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
		Theo.	Practl.	Tut. / Tr.	Total	
1 Environmental Geology	GEOS232	2	0	0	2	
2 Soil Mechanics	EG241	2	1	0	3	
3 Optical Mineralogy	GEOS224	0	2	0	2	
4 Economics of Natural Resources	EG251	2	0	0	2	
5 Statistics	PNR 214	2	0	1	3	
6 Computer Programming	PNR 211	2	1	0	3	
Total credit hours		10	4	1	15	

Third Year First Semester						
Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
		Theo.	Practl.	Tut. / Tr.	Total	
1 Structural Geology	PNR311	2	1	0	3	
2 Igneous and Metamorphic Rocks	GEOS321	2	1	0	3	
3 Sedimentary Rocks	GEOS322	2	1	0	3	
4 Petroleum Geology	GEOS323	2	1	0	3	
5 Hydrogeology	GEOS335	2	1	0	3	
6 Rock Mechanics	EG343	2	1	0	3	
Total credit hours		12	6	0	18	

Third Year Second Semester		Third Year: Second Semester				
Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
		Theo.	Practl.	Tut. / Tr.	Total	
1 Remote Sensing and GIS	PNR312	2	1	0	3	
2 Geology of Yemen	PNR313	2	1	0	3	
3 Field Geology and Survey	GEOS325	2	1	0	3	
4 Industrial Minerals and Rocks	MINR 341	2	1	0	3	
5 Principles of Geochemistry	GEOS333	2	1	0	3	
6 Geophysical Exploration	GEOS334	2	1	0	3	
Total credit hours		12	6	0	18	

Fourth Year First Semester						
Course Title	COURSE CODE	CREDIT HOURS				Prerequisites
		Theo.	Practl.	Tut. / Tr.	Total	

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					Tr.		
1	Economic Geology	MINR 451	2	1	0	3	
2	Mineral Resources of Yemen	MINR 441	2	1	0	3	
3	Geological and Geochemical Exploration	MINR 431	2	0	1	3	
4	Ore Mineralogy	MINR 452	2	1	0	3	
5	Volcanology	MINR 442	2	1	0	3	
6	Graduation Project (1)	MINR 461	2	0	0	2	
Total credit hours			12	4	1	17	

Fourth Year Second Semester							
Course Title	COURSE CODE	CREDIT HOURS				Prerequisites	
		Theo.	Practl.	Tut. / Tr.	Total		
1	Ore Microscopy	MINR 453	2	1	0	3	
2	Geochemistry of Mineral Deposits	MINR 454	2	0	1	3	
3	Mining Geology	MINR 455	2	1	0	3	
4	Geoscience and Computers	MINR 463	2	1	0	3	
5	Graduation Project (2)	MINR 462	2	0	0	2	
Total credit hours			10	3	1	14	

Total credit hours and their Percentage							
Level	Semester	University Requirements	Faculty Requirements	Program Requirements	Training	Total credit hours	
First	First	11	6	0		17	36
	Second	8	11	0		19	
Second	First	0	8	9		17	32
	Second	0	6	9		15	
Third	First	0	3	15		18	36
	Second	0	6	12		18	
Fourth	First	0	0	17		17	31
	Second	0	0	14		14	
Total credit hours		19	40	76		135	
%		14.1%	29.6%	56.3%		100%	

Admission Requirements for the Program
A candidate can be admitted to the program if he/she fulfills the following requirements:
1- The applicant must have a high school certificate with a minimum average grade of 75%
2- Admission Exam



Inter-Level Progression and Graduation Requirements:

(This section clearly outlines the rules and regulations governing student progression from one academic level to the next, including withdrawal procedures and transfers within the same faculty.)

From Level One to Level Two	Students may progress to the next level with no more than three failed courses.
From Level Two to Level Three	Students may progress to the next level with no more than three failed courses.
From Level Three to Level Four	Students may progress to the next level with no more than three failed courses.
Graduation	Successful completion of all courses with a total of 137 credit hours.

Graduation Requirements:

(Graduation requirements should be clearly and accurately defined. The following guidelines can be used:)

- Total Credit Hours Required for Graduation: 137 credit hours
- Minimum Passing Grade for Each Course.
- Total marks or overall grade required for graduation.

Resources and Equipment for the Implementation of the Program:

Learning Resources:

- Qualified teaching staff
- Classrooms equipped with presentation devices
- Specialty-specific laboratories and workshops
- Seminar rooms
- Petrographic rock sample cutting workshop

Laboratories, Equipment, Tools, and Educational Materials:

- Computer labs
- Geology laboratories
- Mineral ore laboratories
- Optical mineralogy laboratories
- Metal and rock cutting and polishing workshop
- Mineral chemistry laboratory
- X-ray laboratory

Program Assessment and Enhancement

Target Group	Assessment Method	Sample Sample
1- Faculty Members	Evaluation sheet	100%
3- Senior students	Evaluation sheet	50%
4- Alumni	Evaluation sheet & interview	10%
5- Stakeholders (Employers)	Evaluation sheet & interview	5

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6-External & Internal Reviewers	Evaluation report	2
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Attributes of the Mineral Resources and Rocks Graduate:

Upon successful completion of the Mineral Resources and Rocks program, graduates should be able to:

1. Apply knowledge of basic science and mathematics, measurement principles, basic engineering concepts, and theories to demonstrate the application of this knowledge to the petroleum industry.
2. Identify, formulate, and solve fundamental mineral exploration problems.
3. Use the techniques, skills, and appropriate software and laboratory tools, necessary for mineral field practice and project management.
4. Function and communicate effectively in multidisciplinary teams and engage in life-long learning.
5. Apply and integrate knowledge from each of the elements of mineral and rock exploration, exploitation, and estimation problems.
6. Analyze and synthesize mineral systems and understand the associated uncertainty in ore estimation.

Supporting Annexes:

- [Annex \(1\) Academic Standards of the Program According to the International Accreditation Board](#)
- [Annex \(2\) A Survey of Similar Programs](#)
- [Annex \(3\) A Survey of the Learning Outcomes of Similar Programs](#)
- [Annex \(4\) A Survey of Credit Hours of Similar Programs](#)
- [Annex \(5\) A Survey of Academic Courses of Similar Programs](#)
- [Annex \(6\) Alignment of Program Aims with PILOs](#)
- [Annex \(8\) Alignment of PILOs with International Reference Standards](#)
- [Annex \(9\) Program Themes and their Relative Weights and Alignment with PILOs](#)
- [Annex \(10\) Coding of Courses and Their Alignment with PILOs](#)
- [Annex \(11\) Matrix of Mapping PILOs with Courses \(Curriculum Map\)](#)
- [Annex \(12\) Program Study Plan](#)
- [Annex \(13\) Updated Program Course Descriptions](#)

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