Academic Program Description Form

University Name: **University of Baghdad**

Faculty/Institute: **College of Science**

Scientific Department: **Geology Department**

Academic or Professional Program Name: **Bachelor of Earth Science**

Final Certificate Name: **Bachelor of Earth Science**

Academic System: **Semester System**

Description Preparation Date: **1 / 10 / 2023**

File Completion Date: **1 / 10 / 2023**

Signature:

Head of Department Name:

Prof. Salam Ismail Marhoon

Date:

Signature:

Scientific Associate Name:

Prof. Namir Ibrahim Abbas

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Prof. Israa Ali Zidan

Date:

Signature:

أ.م.د. رائد فالح حسن

الأستاذ المساعد الدكتور

رائد فالح حسين

عميد كلية العلوم

Approval of the Dean

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

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.

1. Program Vision

Our vision is to be a globally recognized and leading Geology Department dedicated to enhancing the understanding of Earth's processes and resources while fostering the development of knowledgeable and skilled geologists.

2. Program Mission

Our mission is to enhance the understanding of Earth's dynamic processes and geological history through in-depth research, education, and community engagement. We aim to build a vibrant academic community that fosters curiosity, critical thinking, and a passion for geology.

3. Program Objectives

The academic program in the Geology Department at the College of Science, University of Baghdad, aims to achieve several goals, including:

1. **Education and Training:** The primary goal of the Geology Department is to provide high-quality education and training in the field of geology. This includes offering academic courses, degree programs, and field experiences that equip students with the knowledge and skills needed for a career in geology.
2. **Scientific Research:** Another important goal is to conduct scientific research in various fields of geology. This involves studying earth processes, geological formations, analyzing rocks and minerals, and contributing to the understanding of the planet's history and development.
3. **Fieldwork and Exploration:** Geology departments often emphasize fieldwork and exploration to provide practical experiences for students. The aim is to train students in fieldwork techniques, such as mapping,

sample collection, and geological surveying, which are crucial for geologists working in industry, government, and academia.

4. **Collaboration and Networking**: Geology departments aim to foster collaboration and networking within the earth sciences community. This may include partnerships with industry, government agencies, and other higher education institutions to promote joint research projects, collaborative training, and employment opportunities for students.
5. **Environmental Management and Natural Resource Management**: Many geology departments focus on environmental management and natural resource management. The goal is to train students to understand earth resources, such as minerals, water, and energy, and to develop sustainable approaches to their exploration, extraction, and management.
6. **Media Engagement and Public Participation**: Geology departments often aim to engage with the public and raise awareness about geology and its importance. This can include organizing public lectures, workshops, and outreach programs to educate and inspire the community about earth processes, geological hazards, and the significance of geology in everyday life.
7. **Professional Development**: Geology departments also play a role in supporting the professional development of students. This involves guiding students on career paths, assisting with job placement, and promoting continuing education and professional certifications.
8. **Diversity and Inclusion**: Many geology departments strive to promote diversity and inclusion within the field. The goal is to create an inclusive environment that encourages participation from individuals from diverse backgrounds and perspectives, enriching the earth sciences community as a whole.

9. These goals may vary depending on the specific priorities and resources of the geology department, but they provide an overview of what a geology program may aim to achieve.

4. Program Accreditation

The reliability and authentication of the Deans' Committee.

5. Other external influences

Summer training, field visits, training courses, scientific research, laboratories, library.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	17	10%	
College Requirements	5	20	12%	
Department Requirements	37	132	78%	
Summer Training	2	-	-	
Other	-	-	-	

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First Stage		Physical Geology	2	2
		Crystallography	2	2
		Chemistry	2	2
		Computer		4
		English Language	2	\
		Democracy and Human Rights	2	\
		Historical Geology	2	2
		Mineralogy	2	2
		Physics	2	2
		Mathematics	2	\
		Arabic Language	2	\
Second Stage		Optical Mineralogy	2	2
		Structural Geology 1	2	2
		Geomorphology	2	2
		Invertebrate 1	2	2
		Mathematics	2	2
		Computer 1	\	2
		English Language	2	\
		The Crimes of the Baath Regime in Iraq	2	\
		Petrology	2	2
		Structural Geology 2	2	2
		Remote Sensing	2	2
		Invertebrate 2	2	2
		Statistics	2	2
		Computer 2	\	2
		Arabic Language	2	\
Third Stage		Igneous Petrology	2	2
		Stratigraphy	2	2
		Sedimentology	2	2
		Geophysics 1	2	2

		Micropaleontology	2	2
		Geotectonic	2	2
		Research Methodology	2	2
		Metamorphic Petrology	2	2
		Geology of Iraq	2	2
		Sedimentary Petrology	2	2
		Geophysics 2	2	2
		Paleoecology	2	2
		Field Geology	2	2
Fourth Stage		Subsurface Geology	2	2
		Geochemistry	2	2
		Environmental Geology	2	2
		Engineering Geology	2	2
		Elective Subject	2	\
		Petroleum Geology	2	2
		Ore Geology	2	2
		Environmental Pollution	2	2
		Water Resources	2	2
		Elective Subject	2	\
		Field Course	\	\
		Graduation Project	\	\

8. Expected learning outcomes of the program

Knowledge	
Learning Outcome 1: Understanding and applying the acquired knowledge to analyze and scientifically interpret geological phenomena.	**Learning Outcome Statement 1:** Acquiring basic knowledge in the field of geology and understanding natural geological processes, including the Earth's components and its evolution over time.
Skills	
Learning Outcome 2: Ability to conduct field studies and use laboratory techniques to analyze samples and reach accurate conclusions.	**Learning Outcome Statement 2:** Developing the skills necessary to collect and analyze geological data using advanced tools and techniques.
Learning Outcome 3: Ability to identify and interpret geological problems and use analytical skills to arrive at innovative solutions.	**Learning Outcome Statement 3:** Enhancing critical thinking and problem-solving skills.
Ethics	
Learning Outcome 4: Adopting sustainable practices in the exploration and use of natural resources.	**Learning Outcome Statement 4:** Promoting environmental awareness and social responsibility in dealing with natural resources.

Learning Outcome 5: Ability to work effectively as part of a multidisciplinary team on geological projects.	**Learning Outcome Statement 5:** Developing values of collaboration and teamwork.

9.Teaching and Learning Strategies

Geology programs at universities typically employ a variety of strategies and teaching methods to ensure the effectiveness of the educational process and to achieve learning objectives. Among these strategies and methods are:

1. Interactive lectures: Interactive lectures allow students to actively participate in the educational process through discussions and exchanges with the instructor and among themselves. Students are encouraged to ask questions and participate in solving complex problems.
2. Practical lessons and laboratory work: Practical sessions in laboratories and fieldwork are organized to enhance practical understanding of geological concepts, enabling students to interact with geological samples and geophysical data.
3. Case studies and research projects: Case studies and research projects provide students with an opportunity to apply theoretical concepts to real-world scenarios, enhancing their understanding of geological challenges and developing their research and analytical skills.
4. Effective use of technology in education: This includes the use of multimedia such as educational videos, computer simulations, and geomatics software to offer interactive and engaging learning experiences.
5. Discussions and workshops: Discussion sessions and workshops are organized to allow students to exchange ideas and opinions, and to collaboratively solve complex geological problems, helping them build critical thinking and problem-solving skills.
6. Diagnostic and interactive assessment: Continuous diagnostic assessment methods are used to measure students' progress and understanding, with constructive feedback provided to help them improve their performance and deepen their understanding.
7. Cooperative learning: This type of learning encourages cooperation among students in small groups to solve problems and complete projects, fostering social interaction and promoting a mutual understanding of the course material.

By using these diverse educational strategies and methods, students are encouraged to develop critical thinking skills, innovation, and social interaction, thus enhancing the effectiveness of the learning process and achieving the academic program's goals overall.

10.Evaluation methods

Below are some common methods of assessment and their implementation throughout all stages of a geology program:

1. Diagnostic Assessment:
    - This type of assessment is used in the initial phase to determine the level of knowledge and skills of students before beginning the course.
    - Diagnostic assessment includes short quizzes, questionnaire-based questions, and personal interviews.
2. Formative Assessment:
    - Formative assessment is carried out at specific intervals during the academic term, aimed at evaluating students' progress in different subjects.
    - This type of assessment involves tests, assignments, and short projects.
3. Continuous Assessment:
    - Continuous assessment is conducted throughout the academic term to constantly evaluate students' development in understanding and skills.
    - This type of assessment includes student participation in class discussions, group activities, report submissions, and term projects.
4. Summative Assessment:
    - Summative assessment is conducted at the end of the academic term or at the end of a course unit, designed to evaluate the comprehensive understanding of the subjects.
    - This type of assessment involves final exams, large-scale projects, and individual research work.
5. Self-Assessment:
    - Self-assessment encourages students to evaluate their own performance and understanding of the material, and can be part of the continuous assessment process.
    - Students can use concepts like self-observation and personal reporting to evaluate their progress and identify strengths and weaknesses.
6. Participation-Based Assessment:

- Participation-based assessment involves evaluating students' performance during class discussions, workshops, and group projects.
- This type of assessment focuses on the level of participation, interaction, and collaboration among students.

The implementation of these diverse assessment methods across all stages of a geology program helps to provide a comprehensive and balanced evaluation of students' performance and understanding of the subjects, thereby achieving learning objectives.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof. Salam Ismail Marhoon	• Geologist	• Stratigraphy and Fossils			44	
Prof. Eyad Ali Hussein Ali	• Geologist	• Stratigraphy and Fossils				
Prof. Aysar Muhammad Abdulhussein	• Geology	• Hydrogeology				
Prof. Hamed Hassan Abdullah	• Geologist	• Engineering Geology				
Prof. Saleh Muhammad Awad	• Earth Science	• Geochemistry				
Prof. Ali Maki Hussein Al-Rahim	• Geology	• Geophysics				
Prof. Qusay Yassin Salman	• Geology	• Water Resources				
Prof. Kamal Kareem Ali	• Geologist	• Geophysics				
Asst. Prof. Afrah Hassan Saleh	• Geologist	• Stratigraphy and Fossils				
Asst. Prof. Buraq Adnan Hussein	• Earth Science	• Petroleum Geology				
Asst. Prof. Inam Juma Abdullah	• Geologist	• Geochemistry				
Asst. Prof. Sahar Younis Jassim	• Geologist	• Organic Fossils				
Asst. Prof. Firas Muzafar Abdulhussein	• Geologist	• Geochemistry				
Asst. Prof. Mahmoud Abdulamir Salman	• Earth Science	• Structural Geology				
Asst. Prof. Murtadha Jabbar Issa	• Geologist	• Geochemistry				
Asst. Prof. Mayson Omar Ali	• Geologist	• Rocks and Minerals				

Asst. Prof. Najah Abdulhassan Abd	• Geologist	• Geophysics/Sismology				
Asst. Prof. Shatha Fathi Hassan	• Earth Science	• Engineering Geology				
Asst. Prof. Mustafa Ali Hassan	• Geologist	• Hydrogeochemistry				
Asst. Prof. Luay Sameer Shakir Al-Dujaili	• Geologist	• Fossils				
Lect. Atheer Eidan Khalil	• Earth Science	• Geomorphology and Structural Analysis and Remote Sensing				
Lect. Ahmed Kazim Obeid	• Geologist	• Tectonic Geology				
Lect. Anwar Kazim Musa	• Geologist	• Stratigraphy and Fossils				
Lect. Eman Ahmed Muhammad Ali	• Geologist	• Water Resources				
Lect. Osama Saad Sahib Al-Saadi	• Geologist	• Geophysics				
Lect. Ban Salah Mustafa	• Geologist	• Geophysics				
Lect. Thamer Abdullah Mahdi	• Geologist	• Stratigraphy with Petroleum Applications				
Lect. Jinan Mansour Koreel	• Geological Sciences	• Structural Geology				
Lect. Harith Ismail Mustafa	• Geology	• Rocks and Minerals				
Lect. Thaer Thamer Al-Taif Abdulrahman	• Geologist	• Engineering Geology				
Lect. Yasmeen Khudair Ibrahim	• Geologist	• Fossils				
Lect. Rasha Fawzi Faisal	• Earth Science	• Petroleum Geology				
Lect. Rana Abbas Ali	• Geology	• Geochemistry				
Lect. Zainab Dhamad Hassan	• Physical Geography	• Geomorphology and Remote Sensing				
Lect. Safaa Adeeb Saleh Mahdi	• Geologist	• Rocks and Minerals				
Lect. Emad Jassim Muhammad	• Computer Science	• Networks				
Lect. Omar Fityan Rasheed	• Computer Science	• Network Security				
Lect. Lamees Nizar Abdul Kareem	• Geology	• Seismic Geophysics				
Lect. Hasan Katoof Hasem	• Earth Science	• Rocks and Minerals				
Lect. Muhammad Hassan Nasser	• Geology	• Engineering Geology				
Lect. Moayad Jassim Rasheed	• Geology	• Geomorphology				
Lect. Hiba Saadoun Mohsen Jassim	• Earth Science	• Petroleum Geology				

Lect. Hind Fadel Abdullah	• Earth Science	• Water Resources				
Asst. Lect. Abdullah Adel Ibrahim	• Computer Science	• /				

12.Professional Development

Mentoring new faculty members

The process for guiding new, visiting, full-time, and part-time faculty members at the institutional and departmental level includes the following steps in brief:

1. Providing an introduction to the institution and department: A comprehensive introduction is given about the institution, its educational environment, goals, and institutional values, along with an explanation of the department's role in achieving these goals.
2. Orientation on policies and procedures: Administrative and academic policies and procedures related to teaching, research, and community service are explained, including evaluation and promotion procedures, handling student matters, and more.
3. Providing academic and teaching support: Support and guidance are offered on curriculum development, lesson planning, use of educational technology, and implementation of modern teaching methods.
4. Introducing available resources: Highlighting the resources available to faculty members, such as libraries, laboratories, research facilities, funding opportunities, and ongoing training.
5. Social and cultural orientation: This includes guidance on university life and cultural and social activities within the institution and the local community, including cultural, sports, and social events.
6. Offering networking and socialization opportunities: Encouraging the building of networks and collaboration among new and existing faculty, students, and administrative staff to foster communication and share experiences.

These are the main steps followed in guiding new, visiting, full-time, and part-time faculty members at the institutional and departmental level. They aim to provide an educational and supportive environment, encourage constructive interaction, and ensure the continuous development of new faculty members.

Professional development of faculty members

The academic and professional development plan for faculty members includes several key elements:

1. Offering Workshops and Training Courses: Workshops and training courses are organized to develop faculty members' skills in modern teaching and learning areas, such as educational technology, assessment techniques, and active teaching.
2. Individual Mentoring and Critical Review: Individual mentoring sessions and critical reviews of faculty performance are provided, focusing on strengthening their skills, addressing weaknesses, and identifying opportunities for improvement.
3. Participation in Conferences and Seminars: Faculty members are encouraged to participate in local and international conferences, workshops, and seminars to exchange experiences and ideas, and to benefit from new developments in the field.
4. Research and Academic Publication: Faculty members are encouraged to continue scientific research and publish results in peer-reviewed journals, which enhances their professional development and contributes to the overall quality of education.
5. Participation in Community Service Activities: Faculty members are encouraged to engage in community service activities and collaborate with external institutions, extending their impact and enriching their professional development.
6. Continuous Evaluation and Feedback: Continuous evaluation of faculty performance is conducted, along with regular feedback to help improve their performance and develop their skills.
7. Providing Technical and Advisory Support: Technical and advisory support is offered to faculty members in various areas such as instructional design, curriculum development, and the use of technology in education.

Implementing these strategies helps to develop faculty skills and competencies, enhancing their academic and professional performance, thereby contributing to improving the quality of education and learning within the institution.

13.Acceptance Criterion

The college admission criteria typically involve a set of systems and procedures related to application and enrollment:

1. Academic Requirements: These requirements include the necessary academic qualifications for college admission, such as a high school diploma or its equivalent, and prior academic results.
2. Student Application Form: Applicants must submit a student application form containing personal and academic information, along with any additional required information.
3. Health and Behavioral Standards: School or university rules may include health and behavioral standards that applicants must adhere to.
4. Application Deadlines: The institution or college sets deadlines for submitting admission applications, and applicants must comply with them.
5. Tuition Fees and Financial Aid: Applicants should understand the tuition fees and the available options for financial aid or student loans.

14.The most important sources of information about the program

The key sources of information about the academic program in the Geology Department at the College of Science, University of Baghdad, include:

1. University Website:
    - The university's website provides comprehensive information about the available academic programs and the requirements for applying and enrolling in the College of Science, including Geology.
2. College Website:
    - The college's website contains detailed information about the Geology program, such as curriculum plans, requirements, and the courses offered.
3. Academic Program Handbook:
    - An academic program handbook for Geology is available, which contains detailed information about the curriculum, requirements, and academic opportunities.
4. Campus Visits:
    - Prospective students interested in enrolling in the Geology program can visit the campus and talk to department officials, faculty members, and current students to gather additional information.
5. Direct Communication:

- Students can directly communicate with the department administration or academic advisors to request additional information and answer their queries.

6. Social Media Platforms:
    - The university or college's social media accounts may offer useful information and opinions from current students about the academic program.
7. Student Forums:
    - Students can explore online student forums to gain insights and opinions from past and current students about the Geology program.

By using these various sources, students can obtain comprehensive information about the academic program in the Geology Department at the College of Science, University of Baghdad, and make an informed decision about applying and enrolling.

15.Program Development Plan

Vision: To be a leading Geology department in geology education and research at the national and regional levels, and to contribute to graduating outstanding alumni who will play a role in advancing our society and understanding the natural world.

Goals:

1. Updating the Curriculum:
    - Review and update the curriculum to keep pace with scientific and technological developments in the field of geology.
    - Add new courses that reflect current challenges and needs in the field of geology.
2. Enhancing Practical Experiences:
    - Provide more opportunities for hands-on learning through field trips, workshops, and advanced laboratory experiments.
    - Invest in virtual reality and augmented reality technologies to enhance the learning experience.
3. Strengthening Scientific Research:
    - Provide financial support and resources for scientific research in various fields of geology.
    - Encourage faculty and students to participate in conferences and publish research in scientific journals.
4. Enhancing Industry Engagement:

- Develop partnerships with private sector companies and institutions to provide training and employment opportunities for students.
- Organize seminars and workshops in collaboration with industry to share knowledge and promote interaction.

5. Developing Personal and Social Skills:
    - Provide training programs aimed at developing personal skills such as leadership, communication, and problem-solving.
    - Promote teamwork and social interaction through collaborative projects and cultural and social activities.

Proposed Actions:

1. Establish an Academic Development Committee responsible for implementing the plan and monitoring progress.
2. Form specialized working groups to update the curriculum and provide recommendations.
3. Provide continuous training for faculty on the latest teaching and research methods.
4. Launch marketing campaigns to attract talented and interested students to geology.
5. Offer academic support programs for students to enhance their academic success and help them achieve their career goals.

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
Level 1		• Crystallography	Basic	√				√				√			
		• General Geology (1)	Basic	√	√	√	√	√	√	√		√			
		• Human Rights	Basic												
		• Chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
		• Arabic Language	Basic	√	√	√	√	√	√	√	√	√	√	√	√
		• Mathematics (1)	Basic												
		• Computer Science (1)	Basic												
		• Mineralogy	Basic	√				√				√			
		• General Geology (2)	Basic	√	√			√							
		• Freedom and Democracy	Basic												
		• Physics	Basic												
		• English Language	Basic												
		• Mathematics (2)	Basic												
		• Computer Science (2)	Basic												
Level 2		• Geomorphology	Basic	√	√	√	√	√	√			√	√	√	√

		• Invertebrate Fossils (1)	Basic	√	√	√		√	√	√					
		• Optical Mineralogy	Basic	√				√							
		• Structural Geology (1)	Basic	√				√				√			
		• Computer Science (1)	Basic												
		• Mathematics	Basic												
		• Remote Sensing	Basic	√	√	√	√	√	√						
		• Invertebrate Fossils (2)	Basic	√	√	√		√	√	√					
		• Petrology	Basic	√	√			√	√	√		√	√		
		• Structural Geology (2)	Basic	√	√			√				√			
		• Computer Science (2)	Basic												
		• Statistics	Basic												
		• English Language	Basic												
Level 3		• Igneous Petrology	Basic	√				√				√			
		• Sedimentology	Basic												
		• Stratigraphy	Basic	√	√	√	√	√	√	√	√	√	√	√	√
		• Geophysics (1)	Basic	√				√				√			
		• Micropaleontology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
		• Geotectonics	Basic	√	√	√	√	√	√	√		√	√	√	√
		• Metamorphic Petrology	Basic	√				√				√			
		• Sedimentary Petrology	Basic	√	√			√	√			√	√	√	
		• Geology of Iraq	Basic	√				√				√	√		
		• Geophysics (2)	Basic	√				√				√			

		• Paleoecology	Basic	√				√				√			
		• Field Geology	Basic	√	√	√		√	√			√	√	√	
		• English Language	Basic	√				√				√			
Level 4		• Geochemistry	Basic	√	√	√	√	√	√	√		√	√	√	√
		• Subsurface Geology	Basic	√				√				√			
		• Environmental Geology	Basic	√	√	√	√	√	√	√	√	√	√		
		• Engineering Geology	Basic	√	√	√	√	√	√	√		√	√		
		• Isotope Geology	Optional	√	√	√		√	√			√	√	√	
		• Desertification	Optional												
		• Petroleum Geology	Basic	√				√				√			
		• Water Resources	Basic	√	√	√	√	√	√			√	√	√	
		• Gravity Exploration	Optional	√	√	√	√	√	√	√		√	√	√	
		• Ground Penetrating Radar	Optional												
		• Signal Processing	Optional	√	√	√	√	√	√	√	√	√	√	√	√
		• Environmental Population	Basic	√	√			√	√			√	√		
		• Ore Geology	Basic												
		• Biomarker	Optional	√	√	√	√	√	√	√	√	√	√	√	√
		• English Language	Basic												

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

Course Description Form

Physical Geology – First Stage / First Semester

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**physical geology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**GEO-3524**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	**Assistant ProfessorMustafa Ali Hassan**		**e-mail**	Dr.musstafali@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Mohammad Hassan		**e-mail**	Mohammad Hassan @sc.uobaghdad.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	06/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	physical geology	**Semester**	١
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-. Physical geology is defined as one of the branches of earth science that specializes in the study of the solid, non-living features of the planet Earth and other planets. It is done by studying the various rocks, minerals and materials that formed the earth and the processes related to it through time, and employing scientific tools and combined techniques to find out the approximate ages of the rocks on and in the earth's interior, and using this information to determine the history of the earth and the terres it passed through. 2- Providing students with an appropriate amount of information and expertise in the field of geoscience in a functional manner that contributes to the acquisition of a scientific culture

	and contributes to academic preparation and helps them to identify the natural resources in their country
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Gaining the ability and skill in field interpretation and deduction. 2- Acquiring the skill of distinguishing between different geological features. 3- Dealing with the basic laws of various earth sciences. 4-Using the principle of the past is key to the present
Indicative Contents المحتويات الإرشادية	1-. Physical geology is defined as one of the branches of earth science that specializes in the study of the solid, non-living features of the planet Earth and other planets. It is done by studying the various rocks, minerals and materials that formed the earth and the processes related to it through time, and employing scientific tools and combined techniques to find out the approximate ages of the rocks on and in the earth's interior, and using this information to determine the history of the earth and the terres it passed through. 2- Providing students with an appropriate amount of information and expertise in the field of geoscience in a functional manner that contributes to the acquisition of a scientific culture and contributes to academic preparation and helps them to identify the natural resources in their country 3-Gaining the ability and skill in field interpretation and deduction. 4- Acquiring the skill of distinguishing between different geological features. 5- Dealing with the basic laws of various earth sciences. 6-Using the principle of the past is key to the present

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Fieldwork and Hands-on Experience. Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 2. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. Use geological maps to demonstrate the distribution and relationships between different rock units and incorporate stratigraphic columns to illustrate the vertical succession of strata. 3. Virtual Resources: Take advantage of virtual resources, such as interactive online modules, virtual field trips, and digital simulations. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 4. Case Studies and Real-life Examples 5. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of rock samples, including the identification of lithology, sedimentary structures, and fossil content. Encourage students to create stratigraphic logs or cross-sections based on the laboratory data, promoting critical thinking. 6. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data, or interpret stratigraphic information. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 7. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts, illustrate geological processes, and provide additional visual and auditory learning opportunities. . 8Continuous Assessment and Feedback: Implement regular assessments, such as quizzes, assignments, or class discussions, to gauge student understanding and provide timely feedback. This allows students to monitor their progress, identify areas of improvement, and reinforces learning.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٧٩	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٧١	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٥٠		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction- physical geology
Week 2	The importance of geology A brief summary of history of geology
Week 3	Branches of the geology Relationship between geology and other sciences
Week 4	The earth and the Solar System
Week 5	Crystals and crystallography(Crystals: (Introduction, Lattices Crystal, Crystals properties)
Week 6	Crystal symmetry,

	Elements of symmetry, Crystallographic axes, Crystal systems, System of the crystals)
Week 7	Crystals and crystallography(Crystals: (Introduction, Lattices Crystal, Crystals properties)Crystal symmetry, Elements of symmetry, Crystallographic axes, Crystal systems, System of the crystals)
Week 8	**Midterm Exam**
Week 9	Minerals: (Introduction, Minerals groups, Physical properties of minerals,) Economic use of Minerals
Week 10	Petrology I Igneous rocks (Introduction to
Week 11	Petrology II Sedimentary rocks (Introduction to sedimentary rocks, Types of sedimentary rocks,Sedimentary environments
Week 12	Petrology III Metamorphic rocks (Introduction to metamorphic rocks, Agents of metamorphism, Textural and mineralogical changes)
Week 13	Surface Water
Week 14	Groundwater
Week 15	**Weathering and soil**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Crystals
Week 2	Lab 2: Crystals properties
Week 3	Lab 3: Crystal symmetry, Elements of symmetry, Crystallographic axes, Crystal systems, System of the crystals
Week 4	Lab 4 Crystal symmetry, Elements of symmetry, Crystallographic axes, Crystal systems, System of the crystals
Week 5	Lab 5: Crystal symmetry, Elements of symmetry, Crystallographic axes, Crystal systems, System of the crystals

Week 6	Lab 6: Physical properties of minerals
Week 7	Lab 7: Physical properties of minerals
Week 8	Lab 8: Minerals groups
Week 9	Lab 9 Igneous rocks
Week 10	Lab 10: Igneous rocks
Week 11	Lab 11: Sedimentary rocks
Week 12	Lab 12: Sedimentary rocks
Week 13	Lab 13: Metamorphic rocks
Week 14	Lab 14 Metamorphic rocks
Week 15	Lab 15 Comprehensive laboratory review

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Physical Geology First University of Saskatchewan Edition, 102٩ 1. ٢. Physical geology–Laboratory manuals.	Yes

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (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 (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: Marks 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.

Crystallography – First Stage / First Semester

Module Information

معلومات المادة الدراسية

Module Title	**Crystallography**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**GEO-112**		
ECTS Credits	**7**		
SWL (hr/sem)	**175**		
Module Level	1	**Semester of Delivery**	5
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Hasan Kattoof Jasim	**e-mail**	Hasan.jasim@sc.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	21/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Crystallography	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Crystals aims to define how minerals crystallize in nature and what are the methods of crystallization that occur in nature through which minerals will be formed and these minerals will form rocks in nature Training students on how to take field models and convert them into applied products used in making geological maps. 2. Training students to identify the types of bodies that crystals take upon crystallization, and try to benefit from them in diagnosing minerals

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Gain experience in the process of studying the shapes of crystals. 2. Attempting to diagnose crystal parts and crystal systems. 3. Training to identify the elements of symmetry in the crystal 4. Benefit from the study of crystallography and its use in the processes of diagnosing minerals
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. We have introduced you to the basic principles of crystallography . Let us now summarize what you have learned in this unit; 1- Crystallography aims to know how and how crystals are formed in nature 2- Crystallography is closely related to mineralogy, as it is considered one of the branches of mineralogy, and this science is important, especially in mineral diagnostic processes that have many applications, especially in the classification of rocks, as well as the diagnosis of minerals of economic importance 3- Crystallography has many important applications, especially in the detection and determination of crystalline and amorphous chemical substances

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to learning and teaching crystallography , it is important to employ various strategies that cater to different learning styles and maximize understanding and retention. Here are some effective learning and teaching Crystallography : 1- Identify the models of crystals that are used in the laboratory and their relationship with real crystals of minerals in nature 2- Understand the ways in which minerals crystallize, which will vary according to the processes by which the types of igneous, sedimentary, and metamorphic rocks are formed. 3- After understanding the crystallization processes and the different bodies and shapes of the crystals, the link is made with the crystals of natural minerals, which will be seen in field work and in nature sometimes. 4- Absorbing and understanding crystallography will have many industrial and economic applications, as it is possible to go to what is known as industrial minerals and how to crystallize them in a laboratory.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٦٦	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٧٥		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Crystallography
Week 2	Methods of Crystallization
Week 3	Form and Habits of Crystals
Week 4	Parts of Crystals
Week 5	Symmetry of Crystals
Week 6	Face intercepts
Week 7	32 Crystal Classes
Week 8	**Midterm Exam**
Week 9	Triccinic and monoclinic Systems
Week 10	Orthorhombic and tetragonal Systems
Week 11	Hexagonal and Trigonal Systems

Week 12	Cubic System
Week 13	Streographic Projection of Crystals
Week 14	Crystal Drawings
Week 15	Internal Structure of Crystals
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Crystallography
Week 2	Lab 2: Parts of Crystals
Week 3	Lab 3: Crystallographic Systems
Week 4	Lab 4: Symmetry of Crystals, Elements and Operation of Crystals
Week 5	Lab 5: Forms of Crystals
Week 6	Lab 6: 32 Crystal Classes
Week 7	Lab 7: Pinacoidal Class – Triclinic System
Week 8	Lab 8: Prismatic Class – Monoclinic System
Week 9	Lab 9: Orthorhombic Dipyramidal Class – Orthorhombic System
Week 10	Lab 10: Ditetragonal Dipyramidal Class – Tetragonal System
Week 11	Lab 11: Dihexagonal Dipyramidal Class – Hexagonal System
Week 12	Lab 12: Scalenohedral class – Trigonal System
Week 13	Lab 13: Hexaoctahedreal Class – Cubic System
Week 14	Lab 14: Hexahetraderal Class – Cubic System
Week 15	Lab 15: Diploidal Class – Cubic System

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**Philip, F. C., 1971,** An Introduction to Crystallography, 4th edition, Longman Group Ltd, United Kingdom, 349P.	Yes
Recommended Texts	**Al-Kufaishi, F, A,. and Mahmood, M, M,.1989,** Crystallography, Mosul University Prints, (In Arabic), 352P.	Yes
Websites	www.Mindat.com	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (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 (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: Marks 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.

Computer – First Stage / First Semester

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Computer Skills I**	**Module Delivery**	
Module Type	**Basic**	☐ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code			
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	**Semester of Delivery**	
Administering Department	Computer Science	**College**	College of Science
Module Leader	Mela Ghazi Abdul-Haleem	**e-mail**	a.mela@sc.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc
Module Tutor		**e-mail**	
Peer Reviewer Name	Dr. Assmaa A. Fahad	**e-mail**	Assmaa.fahad@sc.uobaghdad.edu.iq
Scientific Committee Approval Date	11-6-2023	**Version Number**	1.0

Relation with other Modules
العالقة مع المواد الدراسية ألخرى

Prerequisite module	None	**Semester**	/
Co-requisites module	None	**Semester**	/

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات اإلرشادية

Module Objectives أهداف المادة الدراسية	• This module sets out essential concepts and skills relating to the use of devices. • This module covers the key skills and main concepts relating to computers, devices, file creation and management, web browsing, and data security. • Help students to demonstrate the ability to use word processing application to accomplish everyday tasks associated with creating, formatting, finishing small-sized word processing documents, such as letters and other everyday documents. • Help students to demonstrate the ability to use a power point application to accomplish tasks associated with creating, and formatting a presentation. • Help students to demonstrate the ability to use Excel application to accomplish a spreadsheet for tasks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of the course, a student will be able to: 1. Understand key concepts relating to computers, devices and software. 2. Identify the main types of Integrated and External equipment 3. Understand concepts of online communities, communications and e-mail 4. Adjust the main operating system settings and use built-in help features. 5. Know about the main concepts of file management and be able to efficiently organize files and folders. 6. Create a report by Ms. Word document and print an output. 7. Use University email to Collaborate inside and outside university and How to participate in video conference using meet 8. Create a presentation using power point application. 9. Create a spreadsheet using Excel application.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: - The general purpose computer model: All types of computers follow the same structure and perform the basic operations (Input, Processing, Output, Storage and controlling) to converting raw input (data) to information. - Components of a computer Hardware: Each computer consists of Hardware and software. The Hardware includes input devices, output devices, system units, storage devices, and communication devices. - System Units (Internal & External components of system units): The internal component of the system units is consists of (CPU, Motherboard, RAM, Ports, Hard disk …). - Central Processing Unit: ALU, CU, and memory unit. - Memory and its Types ▪ Cache Memory ▪ Primary memory –Comparison between RAM & ROM ▪ Secondary Storage - Ports and their types (Ports: is a connection points used as an interface between the computer and its peripheral devices (Serial ports, Parallel ports, PS/2, USB, VGA …)). - Input Devices (Keyboard, Mouse, …) - Output Devices (Printer, speaker, monitors, …) - Software Types of Software ▪ Operating System (Windows, Linux, …) ▪ Application Software & their types ▪ Programming Languages (Low, Assembly, High level). - Internet, Benefits, Browsing the Web (Web Browser) , Search the web (search
	engine) - Communication Technology: It plays an important role in almost every activity that we performed. The best examples of Communication technology includes: blogs, Web sites, live video, social media technology, and E-mail communication. - E-mail: free e-mail providers (G-mail, Yahoo-mail, …), send and receive E-mail operation, send e-mail with attachment, checking the e-mail boxes (inbox, send box, spam …). - Security and keeping information safe: protect the information from unauthorized access and prevent use, modification, and destruction of this information. - Virus transmission ways to the computer: by e-mail, Downloading from the Internet, Pirated software, Exchange of diskettes, in attached e-mail, and in documents. - Protection against viruses: install good anti-viruses. - Antivirus, benefits and Types Introduction to windows - Desktop Components: (Icons, Start, task bar …) - The start menu (its functions and properties) …

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. Different forms of teaching will be used to reach the objective of this module, including power point presentation for the subjects which contains titles, definitions, summary and conclusions, whiteboard will be used and classroom discussion with assignments, the students will be asked to prepare papers on selective topics.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ٥١ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خالل الفصل	62	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خالل الفصل	13	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خالل الفصل	**75**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10	6 and 10	(1), (2), (3), (4), (5), (8), (9)
	Assignments	2	10	11 and 13	
	Projects / Lab.	1	10	Continuous	All
	Report	1	10	10	
Summative assessment	**Midterm Exam**	2hr	10	8	#1-7
	Final Exam	3hr	50	16	All
Total assessment			100 Marks		

Delivery Plan (Weekly Syllabus)
المنهاج االسبوعي

	Material Covered

Week 1	Introduction to Computers – definition -The purposes of using a computer. -The general purpose computer model. -The difference between Data and Information concepts. Introduction to windows - Desktop Components - The start menu (its functions and properties)
Week 2	The Components of a computer: Hardware - System Units (Internal & External components of system units) - Central Processing Unit (Features and components) Windows: - Task bar and its functions and properties
Week 3	- Memory and its Types ▪ Cache Memory ▪ Primary memory –Comparison between RAM & ROM ▪ Secondary Storage Windows: - Files and Folders: All operations on files and folders (selection, creation, saving, moving and renaming.
Week 4	Ports and their types - Input Devices, - Output Devices Windows: - Delete Files. - Recycle bin. - Creating a Shortcut. - Desktop Icons. - The Windows Explorer Views. - Sort files.

Week 5	- Software Types of Software ▪ Operating System ▪ Application Software & their types Programming Languages Windows: -Customizing the desktop. -Change screen resolution. - Change Desktop Background
Week 6	- Communication Technology - E-mail Windows: - Print Screen - Cleaning Up the Disk - Defragmenting the Disk **Quiz (1, 2, 3, 4, 5) -Windows only**
Week 7	- Internet, Browsing the Web (Web Browser) , Search the web (search engine) - Security and keeping information safe -Virus transmission ways to the computer -Protection against viruses -Antivirus, benefits and Types
Week 8	**Mid Exam**

Week 9	Microsoft Word - - Word Program Interface -Keyboard Shortcuts in Microsoft Word -The operations on Text - File Menu Home Tab & it commands - Insert Tab (Pages & tables Groups) - Table Tools
Week 10	Microsoft Word - Insert Tab (Illustrations, Header & Footer, Text and Symbols Groups) - Page Layout, References, Review Tabs **Quiz (Week 8, 9)**
Week 11	Microsoft PowerPoint - PowerPoint program Interface. - File Menu - Home Tab & it commands - Operations on the Slides (duplicate, Delete, and Move)
Week 12	Microsoft PowerPoint - Insert Tab, Design Tab, Slide Show Tab and their commands - Transitions, and Animations Tabs
Week 13	Microsoft Excel - File Menu, Home Tab & it commands
Week 14	Microsoft Excel - Excel Worksheet Basics - Cell format
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. M. E. Vermaat and G. B. Shelly, *Discovering Computers Fundamentals: Living in a Digital World*, Shelly Cashman, 2011 Edition. 2. J. Lambert, J. Cox , and C. Frye, *Microsoft Office Professional 2010 Step by Step* , 1'st Edition, Microsoft Press, 2010, 152P.	E-Copy
Recommended Texts	D. Hajek and C. Herrera***, Introduction to Computers 2022 Edition,*** Independently published, May 19, 2022, 255P.	NO
Websites	1. https://theictbook.com/components-of-the-system-unit-and-their-functions/ 2. https://www.tutorialspoint.com/computer_fundamentals/index.htm 3. https://www.slideshare.net/Jamjolojessa/types-of-application-software?from_action=sav 4. https://www.bbc.co.uk/bitesize/guides/zbfny4j/revision/1 5. https://generalnote.com/Computer-Fundamental/ 6. https://edu.gcfglobal.org/en/word2010/# 7. https://edu.gcfglobal.org/en/powerpoint2010/# 8. https://edu.gcfglobal.org/en/excel2010/# 9. https://antivirus.comodo.com/blog/computer-safety/what-is-antivirus 10. https://thingscouplesdo.com/what-is-the-antivirus-software-that-is-best-for-a-user	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (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 (0 – 49)	**FX** – Fail	(قيد المعالجة)راسب	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks 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.

Optical Mineralogy – Second Stage / First Semester

1. Course Name:
Optical Mineralogy
2. Course Code:
Optical Mineralogy GEO-239
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 45 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lec Dr. Hasan Kattoof Jasim Email: Abdullah.i@sc.uobaghdad.edu.iq **Name: Assit Prof Dr. Maysoon Omer Ali Email: maysoon.ali@sc.uobaghdad.edu.iq** **Name: Lec Dr. Ahmed Kadhum Obaid Email: ahmedobaid@uobaghdad.edu.iq**
8. Course Objectives

Course Objectives	3. Optical Mineralogy aims to introduce the student to this very important science, which has many applications especial the identification the mineral through the polarizing microscopre, as rocks are composed in nature of minerals, and therefore the earth's crust will also be composed of minerals, which will affect many of the events that occur in the earth's crust, as well as the economic importance of minerals, which are included in Lots of industries. 4. Optical Mineralogy is important not only in the study of minerals, but it has many practical applications in the field of medicine, engineering, agriculture and forensics Optical Mineralogy also aims to recognize that minerals are the main source of chemical elements, which are considered the basic element of many sciences, especially chemistry, physics and engineering branches. When it comes to learning and teaching Mineralogy, it is important to employ various strategies that cater to different learning styles and maximize understanding and retention. Here are some effective learning and teaching Mineralogy: 5- Mastering work skills in geological workshops and learning about the types of devices available in them and how to operate them 6- Training and mastering the process of making thin slices of minerals and rocks and getting acquainted with the most important materials needed to manufacture thin slices of minerals and rocks and mastering the manufacturing steps 7- Mastering the process of diagnosing minerals through the optical properties of minerals and the relationship of polarized light to minerals when light penetrates a mineral slice Understanding and comprehending the basic characteristics of each mineral and what is the basic characteristic of the diagnosis through which the move is made to determine the mineral composition of the three types of igneous, sedimentary and metamorphic rocks

9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **1. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **2. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **3. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **4. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **5. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** **6. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **7. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **8. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	• Parts of microscope • Thin section preparation	Introduction to Optical Mineralogy	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	4	• Nature of light • Components of light	The Nature and properties of Light, retardation , vibration , wave length	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	4	• Types of polarized light • Types f polarization	Concept and Methods of Polarization	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	4	• Methods of generation of polarized light	Types of polarized Light	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	4	• Concepts of light refraction • Snell's low	Refraction of Light and Snels Low	Theoretical explanation and practical application.	Interactive participation + Practical exercise

6	**4**	• **Types of polarizers** • **Types of polarizing microscope**	Types of polarizes microscops	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
7	**4**	• **Optical properties**	Optical Poetries	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
8	**4**	• **Middle examination**	Mid Theoretical Examination	**Theoretical explanation and practical application.**	**Practical Exam**
9	**4**	• **Plan polarized light properties** • **Color** • **Peochroism**	Plane Polarized Light Properties Color and peleochroism	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**4**	• **Relief** • **Cleavage** • **Refractive Index**	Relief, Cleavage and Refractive Index	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**4**	• **Form** • **Habit**	Form and Habit of Minerals	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**4**	• **Cross Nichols polarized properties** • **QurtzWedge**	Cross Nichols Polarized light Properties , Quartz Wedges	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**4**	• **Extiction** • **Twining** • **Interference Colors** • **Accessories plates**	Extinction, Twining, Interference Colors, Accessories Plates	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**4**	• **Sign of elongation** • **Interference figures** • **Optical indicatrix**	Sign of Elongation and Interference Figures and Optic Sign , Optical Indicatrix	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**4**	• **Final examination**	**Rock Forming minerals Groups with their main optical properties**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Optical Mineralogy , Keer, 1959**
Main references (sources)	Nesse, 2000. Mineralogy

Recommended books and references (scientific journals, reports...)	Al-shakeri et al, 2016, Optical Properties for Common Rock Forming Minerals
Electronic References, Websites	www.Mindat.com

Geomorphology – Second Stage / First Semester

1. Course Name: Geomorphology

2. Course Code:

3. Semester / Year: First course 2023-2024

4. Description Preparation Date:25-4-2024

5. Available Attendance Forms: Mandatory

6. Number of Credit Hours (Total) / Number of Units (Total) 30 hours

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

Name: Muaid Jassim Rasheed
Email: muayid.j@sc.uobaghdad.edu.iq

8. Course Objectives

Course Objectives	1- This course aims to introduce the student to geomorphology and teach the student how to describe landforms, name them and the reason for their occurrence, and then interpret these geomorphological phenomena. 2- Learn the basic principles of geomorphology. 3- Studying the phenomena of weathering and erosion, their types, and their geomorphological effects on the formation of soil and sediments, their types, and changing geomorphological forms. Studying the phenomenon of desertification and the geomorphology of deserts. Study of rivers, river patterns, and valley development.

9. Teaching and Learning Strategies

Strategy	1-Teaching through lectures with the help of a white board and a projector. 2. Encouraging the student in geomorphological analysis and interpretation. 3. Enabling students to think in theoretical ways. 4. Distinguish and know the geomorphological units and landforms in the satellite image. 5. Acquiring skills in geomorphological thinking. 6. Open discussion.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Theoretical	Introduction	Lectures	Tracking

2	**2**	**Theoretical**	**Concepts of geomorphology**	**Lectures**	**The**
3	**2**	**Theoretical**	**Concepts of geomorphology**	**Lectures**	**Student**
4	**2**	**Theoretical**	**An Analysis of the Geomorphic processes**	**Lectures**	**and**
5	**2**	**Theoretical**	**Geomorphological processes and the impact of climate on them**	**Lectures**	**Role**
6	**2**	**Theoretical**	**Weathering and its kinds and its Significance**	**Lectures**	**The**
7	**2**	**Theoretical**	**Soils ,kinds ,profile .**	**Lectures**	**dissection**
8	**2**	**Theoretical**	**River cycle**	**Lectures**	**And**
9	**2**	**Theoretical**	**Shapes resulting from river meanders**	**Lectures**	**Made**
10	**2**	**Theoretical**	**Landslide**	**Lectures**	**report**
11	**2**	**Theoretical**	**Drainage Patterns and their Significance**	**Lectures**	**And**
12	**2**	**Theoretical**	**River terraces**	**Lectures**	**Exams**
13	**2**	**Theoretical**	**Deserts**	**Lectures**	
14	**2**	**Theoretical**	**Sand dunes**	**Lectures**	

11. Course Evaluation
100 marks for the semester, divided into two monthly exams (60), daily exams (20), and a geomorphology report and its discussion (20).

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**Fundamental of Geomorphology**
Main references (sources)	**Principles of Geomorphology** **Applied Geomorphology**
Recommended books and references (scientific journals, reports...)	**According to the geomorphology titles in the course.**
Electronic References, Websites	**Accessing scientifically websites from Wikipedia or universities (lectures and videos).**

1. Course Name: Geomorphology- practical
2. Course Code:
3. Semester / Year: Semester
4. Description Preparation Date: 1/2/2024
5. Available Attendance Forms: weekly

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

30 practical hours

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

اسم: م.د.زينب ضمد حسن بريد إلكتروني: zainab.hassan@sc.uobaghdad.edu.iq
د.اثير عيدان atheer.khalil@sc.uobaghdad.edu.iq
د.مؤيد جاسم

8. Course Objectives

Course Objectives	**• Supporting cognitive skills related to the concepts and foundations of applied geomorphology and the development of geomorphological thou** **• Introducing the importance of applied aspects in geomorpholo studies.** **• Developing the student's scientific and environmental aspect thr applied treatment of geomorphological problems.** **• Identify methods of analysis and measurement for ap geomorphological studies, developing students' abilities to optimally em geomorphological knowledge in various applied fields.**

9. Teaching and Learning Strategies

Strategy	• The student's ability to analyse, apply and organize knowledge so that he can impose assumptions and interpretation as well as describ solutions. • Ability to learn both simple and deep knowledge exploration and focus on applying knowledge to solve existing problems. • Distinguishing that the test increases the student's motivation towards studying and furthering and is not a means of punishing him. Evaluation methods The department has relied on clear, high-quality evaluation methods and tools for student learning in order to maintain the quality of th graduate and the department's academic reputation. This is embodied in the university's regulations and the requirements for continuous evaluation of students, provided that there are several types of evaluation methods in order to ensure the quality and The quality of the graduate, which constitutes the final outcome of the educational process, and the most important methods of evaluation are: A - Objective tests measure knowledge of scientific facts, their comprehension, application of scientific knowledge in new situations, an measurement of memory, through the following: - • True and false questions. • Multiple choice questions. • Interview questions (matching items). • Completion questions. B-Technical tests related to the following matters:- • Remember facts and figures. • Understanding scientific material and technical principles. • The ability to recall, link and interpret. • Apply knowledge in a simple way to interpret data, diagnose and solve problems. It is done through the following:- • Connection test/open questions:- • Questions that have a specific answer. Questions that do not have a specific answer. Which is based on motivating the student to: • Having the ability to answer freely. • Possessing the skill in organization. • Possessing the skill in arranging ideas. • Do not cheat • The student's ability to analyses, apply and organize knowledge so that he can impose assumptions and interpretation as well as describe solutions. • Ability to learn both simple and deep knowledge exploration and focus on applying knowledge to solve existing problems. • Distinguishing that the test increases the student's motivation towards studying and furthering and is not a means of punishing him. Evaluation methods The department has relied on clear, high-quality evaluation methods and tools for student learning in order to maintain the quality of th graduate and the department's academic reputation. This is embodied in the university's regulations and the requirements for continuous evaluation of students, provided that there are several types of evaluation methods in order to ensure the quality and The quality of the graduate, which constitutes the final outcome of the educational process, and the most important methods of evaluation are: A - Objective tests measure knowledge of scientific facts, their comprehension, application of scientific knowledge in new situations, an measurement of memory, through the following: - • True and false questions. • Multiple choice questions. • Interview questions (matching items). • Completion questions. B-Technical tests related to the following matters:- • Remember facts and figures. • Understanding scientific material and technical principles. • The ability to recall, link and interpret. • Apply knowledge in a simple way to interpret data, diagnose and solve problems. It is done through the following:- • Connection test/open questions:- • Questions that have a specific answer. Questions that do not have a specific answer. Which is based on motivating the student to: • Having the ability to answer freely.

	• Possessing the skill in organization. • Possessing the skill in arranging ideas. • Avoid fraud and confront it

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Introduction to geomorphological maps, demarcation components, and projections	Introductions	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
2	**2**	Learn about drawing scale, its types, and how to calculate the unknown map scale.	Scales	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
3	**2**	How to set coordinates and their sources	Longitude& Latitude	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
4	**2**	Exercises to calculate coordinates using real maps	Longitude& Latitude an exercise	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
5	**2**	How to calculate the bifraction ratio and river density of basins	Stream order& stream density	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
6	**2**	-	EX_1	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
7	**2**	How to reshape the map and the appearance of the Earth's surface to before erosion processes	Generalized	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
8	**2**	Definition of slope, degree of slope, and how to draw slope maps	Slop map	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
9	**2**	How to draw contour maps for various types of terrain	Contour Map an exercise 3	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
10	**2**	How to draw the intersection of rivers with a contour line	.Map with v	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual	Oral and written exam, quiz and mid exam.

				board, and publishing video lectures through the YouTube channel.	
11	**2**	-	EX_2	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
12	**2**	Basic anomalous rules in contour mapping	$_1$"v" rule	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
13	**2**	Rivers intersect with the layers of the earth	$_2$"v" rule	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
14	**2**	-	Final EX_3	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
15	**2**	Mapping from aerial photographs and satellite image	Application	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid 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 textbooks (curricular books, if any)	
Main references (sources)	Aerial photos, satellite visuals, and various maps
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Invertebrate 1 – Second Stage / First Semester

1. Course Name:

Invertebrate Fossils 1/ Second stsge.

2. Course Code:

Invertebrate Fossils 1

3. Semester / Year:

Semester 1 / 2023 - 2024

4. Description Preparation Date:

1 / 10 / 2023

5. Available Attendance Forms:

Theory & Practical Lab Attendance

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

30 Hours / 30 Units

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

Name: Asst.prof.Dr.Afrah H.Saleh **Email: afrah.saleh@sc.uobaghdad.edu.iq**
Name: Asst.Luay S.Sahskir **Email** Luay.shakir@sc.uobaghdad.edu.iq
Name: Dr. Anwar K.Mousa **Email: anwar.mousa@sc.uobaghdad.edu.iq**

8. Course Objectives

Course Objectives	1. This module on individual projects and provides the students more information about the main phylum of animals. 2. Training the student to understand the shapes, modes of preservation, classification, nomenclature of species and genera.. 3. beneficialness the specifying geological time then educing the paleo environment. 4. Acquiring the skill of distinguishing between different geological formations. 5. Dealing with the basic laws of various earth sciences. 6. Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.

9. Teaching and Learning Strategies

Strategy	When it comes to learning and teaching Invertebrate Fossils, it is important to employ various strategies that cater to different learning styles and maximize understanding and retention. Here are some effective learning and teaching strategies for stratigraphy: 1. Hands-on Experience: Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 2. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. 3. Virtual Resources: Take advantage of virtual resources, such as interactive online modules. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 4. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as

	paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of the course. 5. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of samples. Encourage students to the laboratory data. 6. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 7. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts. 8. Allows students to monitor their progress, identify areas of improvement, and reinforces learning. 9.Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	• **Understanding all principles of paleontology.**	Introduction of Paleontology	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
2	**2**	• **Introduction to** Modes of Preservation.	Modes of Preservation	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
3	**2**	• **Understanding the** Rules of species nomenclature & Time Geological.	Rules of species nomenclature & Time Geological Scale	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
4	**2**	• **Understanding** Habit (Mode of life) of marine organisms	Habit (Mode of life) of marine organisms	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
5	**2**	• **Understanding** Taphonomy & Preservation**.**	Taphonomy & Preservation	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
6	**2**	• **Understanding & studying** Foraminifera**.**	Foraminifera	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
7	**2**	• **Introduction to the** Foraminiferal Test, Wall & Aperture	Foraminiferal Test, Wall & Aperture	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
8	**2**	• **Assessing students' understanding of concepts and skills acquired so far.**	**Midterm Exam 1**	**Theoretical explanation and practical application.**	**Practical Exam**

9	**2**	• **Understanding and studying the** Radiolaria**.**	Radiolaria	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**2**	• **Understanding and studying the** Classification of Radiolaria**.**	Classification of Radiolaria	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**2**	• **Understanding and studying the** Phylum of Porifera (Sponge).	Phylum of Porifera (Sponge)	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**2**	• **Understanding** Classification of Porifera (Sponge)	Classification of Porifera (Sponge)	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**2**	• **Understanding and studying the** Phylum Coelentrata (Cnidaria	Phylum Coelentrata (Cnidaria)	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**2**	• **Understanding** Classification of Coelentrata (Cnidaria	Classification of Coelentrata (Cnidaria)	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**2**	**Understanding and studying the Phylum Bryozoa .**	**Phylum Bryozoa**	**Theoretical explanation and practical application.**	**Practical Exam**
16	**2**	• **Evaluation the students.**	**Preparatory week before the final Exam**		

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Fossils and Evolution – The theory and its supporting evidence د. عامر الخفاجي 2. Foraminifera – جوزيف كوشمان 3. principles of paleontology. Moore
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	مبادئ علم المستحاثات او المتحجرات شفيق مهدي

Electronic References, Websites	http://www.sepmstrata.org/page.aspx?pageid=229

1. Course Name:
Invertebrate Fossils 1/ Second stsge.
2. Course Code:
Invertebrate Fossils 1
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Theory & Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst.prof.Dr.Afrah H.Saleh **Email: afrah.saleh@sc.uobaghdad.edu.iq** **Name: Asst.Luay S.Sahskir** **Email** Luay.shakir@sc.uobaghdad.edu.iq **Name: Dr. Anwar K.Mousa** **Email: anwar.mousa@sc.uobaghdad.edu.iq**
8. Course Objectives

Course Objectives	7. This module on individual projects and provides the students more information about the main phylum of animals. **8.** Training the student to understand the shapes, modes of preservation, classification, nomenclature of species and genera.. 9. beneficialness the specifying geological time then educing the paleo environment. 10. Acquiring the skill of distinguishing between different geological formations. 11. Dealing with the basic laws of various earth sciences. **12.** Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.

9. Teaching and Learning Strategies

Strategy	When it comes to learning and teaching Invertebrate Fossils, it is important to employ various strategies that cater to different learning styles and maximize understanding and retention. Here are some effective learning and teaching strategies for stratigraphy: 8. Hands-on Experience: Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 9. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. 10. Virtual Resources: Take advantage of virtual resources, such as interactive online modules. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually.

	11. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of the course. 12. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of samples. Encourage students to the laboratory data. 13. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 14. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts. 8. Allows students to monitor their progress, identify areas of improvement, and reinforces learning. 9.Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding all principles of paleontology.	Introduction of Paleontology	Practical application of models in the laboratory and making reports on each animal phylum for the given sample	Discussing and correcting reports after each laboratory
2	2	Introduction to Modes of Preservation.	Modes of Preservation	=	=
3	2	Determine the reasons for the fossilization process.	causes that lead to fossilization	=	=
4	2	Determine the many phylums of petrified animals.	Identify the different groups of fossilized animal phylum	=	=
5	2	Rules for Time Geological Scale and Species Nomenclature	Rules of species nomenclature & Time Geological Scale	=	=
6	2	determine the habitat (or mode of existence) of marine animals	Habit (Mode of life) of marine organisms	=	=
7	2	Identify to the Phylum of Porifera (Sponge)	Phylum of Porifera (Sponge)	=	=

8	**2**	**Application to hand sample of how to classify the phylum Porifera (Sponge)**	**classification the phylum Porifera (Sponge)**	**=**	**=**
9		**Exam**			
10	**2**	**Identify to Phylum Coelentrata (Cnidaria)**	**Phylum Coelentrata (Cnidaria)**	**Practical application of models in the laboratory and making reports on each animal phylum for the given sample**	**Discussing and correcting reports after each laboratory**
11	**2**	**Application to hand sample of how to classify the phylum Cnidaria**	**Application to hand sample of how to classifiction the phylum Cnidaria)**	**=**	**=**
12	**2**	**distinguish between colonies and individuals of the phylum cnidarian**	**• Study and practical application on how to distinguish between colonies and individuals of the phylum cnidarian**	**=**	**=**
13	**2**	**Phylum Bryozoa**		**=**	**=**
14	**2**	**Classification of Phylum Bryozoa**	**Application to hand sample of how to classify the phylum Bryozoa**	**=**	**=**
15	**2**	**distinguish between colonies and individuals of the phylum Bryozoa**	**• Study and practical application on how to distinguish between colonies and individuals of the phylum Bryozoa**	**=**	**=**

16	**2**	• **Exam**			

11. Course Evaluation

- **- The score of the first semester exam is 15**
- **- The score of the second semester exam is 15**
- **- Reporting score 30**
- **The final practical exam score is 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Fossils and Evolution – The theory and its supporting evidence د. عامر الخفاجي 2. Foraminifera – جوزيف كوشمان 3. principles of paleontology. Moore
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	مبادئ علم المستحاثات او المتحجرات شفيق مهدي
Electronic References, Websites	http://www.sepmstrata.org/page.aspx?pageid=229

Computer 1 – Second Stage / First Semester

1. Course Name:
Computer
2. Course Code:
Computer 2
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)

Name: Lec. Abdallah A. Ibrahim **Email: Abdullah.i@sc.uobaghdad.edu.iq**
Name: Dr. Imad Jasim **Email: emad.j@sc.uobaghdad.edu.iq**
Name: Dr. Omar Fitian **Email: omar.f@sc.uobaghdad.edu.iq**

8. Course Objectives	
Course Objectives	**Teaching the Computer Course in ArcGIS aims to achieve several specific objectives, including:** **13. Understanding the concepts and fundamentals of Geographic Information Systems (GIS): Introducing students to the concepts and principles of GIS, including spatial data components and types of spatial analysis.** **14. Learning to use ArcGIS software: Providing students with the opportunity to learn how to use ArcGIS software, familiarize themselves with its interface, and utilize its various tools for managing geographic data and performing spatial analyses.** **15. Practical applications and applied projects: Providing practical contexts for students to apply what they have learned in projects related to various geographic fields such as urban planning, natural resource management, and environmental analysis.** **16. Geographic data analysis: Developing students' skills in geographic data analysis and using ArcGIS tools to extract spatial information and trends from geographic data.** **17. Creating and designing geographic maps: Enhancing students' abilities to create and design various geographic maps using ArcGIS and customize them to meet the needs of geographic analysis and communication.** **18. Developing research and analytical skills: Encouraging students to use scientific research skills to find and effectively analyze necessary geographic data and produce appropriate results.** **19. Enhancing critical and creative thinking: Stimulating students to engage in critical thinking and innovation in using ArcGIS to solve geographic problems and develop innovative solutions to contemporary geographic challenges.** **Achieving these objectives helps equip students to maximize the benefits of Geographic Information Systems applications in their future professional fields and contribute effectively to solving modern geographic problems.**

9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **9. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **10. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **11. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **12. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **13. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** **14. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **15. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **16. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Understanding the concepts of Geographic Information Systems (GIS) and their significance. • Familiarizing with ArcGIS software and its core components.	Introduction to ArcGIS	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	2	• Introduction to the ArcMap program interface and its components. • Utilizing basic tools in the interface for navigation and editing.	ArcMap - Interface	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• Understanding the types of views in ArcMap and how to switch between them.	ArcMap - Views	Theoretical explanation and practical application.	Interactive participation + Practical exercise

		• Effectively using each type of view.			
4	2	• Understanding different selection methods in ArcMap and using them to select items efficiently.	ArcMap – Selection Methods	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• Understanding layer properties in ArcMap and how to customize and format them.	ArcMap – Layer Properties	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Deepening understanding of layer properties and utilizing more options and customizations.	ArcMap – Layer Properties 2	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	2	• Introduction to the layout view mode in ArcMap and creating map layouts for printing.	ArcMap – Layout View	Theoretical explanation and practical application.	Interactive participation + Practical exercise
8	2	• Assessing students' understanding of concepts and skills acquired so far.	Midterm Exam 1	Theoretical explanation and practical application.	Practical Exam
9	2	• Understanding and using attribute tables in ArcMap.	ArcMap – Attribute Table	Theoretical explanation and practical application.	Interactive participation + Practical exercise
10	2	• Learning to use geoprocessing tools in ArcMap for analysis and processing.	ArcMap – Geoprocessing Tools	Theoretical explanation and practical application.	Interactive participation + Practical exercise
11	2	• Delving deeper into using geoprocessing tools for data analysis.	ArcMap – Geoprocessing Tools 2	Theoretical explanation and practical application.	Interactive participation + Practical exercise
12	2	• Understanding and using the Model Builder tool to create repeatable models for geographic analysis.	ArcMap – Mode Builder	Theoretical explanation and practical application.	Interactive participation + Practical exercise
13	2	• Learning to create raster data layers in ArcMap and customize them.	ArcMap – Creating Vector Layers	Theoretical explanation and practical application.	Interactive participation + Practical exercise
14	2	• Understanding coordinate systems and how to apply and customize them in ArcMap.	ArcMap – Coordinate System	Theoretical explanation and practical application.	Interactive participation + Practical exercise

15	**2**	• **Evaluating students' understanding of new topics and their skills in applying them**	**Midterm Exam 2**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	\
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	\
Electronic References, Websites	**ArcMap Documentation:** https://desktop.arcgis.com/en/documentation/ **My Youtube Channel:** https://youtube.com/playlist?list=PLjfG_oiqCXxpR0PtjwMa3WdpYCIF-92fv&si=9aK_qsLvs1xK7AXX

English Language – Second Stage / First Semester

1. Course Name:
English language
2. Course Code:
3. Semester / Year:
2023/2024
4. Description Preparation Date:
26/4/2024
5. Available Attendance Forms:
2 hours weekly per group
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lamees nazar abdulkareem **Email:** lamees.nazar@sc.uobaghdad.edu.iq
8. Course Objectives

Course Objectives	**Improving students skill in engliish writing and speaking**

9. Teaching and Learning Strategies	
Strategy	**Made discussion between students by asking questions and discuss it in English and also writing in english**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	٢	Present perfect simple Explain the structure of this tense and when to use it with examples	**English language**	**Theoretical explanation**	**Interactive participation**
2	٢	Past perfect simple Explain the structure of this tense and when to use it with examples	**English language**	**Theoretical explanation**	**Interactive participation**
3	٢	Words used with the present perfect ever, never, before	**English language**	**Theoretical explanation**	**Interactive participation**
4	٢	Present perfect continuous	**English language**	**Theoretical explanation**	**Interactive participation**

		Explain the structure of this tense and when to use it with examples			
5	٢	Past perfect continuous Explain the structure of this tense and when to use it with examples	**English language**	**Theoretical explanation**	**Interactive participation**
6	٢	Speaking lesson In this lecture students are divided into two groups and we discuss any geological subject in English to practice their speaking.	**English language**	**Theoretical explanation**	**Interactive participation**
7	٢	Quantifiers: much/many/a lot of	**English language**	**Theoretical explanation**	**Interactive participation**
8	٢	Linking words in writing Define the types of linking word and when to use each word	**English language**	**Theoretical explanation**	**Interactive participation**
9	٢	Writing Lesson Each student chooses a geological subject and the write a short paragraph.	**English language**	**Theoretical explanation**	**Interactive participation**
10	٢	Preposition This lecture include two types of preposition word with different examples	**English language**	**Theoretical explanation**	**Interactive participation**
11	٢	Final exam for the semester			
12					
13					
14					
15					

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)	New Headaway English course

	Joh and Liz Soars
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Petrology – Second Stage / Second Semester

1. Course Name:	
Petrology	
2. Course Code:	
Petrology	
3. Semester / Year:	
Semester 2 / 2023 - 2024	
4. Description Preparation Date:	
01-Feb-2024	
5. Available Attendance Forms:	
Theoretical lecture	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Maysoon Omar Ali **Email: maysoon.ali@sc.uobaghdad.edu.iq**	
8. Course Objectives	
Course Objectives	5. Contribute to the process of scientific progress, raise the level of education, and provide the labor market with graduates to work in all fields of the country's rocks, mineral and environmental investment. 6. Petrology deals with mineralogical and textural parameters for different rock types classification and physical –chemical conditions for the formation of these rocks in with different aspects of parent rocks . Training the student on the most important methods of determining the type of rock depending on mineralogical and textural classification , and the relationship of the rocks to each other this is the key to discovery and development of minerals resources ,and because fundamental principles learned from petrology have applications in modern industry.
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **17. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **18. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **19. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **20. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.**

	21. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications. 22. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively. 23. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning. 24. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks. Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	۲		Introduction to Petrology	Theoretical explanation and practical application.	Theoretical exam and interactive participation
2			Rock forming minerals	Theoretical explanation and practical application.	Theoretical exam and interactive participation
3	2		Igneous rocks	Theoretical explanation and practical application.	Theoretical exam and interactive participation
4	2		Textures of igneous rocks	Theoretical explanation and practical application.	Theoretical exam and interactive participation
5	2		Mineralogy of igneous rocks	Theoretical explanation and practical application.	Theoretical exam and interactive participation
6	2		Bowen Reactionseries	Theoretical explanation and practical application.	Theoretical exam and interactive participation
7	2		Structures of igneous rocks	Theoretical explanation and practical application.	Theoretical exam and interactive participation
8	2		Sedimentary rocks	Theoretical explanation and practical application.	Theoretical exam and interactive participation
9	2		Textures of sedimentary rocks	Theoretical explanation and practical application.	Theoretical exam and interactive participation

10	**2**		**Mineralogy of sedimentary rocks**	**Theoretical explanation and practical application.**	**Theoretical exam and interactive participation**
11	**2**		**Sedimentary structures**	**Theoretical explanation and practical application.**	**Theoretical exam and interactive participation**
12	**2**		**Metamorphic rocks**	**Theoretical explanation and practical application.**	**Theoretical exam and interactive participation**
13	**2**		**Textures and mineralogy of metamorphic rocks**	**Theoretical explanation and practical application.**	**Theoretical exam and interactive participation**
14	**2**		**Structures of metamorphic rocks**	**Theoretical explanation and practical application.**	**Theoretical exam and interactive participation**
15	**2**		**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 textbooks (curricular books, if any)	**Raymond, 2009: The Study of Igneous, Sedimentary and Metamorphic Rocks.**
Main references (sources)	
Recommended books and references (scientific journals, reports...)	**Hyndman: Petrology of Igneous and Metamorphic Rocks**
Electronic References, Websites	**WWW.Geology.com**

Remote Sensing – Second Stage / Second Semester

1. Course Name: Remote Sensing

2. Course Code:

3. Semester / Year: Semester

4. Description Preparation Date: 1/2/2024

5. Available Attendance Forms: weekly

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

30 theoretical hours+ 30 laboratory hours

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

Name:Dr. Zainab dhamad hassan
Email: zainab.hassan@sc.uobaghdad.edu.iq

8. Course Objectives

Course Objectives	**• Supporting cognitive skills related to the concepts and foundation applied geomorphology and the development of Remote Sensing thoug • Introducing the importance of applied aspects in Remote Sensing stu • Developing the student's scientific and environmental aspect thr applied treatment of Remote Sensing problems. • Identify methods of analysis and measurement for applied Remote Se studies, developing students' abilities to optimally employ geomorpholo knowledge in various applied fields.**

9. Teaching and Learning Strategies

Strategy	• The student's ability to analyse, apply and organize knowledge so that he can impose assumptions and interpretation as well as describ solutions. • Ability to learn both simple and deep knowledge exploration and focus on applying knowledge to solve existing problems. • Distinguishing that the test increases the student's motivation towards studying and furthering and is not a means of punishing him. Evaluation methods The department has relied on clear, high-quality evaluation methods and tools for student learning in order to maintain the quality of th graduate and the department's academic reputation. This is embodied in the university's regulations and the requirements for continuous evaluation of students, provided that there are several types of evaluation methods in order to ensure the quality and The quality of the graduate, which constitutes the final outcome of the educational process, and the most important methods of evaluation are: A - Objective tests measure knowledge of scientific facts, their comprehension, application of scientific knowledge in new situations, an measurement of memory, through the following: - • True and false questions. • Multiple choice questions. • Interview questions (matching items). • Completion questions. B-Technical tests related to the following matters:- • Remember facts and figures. • Understanding scientific material and technical principles. • The ability to recall, link and interpret. • Apply knowledge in a simple way to interpret data, diagnose and solve problems. It is done through the following:- • Connection test/open questions:- • Questions that have a specific answer. Questions that do not have a specific answer. Which is based on motivating the student to: • Having the ability to answer freely. • Possessing the skill in organization. • Possessing the skill in arranging ideas. • Do not cheat • The student's ability to analyses, apply and organize knowledge so that he can impose assumptions and interpretation as well as describe solutions. • Ability to learn both simple and deep knowledge exploration and focus on applying knowledge to solve existing problems. • Distinguishing that the test increases the student's motivation towards studying and furthering and is not a means of punishing him. Evaluation methods

	The department has relied on clear, high-quality evaluation methods and tools for student learning in order to maintain the quality of th graduate and the department's academic reputation. This is embodied in the university's regulations and the requirements for continuous evaluation of students, provided that there are several types of evaluation methods in order to ensure the quality and The quality of the graduate, which constitutes the final outcome of the educational process, and the most important methods of evaluation are: A - Objective tests measure knowledge of scientific facts, their comprehension, application of scientific knowledge in new situations, an measurement of memory, through the following: - • True and false questions. • Multiple choice questions. • Interview questions (matching items). • Completion questions. B-Technical tests related to the following matters:- • Remember facts and figures. • Understanding scientific material and technical principles. • The ability to recall, link and interpret. • Apply knowledge in a simple way to interpret data, diagnose and solve problems. It is done through the following:- • Connection test/open questions:- • Questions that have a specific answer. Questions that do not have a specific answer. Which is based on motivating the student to: • Having the ability to answer freely. • Possessing the skill in organization. • Possessing the skill in arranging ideas. • Avoid fraud and confront it

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introducing the student to the basic concepts of remote sensing: electromagnetic radiation, wavelength, electromagnetic spectrum..	Identifying the basic elements of the data collection system in remote sensing	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
2	2	Identifying the atmosphere and the most important processes that occur in it, such as scattering and its types, absorption, and atmospheric windows.	Interaction of electromagnetic radiation with the atmosphere	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
3	2	Identifying models of energy interaction with Earth's surface materials: plants, soil, and water.	Interaction of electromagnetic radiation with the Earth's surface	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
4	2	MID EXAM1	-	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
5	2	Identify the difference between the platform and the sensor and determine the types of satellite orbits and their characteristics.	Platforms and sensors	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
6	2	Identifying the discrimination ability and its types (spatial, spectral, radiative, temporal), pixel size and scale, the concept of digital IMAGE.	Specifications of satellite Image	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
7	2	The difference between a false and true color image, processing visual space with enhancements and correction.	Image processing	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual	Oral and written exam, quiz and mid exam.

				board, and publishing video lectures through the YouTube channel.	
8	**2**	Definition of satellite image classification, with both types of supervised and unsupervised classification.	-	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
9	**2**	Using index and identifying two types of index: vegetative index and water index.	–	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
10	**2**	Illustrating examples of Earth observation satellites, their specifications, and goals: LANSAT, SPOT, Indian Satellite, IKONOS.	Earth observation satellites/sensors	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
11	**2**	General applications for each band and its development according to the type of satellite	-	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
12	**2**	In the field of agriculture, forestry, geology, water and sea ice.	General applications of remote sensing	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
13	**2**	Applications of meteorology, disaster control, oceans, seas, etc. Environmental applications of remote sensing	Environmental applications of remote sensing	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
14	**2**	-	Arab systems for monitoring terrestrial phenomena, development in practical applications in remote sensing	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
15	**2**	MID EXAM2		Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid 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 textbooks (curricular books, if any)	Fundamentals of Remote Sensing Edited and written by Noam Levin November 1999. *Introduction to Environmental Remote Sensing David P. Lusch, Ph.D. Senior Research* Specialist Center for Remote Sensing and GIS Michi State University.
Main references (sources)	Fundamentals of Remote Sensing Edited and written by Noam Levin November 1999.
Recommended books and references (scientific journals, reports…)	All research published on Scopus and accredited journals
Electronic References, Websites	-

1. Course Name: Remote Sensing - practical

2. Course Code:

3. Semester / Year: Semester

4. Description Preparation Date: 1/2/2024

5. Available Attendance Forms: weekly

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

30 practical hours

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

Name:Dr. Zainab dhamad hassan Email: zainab.hassan@sc.uobaghdad.edu.iq
Dr.atheer khalil Edan Email: atheer.khalil@sc.uobaghdad.edu.iq
Dr.muaid jassem.

8. Course Objectives

Course Objectives	**• Supporting cognitive skills related to the concepts and foundatio applied geomorphology and the development of Remote Sensing thoug • Introducing the importance of applied aspects in Remote Sensing stu • Developing the student's scientific and environmental aspect thr applied treatment of Remote Sensing problems. • Identify methods of analysis and measurement in erdas program2014.**

9. Teaching and Learning Strategies

Strategy	• The student's ability to analyse, apply and organize knowledge so that he can impose assumptions and interpretation as well as describ solutions. • Ability to learn both simple and deep knowledge exploration and focus on applying knowledge to solve existing problems. • Distinguishing that the test increases the student's motivation towards studying and furthering and is not a means of punishing him. Evaluation methods The department has relied on clear, high-quality evaluation methods and tools for student learning in order to maintain the quality of th graduate and the department's academic reputation. This is embodied in the university's regulations and the requirements for continuous evaluation of students, provided that there are several types of evaluation methods in order to ensure the quality and The quality of the graduate, which constitutes the final outcome of the educational process, and the most important methods of evaluation are: A - Objective tests measure knowledge of scientific facts, their comprehension, application of scientific knowledge in new situations, an measurement of memory, through the following: - • True and false questions. • Multiple choice questions. • Interview questions (matching items). • Completion questions. B-Technical tests related to the following matters:- • Remember facts and figures. • Understanding scientific material and technical principles. • The ability to recall, link and interpret. • Apply knowledge in a simple way to interpret data, diagnose and solve problems. It is done through the following:- • Connection test/open questions:- • Questions that have a specific answer. Questions that do not have a specific answer. Which is based on motivating the student to: • Having the ability to answer freely. • Possessing the skill in organization. • Possessing the skill in arranging ideas. • Do not cheat • The student's ability to analyses, apply and organize knowledge so that he can impose assumptions and interpretation as well as describe solutions. • Ability to learn both simple and deep knowledge exploration and focus on applying knowledge to solve existing problems. • Distinguishing that the test increases the student's motivation towards studying and furthering and is not a means of punishing him. Evaluation methods The department has relied on clear, high-quality evaluation methods and tools for student learning in order to maintain the quality of th graduate and the department's academic reputation. This is embodied in the university's regulations and the requirements for continuous

	evaluation of students, provided that there are several types of evaluation methods in order to ensure the quality and The quality of the graduate, which constitutes the final outcome of the educational process, and the most important methods of evaluation are: A - Objective tests measure knowledge of scientific facts, their comprehension, application of scientific knowledge in new situations, and measurement of memory, through the following: - • True and false questions. • Multiple choice questions. • Interview questions (matching items). • Completion questions. B-Technical tests related to the following matters:- • Remember facts and figures. • Understanding scientific material and technical principles. • The ability to recall, link and interpret. • Apply knowledge in a simple way to interpret data, diagnose and solve problems. It is done through the following:- • Connection test/open questions:- • Questions that have a specific answer. Questions that do not have a specific answer. Which is based on motivating the student to: • Having the ability to answer freely. • Possessing the skill in organization. • Possessing the skill in arranging ideas. • Avoid fraud and confront it

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Identifying the aerial photograph, its specifications, how to interpret the image, and the foundations of distinguishing between phenomena using stereoscope	Definition of the aerial image, its components, types, the difference between the vertical and the oblique image, the scale of the image	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
2	2	Recognizing space visuals and regions of the electromagnetic spectrum	Definition of the satellite image, its components, specifications, definition of the regions of the electromagnetic spectrum. Introduction to the erdas program	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
3	2	Distinguish visual information, how to draw spectral reflectivity from the spectral curve, and explain the concept of pixels	image information. profile, pixel data, histogram	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
4	2	Determine how to use part of the visual through subtraction operations and learn about its tools	How to subset an image of a regular and irregular area.	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
5	2	How to make Enhancement to satellite image	Enhancement	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
6	2	-	Ex.1	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
7	2	Learn about the basic tools for combining bands to create a satellite image	Layer stack	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing	Oral and written exam, quiz and mid exam.

				video lectures through the YouTube channel.	
8	**2**	Using tools to combine two adjacent satellite image	Mosaic	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
9	**2**	Recognizing the unsupervised classification of satellite image	Unsupervised classification	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
10	**2**	Using the tools of supervised classification and comparison between two types	Supervised classification	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
11	**2**	Conducting geometric correction operations to eliminate geometric distortions	Geometric correction of the image	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
12	**2**	Using evidence and mathematical models to distinguish vegetation and water	Normalized difference vegetation and water index	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
13	**2**	Learn how to combine two image to obtain a more accurate visual with a wide coverage	How to change the overlay of channels, how to combine a multispectral image such as Landsat 30m with an image with high spatial resolution such as SPOT.	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
14	**2**	-	Ex.2	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid exam.
15	**2**	Remote sensing applications	**project**	Presenting the lecture through Microsoft PowerPoint, digital TV (52 inches) + manual board, and publishing video lectures through the YouTube channel.	Oral and written exam, quiz and mid 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 textbooks (curricular books, if any)	Erdas2014 program .
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

Invertebrate 2 – Second Stage / Second Semester

1. Course Name:

Invertebrate Fossils 2/ Second stage.

2. Course Code:

Invertebrate Fossils 2

3. Semester / Year:

Semester 1 / 2023 - 2024

4. Description Preparation Date:

1 / 10 / 2023

5. Available Attendance Forms:

Theory & Practical Lab Attendance

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

30 Hours / 30 Units

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

Name: Asst.prof.Dr.Afrah H.Saleh **Email: afrah.saleh@sc.uobaghdad.edu.iq**
Name: Asst.Luay S.Sahskir **Email** Luay.shakir@sc.uobaghdad.edu.iq
Name: Dr. Anwar K.Mousa **Email: anwar.mousa@sc.uobaghdad.edu.iq**

8. Course Objectives

Course Objectives	20. This module on individual projects and provides the students more information about the main phylum of animals. **21.** Training the student to understand the shapes, modes of preservation, classification, nomenclature of species and genera.. 22. beneficialness the specifying geological time then educing the paleo environment. 23. Acquiring the skill of distinguishing between different geological formations. 24. Dealing with the basic laws of various earth sciences. **25.** Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.

9. Teaching and Learning Strategies

Strategy	When it comes to learning and teaching Invertebrate Fossils, it is important to employ various strategies that cater to different learning styles and maximize understanding and retention. Here are some effective learning and teaching strategies for stratigraphy: 15. Hands-on Experience: Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 16. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. 17. Virtual Resources: Take advantage of virtual resources, such as interactive online modules. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 18. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as

	paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of the course. 19. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of samples. Encourage students to the laboratory data. 20. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 21. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts. 8. Allows students to monitor their progress, identify areas of improvement, and reinforces learning. 9.Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• **Understanding** Phylum Brachiopoda**.**	Phylum Brachiopoda	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
2	2	• **Introduction to** Classification of Brachiopoda.	Classificatio n of Brachiopoda	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
3	2	**Understanding the** Phylum Mollusca	Phylum Mollusca	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
4	2	**Understanding the** Classification of Mollusca	Classification of Mollusca	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
5	2	• **Understanding the** Phylum Mollusca / Class Pelecypoda (Bivalvia)	Phylum Mollusca / Class Pelecypoda (Bivalvia)	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
6	2	• **Understanding & studying** Classification of Class Pelecypoda (Bivalvia) / Oysters & Rudistids	Classification of Class Pelecypoda (Bivalvia) / Oysters & Rudistids	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**

7	**2**	• **Introduction to the** Class Gastropoda	Class Gastropoda	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
8	**2**	• **Assessing students' understanding of concepts and skills acquired so far.**	**Midterm Exam 1**	**Theoretical explanation and practical application.**	**Practical Exam**
9	**2**	• **Understanding and studying the** class cephalopoda	Class Cephalopoda	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**2**	• **Understanding and studying the** Classification of Class Cephalopoda	Classification of Class Cephalopoda	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**2**	• **Understanding and studying the** Phylum Arthropods/ Trilobites	Phylum Arthropods/ Trilobites	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**2**	**Understanding and studying the** Morphology of Trilobites	Morphology of Trilobites	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**2**	• **Understanding and studying the** Phylum Echinodermata	Phylum Echinodermata	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**2**	• **Understanding** Classification of Echinodermata	Classification of Echinodermata	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**2**	**Understanding and studying the Phylum Chordata / Graptolites.**	**Phylum Chordata / Graptolites**	**Theoretical explanation and practical application.**	**Practical Exam**
16	**2**	• **Evaluation the students.**	**Preparatory week before the final Exam**		

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Fossils and Evolution – The theory and its supporting evidence د. عامر الخفاجي 2. Foraminifera – جوزيف كوشمان

	3. principles of paleontology. Moore
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	مبادئ علم المستحاثات او المتحجرات شفيق مهدي
Electronic References, Websites	http://www.sepmstrata.org/page.aspx?pageid=229

1. Course Name:

Invertebrate Fossils 2/ Second stage.

2. Course Code:

Invertebrate Fossils 2

3. Semester / Year:

Semester 1 / 2023 - 2024

4. Description Preparation Date:

1 / 10 / 2023

5. Available Attendance Forms:

Theory & Practical Lab Attendance

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

30 Hours / 30 Units

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

Name: Asst.prof.Dr.Afrah H.Saleh **Email: afrah.saleh@sc.uobaghdad.edu.iq**
Name: Asst.Luay S.Sahskir **Email** Luay.shakir@sc.uobaghdad.edu.iq
Name: Dr. Anwar K.Mousa **Email: anwar.mousa@sc.uobaghdad.edu.iq**

8. Course Objectives

Course Objectives	26. This module on individual projects and provides the students more information about the main phylum of animals. **27.** Training the student to understand the shapes, modes of preservation, classification, nomenclature of species and genera**..** 28. beneficialness the specifying geological time then educing the paleo environment. 29. Acquiring the skill of distinguishing between different geological formations. 30. Dealing with the basic laws of various earth sciences. **31.** Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.

9. Teaching and Learning Strategies

Strategy	When it comes to learning and teaching Invertebrate Fossils, it is important to employ various strategies that cater to different learning styles and maximize understanding and retention. Here are some effective learning and teaching strategies for stratigraphy: 22. Hands-on Experience: Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles.

	23. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. 24. Virtual Resources: Take advantage of virtual resources, such as interactive online modules. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 25. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of the course. 26. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of samples. Encourage students to the laboratory data. 27. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 28. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts. 8. Allows students to monitor their progress, identify areas of improvement, and reinforces learning. 9.Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	• **Understanding** Phylum Brachiopoda**.**	Phylum Brachiopoda	**Practical application of models in the laboratory and making reports on each animal phylum for the given sample**	**Discussing and correcting reports after each laboratory**
2	**2**	• **Introduction to** Classification of Brachiopoda.	Classificatio n of Brachiopoda	=	=
3	**2**	**Understanding the** Phylum Mollusca	Phylum Mollusca	=	=
4	**2**	**Understanding the** Classification of Mollusca	Classification of Mollusca	=	=
5	**2**	• **Understanding the** Phylum Mollusca / Class Pelecypoda (Bivalvia)	Phylum Mollusca / Class Pelecypoda (Bivalvia)	**Practical application of models in the laboratory and making reports on each animal phylum for the given sample**	**Discussing and correcting reports after each laboratory**

6	**2**	• **Understanding & studying** Classification of Class Pelecypoda (Bivalvia) / Oysters & Rudistids	Classification of Class Pelecypoda (Bivalvia) / Oysters & Rudistids	=	=
7	**2**	• **Introduction to the** Class Gastropoda	Class Gastropoda	=	=
8	**2**	• **Assessing students' understanding of concepts and skills acquired so far.**	**Midterm Exam 1**		
9	**2**	• **Understanding and studying the** class cephalopoda	Class Cephalopoda	**Practical application of models in the laboratory and making reports on each animal phylum for the given sample**	**Discussing and correcting reports after each laboratory**
10	**2**	• **Understanding and studying the** Classification of Class Cephalopoda	Classification of Class Cephalopoda	=	=
11	**2**	• **Understanding and studying the** Phylum Arthropods/ Trilobites	Phylum Arthropods/ Trilobites	=	=
12	**2**	**Understanding and studying the** Morphology of Trilobites	Morphology of Trilobites	=	=
13	**2**	• **Understanding and studying the** Phylum Echinodermata	Phylum Echinodermata	=	=
14	**2**	• **Understanding** Classification of Echinodermata	Classification of Echinodermata	=	=
15	**2**	**Understanding and studying the Phylum Chordata / Graptolites.**	**Phylum Chordata / Graptolites**	=	=
16	**2**	• **Evaluation the students.**	**Preparatory week before the final Exam**		
11. Course Evaluation					

- **- The score of the first semester exam is 15**
- **- The score of the second semester exam is 15**
- **- Reporting score 30**
- **The final practical exam score is 40**

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1. Fossils and Evolution – The theory and its supporting evidence د. عامر الخفاجي 2. Foraminifera – جوزيف كوشمان 3. principles of paleontology. Moore
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	مبادئ علم المستحاثات او المتحجرات شفيق مهدي
Electronic References, Websites	http://www.sepmstrata.org/page.aspx?pageid=229

Computer 2 – Second Stage / Second Semester

1. Course Name:	
Computer	
2. Course Code:	
Computer 2	
3. Semester / Year:	
Semester 1 / 2023 - 2024	
4. Description Preparation Date:	
1 / 10 / 2023	
5. Available Attendance Forms:	
Practical Lab Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Lec. Abdallah A. Ibrahim	**Email: Abdullah.i@sc.uobaghdad.edu.iq**
Name: Dr. Imad Jasim	**Email: emad.j@sc.uobaghdad.edu.iq**
Name: Dr. Omar Fitian	**Email: omar.f@sc.uobaghdad.edu.iq**
8. Course Objectives	
Course Objectives	**The objectives of a course teaching the basics of the Python programming language include:** **1. Learning Basic Programming Concepts: Introducing students to fundamental programming concepts such as variables, data types, loops, conditionals, and functions.** **2. Developing Analytical Thinking Skills: Enabling students to develop analytical thinking skills and problem-solving capabilities using Python.** **3. Using Development Tools: Teaching students how to use integrated development environments (IDEs) and other relevant tools for coding and developing with Python.** **4. Creating Simple Programs: Helping students write simple programs using Python, providing a hands-on understanding of the programming process from start to finish.** **5. Encouraging Teamwork: Promoting teamwork by encouraging students to collaborate in small groups to develop coding projects using Python.** **6. Using Python Libraries: Introducing students to essential Python libraries and teaching them how to use these libraries to simplify coding and solve common problems.** **7. Enhancing Applied Understanding: Applying the concepts learned in practical scenarios, such as data analysis or developing simple web applications.** **8. Fostering Self-Learning: Encouraging students to pursue continuous learning and professional development in the field of programming and Python.** **9. Assessing Performance: Using quizzes and practical projects to evaluate students' understanding of the material and their ability to apply the concepts taught in the course.** **By achieving these objectives, students can gain foundational skills in Python and apply them in various contexts.**

9. Teaching and Learning Strategies

Strategy

The teaching and learning strategies to achieve the goals of a course include:

1. **Interactive Lectures and Demonstrations:**
   - **Deliver lectures that include interactive elements such as code demonstrations, live coding, and audience participation to engage students and make learning more dynamic.**
2. **Hands-on Practice:**
   - **Provide students with regular coding exercises and assignments to apply the concepts learned in class. This approach reinforces learning through practice.**
3. **Project-Based Learning:**
   - **Assign project-based tasks that encourage students to work on larger coding projects, allowing them to integrate multiple concepts and develop problem-solving skills.**
4. **Collaborative Learning:**
   - **Organize group activities and collaborative projects to promote teamwork, idea sharing, and peer-to-peer learning. This helps students learn from one another and fosters a sense of community.**
5. **Use of Technology and Tools:**
   - **Introduce students to integrated development environments (IDEs), code editors, and other programming tools to simulate real-world coding environments. This helps students build familiarity with the tools used by professionals.**
6. **Self-Paced Learning Resources:**
   - **Provide access to online resources such as coding tutorials, documentation, and interactive coding platforms to encourage self-paced learning and allow students to explore topics in depth.**
7. **Continuous Feedback and Assessment:**
   - **Implement regular quizzes, code reviews, and feedback sessions to track student progress and provide constructive criticism. This approach helps students identify areas for improvement and build confidence in their skills.**
8. **Problem-Based Learning:**
   - **Create problem-solving scenarios that require students to apply Python programming concepts to solve practical problems, such as building simple algorithms or creating small applications.**
9. **Encouragement of Creativity and Innovation:**
   - **Encourage students to experiment with code and explore creative solutions to problems. This fosters innovation and helps students develop a more flexible approach to programming.**

By integrating these teaching and learning strategies, instructors can create a dynamic and engaging learning environment that helps students achieve the course objectives and build a strong foundation in Python programming.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Understand the basic syntax and structure of Python code. • Learn how to set up a Python development environment. • Write simple Python	Introduction to Python	Theoretical explanation and practical application.	Interactive participation + Practical exercise

		scripts to perform basic tasks.			
2	2	• Learn about different data types in Python (e.g., integers, floats, strings, booleans). • Understand variable assignment and naming conventions. • Implement arithmetic operations using variables.	Python - Variables	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• Understand different types of operations (arithmetic, comparison, logical, etc.). • Use Python operators to manipulate data and variables. • Apply operations to solve simple problems.	Python - Operations	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	2	• Learn about Python lists and their basic properties. • Understand list indexing, slicing, and list comprehensions. • Implement common list operations like append, extend, and pop.	Python - List	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• Understand the structure and use cases of "for" loops in Python. • Use "for" loops to iterate over lists, ranges, and other iterable objects. • Implement "for" loops to solve practical problems.	Python – For Loops	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Learn the syntax and structure of "if" statements in Python. • Understand the use of "elif" and "else" clauses in conditional logic. • Apply "if" statements	Python – If Statements	Theoretical explanation and practical application.	Interactive participation + Practical exercise

		to create branching logic in code.			
7	2	• Understand what dictionaries are and how they differ from lists. • Learn how to create, access, and modify dictionary entries. • Implement dictionary operations like adding, removing, and updating key-value pairs.	Python – Dictionaries	Theoretical explanation and practical application.	Interactive participation + Practical exercise
8	2	• Assessing students' understanding of concepts and skills acquired so far.	Midterm Exam 1	Theoretical explanation and practical application.	Practical Exam
9	2	• Understand the structure and use cases of "while" loops in Python. • Use "while" loops to create repeated logic based on conditions. • Implement "while" loops to solve iterative problems.	Python – While Loops	Theoretical explanation and practical application.	Interactive participation + Practical exercise
10	2	• Learn the structure and benefits of using functions in Python. • Understand how to define and call functions with and without parameters. • Create simple functions to modularize code and improve reusability.	Python – Functions	Theoretical explanation and practical application.	Interactive participation + Practical exercise
11	2	• Understand more complex function concepts like default arguments and variable-length arguments. • Learn about return values and scope within functions. • Implement functions to solve more complex tasks.	Python – Functions 2	Theoretical explanation and practical application.	Interactive participation + Practical exercise

12	**2**	• **Learn the basics of object-oriented programming in Python.** • **Understand how to define classes, attributes, and methods.** • **Create simple classes to represent objects and encapsulate behavior.**	**Python – Classes**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**2**	• **Learning to create raster data layers in ArcMap and customize them.**	**Python – Classes 2**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**2**	• **Understanding coordinate systems and how to apply and customize them in ArcMap.**	**Python – Files and Exceptions**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**2**	• **Evaluating students' understanding of new topics and their skills in applying them**	**Midterm Exam 2**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	\
Main references (sources)	**Python Crash Course**
Recommended books and references (scientific journals, reports...)	\
Electronic References, Websites	**My Youtube Channel:** https://youtu.be/egyyIFlbrvU?si=EVZL-IAJDX3Yw-UP

Igneous Petrology – Third Stage / First Semester

1. Course Name:
Igneous Petrology

2. Course Code:
Igneous Petrology 3
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lec. Dr. Harith Esmaeel Mustaf Email: harith.aljubury@sc.uobaghdad.edu.iq Name: Lec. Dr. Rana Abas Ali Email: Rana.Ali@sc.uobaghdad.edu.iq Name: Ass. Lec. Neaam Omar Farhan Email: neaam.o@sc.uobghdad.edu.iq

8. Course Objectives	
Course Objectives	Teaching the subject of Igneous Petrology, which aims to achieve several specific goals, including: 1. Contributing to the process of scientific progress, raising the level of education, and providing the labor market with graduates to work in all fields of investing in the country's mineral and other geological applications. 2. Training students on how to take field models and convert them into various applied products used in making various geological maps and analyses. 3. Cooperating with state institutions to provide scientific consultations and conduct various tests to complete scientific research in all different geological fields. 4. Conducting scientific research that serves the community in various geological fields
9. Teaching and Learning Strategies	
Strategy	Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including: 25. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects. 26. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills. 27. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively. 28. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills. 29. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications. 30. Continuous assessment: Providing feedback and ongoing assessment of

	student performance to help them improve their performance and achieve learning objectives more effectively. **31. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **32. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Introduction to igneous petrology	Definition of terms and introduction	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	2	• Classification of acidic and intermediate igneous rocks	Diagnosing minerals and calculating their percentages in igneous rocks	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• Classification of mafic and ultramafic igneous rocks	Diagnosing minerals and calculating their percentages in igneous rocks	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	2	• Forms of volcanic and subterranean igneous structures	Studying the forms of subterranean and volcanic igneous rocks appearing on the Earth's surface	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• Fabrics of plutonic igneous rocks	Studying the shapes, size, and distribution of mineral grains that make up rocks and the relationships between them	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Theoretical and practical exam	Midterm Exam 1	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	2	• Plutonic igneous rock textures	Studying the shapes, size, and distribution of mineral grains that make up rocks and the relationships between them	Theoretical explanation and practical application.	Interactive participation + Practical exercise
8	2	• Volcanic igneous rock	Studying the shapes, size,	Theoretical explanation and	Practical Exam

		textures	and distribution of mineral grains that make up rocks and the relationships between them	practical application.	
9	2	• Chemical relationships of the minerals forming igneous rocks	Study of the chemical composition and behavior of chemical elements with each other in magma and during the crystallization process of minerals	Theoretical explanation and practical application.	Interactive participation + Practical exercise
10	2	• Chemical relationships of the minerals forming igneous rocks	Study of the chemical composition and behavior of chemical elements with each other in magma and during the crystallization process of minerals	Theoretical explanation and practical application.	Interactive participation + Practical exercise
11	2	• Practical and theoretical exam	Midterm Exam 2	Theoretical explanation and practical application.	Interactive participation + Practical exercise
12	2	• Types of magma forming igneous rocks	The type of magma, whether it is underground or surface, represented by volcanoes	Theoretical explanation and practical application.	Interactive participation + Practical exercise
13	2	• Magma formation mechanism	How magma is formed and generated during geological time	Theoretical explanation and practical application.	Interactive participation + Practical exercise
14	2	• Tectonic effect of magma evolution	Studying the relationship of tectonic movements to the formation and development of magma	Theoretical explanation and practical application.	Interactive participation + Practical exercise
15	2	• Practical and theoretical exam	Midterm Exam 3	Theoretical explanation and practical application.	Practical Exam

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**

- **Third midterm exam grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	\
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	\
Electronic References, Websites	1. **1.** Essentials of Igneous and Metamorphic Petrology 2. Principles of Igneous and Metamorphic Petrology Second Edition. 3. THE PETROLOGY OF THE IGNEOUS ROCKS.

Stratigraphy – Third Stage / First Semester

1. Course Name:
Stratigraphy
2. Course Code:
Stratigraphy 3
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Aiad Ali Hussien **Email: aiad.hussien@sc.uobaghdad.edu.iq** **Name: Lec. Shatha Fathi** **Email: @sc.uobaghdad.edu.iq**

8. Course Objectives	
Course Objectives	**Teaching the subject of stratigraphy, which aims to achieve several specific goals, including:** **1. Contributing to the process of scientific progress, raising the level of education, and providing the labor market with graduates to work in all fields of investing in the country's mineral and oil wealth and other geological applications.** **2. Training students on how to take field models and convert them into various applied products used in making various geological maps and analyses.** **3. Cooperating with state institutions to provide scientific consultations and conduct various tests to complete scientific research in all different geological fields.** **4. Conducting scientific research that serves the community in various geological fields**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **33. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **34. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **35. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **36. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.**

	37. **Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** 38. **Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** 39. **Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** 40. **Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Definition of terms and introduction	Introduction to stratigraphy	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	2	• Classification categories	Stratigraphy classification	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• Types of rock units and their properties (learn the scientific method for describing them and the method of writing the name of the rock units)	Lithostratigraphic units	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	2	• Comparing and matching rock units and their usefulness locally and regionally	Lithostratigraphic correlation	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• • Types of biostratigraphic units, their pronunciation, and properties (learning the scientific method for describing them and writing their names)	Biostratigraphic units	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Biostratigraphy and Graph correlation	Biostratigraphic correlation	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	2	• Theoretical and practical exam	Midterm Exam 1	Theoretical explanation and practical application.	Interactive participation + Practical exercise

8	**2**	• **Types of time units and their properties (learn the scientific method in describing them and writing their names)**	**Chronostratigraphic units**	**Theoretical explanation and practical application.**	**Practical Exam**
9	**2**	• **Comparing and matching chronostratigraphy units and their usefulness spatially and regionally**	**Chronostratigraphic correlation**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**2**	• **Determine the changes and stratigraphic relationships vertically and laterally**	**Stratigraphic relationships**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**2**	• **Practical and theoretical exam**	**Midterm Exam 2**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**2**	• **The effect of the advance and retreat of the sea on stratigraphic sequences**	**Transgression and regression**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**2**	• **Tectonic/stratigraphic relationships during geological time**	**tectonostratigraphy**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**2**	• **Applying the principles of stratigraphy in Iraq's geological sequences**	**Applied stratigraphy in geology of Iraq**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**2**	• **Practical and theoretical exam**	**Midterm Exam 3**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Third midterm exam grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	\
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	\

Electronic References, Websites	**1. North American Commission on Stratigraphic Nomenclature (NORTH AMERICAN STRATIGRAPHIC CODE)** **2. Principles of stratigraphy (Faroq S. Al-Omari)** **3. Principles of sequence stratigraphy (Octavian Catuneanu)**

Sedimentology – Third Stage / First Semester

1. Course Name:	
Sedimentoogy	
2. Course Code:	
Sedimentology GEO-3626	
3. Semester / Year:	
Semester 1 / 2023 - 2024	
4. Description Preparation Date:	
1 / 10 / 2023	
5. Available Attendance Forms:	
Practical Lab Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Hours / 45 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Lec Dr. Hasan Kattoof Jasim **Email: Abdullah.i@sc.uobaghdad.edu.iq** **Name: Assit Prof Dr. Maysoon Omer Ali** **Email: maysoon.ali@sc.uobaghdad.edu.iq** **Name: Lec Dr. Ahmed Kadhum Obaid** **Email: ahmedobaid@uobaghdad.edu.iq**	
8. Course Objectives	
Course Objectives	7. Sedimentology aims to identify the types of loose sediments, how they are formed, the way they are transported, and the places and environments in which they deposition. 8. Introducing the importance of sedimentology, which is the link between earth science and all natural, medical and engineering sciences, agricultural and pure sciences 3- Training in identifying and diagnosing the types of sediments of sediment, chemical and organic 4- Training on the skills of dealing with different types of sediment and mastering how to study its physical and chemical properties 5- Mastering the most important applications needed by all engineering scientific disciplines and pure sciences that deal with sediment of all kinds and its industrial and engineering applications.
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **41. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **42. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **43. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **44. Inquiry-based learning: Encouraging students to actively explore topics**

	and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills. **45. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** **46. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **47. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **48. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	• **Introduction in sedimentology** • **Types of Sediments** • **Nature of sediments**	Introduction to Sedimentology – How are sediment formed	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
2	**4**	• **Field geology techniques for sediments** • **Methods of sediment collection from field**	Field Technique and Collection of Samples	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
3	**4**	• **Types of sediments** • **Clastic sediments** • **Chemical sediment** • **Organic sediments**	Types of sediment , clastic, chemical , organic and their main properties	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
4	**4**	• **Sedimentary environments** • **Continental environments** • **Transitional Environments** • **Marine environments**	Sedimentary Environments	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
5	**4**	• **Processes of sediment formation** • **Weathering** • **Methods of sediment transportation**	The physical processes of sediments, especially the methods of transport and sedimentation	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
6	**4**	• **Texture of sediment** • **Grain size analysis** • **Grain shape** • **sorting**	Texture of Sediments (Grain size , Shape, and Sorting of Sediments)	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
7	**4**	• **Grain size technique measurements** • **Direct measurement** • **Sieving** • **Grain size analysis fro thin section**	Main Technique of Grain Size	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
8	**4**	• **Middleexmination**	Mid Theoretical Examination	**Theoretical explanation and practical application.**	**Practical Exam**
9	**4**	• **Grain shape** • **How to determine shape of sediment** • **Form** • **Roundness**	Shape of Sediments	**Theoretical explanation and**	**Interactive participation +**

		• **Sphericity**		**practical application.**	**Practical exercise**
10	**4**	• **Stability of sediment** • **Maturity of sediment**	Stability and Maturity of Sediments	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**4**	• **Dust storms** • **Components of dust storm** • **Classification of dust storms** • **How to analyze dust storms**	Dust Storms	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**4**	• **Method of mineral separation** • **Hand separation** • **Heavy liquids** • **Froth floatation** • **Magnatic separation**	Main Technique of Mineral Separation	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**4**	• **Sedimentary Structures** • **Inorganic sedimentary tructures** • **Organic sedimentary structures**	Sedimentary Structures	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**4**	• **Application of sedimentlogy** • **Factory separation of sediment** • **Industrial uses of sediments**	Application of Sedimentology	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**4**	• **امتحان نهاية المقرر**	**Final Theoretical Examination**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Selly, 2000, Applied sedimentology**
Main references (sources)	Folk, 1974, Petrology of Sedimentary Rocks
Recommended books and references (scientific journals, reports...)	**Boggs, 2001, Sedimentology and Stratigraphy**
Electronic References, Websites	www.Sedimentology.com

Geophysics 1 – Third Stage / First Semester

1. Course Name:
Geophysics 1
2. Course Code:
Geophysics ٣
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Prof. Dr. Najah Abd Email: najah.abd@sc.uobaghdad.edu.iq **Name: Lec. Dr. Osamah Saad Al-Saadi Email: osamah.sahib@sc.uobaghdad.edu.iq** **Name: Lec. Dr. Ban Salah Mustafa Email: ban.mustafa@sc.uobaghdad.edu.iq**

8. Course Objectives	
Course Objectives	**Teaching the subject of Geophysical potential methods, which aims to achieve several specific goals, including:** **1. Contributing to the process of scientific progress, raising the level of education, and providing the labor market with graduates to work in all Geological fields of investing in the country's mineral and oil wealth and other geological applications.** **2. Training students on how to take field models and convert them into various applied products used in making various geological maps and analyses.** **3. Cooperating with state institutions to provide scientific consultations and conduct various tests to complete scientific research in all different geological and Geophysical fields.** **4. Conducting scientific research that serves the community in various geological fields.**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **49. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **50. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **51. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **52. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.**

	53. **Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** 54. **Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** 55. **Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** 56. **Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Definition of terms and introduction	Introduction to Geophysical methods	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	2	• Explain theory of gravitational	Principles of gravity method	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• Explanation of survey modes and data processing	Correction of gravity data	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	2	• Diurnal correction explanation	First data correction	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• Application of diurnal correction	Gravity data corrections	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Second correction: Elevation correction	Gravity data corrections	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	2	• Latitude correction	Gravity data corrections	Theoretical explanation and practical application.	Practical Exam
8	2	• Mid-term exam	Mid-term exam	Theoretical explanation and practical application.	Interactive participation + Practical exercise
9	2	• Calculate total Bouguer gravity data	Total Bouguer values	Theoretical explanation and practical application.	Interactive participation + Practical exercise

10	2	• Interpretation of gravity data	Sphere shape case	Theoretical explanation and practical application.	Interactive participation + Practical exercise
11	2	• Interpretation of gravity data	Cylinder shape	Theoretical explanation and practical application.	Interactive participation + Practical exercise
12	2	• Regional-residual separation (Graphical method)	Gravity data separation	Theoretical explanation and practical application.	Interactive participation + Practical exercise
13	2	• Analytical method of data separation	Gravity data separation	Theoretical explanation and practical application.	Interactive participation + Practical exercise
14	2	• Introduction to magnetic method	Magnetic method	Theoretical explanation and practical application.	Practical Exam
15	2	• Parameter explanation of the Magnetic method	Magnetic method	Theoretical explanation and practical application.	Practical Exam

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Third midterm exam grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	\
Main references (sources)	**-Applied Geophysics, Telford, Geldhart, Sheriff and Keys, Cambridge University Press.** **--An Introduction to Applied and Environmental Geophysics, Reynolds 2011, 2nd Ed., Wiley Blackwell.** **Fundamentals of Geophysics, William Lowrie 2007, 2nd Ed., Cambridge University Press.**
Recommended books and references (scientific journals, reports...)	\
Electronic References, Websites	1. https://seg.org/resources/ 2. https://geologyscience.com/geology-branches/geophysical-methods

Micropaleontology – Third Stage / First Semester

1. Course Name:

Micropaleontology

2. Course Code:

3. Semester / Year:

Semester 1 / 2023 – 2024

4. Description Preparation Date:

1 / 10 / 2023

5. Available Attendance Forms:

Theoretical Attendance

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

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

Name: Dr. Yasamin Kh Ibrahim
Email: yasamin.ibrahim@sc.uobaghdad.edu.iq

8. Course Objectives

Course Objectives	**. To give the student an idea about the diagnostic details of fossils that could not be studied without a microscope, in addition to their stratigraphical and paleoecological importance in the geological studies.**

9. Teaching and Learning Strategies

Strategy	**Introductory lectures to give students a comprehensive overview of the subject matter 2- Covering the theoretical aspect by giving lectures or using modern technologies in presenting academic courses 3- Using microscopes and stereoscopes as means of teaching and clarification 4- Assigning students to solve assignments on specific topics and then discussing them during the lesson to demonstrate the extent of their familiarity with the acquired knowledge and so that they become capable of scientific research. 5- Assigning students to visit the library and websites to obtain academic knowledge of various geological sciences**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Preparation of Microfossils	Collecting and studying Microfossils	Theoretical explanation	Discussion
2	2	Small Foraminifera	Foraminifera: Introduction	=	=
3	2	Small Foraminifera: - Shape of the chambers. - Shape of the test	Wall Structure, Chamber shape and chamber arrangement	=	=

4	2	- Arrangement of chambers. - The apertures.	Apertures and openings, Pores, and.	=	=
5		Exam	Exam		
6	2	Ornamentation and suture line	Ornamentation and suture line	Theoretical explanation and practical application	=
7	2	Study of thin sections from different ages to distinguish families of larger Foraminifera.	larger Foraminifera	=	=
8	2	: Families Orbitoididae, Discocyclinidae, and Miogypsinidae	larger Foraminifera	=	=
9	2	Ostracoda: - Shape. - Inner margin and outline.	Ostracoda: Introduction Outer lamella, Shape, outline	=	=
10	2	Ostracoda: - Muscle scars	Ostracoda: - Muscle scars	=	=
11	2	: Hingement	: Hingement	=	=
12	2	Larval stages, and Sexual dimorphism.	Larval stages, and Sexual dimorphism.	=	=
13	2	Orientation	Orientation	=	=
14	2	Ecology, and Adaptive morphology	Ecology, and Adaptive morphology	=	=
15		Exam	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

- **Second midterm exam grade: 10**
- **first midterm exam grade: 10**
- **Attendance and participation grade: ٥**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Raup, D. and Stanley, S.; 1971; Principles of Paleontology**
Main references (sources)	**Brenchley, P. and Harper, D.; 2004; Palaeoecology**
Recommended books and references (scientific journals, reports...)	**–Moore, R.C. (ed.); 1961; Treatise on Invertebrate Paleontology, Pt.Q, Arthropoda** **–Van Morkhoven, P.; 1962; Post-Paleozoic ostracoda, Vol. 1.**

	–Haq, B. and Boersma, A.; 1998; Introduction to Marine Micropaleontology, 2nd ed. **–Armstrong, H. and Brasier, M.; 2005; Microfossils, 2nd ed.**
Electronic References, Websites	**https://education.nationalgeographic.org/resource/paleontology/**

1. Course Name:
Micropaleontology \ lab
2. Course Code:
3. Semester / Year:
Semester 1 / 2023 – 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Laboratory work
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Yasamin Kh Ibrahim **Email: yasamin.ibrahim@sc.uobaghdad.edu.iq** **Name:- Luay Samir Shakir** **Email:- luay.shakir@sc.uobaghdad.edu.iq** **Name:- anwar Kadhim Mousa** **Email:- anwar.mousa@sc.uobaghdad.edu.iq**

8. Course Objectives	
Course Objectives	**1- Giving the student an idea of the diagnostic details of fossils that can only be studied microscopically** **Its stratigraphic and environmental importance in geological studies 2- Teaching students the basics of paleoecology and how to use fossils, methods of preservation, growth, development, and their aggregate structures in interpreting ancient environments and ancient geography.**
9. Teaching and Learning Strategies	
Strategy	**1-- Laboratory work to teach students the basics of identifying fossils and how to distinguish between different species and genera** **2- Using microscopes as a means of teaching and clarification** **3- Assigning students to work on specific topics and then discussing them in the laboratory** **4- Assigning students to make reports on each part of the laboratory work after completing each subject, discussing them, correcting them, and returning them to the students.**

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Explaining how to make rock slides for fossils	Collecting and studying Microfossils	Explaining the method and applying it in practice using the workshop	Follow up on students' understanding and application correctly
2	2	Small Foraminifera	Foraminifera: Introduction	Examine the slides under a microscope	=
3	2	Small Foraminifera: - Shape of the chambers. - Shape of the test	Wall Structure, Chamber shape and chamber arrangement	=	=
4	2	- Arrangement of chambers. - The apertures.	Apertures and openings, Pores, and.	=	=
5		Exam	Exam		
6	2	Ornamentation and suture line	Ornamentation and suture line	Examine the slides under a microscope	Follow up on students' understanding and application correctly
7	2	Study of thin sections from different ages to distinguish families of larger Foraminifera.	larger Foraminifera	=	=
8	2	: Families Orbitoididae, Discocyclinidae, and Miogypsinidae	larger Foraminifera	=	=
9	2	Ostracoda: - Shape. - Inner margin and outline.	Ostracoda: Introduction Outer lamella, Shape, outline	=	=
10	2	Ostracoda: - Muscle scars	Ostracoda: - Muscle scars	=	=
11	2	Hingement	Studying Hingement of Ostrocoda shell	=	=
12	2	Ostrocoda shell ornamentation	Studying ornamentation and distinguishing between different types in practical application	=	=
13	2	Ostrocoda shell Orientation	Practical application of how to orientation the Ostrocoda shell	=	=

14	**2**	**Ecology, and Adaptive morphology**	**Ecology, and Adaptive morphology**	**=**	**=**
15		**Exam**	**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
Attendance score and reports 10
The first semester exam score is 20
The score for the second semester exam is 20
Final practical exam score: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Raup, D. and Stanley, S.; 1971; Principles of Paleontology**
Main references (sources)	**Brenchley, P. and Harper, D.; 2004; Palaeoecology**
Recommended books and references (scientific journals, reports...)	**–Moore, R.C. (ed.); 1961; Treatise on Invertebrate Paleontology, Pt.Q, Arthropoda** **–Van Morkhoven, P.; 1962; Post-Paleozoic ostracoda, Vol. 1.** **–Haq, B. and Boersma, A.; 1998; Introduction to Marine Micropaleontology, 2nd ed.** **–Armstrong, H. and Brasier, M.; 2005; Microfossils, 2nd ed.**
Electronic References, Websites	**https://education.nationalgeographic.org/resource/paleontology/**

Research Methodology – Third Stage / First Semester

1. Course Name
Research methodology
2. Course Code:
3. Semester / Year:
2023/2024
4. Description Preparation Date:
26/4/2024
5. Available Attendance Forms:
Mandatory attendance at theoretical lectures
6. Number of Credit Hours (Total) / Number of Units (Total) 30 Hours / 30 Units
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lamees Nazar Abdulkareem **Email: lamees.nazar@sc.uobaghdad.edu.iq**
8. Course Objectives

Course Objectives	**1.Basic knowledge of concepts that need research** **2- Identifying the methods of preparing scientific research** **3- Applying the studied concepts to prepare a mini-research**
9. Teaching and Learning Strategies	
Strategy	**Extracting information for each course from several sources, such as methodical books, scientific references, and the Internet, in addition to benefiting from the professors' experiences during and even after the end of the lectures during the professors' office hours.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1		Research methodology	Theoretical	Questions with discussion	
2		The research problem	Theoretical	Questions with discussion	
3		The review of literature	Theoretical	Questions with discussion	

4		The research approach	Theoretical	Questions with discussion	
5		Preparation of report	Theoretical	Questions with discussion	
6		Writing your introduction	Theoretical	Questions with discussion	
7		What is the Difference Between Thesis and Research Paper	Theoretical	Questions with discussion	
8		-What is a Thesis	Theoretical	Questions with discussion	
9		**Writing mini research project**		Questions with discussion	
10		**Writing mini research project**		Questions with discussion	
11		**Writing mini research project**		Questions with discussion	
12		**Writing mini research project**		Questions with discussion	
13		**Writing mini research project**		Questions with discussion	
14		**Writing mini research project**		discussion	
15				Final test	

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)	**Research methodology Methods and techniques C.R.Kothari**
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**Collecting research from different specializations to read and benefit from how to write scientific research**

Metamorphic Petrology – Third Stage / Second Semester

1. Course Name:
Metamorphic Petrology
2. Course Code:
Metamorphic Petrology 3
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lec. Dr. Harith Esmaeel Mustaf Email: harith.aljubury@sc.uobaghdad.edu.iq **Name: Lec. Dr. Rana Abas Ali Email: Rana.Ali@sc.uobaghdad.edu.iq** **Name: Ass. Lec. Neaam Omar Farhan Email: neaam.o@sc.uobghdad.edu.iq**
8. Course Objectives

Course Objectives	**Teaching the subject of metamorphic Petrology, which aims to achieve several specific goals, including:** **1. Contributing to the process of scientific progress, raising the level of education, and providing the labor market with graduates to work in all fields of investing in the country's mineral and other geological applications.** **2. Training students on how to take field models and convert them into various applied products used in making various geological maps and analyses.** **3. Cooperating with state institutions to provide scientific consultations and conduct various tests to complete scientific research in all different geological fields.** **4. Conducting scientific research that serves the community in various geological fields**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **57. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **58. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **59. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **60. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.**

	61. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications. **62. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **63. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **64. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Introduction to metamorphic petrology	Definition of terms and introduction	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	2	• Classification of metamorphic rocks on the basis of mineralogy	Diagnosing minerals and calculating their percentages that make up metamorphic rocks	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• Classification of metamorphic rocks on the basis of texture	Identifying minerals and studying the textural relationships that bind minerals	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	2	• Forms of metamorphic structures	Studying the forms of metamorphic rocks appearing on the Earth's surface	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• Texture of metamorphic rocks	Studying the shapes, size, and distribution of mineral grains that make up rocks and the relationships between them	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Theoretical and practical exam	Midterm Exam 1	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	2	• Texture of metamorphic rocks	Studying the shapes, size, and distribution of	Theoretical explanation and	Interactive participation +

			mineral grains that make up rocks and the relationships between them	practical application.	Practical exercise
8	2	• Metamorphic conditions	The change in the conditions that make up the original rocks, including temperature, pressure, and the time required for transformation	Theoretical explanation and practical application.	Practical Exam
9	2	• Metamorphic Facies	Studying the relationships between the factors causing the metamorphism of heat and pressure and how they combine	Theoretical explanation and practical application.	Interactive participation + Practical exercise
10	2	• Metamorphic Facies	Studying the relationships between the factors causing the metamorphism of heat and pressure and how they combine	Theoretical explanation and practical application.	Interactive participation + Practical exercise
11	2	• Practical and theoretical exam	Midterm Exam 2	Theoretical explanation and practical application.	Interactive participation + Practical exercise
12	2	• Chemical relationships of the minerals that make up metamorphic rocks	Study of the chemical composition and behavior of chemical elements with each other under changing basic conditions for the formation of metals, such as heat and pressure	Theoretical explanation and practical application.	Interactive participation + Practical exercise
13	2	• Chemical relationships of the minerals that make up metamorphic rocks	Study of the chemical composition and behavior of chemical elements with each other under changing basic conditions for	Theoretical explanation and practical application.	Interactive participation + Practical exercise

			the formation of metals, such as heat and pressure		
14	**2**	• **Tectonic effect on metamorphic rocks**	**Studying the relationship of tectonic movements to the formation and development of metamorphic rocks**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**2**	• **Practical and theoretical exam**	**Midterm Exam 3**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Third midterm exam grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	\
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	\
Electronic References, Websites	4. Essentials of Igneous and Metamorphic Petrology 5. Principles of Metamorphic Petrology Second Edition. 6. METAMORPHIC ROCKS AND THEIR GEODYNAMIC SIGNIFICANCE.

1. Course Name:	
Geology of Iraq	
2. Course Code:	
Geology of Iraq 3	
3. Semester / Year:	
Semester 1 / 2023 - 2024	
4. Description Preparation Date:	
1 / 10 / 2023	
5. Available Attendance Forms:	
Practical Lab Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Aiad Ali Hussien	**Email: aiad.hussien@sc.uobaghdad.edu.iq**
Name: Lec. Shatha Fathi	**Email: shatha.hassan@sc.uobaghdad.edu.iq**
8. Course Objectives	
Course Objectives	**Teaching the subject of stratigraphy, which aims to achieve several specific goals, including:** **1. Contributing to the process of scientific progress, raising the level of education, and providing the labor market with graduates to work in all fields of the country's oil investment and aviation industry.** **2: Training students on how to take field models and convert them into applied products used in making geological maps.** **3: Training the student in the most important way to know the history or age of earth's layers that carry fossils in their belly, the relationship of the layers to each other, and the relationship of the plants and animals that lived in them. This science also studies the sedimentary layers of Iraq, and relies on all of them in geological dating, and determining the exact age of the rocks, thus enabling us to describe the sequence of eras that passed on the Earth, and the development of plants and animals that occurred during them.**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **65. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **66. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **67. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **68. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.**

	69. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications. **70. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **71. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **72. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• Introduction to the Geology of Iraq	Introduction to the Geology of Iraq	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	2	• Tectonic classification of Iraq	Tectonic classification of Iraq	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	2	• stratigraphic units of the Paleozoic era in Iraq	stratigraphic units of the Paleozoic era in Iraq	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	2	• Correlation of the rock units for Paleozoic period	Correlation of the rock units for Paleozoic period	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	2	• stratigraphic Units of the Triassic and Jurassic Periods in Iraq	stratigraphic Units of the Triassic and Jurassic Periods in Iraq	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	2	• Midterm Exam 1	Midterm Exam 1	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	2	• stratigraphic units of the Cretaceous period in Iraq	stratigraphic units of the Cretaceous period in Iraq	Theoretical explanation and practical application.	Interactive participation + Practical exercise
8	2	• Comparison of Mesozoic sedimentary basins	Comparison of Mesozoic sedimentary basins	Theoretical explanation and practical application.	Practical Exam
9	2	• stratigraphic Units of the Paleogene Age in Iraq	stratigraphic Units of the Paleogene Age in Iraq	Theoretical explanation and practical application.	Interactive participation + Practical exercise

10	**2**	• Stratigraphic relationships between the Mesozoic Age and the Paleogene	**Stratigraphic relationships between the Mesozoic Age and the Paleogene**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**2**	• Midterm Exam 2	**Midterm Exam 2**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**2**	• Neogen Age stratigraphic Units in Iraq	**Neogen Age stratigraphic Units in Iraq**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**2**	• stratigraphic tectonics relationships of the Cenozoic era (Tertiary)	**stratigraphic tectonics relationships of the Cenozoic era (Tertiary)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**2**	• Quaternary sediments and rock units in Iraq	**Quaternary sediments and rock units in Iraq**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**2**	• End of Semester Test	**End of Semester Test**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Third midterm exam grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	\
Main references (sources)	\
Recommended books and references (scientific journals, reports...)	\
Electronic References, Websites	**1. Geology of Iraq (Jassim and Goff, 2006)** **2. Lexique Stratigraphique International Asie, Iraq. (Bellen et al., 1959)** **3. Regional geology of Iraq (Buday, 1980)** **4. Petroleum geology of Iraq (2010)**

Sedimentary Petrology – Third Stage / Second Semester

1. Course Name:
Sedimentary Petrology
2. Course Code:
Sedimentary Petrology GEO-3626
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 45 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lec Dr. Hasan Kattoof Jasim Email: Abdullah.i@sc.uobaghdad.edu.iq **Name: Assit Prof Dr. Maysoon Omer Ali Email: maysoon.ali@sc.uobaghdad.edu.iq** **Name: Assist Lec .Saly Hussain Email:** sally.h@sc.uobaghdad.edu.iq
8. Course Objectives

Course Objectives	9. Sedimentary rocks aims to identify the types of loose sediments, how they are formed, the way they are transported, and the places and environments in which they deposition. 10. Introducing the importance of sedimentary rocks , which is the link between earth science and all natural, medical and engineering sciences, agricultural and pure sciences 11. Training on the skill of studying and diagnosing sedimentary rocks during field work, as most parts of Iraq are covered by sedimentary rocks or loose sediments After solidification of the sediments, sedimentary rocks will be formed, which are considered one of the important materials in nature, as they form most parts of the outer part of the earth's crust.
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **73. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **74. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **75. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **76. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **77. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use**

	of multimedia and interactive applications. **78. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **79. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **80. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	• **Introduction to sedimentary rocks**	Introduction to Sedimentary Rocks	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
2	**4**	• **Classification of sedimentary rocks**	Classification of sedimentary rocks	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
3	**4**	• **Clastic sedimentary rocks** • **Texture of sedimentary rocks** • **Mineralogical composition of sedimentary rocks**	Clastic Sedimentary Rocks	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
4	**4**	• **Conglomerate and breccia rocks** • **Components of conglomerate rocks** • **Classification of conglomerate rocks**	Conglomerate and Breccia	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
5	**4**	• **Sandstone** • **Components of sandstone** • **Sedimentary environments of sandstones**	Sandstone	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
6	**4**	• **Classification of sandstone** • **Folk classification** • **Pettijohn classification**	Classification of Sandstone	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
7	**4**	• **Mudstone** • **Claystone** • **Clay minerals**	Mudstone and Claystone	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
8	**4**	• **Middle examination**	Mid Theoretical Examination	**Theoretical explanation and practical application.**	**Practical Exam**
9	**4**	• **Carbonate sedimentary rocks** • **Components of carbonate sedimentary rocks** • **Mineralogical composition of carbonate sedimentary rocks**	Carbonate Sedimentary Rocks	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**4**	• **Classification of carbonate sedimentary rocks** • **Dunham classification**	Classification of Carbonate Sedimentary Rocks	**Theoretical explanation and**	**Interactive participation +**

				practical application.	**Practical exercise**
11	**4**	• **Chemical sedimentary rocks** • **Groups of chemical sedimentary rocks** • **Mineralogical composition of chemical sedimentary rocks**	Chemical Sedimentary Rocks	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**4**	• **Sedimentary environments of chemical sedimentary rocks**	Sedimentary Environments of Sedimentary Rocks	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**4**	• **Standard facies of sedimentary rocks**	**Facies analysis of carbonate sedimentary rocks**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**4**	• **Sedimentary rocks in Iraq** • **Important** • **Applications**	Sedimentary Rocks in Iraq	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**4**	• **Final examination**	**Final Theoretical Examination**	**Theoretical explanation and practical application.**	**Practical Exam**

11. Course Evaluation

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Pettijohn, 1975, sedimentary rocks**
Main references (sources)	Folk, 1974, Petrology of Sedimentary Rocks
Recommended books and references (scientific journals, reports...)	**Boggs, 2001, Sedimentology and Stratigraphy**
Electronic References, Websites	www.Sedimentary Petrology.com

Geophysics 2 – Third Stage / Second Semester

1. Course Name:
Geophysics 2
2. Course Code:
Geophysics 3
3. Semester / Year:
Semester 2 / 2023-2024
4. Description Preparation Date:
1/2/2024
5. Available Attendance Forms:
Practical Lab Attendance- Physical attendance in the Hall
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Names: Lect. Dr. Ban Salah Mustafa Emails: ban.Mustafa@sc.uobaghdad.edu.iq **Lect. Dr. Osamah Saad Al-Saadi Osamah.Sahib@sc.uobaghdad.edu.iq** **Lect. Dr. Lamees Nazar lamees.nazar@sc.uobaghdad.edu.iq**
8. Course Objectives

Course Objectives	**–The goal of studying geophysics 2 is to identify two important geophysical methods, which are Seismic and the electrical resistivity methods, which are mostly used in exploratory geophysical investigations of structures near, medium, and deep from the Earth's surface.** **–The course also explains the principles of these methods in detail, the applications of each method, the importance of using them in geophysical exploration, as well as the most important field seismic and electrical survey methods, the most important advantages and disadvantages of each method, the quality of the results obtained from it, and the methods of quantitative and qualitative interpretation of those results to give a picture of the subsurface geological structures.**

9. Teaching and Learning Strategies	
Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Determined and calculate the parts of seismic waves. applications on Snell's law	Seismic method	Theoretical explanation and practical application	Interactive participation + Practical exercise

2	**2**	**Calculation the Elastic constants & seismic velocity**	**Elastic moduli**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
3	**2**	**Refraction method /Time -distance curve**	**Interpretations of the Refraction method**	**Theoretical explanation and practical application**	
4	**2**	**Refraction method /Two horizontal layers**	**Interpretations of the Refraction method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
5		**Refraction method / Three horizontal layers &Dipping layer**	**Interpretations of the Refraction method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
6	**2**	**Reflection method / Time -distance curve. Calculate Acoustic impedance, Reflection coefficient & Transmission coefficient**	**Interpretations of the Reflection method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
7		**Mid-Term-Seismic method Exam**			
8	**2**	**Ohm's law and Calculation of Apparent resistivity**	**Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
9	**2**	**Quantitative interpretation of 1D VES curve**	**1D Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
10	**2**	**Two-layers Field curve example of 1D VES resistivity curve**	**1D Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
11	**2**	**Three-layers complete curve matching**	**1D Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
12	**2**	**Second Field curve example of Three-layers complete curve matching**	**1D Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
13	**2**	**Three-layers Partial curve matching**	**1D Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
14	**2**	**Qualitative Interpretation of 2D resistivity field profile**	**2D Electric Resistivity method**	**Theoretical explanation and practical application**	**Interactive participation + Practical exercise**
15	**2**	**2^{ND} Mid-Term-Electric Resistivity Exam**	**EXAM**	**Theoretical explanation**	**Interactive participation**

				and practical application	+ Practical exercise

11. Course Evaluation

- Attendance and participation grade: 10
- First midterm exam grade: 10
- Second midterm exam grade: 10
- Lab-Work Evaluation: 10
- Final practical exam grade: 40

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Geophysics, William Lowrie 2007, 2nd Ed., Cambridge University Press. An Introduction to Applied and Environmental Geophysics, Reynolds 2011, 2nd Ed., Wiley-Blackwell
Main references (sources)	Applied Geophysics, Telford, Geldhart, Sheriff and Keys, Cambridge University Press
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	1- https://geologyscience.com/geology-branches/geophysical-methods/ 2- https://seg.org/resources/

1. Course Name:

Geophysics 2

2. Course Code:

GEO-3524

3. Semester / Year: 1/3/2024

2/2024

4. Description Preparation Date:

1/3/2024

5. Available Attendance Forms:

Theoretical lecture Attendance in the classroom

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

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

Name: Ban Salah Mustafa
Email: Ban.Mustafa@sc.uobaghdad.edu.iq

8. Course Objectives

Course Objectives	The course aims to know the basic principles of the seismic method, with its two parts, reflection and refraction, and its most important applications in various geological investigations, in addition to identifying methods for

	interpreting seismic surveys by deriving the special laws for each method for the purpose of calculating the depths, number of layers, and velocity of layers in the case of horizontal layers and dipping layers. Also identifying elasticity moduli and their relationship with seismic velocities. And study the factors affecting the velocity of progression of seismic waves .....

9. Teaching and Learning Strategies

Strategy	**An overview of one of the most important applied geophysical exploratory methods, which is used in investigations of subsurface geological structures and in investigations of oil reservoirs.** **Training students to use the data obtained from various field seismic surveys to interpret that data and identify the number of layers that differ in thickness and seismic velocity as a result of their different elastic properties and their influence on the resulting geological structures and features . Thus, to give a comprehensive geological description of the area that was surveyed by the seismic method.**

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	٢	Introduction to the seismic method and the most important applications	Seismic methods	Theory with detailed video explanation	Attendance - interaction
2	٢	Types of seismic waves	Identify the types of seismic waves and the characteristics of each type	Theory with detailed video explanation	Attendance – interaction
3	٢	Theory of elasticity and types of elastic moduli , Factors affecting seismic wave velocity	Studying the types of elastic modulus and their relationship with seismic velocities Vp&Vs, in addition to identifying the factors affecting the velocity of seismic wave propagation .	Theory with detailed video explanation	
4		Seismic exploration /refraction method	Identify the most important devices and equipment used in seismic exploration / the refractive	Theory with detailed video explanation	Attendance - interaction

			method and interpretation methods to calculate the depth of the first layer and the velocity of the two layers		
5		**Refraction method**	**Calculating the depths of the first and second layers and calculating the velocity of the waves in the case of three layers. Also calculating the depth of the inclined layer and the velocities of the two layers.**	**Theory with detailed video explanation**	**Attendance - interaction**
6		**Seismic reflection**	**The principles of the reflection method, its most important applications, and understanding the concepts on which the method depends, such as acoustic impedance, reflection and Transmission coefficients, their relationship with density, and how to calculate them.**	**Theory with detailed video explanation**	Attendance - interaction
7		**Seismic reflection**	**Interpretation of travel time data for two horizontal Layers case**	**Theory with detailed video explanation**	**Attendance - interaction**

			and dipping layer		
8	2	Mid-term-Exam			
9					
10					
11					
12					
13					
14					
15					

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)	- An Introduction to Applied and Environmental Geophysics, Reynolds 2011, 2nd Ed., Wiley Blackwell. - Fundamentals of Geophysics, William Lowrie 2007, 2nd Ed., Cambridge University Press.
Main references (sources)	- Applied Geophysics, Telford, Geldhart, Sheriff and Keys, Cambridge University Press
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://geologyscience.com/geology-branches/geophysical-methods/

Paleoecology – Third Stage / Second Semester

1. Course Name:
Paleoecology
2. Course Code:
3. Semester / Year:
Semester 2 / 2023 – 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Theoretical Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Yasamin Kh Ibrahim **Email: yasamin.ibrahim@sc.uobaghdad.edu.iq**

8. Course Objectives	
Course Objectives	**To teach the students the fundamentals of paleoecology and how to utilize fossils, their preservation, growth, evolution and population structures in describing paleoecology and paleogeography.**

9. Teaching and Learning Strategies	
Strategy	**1 - Extracting information for each course from several sources, such as methodological books, field trips, scientific references, and the Internet, in addition to benefiting from the professors' experiences during and even after the end of the lectures through the professors' office hours.** **2 - Developing students' intellectual skills by bringing real applied geological problems to the laboratory and urging students how to think appliedly in solving them and simulating them practically.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Preservation and the Fossil Record: Kinds of Organisms, Numbers of Individuals	How to differentiate paleo-environments	Theoretical explanation	Discussion
2	2	Ontogenetic Variation: Types of Growth	Classification of ecological units.	=	=
3	2	Population in Biology, Individual variation within Populations	Studying types of trace fossils	=	=

4	**2**	**Speciation, The Subspecies and Clines & Ring Species**	**Studying of evolution by shape as a simulation**	**=**	**=**
5		**Exam**	**Exam**		
6	**2**	**Rates of Evolution and Extinction**	**Studying of evolution**	**=**	**=**
7	**2**	**Evolution and the Fossil Record**	**Evolution and diversity**	**=**	**=**
8	**2**	**Models of Evolution, Patterns of Evolution and Extinction**	**Evolution and the Fossil Record**	**=**	**=**
9	**2**	**Applications environments**	**Tophonomy**	**=**	**=**
10	**2**	**Limiting Factors, and Spatial Distribution of Populations**	**Ecologic units and limiting factors**	**=**	**=**
11	**2**	**The Marine Ecosystem, and Life Habits.**	**Fundamental Ecologic Principles**	**=**	**=**
12	**2**	**The Marine Ecosystem**	**Fundamental Ecologic Principles**	**=**	**=**
13	**2**	**Organic reef communities**	**Fossil Communities**	**=**	**=**
14	**2**	**Limiting Factors**	**Ecologic units**	**=**	**=**
15		**Exam**	**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
Second midterm exam grade: 10

- **first midterm exam grade: 10**
- **Attendance and participation grade: 5**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Brenchley, P. and Harper, D.; 2004; Palaeoecology.**
Main references (sources)	**Ager, D.; 1963; Principles of Paleoecolgy.**
Recommended books and references (scientific journals, reports...)	**Brenchley, P. and Harper, D.; 2006; Palaeoecology.**
Electronic References, Websites	**https://www.amazon.com/Principles-Paleoecology-Introduction-Animals-Plants/dp/1258398850**

1. Course Name:

Paleoecology\ lab

2. Course Code:

3. Semester / Year:

Semester 2 / 2023 – 2024

4. Description Preparation Date:

1 / 10 / 2023

5. Available Attendance Forms:

Theoretical Attendance

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

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

Name: Dr. Yasamin Kh Ibrahim
Email: yasamin.ibrahim@sc.uobaghdad.edu.iq
Name:- Luay Samir Shakir
Email:- luay.shakir@sc.uobaghdad.edu.iq
Name:- anwar Kadhim Mousa
Email:- anwar.mousa@sc.uobaghdad.edu.iq

8. Course Objectives

Course Objectives	**To teach the students the fundamentals of paleoecology and how to utilize fossils, their preservation, growth, evolution and population structures in describing paleoecology and paleogeography.**

9. Teaching and Learning Strategies

Strategy	**1 - Extracting information for each course from several sources, such as methodological books, field trips, scientific references, and the Internet, in addition to benefiting from the professors' experiences during and even after the end of the lectures through the professors' office hours.** **2 - Developing students' intellectual skills by bringing real applied geological problems to the laboratory and urging students how to think appliedly in solving them and simulating them practically.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Preservation and the Fossil Record: Kinds of Organisms, Numbers of Individuals	How to differentiate paleo-environments	Preparing laboratory reports, practical application	Discussing and correcting reports after each laboratory
2	2	Ontogenetic Variation: Types of Growth	Classification of ecological units.	=	=
3	2	Population in Biology, Individual variation within Populations	Studying types of trace fossils	=	=

4	**2**	**Speciation, The Subspecies and Clines & Ring Species**	**Studying of evolution by shape as a simulation**	**=**	**=**
5		**Exam**	**Exam**		
6	**2**	**Rates of Evolution and Extinction**	**Studying of evolution**	**Preparing laboratory reports, practical application**	**Discussing and correcting reports after each laboratory**
7	**2**	**Evolution and the Fossil Record**	**Evolution and diversity**	**=**	**=**
8	**2**	**Models of Evolution, Patterns of Evolution and Extinction**	**Evolution and the Fossil Record**	**=**	**=**
9	**2**	**Applications environments**	**Tophonomy**	**=**	**=**
10	**2**	**Limiting Factors, and Spatial Distribution of Populations**	**Ecologic units and limiting factors**	**=**	**=**
11	**2**	**The Marine Ecosystem, and Life Habits.**	**Fundamental Ecologic Principles**	**=**	**=**
12	**2**	**The Marine Ecosystem**	**Fundamental Ecologic Principles**	**=**	**=**
13	**2**	**Organic reef communities**	**Fossil Communities**	**=**	**=**
14	**2**	**Limiting Factors**	**Ecologic units**	**=**	**=**
15		**Exam**	**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
The score for the first semester exam is 15
The score for the second semester exam is 15
Reporting score: 30
Final practical exam score

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Brenchley, P. and Harper, D.; 2004; Palaeoecology.**
Main references (sources)	**Ager, D.; 1963; Principles of Paleoecolgy.**
Recommended books and references (scientific journals, reports...)	**Brenchley, P. and Harper, D.; 2006; Palaeoecology.**
Electronic References, Websites	**https://www.amazon.com/Principles-Paleoecology-Introduction-Animals-Plants/dp/1258398850**

Field Geology – Third Stage / Second Semester

1. Course Name:	
Field geology	
2. Course Code:	
Field geology	
3. Semester / Year:	
Semester 1 / 2023 - 2024	
4. Description Preparation Date:	
1 / 10 / 2023	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Assist. Prof. Dr. Thair Thamer Iltayif **Email: thair.t@sc.uobaghdad.edu.iq**	
8. Course Objectives	
Course Objectives	**Understanding the basics of field geology and linking field geology as far as common topics are concerned, which are mainly represented by field observations of all geological phenomena (structural and geomorphological), knowing how to measure the direction and inclination of the ground layers because they are considered very necessary for every geological student and are considered the foundation of the field, and knowing the site stabilization and drawing the geological map and geological section.**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **81. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **82. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **83. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **84. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **85. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** **86. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **87. Blended learning: Integrating a variety of teaching methods and**

	resources in the educational process, such as traditional lectures with hands-on activities and online learning. **88. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	•	**Principle of field geology**	**Theoretical explanation and video.**	**Theoretical examination**
2	**2**	•	Tooles and observations of field geology	**Theoretical explanation and video.**	**Theoretical examination**
3	**2**	•	Rock and fossils sampling	**Theoretical explanation and video.**	**Theoretical examination**
4	**2**	•	Orientations of map and methods of drawing geological map	**Theoretical explanation and video.**	**Theoretical examination**
5	**2**	•	Geological map contnu..	**Theoretical explanation and video.**	**Theoretical examination**
6	**2**	•	Bruntun compass and its uses	**Theoretical explanation and video.**	**Theoretical examination**
7	**2**	•	Bearing, strike, and dip by Bruntun compass	**Theoretical explanation and video.**	**Theoretical examination**
8	**2**	•	Silva compass and its uses	**Theoretical explanation and video.**	**Theoretical examination**
9	**2**	•	Bearing, strike, and dip by Silva compass	**Theoretical explanation and video.**	**Theoretical examination**
10	**2**	•	**Abne level**	**Theoretical explanation and video.**	**Theoretical examination**
11	**2**	•	**The clinometer**	**Theoretical explanation and video.**	**Theoretical examination**
12	**2**	•	Geological traverse	**Theoretical explanation and video.**	**Theoretical examination**
13	**2**	•	Geological cross section	**Theoretical explanation and video.**	**Theoretical examination**

14	**2**	•	Sequence stratigraphy	**Theoretical explanation and video.**	**Theoretical examination**
15	**2**		Methods of true thickness calculate	**Theoretical explanation and video.**	**Theoretical examination**

11. Course Evaluation

- **Attendance and participation grade: 5**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Practical grade: 15**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	المحاضرات مادة الجيولوجية الحقلية النظري **Manual of Field Geology**
Main references (sources)	**Fundamentals of Geology**
Recommended books and references (scientific journals, reports...)	-Geological Field Techniques
Electronic References, Websites	

1. Course Name:

Field geology

2. Course Code:

3. Semester / Year:

Second semester/ third year 2023-2024

4. Description Preparation Date:

20/4/2024

5. Available Attendance Forms:

Attendance

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

30 hours /3 units

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

Name :Dr. Hamed Hassan Abdullah **Email: hamid.h@sc.uobaghdad.edu.iq**
Lecturer . shatha fathi Hassan **Email: shatha.hassan@sc.uobaghdad.edu.iq**

8. Course Objectives

Course Objectives	Teaching students field methods to draw a geological map using topographic maps, measuring a geological section and a stratigraphic section in the field, and training in using field tools such as compasses.

9. Teaching and Learning Strategies

Strategy	1. Theoretical explanation of the practical approach 2. Review the various existing maps 3. Presentation of field devices and methods of using them

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**Geological mapping**	Bearing: quadrant and azimuth	**Theoretical explanation and practical application**	**Report and practical application**
2	**2**	**Geological mapping**	Reverse bearing	**Theoretical explanation and practical application**	**Report and practical application**
3	**2**	**Geological mapping**	Point location by reverse bearing intersection with linear feature	**Theoretical explanation and practical application**	**Report and practical application**
4	**2**	**Geological mapping**	Point location by intersection of reverse bearing lines	**Theoretical explanation and practical application**	**Report and practical application**
5	**2**	**Geological mapping**	Point location by pacing method	**Theoretical explanation and practical application**	**Report and practical application**
6	**2**	**Geological mapping**	Point location by reverse bearing intersection with contour lines.	**Theoretical explanation and practical application**	**Report and practical application**
7	**2**	**Field instruments**	Brunton compass: parts & uses	**Theoretical explanation and practical application**	**Report and practical application**
8	**2**	**Field instruments**	Brunton compass:practical application	**Theoretical explanation and practical application**	**Report and practical application**
9	**2**	**Field instruments**	Silva compass :parts& uses	**Theoretical explanation and practical application**	**Report and practical application**
10	**2**	**Field instruments**	**Silva compass practical application**	**Theoretical explanation and practical application**	**Report and practical application**

11	**2**	**Field instruments**	**Abeny level**	**Theoretical explanation and practical application**	**Report and practical application**
12	**2**	**Field instruments**	**Hand level**	**Theoretical explanation and practical application**	**Report and practical application**
13	**2**	**Geological section**	**Geological section (part 1)**	**Theoretical explanation and practical application**	**Report and practical application**
14	**2**	**Geological section**	**Geological section (part 2)**	**Theoretical explanation and practical application**	**Report and practical application**
15	**2**	**Practical exam.**	**Examination**	**Practical exam.**	**Practical 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

Exam. Mark 10
Report mark 5
Final exam. Mark 20

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Compton , R.R. , 1968 , Manual of Field Geology , Wiley Eastern Private Limited , New Delhi , 378p.
Main references (sources)	Barnes , J.W. , and Lisle , R.J. , 2004 , Basic Geological Mapping , (4^{th} ed.) , John Wiley & Sons , Ltd.
Recommended books and references (scientific journals, reports...)	**Report of Iraqi geosurv**
Electronic References, Websites	Websites related to field geology and methods of using compasses, in addition to educational video websites

1. Course Name:
Subsurface Geology
2. Course Code:
Subsurface Geology
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Theoretical and Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours/ 60 credits
7. Course administrator's name (mention all, if more than one name)
Name: Assist.Prof.Dr. Buraq Adnan Hussein Email: buraq.hussein@sc.uobaghdad.edu.iq **Name: Dr.Thamer Abdulah Mahdi Email: thamer.mahdi@sc.uobaghdad.edu.iq** **Name: Dr. Rasha Fawzi Faisal rasha.faisal@sc.uobaghdad.edu.iq**

8. Course Objectives	
Course Objectives	**Subsurface geology is linked different branches of geological sciences that can be applied to petroleum exploration. This module offers students the basic understanding of geological mapping principles, and techniques, in addition to well logs analysis. It presents the different methods of subsurface geologic mapping, including subsurface maps and cross sections, and different types of well logs and their applications in stratigraphy and structural geology of the oilfields. During the module, students learn principles and techniques for subsurface geologic interpretation through inquiry-based, hands-on activities using typical oil fields data.**

9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **1. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **2. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **3. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **4. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **5. Technological learning: Utilizing technology in the learning process to**

	provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications. 6. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively. 7. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning. 8. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks. Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Types of subsurface geologic data	Subsurface geologic data	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	4	Types of drilling wells	Drilling wells	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	4	Interpretation of Subsurface structural and thickness maps	Subsurface structural and thickness maps	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	4	Types of facies maps	Facies maps	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	4	Types of subsurface geologic cross sections	Subsurface geologic cross sections	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	4	Explain the basic concepts of well logs	Basics of well logging	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	4	Understanding the gamma ray log and its applications	Gamma ray log	Theoretical explanation and practical application.	Interactive participation + Practical exercise
8	4	Evaluating students' understanding of new topics and their skills in applying them	Midterm Exam 1	Theoretical explanation and practical application.	Theoretical and Practical Exam
9	4	Understanding the sp log and its applications	SP log	Theoretical explanation and practical application.	Interactive participation + Practical exercise

10	**4**	**Understanding the Neutron log and its applications**	**Neutron log**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**4**	**Understanding the Density log and its applications**	**Density log**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**4**	**Understanding the Sonic log and its applications**	**Sonic log**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**4**	**Understanding the Resistivity log and its applications**	**Resistivity logs**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**4**	**Explain the Sw calculation and well logs interpretation**	**Sw calculation and well logs interpretation**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**4**	**Evaluating students' understanding of new topics and their skills in applying them**	**Midterm Exam 2**	**Theoretical explanation and practical application.**	**Theoretical and Practical 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.

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	**Basic well logs Analysis for Geologists. 2004 Tearpock and Bischke (2002),Applied Subsurface Geological Mapping**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Geochemistry – Fourth Stage / First Semester

1. Course Name:
Practical geochemistry
2. Course Code:
Practical geochemistry 4
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1/10/2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Professor Dr. Firas Mudhafar Abdulhussein **Dr. Rana Abbas Ali** **Email: firas.mudhafar@sc.uobaghdad.edu.iq** **rana.ali@sc.uobaghdad.edu.iq**
8. Course Objectives

Course Objectives	**... Course objectives: Understanding the basis of geochemistry, detecting major and trace elements, and rare earth elements in the Earth's crust, knowing methods of measurement for these elements, measuring units, laboratory and research devices for measurement, knowledge of the fields of laboratory analysis of rocks and soils, and following up on developments in the techniques used in geochemistry. It provides students with the skills, knowledge, and efforts required to work in diagnosing elements through laboratory tests. Introducing the basic concept of geochemistry and how to investigate important minerals and ores.**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **89. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **90. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **91. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **92. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.**

93. **Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.**
94. **Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.**
95. **Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.**
96. **Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.**

Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Soil, river and rock modeling surveys	Geochemical modeling	Smart board and poster	Practical exam and class effectiveness
2	2	Parts per million, percentage and molarity	Units	Smart board and poster	=
3	2	Calculating concentrations of major and trace elements	Atomic absorption spectrometer	Smart board and poster	=
4	2	Calculating the validity and accuracy of the analyses	Correctness and accuracy	Smart board and poster	=
5	2	Calculate the chemical formula of metals	Calculate the chemical formula	Smart board and poster	=
6	2	Calculating undissolved minerals	Undissolved waste	Smart board and poster	=
7	2	Calculate the percentage of minerals	Calculate XRD charts	Smart board and poster	=
8	2	Calculate and set water quality	Calculate the hydrochemical formula	Smart board and poster	=
9	2	Determine water quality using the STF chart	Stv chart	Smart board and poster	=
10	2	Determine the total dissolved salts and the electrical and acid	TDS, EC, PH and T	Smart board and poster	=
11	2	conductivity of the aqueous solution	TDS, EC, PH and T	Smart board and poster	=
12	2	Determine water quality using a Piper chart	Piper chart	Smart board and poster	=
13	2	Determine the default total salts and water type	Virtual salts	Smart board and poster	=
14	2	Classification of calcium and magnesium ions in the aqueous model	Know the type of water	Smart board and poster	=

15	**2**	**Calculate the chemical transformation index and the chemical weathering index**	**CIA and CIW**	**Smart board and poster**	**=**

11. Course Evaluation

- **The score of the first monthly exam is 20**
- **The score of the second monthly exam is 20**
- **Cues and attendance score 5**
- **Practical exam score 15**
- **Quest score 40**
- **The final practical exam score is 20**
- **The final semester exam score is 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Lectures on practical geochemistry from various sources**
Main references (sources)	**Principles of Geochemistry for the First Semester, Edition C, written by Dr. Adel Kamal Jamil**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Environmental Geology – Fourth Stage / First Semester

1. Course Name:
Environmental Geology
2. Course Code:
Environmental Geology
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Enaam Jumaa Abdullah **Email:** anam.g@sc.uobaghdad.edu.iq
8. Course Objectives

Course Objectives	**1-**Knowledge and Understanding: Upon completing the Environmental Geology module, students will demonstrate a comprehensive knowledge and understanding of Earth's dynamic systems and their interactions with the environment. They will be able to explain the key geological processes that shape the Earth's surface, analyze the formation and behavior of natural hazards, and assess the impacts of human activities on the environment. Students will also have a solid understanding of the principles and techniques used in geotechnical investigations, hazard assessment, and environmental conservation. **2-**Analytical Skills: Students will develop strong analytical skills through the Environmental Geology module. They will be able to critically analyze geological data, interpret maps, diagrams, and satellite imagery to assess environmental risks and hazards. Students will demonstrate proficiency in applying scientific principles to evaluate the impacts of geological processes on the environment and make informed decisions regarding resource management and hazard mitigation. They will also develop the ability to identify and propose solutions for environmental challenges based on a thorough understanding of geological concepts. **3-**Communication and Collaboration: The module aims to enhance students' communication and collaboration skills within the context of environmental geology. Students will learn how to effectively communicate complex geological concepts, hazard assessments, and conservation strategies to diverse audiences, both orally and in written form. They will also develop the ability to work collaboratively in

	interdisciplinary teams, engaging with professionals from various fields to address environmental challenges. Through group projects, presentations, and discussions, students will refine their communication and collaboration skills, preparing them for real-world applications of environmental geology in professional settings.

9. Teaching and Learning Strategies

Strategy	1- Integrated Field Studies: One strategy employed in Environmental Geology is the integration of field studies into the curriculum. Field studies provide students with hands-on experiences to observe and analyze geological features and processes in their natural environment. Students may visit geological sites, such as coastlines, river valleys, or areas affected by natural hazards, to apply their theoretical knowledge and develop practical skills in data collection, geological mapping, and sample analysis. This strategy allows students to deepen their understanding of geological concepts and their relevance to environmental issues, fostering a direct connection between theory and real-world applications. 2- Hazard Mapping and Risk Assessment: Environmental Geology incorporates strategies for hazard mapping and risk assessment to evaluate and mitigate environmental risks. Students learn to identify and map areas prone to natural hazards such as earthquakes, landslides, or floods using geological and geospatial data. They develop skills in analyzing geological structures, topography, and historical hazard events to assess the potential impacts on human populations and infrastructure. By applying quantitative risk assessment methodologies, students can prioritize areas for hazard mitigation measures, including land-use planning, engineering solutions, and emergency preparedness strategies. 3- Collaboration and Interdisciplinary Approach: Environmental Geology encourages collaboration and an interdisciplinary approach to address complex environmental challenges. Students work collaboratively with professionals from various fields, such as environmental science, engineering, and policy-making, to develop comprehensive solutions. This strategy promotes the exchange of ideas, diverse perspectives, and integration of different expertise to tackle environmental issues holistically. By engaging in group projects, discussions, and presentations, students enhance their communication, teamwork, and problem-solving skills, preparing them for multidisciplinary work environments where collaboration is essential for effective environmental management.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Introduction	Basics of environmental geology	Theoretical + practical	General questions, reports and discussion
2	**4**	Earthquake	Environmental causes and effects, methods of protection and environmental treatments	Theoretical + practical	General questions, reports and discussion
3	**4**	Volcanoes	Environmental causes and effects, methods of protection and	Theoretical + practical	General questions, reports and discussion

			environmental treatments		
4	**4**	Floods	Environmental causes and effects, methods of protection and environmental treatments	Theoretical + practical	General questions, reports and discussion
5	**4**	Coastal operations	Geological processes that threaten coastal areas, identifying and treating them	Theoretical + practical	General questions, reports and discussion
6	**4**	Coastal and riverine environments	Geological processes that threaten coastal areas, identifying and treating them	Theoretical + practical	General questions, reports and discussion
7	**4**	Landslides	The impact of landslides on the environment and methods of protection	Theoretical + practical	General questions, reports and discussion
8	**4**	Operations in desert areas	Reasons for the increase in dry areas and treatment methods	Theoretical + practical	General questions, reports and discussion
9	**4**	Desertification	Human causes of desertification and ways to reduce them	Theoretical + practical	General questions, reports and discussion
10	**4**	Climate change	Climate change factors and its impact on the environment, reasoning about it, and simulating the phenomenon in the future	Theoretical + practical	General questions, reports and discussion
11	**4**	Natural sources/water, rocks and minerals	Use of natural resources and their environmental impacts	Theoretical + practical	General questions, reports and discussion
12	**4**	Renewable energy/fossil fuels	The use of fossil fuels and their environmental pollution	Theoretical + practical	General questions, reports and discussion
13	**4**	Renewable energy/nuclear energy	The use of sustainable nuclear energy, its applications and environmental impacts	Theoretical + practical	General questions, reports and discussion
14	**4**	Renewable energy/solar energy	The use of sustainable solar energy, its applications and environmental impacts		
15	**4**	Environmental Laws	definitions		discussion

11. Course Evaluation

The score of the first monthly exam is 20
- The score of the second monthly exam is 20

- Cues and attendance score 5 **- Practical exam score 15** **Quest score 40** **The final practical exam score is 20** **The final semester exam score is 40**

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Environmental geology (Montgomery, 2006)
Main references (sources)	Environmental geology (Montgomery, 2006)
Recommended books and references (scientific journals, reports...)	Environmental Geology/ Handbook of Field Methods and Case Studies (Klaus et al., 2007)
Electronic References, Websites	https://www.googleadservices.com/ https://www.aegweb.org/environmental-geology https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-geology

1. Course Name:
Engineering geology
2. Course Code:
Engineering geology
3. Semester / Year:
Semester 1 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Prof. Dr. Thair Thamer Iltayif Email: thair.t@sc.uobaghdad.edu.iq
8. Course Objectives

Course Objectives	**Understanding the basics of engineering geology and linking geology to engineering as far as common topics are concerned, which are mainly represented by engineering geotechnical examinations and analyzes of ground materials, namely soil and rocks, to reveal the locations of engineering facilities through analysis and interpretation of the results obtained from those examinations and even some results measured from the field.**
9. Teaching and Learning Strategies	
Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **97. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **98. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **99. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **100. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **101. Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** **102. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **103. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with**

	hands-on activities and online learning. **104. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	•	Engineering Geology – general notes Engineering problems – references	**Theoretical explanation and video.**	**Theoretical examination**
2	**2**	•	Soil Analysis, particle size analysis grading curves analysis. Atterberg limits	**Theoretical explanation and video.**	**Theoretical examination**
3	**2**	•	Casagrande Plasticity Chart, Casagrande Classification of Soil	**Theoretical explanation and video.**	**Theoretical examination**
4	**2**	•	Determination of Atterberg Limits (LL and PL). flow curve	**Theoretical explanation and video.**	**Theoretical examination**
5	**2**	•	Compaction, consolidation. Triaxialtest , and Mohr Diagram , Ø and c .	**Theoretical explanation and video.**	**Theoretical examination**
6	**2**	•	Static elastic moduli : mod. of compression, true mod. of elasticity. Tangent modulus. Secant modulus.	**Theoretical explanation and video.**	**Theoretical examination**
7	**2**	•	Dynamic Moduli of Elasticity : Young's Modulas Ed , Poission's Ratio *V*d , Shear ModulasGd .	**Theoretical explanation and video.**	**Theoretical examination**
8	**2**	•	Uniaxial compression test, tensile strength test, point load test, shear box test.	**Theoretical explanation and video.**	**Theoretical examination**
9	**2**	•	Pressure in Earth Masses Boussinesq and Westergaard Methods	**Theoretical explanation and video.**	**Theoretical examination**
10	**2**	•	2:1 Method. andNewmark's Chart.	**Theoretical explanation and video.**	**Theoretical examination**
11	**2**	•	Dams: types, materials, cross-sections, site selection	**Theoretical explanation and video.**	**Theoretical examination**
12	**2**	•	Slope stability: Modes of failure , Conditions for Sliding (plane and wedge) , Toppling and Rockfall	**Theoretical explanation and video.**	**Theoretical examination**
13	**2**	•	Tunnels: terminology, factors affecting stability of tunnels	**Theoretical explanation and video.**	**Theoretical examination**

14	**2**	•	Construction materials: Aggregates, cement, alkali reactions	**Theoretical explanation and video.**	**Theoretical examination**
15	**2**		Roads – layers of road, road prism	**Theoretical explanation and video.**	**Theoretical examination**

11. Course Evaluation

- **Attendance and participation grade: 5**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Practical grade: 15**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	المحاضرات مادة الجيولوجية الهندسية النظري
Main references (sources)	١. Johnson , R.B. , and De Graff , J.V. , 1988 , Principles of Engineering Geology , John Wiley and Sons , New York . 497P . ٢. Krynine , D.P. , and Judd , W.R. , 1957 , Principles of Engineering Geology and Geotechnics , McGraw Hill Book Company , New York , 780P.
Recommended books and references (scientific journals, reports...)	-Engineering Geology 2022
Electronic References, Websites	

1. Course Name:

Engineering geology

2. Course Code:

3. Semester / Year:

first semester/ fourth year 2023-2024

4. Description Preparation Date:

20/4/2024

5. Available Attendance Forms:

Attendance

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

30 hours /3 units

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

Name :Dr. Hamed Hassan Abdullah **Email: hamid.h@sc.uobaghdad.edu.iq**
Lecturer . shatha fathi Hassan **Email: shatha.hassan@sc.uobaghdad.edu.iq**

8. Course Objectives

Course Objectives	Introducing the student to the basics of engineering geology and learning about the behavior of soil and rocks in terms of their physical properties and the way they behave toward the pressures placed on them.

9. Teaching and Learning Strategies

Strategy	1. Theoretical explanation of the practical approach 2. Review some simple scientific experiments related to soil mechanics

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**Soil mechanics**	Basic definitions and introduction to the engineering geological subject	**Theoretical explanation and practical application**	**Report and practical application**
2	**2**	**Soil mechanics**	Physical properties of soil. Density, specific gravity, moisture content	**Theoretical explanation and practical application**	**Report and practical application**
3	**2**	**Soil mechanics**	Three weights: (Dry, Saturated and submerged weights)	**Theoretical explanation and practical application**	**Report and practical application**
4	**2**	**Soil mechanics**	Grading curves and classification of coarse soil	**Theoretical explanation and practical application**	**Report and practical application**
5	**2**	**Soil mechanics**	Grading curves and classification of fine soil	**Theoretical explanation and practical application**	**Report and practical application**
6	**2**	**Soil mechanics**	Determination of liquid and plastic limits and Plasticity Chart	**Theoretical explanation and practical application**	**Report and practical application**
7	**2**	**Soil mechanics**	Pressure in Earth Masses: 1) Boussinesq and Westergaard Methods	**Theoretical explanation and practical application**	**Report and practical application**
8	**2**	**Soil mechanics**	2 : 1 Method and Newmark's Chart	**Theoretical explanation and practical application**	**Report and practical application**

9	**2**	**Rock mechanics**	Modulus of Elasticity for rock and Poisson's ratio	**Theoretical explanation and practical application**	**Report and practical application**
10	**2**	**Rock mechanics**	Trixial compression test **for rock**	**Theoretical explanation and practical application**	**Report and practical application**
11	**2**	**Slope stability analysis**	**Slope stability analysis**	**Theoretical explanation and practical application**	**Report and practical application**
12	**2**	**Mathematical problems in engineering geology**	**Mathematical problems in engineering geology**	**Theoretical explanation and practical application**	**Report and practical application**
13	**2**	**Mathematical problems in engineering geology**	**Mathematical problems in engineering geology**	**Theoretical explanation and practical application**	**Report and practical application**
14	**2**	**Mathematical problems in engineering geology**	**Mathematical problems in engineering geology**	**Theoretical explanation and practical application**	**Report and practical application**
15	**2**	**Practical exam.**	**Examination**	**Practical exam.**	**Practical 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

Exam. Mark 10
Report mark 5
Final exam. Mark 20

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Principle of Engineering geology , Gooff ,1989**
Main references (sources)	**Price, David George, 2008, Engineering Geology: Principles and Practice, Springer, Venkat**
Recommended books and references (scientific journals, reports...)	**Reddy, NIT-Karnataka, 2010, Engineering Geology, Vikas Publishers, Bulletin of Engineering Geology and the Environment**
Electronic References, Websites	**Web site related to engineering geology**

Petroleum Geology – Fourth Stage / Second Semester

1. Course Name:
Petroleum geology
2. Course Code:
Petroleum geology
3. Semester / Year:
2nd semester(2023-2024)
4. Description Preparation Date:
1\2\2024
5. Available Attendance Forms:
Theoretical Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours/60 credits
7. Course administrator's name (mention all, if more than one name)
Name: Assist.Prof.Dr. Buraq Adnan Hussein Email: buraq.hussein@sc.uobaghdad.edu.iq **Name: Dr. Thamer Abdullah Mahdi Email: thamer.mahdi@sc.uobaghdad.edu.iq** **Name: Dr. Rasha Fawzi Faisal rasha.faisal@sc.uobaghdad.edu.iq**
8. Course Objectives

Course Objectives	**This module is designed to describe the different elements and processes that constitute the petroleum system. The module presents the origin, types and characteristics of source rocks and hydrocarbons. It contains the reservoir rocks and their petrophysical properties. The hydrocarbon migration and traps are also included in this module. Main oil fields in Iraq and selected case study will be presented, as well. Tha laboratory work includes the methods of calculation different petrophysical properties of rocks by using well logs. During the module, students learn principles and techniques to differentiate between source, reservoir, and seal rocks through inquiry-based, hands-on activities using typical oil fields data.**

9. Teaching and Learning Strategies

Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **1. Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **2. Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **3. Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **4. Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **5. Technological learning: Utilizing technology in the learning process to provide**

	diverse and stimulating educational experiences, including the use of multimedia and interactive applications. **6. Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **7. Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **8. Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Origin and generation of oil	Origin and generation of oil	Theoretical explanation and practical application.	Interactive participation + Practical exercise
2	4	Stages of thermal maturation	Thermal maturation	Theoretical explanation and practical application.	Interactive participation + Practical exercise
3	4	Types of petroleum components	Petroleum components	Theoretical explanation and practical application.	Interactive participation + Practical exercise
4	4	Hydrocarbons migration mechanism	Hydrocarbons migration	Theoretical explanation and practical application.	Interactive participation + Practical exercise
5	4	Explain the properties of sandstone reservoirs	Sandstone reservoirs	Theoretical explanation and practical application.	Interactive participation + Practical exercise
6	4	Explain the properties of carbonate reservoirs	Carbonate reservoirs	Theoretical explanation and practical application.	Interactive participation + Practical exercise
7	4	Distribution of fluid in the reservoir and types of cap rocks	Reservoir hydrodynamics and seal	Theoretical explanation and practical application.	Interactive participation + Practical exercise
8	4	Evaluating students' understanding of new topics and their skills in applying them	Midterm Exam 1	Theoretical explanation and practical application.	Theoretical and Practical Exam

9	**4**	**Explain the elements of traps and classification**	**Basics of Hydrocarbon traps**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**4**	**Explain the types of structural traps**	**Structural traps**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**4**	**Explain the types of Stratigraphic traps**	**Stratigraphic traps**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**4**	**Explain the Hydrodynamic and combination traps traps**	**Hydrodynamic and combination traps**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**4**	**Understanding of oil exploration methods**	**Oil exploration methods**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**4**	**Understanding of distribution of Iraqi oil field**	**Petroleum systems of Iraq**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
15	**4**	**Evaluating students' understanding of new topics and their skills in applying them**	**Midterm Exam 2**	**Theoretical explanation and practical application.**	**Theoretical and Practical 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

- **Attendance and participation grade: 10**
- **First midterm exam grade: 10**
- **Second midterm exam grade: 10**
- **Project grade: 10**
- **Final practical exam grade: 20**
- **Final theoretical exam grade: 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	**Selley and Sonnenberg, 2014. Elements of Petroleum Geology**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Ore Geology – Fourth Stage / Second Semester

1. Course Name:
Ore Geology
2. Course Code:
Ore Geology 4
3. Semester / Year:
Second semester 2023-2024
4. Description Preparation Date:
1/10/2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Enaam Jumaa Abdullah **Email:** anam.g@sc.uobaghdad.edu.iq

8. Course Objectives	
Course Objectives	**1-** Understanding Ore Formation Processes: The aim of the Ore Geology module is to provide students with a comprehensive understanding of the geological processes involved in the formation of mineral deposits. Students will learn about the various ore-forming processes, including magmatic, hydrothermal, sedimentary, and metamorphic processes. They will explore the factors that control the concentration and enrichment of valuable minerals in specific geological settings. By gaining knowledge of the processes that lead to ore formation, students will be able to identify and characterize different types of mineral deposits and understand the factors that contribute to their economic significance. **2-** Ore Deposit Evaluation and Resource Assessment: Another key aim of the module is to equip students with the skills to evaluate and assess ore deposits. Students will learn the methods and techniques used in exploration, sampling, and geological modeling to estimate the size, grade, and economic potential of mineral deposits. They will gain proficiency in analyzing geological data, such as drill core samples, geophysical data, and geochemical data, to determine the presence and characteristics of ore bodies. By developing expertise in resource assessment, students will be able to contribute to the estimation of mineral reserves and the evaluation of mining projects for sustainable resource management.

	3-Mineral Resource Extraction and Environmental Considerations: The Ore Geology module aims to provide students with an understanding of the extraction of mineral resources and the associated environmental considerations. Students will explore the various mining methods used to extract ores, including underground mining, open-pit mining, and placer mining. They will examine the environmental impacts of mining activities, such as habitat destruction, water pollution, and the release of greenhouse gases. Students will also learn about the principles and practices of responsible mining, including mine reclamation, waste management, and the use of sustainable technologies. By considering environmental considerations in ore extraction, students will develop the knowledge and awareness necessary to contribute to sustainable mining practices and minimize the environmental footprint of mineral resource extraction.

9. Teaching and Learning Strategies

Strategy	Exploration Strategy: The ore geology module focuses on the strategies used to identify and explore potential ore deposits. This includes various techniques such as geological mapping, geochemical sampling, geophysical surveys, and remote sensing. The module emphasizes the importance of understanding the geological setting and structural controls of ore deposits to guide exploration efforts. Students learn about target generation, data interpretation, and decision-making processes involved in designing and implementing effective exploration strategies. **2-** Deposit Characterization Strategy: Once an ore deposit is discovered, the module covers strategies for characterizing its geology and mineralization. This involves detailed sampling, laboratory analyses, and geological modeling. Students learn about the different types of ore deposits, their mineralogy, textures, and geological controls. They study methods to determine the grade, tonnage, and economic viability of the deposit. Emphasis is placed on integrating geological, geochemical, and geophysical data to develop comprehensive models that aid in understanding the deposit's genesis and potential. **3-**Mining Strategy: The ore geology module also delves into the strategies employed in mining operations. This includes selecting appropriate mining methods based on deposit characteristics, economics, and environmental considerations. Students learn about underground and open-pit mining techniques, mine planning, and optimization. They explore strategies for efficient extraction, mineral processing, and metallurgical recovery. The module also covers sustainable mining practices, mine closure planning, and the mitigation of environmental impacts associated with ore extraction.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Basics of economic geology	Basics of economic geology	Theoretical + practical	General questions, reports and discussion

2	**4**	Definition of ore deposits and economic terms	Definition of ore deposits and economic terms	Theoretical + practical	General questions, reports and discussion
3	**4**	Classification and distribution	Classification and distribution	Theoretical + practical	General questions, reports and discussion
4	**4**	Show the characteristics of each group	Show the characteristics of each group	Theoretical + practical	General questions, reports and discussion
5	**4**	Classification of geological processes that form mineral deposits	Classification of geological processes that form mineral deposits	Theoretical + practical	General questions, reports and discussion
6	**4**	Classification of geological processes that form mineral deposits	Classification of geological processes that form mineral deposits	Theoretical + practical	General questions, reports and discussion
7	**4**	Classification of geological processes that form mineral deposits	Classification of geological processes that form mineral deposits	Theoretical + practical	General questions, reports and discussion
8	**4**	Showing the types of mineral formations within the rock layers	Showing the types of mineral formations within the rock layers	Theoretical + practical	General questions, reports and discussion
9	**4**	Showing the types of structural textures for material compositions	Showing the types of structural textures for material compositions	Theoretical + practical	General questions, reports and discussion
10	**4**	Showing the types of structural textures for material compositions	Showing the types of structural textures for material compositions	Theoretical + practical	General questions, reports and discussion
11	**4**	Showing methods of investigating and exploring raw materials	Showing methods of investigating and exploring raw materials	Theoretical + practical	General questions, reports and discussion
12	**4**	Classification of types and spread of gemstones	Classification of types and spread of gemstones	Theoretical + practical	General questions, reports and discussion
13	**4**	Types and distribution	Types and distribution	Theoretical + practical	General questions, reports and discussion
14	**4**	Types and distribution	Types and distribution	Theoretical + practical	General questions, reports and discussion
15	**4**	**Exam**			

11. Course Evaluation

The score of the first monthly exam is 20
- The score of the second monthly exam is 20
- Cues and attendance score 5
- Practical exam score 15
Quest score 40 (25 theoretical + 15 practical)
The final practical exam score is 20
The final semester exam score is 40

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ore Geology and Industrial Minerals(ANTHONY M. EVANS, 1993)
Main references (sources)	
Recommended books and references (scientific journals, reports...)	**Ore Deposits: Origin, Exploration : by** Sophie Decree (Editor), Laurence Robb (Editor)2019
Electronic References, Websites	https://www.amazon.com/Introduction-Ore-Forming-Processes-Laurence

Environmental Pollution – Fourth Stage / Second Semester

1. Course Name:	
Environmental pollution	
2. Course Code:	
Environmental pollution 2	
3. Semester / Year:	
Second semester 2023-2024	
4. Description Preparation Date:	
10/1/2023	
5. Available Attendance Forms:	
Present / theoretical / practical	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30/30 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Murtadha Jabbar Issa **Email: murtadha.issa@sc.uobaghdad.edu.iq**	
8. Course Objectives	
Course Objectives	**1- Identify environmental pollutants, which include air, water and soil pollution by measuring the main chemical elements and toxic trace chemical elements for the purpose of obtaining a healthy and sustainable environment.** **2- Developing students' skills by taking environmental samples and analyzing them, then drawing geological data and interpreting maps, graphs, and satellite images to assess environmental risks.** **3- Communication and cooperation by providing the relevant ministries with researchers for the purpose of assessing risks and strategy for preserving the environment, developing the ability to work cooperatively, and establishing consulting offices for the purpose of identifying the environmental risk of laboratories, factories, and various activities.**
9. Teaching and Learning Strategies	
Strategy	**1- Integrated Field Studies: One of the strategies used in environmental pollution is integrating field studies into the curriculum. Field studies provide students with practical experiences to monitor and analyze geological features and processes in environmental pollution. Students can visit geological sites such as coastlines, river valleys, or areas affected by natural hazards to apply their theoretical knowledge and develop practical skills in data collection, geological mapping, and sample analysis. This strategy allows students to deepen their understanding of geological concepts and their relevance to environmental pollution issues, as well as enhance direct communication between theory and real-world applications.** **2- Hazard Mapping and Risk Assessment: Environmental pollution involves strategies for hazard mapping and risk assessment to evaluate and mitigate environmental risks. Students learn to identify and map areas prone to natural hazards such as earthquakes, landslides, or floods using geological and spatial geographic data.**

	They develop skills in analyzing geological structures, terrains, and historical hazard events to assess potential impacts on populations and infrastructure. By applying quantitative risk assessment methodologies, students can prioritize areas for risk mitigation measures, including land use planning, engineering solutions, and emergency preparedness strategies. 3- Collaboration and Interdisciplinary Approach: Environmental pollution encourages collaboration and interdisciplinary approaches to address complex environmental challenges. Students collaborate with professionals from various fields such as environmental sciences, engineering, and policymaking to develop comprehensive solutions. This strategy promotes the exchange of diverse ideas and perspectives and integrates different experiences to address environmental issues holistically. Through engaging in collective projects, discussions, and presentations, students enhance communication, teamwork, problem-solving skills, and prepare for multidisciplinary work environments where collaboration is essential for effective environmental management.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The reality of environmental problems	Supplies and	Theoretical + practical	General questions, reports and discussion
2	4	The reality of environmental	problems in Iraq	Theoretical + practical	General questions, reports and discussion
3	4	Environment and future	generations	Theoretical + practical	General questions, reports and discussion
4	4	The basic concepts of environmental geology	environmental geology	Theoretical + practical	General questions, reports and discussion
5	4	Examples of industrial risks	Examples	Theoretical + practical	General questions, reports and discussion
6	4	Sources of air pollution	Examples and solutions	Theoretical + practical	General questions, reports and discussion
7	4	Sources of water pollution	Examples and solutions	Theoretical + practical	General questions, reports and discussion
8	4	Allimnologip cycle of lakes	environmental problems and solutions	Theoretical + practical	General questions, reports and discussion
9	4	Hydro chemical surveys of various	Global units	Theoretical + practical	General questions, reports and discussion
10	4	water sources	Risk and solutions	Theoretical + practical	General questions, reports and discussion
11	4	Classification of water-the theory of the spread of pollutants	For local and international	Theoretical + practical	General questions, reports and discussion
12	4	Pollution standards	Global	Theoretical + practical	General questions, reports and discussion
13	4	Processors to reduce water pollution	Use of geological materials	Theoretical + practical	General questions, reports and discussion

14	**4**	**The radioactive contamination**	**air pollution**	Theoretical + practical	General questions, reports and discussion
15	**4**	**Oil Pollution and Medical Geological**	**Applied**	Theoretical + practical	General questions, reports and discussion

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)	Environmental geology (Montgomery, 2012)
Main references (sources)	Kabata-Pendias, A., 2000. Trace elements in soils and plants. CRC press.
Recommended books and references (scientific journals, reports...)	Environmental Geology/ Handbook of Field Methods and Case Studies (Klaus et al., 2007)
Electronic References, Websites	https://www.googleadservices.com/ https://www.aegweb.org/environmental-geology https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-geology

1. Course Name:
Environmental Pollution
2. Course Code:
Environmental Pollution 4
3. Semester / Year:
Semester 2 / 2023 - 2024
4. Description Preparation Date:
1 / 10 / 2023
5. Available Attendance Forms:
Practical Lab Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Professor Dr. Murtadha Issa **Assistant Professor Dr. Firas Mudhafar Abdulhussein** **Lecturer Dr. Hind Fadhil Abdullah** **Email: murtadha.issa@sc.uobaghdad.edu.iq** **firas.mudhafar@sc.uobaghdad.edu.iq** **hind.abdullah1108@sc.uobaghdad.edu.iq**

8. Course Objectives

Course Objectives	**1- Developing perception and comprehension skills with analytical thinking about the concepts of environmental pollution.** **2- Realizing the importance of reducing environmental pollution.** **3- Environmental studies occupy a wide area of knowledge fields that are employed in a number of specializations that meet some of the needs of current human civilization and attempt to find appropriate solutions to a number of its various problems.** **4- Detecting the impact of human activities on environmental pollution.** **5- Understanding the basics of environmental pollution.** **6- Study the sources of environmental pollution.** **6- Study the distribution of pollutants in the air, water and soil.** **7-Learn about ways to prevent pollution.**

9. Teaching and Learning Strategies

Strategy	**Teaching and learning strategies rely on a variety of methods and approaches aimed at effectively achieving educational objectives, including:** **1.Active learning: Encouraging students to actively engage in the learning process through activities such as group discussions, hands-on experiments, and research projects.** **2.Cooperative learning: Promoting students to work together as a team to solve problems and accomplish tasks, fostering social interaction, collaboration, and communication skills.** **3.Self-directed learning: Empowering students to take responsibility for their learning process by providing the necessary resources and tools for self-directed learning and motivating them to use them effectively.** **4.Inquiry-based learning: Encouraging students to actively explore topics and concepts through inquiry, self-directed research, and data collection, enhancing critical and creative thinking skills.** **5.Technological learning: Utilizing technology in the learning process to provide diverse and stimulating educational experiences, including the use of multimedia and interactive applications.** **6.Continuous assessment: Providing feedback and ongoing assessment of student performance to help them improve their performance and achieve learning objectives more effectively.** **7.Blended learning: Integrating a variety of teaching methods and resources in the educational process, such as traditional lectures with hands-on activities and online learning.** **8.Promoting interaction: Encouraging students to actively participate in the lesson through asking questions, discussions, solving puzzles, and interactive tasks.** **Employing these strategies appropriately can enhance the learning experience and maximize student benefits in various educational contexts.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**Evaluation of air pollution by suspended particles**	**Air pollution (Particulate matter)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**

2	**2**	**Evaluation of air pollution by gases**	**Air pollution (Gases pollution)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
3	**2**	**Evaluation of air pollution with heavy metals**	**Air pollution (Heavy metals)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
4	**2**	**Evaluating the suitability of water for human drinking**	**Water Quality for Human Drinking**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
5	**2**	**Evaluating the suitability and quality of water for agricultural and irrigation purposes**	**Irrigation water quality**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
6	**2**	**Evaluation of water pollution with heavy metals**	**Water pollution (Metal Index Calculation)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
7	**2**	**Assessing the risk to human health**	**Water pollution (Human health risk assessment)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
8	**2**	**Midterm Exam 1**	**Midterm Exam 1**	**Practical Exam 1**	**Practical Exam 1**
9	**2**	**Evaluation of contamination by various pollutants of groundwater**	**Groundwater Pollution**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
10	**2**	**Evaluating soil quality and extent of contamination**	**Soil Pollution (pollution index)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
11	**2**	**Evaluating soil quality and extent of contamination**	**Soil Pollution (Enrichment factor)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
12	**2**	**Evaluating soil quality and extent of contamination**	**Soil Pollution (metal pollution)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
13	**2**	**Evaluating soil quality and extent of contamination**	**Soil Pollution (Geo accumulation factor)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**
14	**2**	**Evaluating the impact of soil pollution on human health**	**Soil pollution (Human health risk assessment)**	**Theoretical explanation and practical application.**	**Interactive participation + Practical exercise**

15	**2**	**Exam 2**	**Exam 2**	**Practical Exam 2**	**Practical Exam 2**

11. Course Evaluation

- **The score of the first monthly exam is 20**
- **The score of the second monthly exam is 20**
- **Cues and attendance score 5**
- **Practical exam score 15**
- **Quest score 40**
- **The final practical exam score is 20**
- **The final semester exam score is 40**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	**Pepper, I. L., Gerba, C. P., and Brusseau, Mark L., 2006; Environmental and pollution science. 2nd ed., Elsevier Academic Press, 628 p.** **Montgomery, C., W., 2006; Environmental Geology. McGraw Hill, Companies Inc., Boston, 7th ed., 346 P.**
Recommended books and references (scientific journals, reports...)	**Weiner E. R., 2008; Applications of Environmental Aquatic Chemistry A Practical Guide, 2nd ed., CRC Press, USA, Taylor & Francis Group, ISBN 978-0- 8493-9066-1 (alk. paper).**
Electronic References, Websites	