Soran University

Course Description

Basic Course Information	
University	Soran University
Faculty	Engineering
Department	Civil and Environmental Engineering
Course Title	Geology and Geotechnical Engineering
Semester	5
Number of Units/ Credit	6
Hours per a week	6

Basic Instructor Information	
Name and Scientific Title of the Instructor	Ako Abdollah Daraei, PhD.
Email Adress and Phone number (if permitted)	Ako.daraei@soran.edu.iq
Office Hours	6
Preferred Method of Contact	Email
Teaching Assistant Name (if there is one)	Baran Sami
Contact Information of Teaching Assistant	

Basic Course Information	
Introduction to the course and how does this course fits in the college or department curriculum	This course provides civil engineering students with a foundational understanding of geology and geotechnical engineering, focusing on the identification of earth materials, interpretation of geological structures, site investigation methods, rock mechanics, and ground control techniques. It plays a critical role in the civil engineering curriculum by linking geological sciences with engineering applications, ensuring students are equipped to assess and manage ground conditions in construction and infrastructure projects. The knowledge gained supports advanced subjects such as soil mechanics, foundation engineering, and environmental geotechnics, and contributes to the development of sustainable, safe, and responsible engineering practices.
Course Learning outcome which fits department, faculty and University's learning outcomes.	• Identify and classify rocks and minerals relevant to civil engineering. • Interpret geological structures affecting site stability. • Conduct and evaluate site investigations using geotechnical methods. • Analyze mechanical properties of rock materials under load.

	• Apply rock mass classification for engineering design. • Propose safe and sustainable ground control solutions. • Demonstrate professional ethics and responsibility. • Work effectively in teams and communicate technical information. • Engage in lifelong learning and research in geotechnical engineering.
What are skills and competences that could be developed throughout this course	• Technical Knowledge: Identify and analyze minerals, rocks, geological structures, and ground conditions relevant to civil engineering. • Practical Skills: Conduct site investigations, perform lab tests, and use geotechnical tools and software. • Problem-Solving: Apply rock mechanics and classification to develop safe, effective engineering solutions. • Communication: Prepare clear technical reports and present findings to teams and stakeholders. • Safety and Risk Management: Understand and apply safety standards in fieldwork and ground control. • Ethics and Professionalism: Make responsible decisions respecting environmental and societal impacts. • Teamwork and Leadership: Collaborate effectively and lead multidisciplinary engineering projects. • Lifelong Learning: Stay updated with new methods and technologies in geotechnical engineering.
How this course connects academia to society and marketplace	• Prepares students to solve real-world ground engineering problems impacting infrastructure and communities. • Promotes sustainable and safe engineering practices to protect the environment and public safety. • Aligns with industry standards and technologies for job readiness in construction and consulting sectors. • Develops teamwork and communication skills for collaborative engineering projects. • Encourages research and innovation to stay current with market and societal needs.
Course pre-requisites (if there is any)	------

Course Requirements and Assessment Overview

Pre-requirements: Reading a book, an article, watching a movie or a documentary, Knowing a language or any other requirement	• Basic knowledge of Physics and Mathematics (especially mechanics and calculus). • Familiarity with English language for reading technical materials and reports. • Recommended reading: Introductory textbooks on Geology or Soil Mechanics. • Optional: Watching documentaries or videos on earth sciences or geotechnical engineering to build context.
Nature of assessment, method and types of examination	• Nature: Tests both theory and practical skills. • Methods: Written exams, lab reports, fieldwork, projects, and presentations. • Exam Types: Midterms, practical exams, and continuous assessments like quizzes and assignments.
Deadlines and test dates, description of grading procedure	• Quiz: After completion of each chapter (6 quizzes total) • Midterm Exam: Week 7 • Final Exam: Week 14

	• Lab Reports: Due one week after each lab session • Fieldwork Assignments: Submitted within two weeks of completion [if any] • Project Submission [if any]: Week 12 • **Quizzes:** 10% (after each chapter) • **Midterm Exam:** 20% • **Final Exam:** 50% • **Lab Reports:** 10% • **Gallery walks**: 5% • **Report and Assignments**: 5%

Suggested Scientific Recourses

1) Sivakugan N., Shukla S.K., Das B.M. (2013). Rock Mechanics, an introduction. CRC press.
2) Xiao, M. (2015). Geotechnical Engineering design, John wiley and sons.
3) Bell F.G. (2007). Engineering Geology. 2nd edition. Elsevier
4) Waltham T. (2005). Foundations of engineering geology. 2nd edition. Spon pres

Student Support Resources

Textbook and other required materials.	
Campus Resources, scientific consultant, counselling.	**Scientific consultant**: members of Scientific Committee **Counselling:** health.safety@soran.edu.iq
Career Development Centre (CDC)	cdc@soran.edu.iq
Other student supports	

University Policies

• University based policies- Academic Integrity	https://main.soran.edu.iq/student-affairs/8
• Course specific policies, participation, behaviour, late assignments, test dates, etc..	•
Regulation of Student's Absence Record	https://main.soran.edu.iq/student-affairs/11
Statement on Accommodation	https://main.soran.edu.iq/student-affairs/4
Emergency Response Plan	https://main.soran.edu.iq/student-affairs/10
Codes of misconduct	https://main.soran.edu.iq/student-affairs/6

Important dates, deadlines	

Delivery and Workload		
Type of Learning g time	**Number of Hours**	**Percentage**
Contact time	90	60
Directed-self study	30	20
Self-directed Learning	15	10
Assessment and Review	15	10
Total	150	100

WORKLOAD

The information below is provided as a guide to assist students in engaging appropriately with the course requirements. Please note that, in general, for each formal contact hour, it is expected that a minimum of 2 additional hours of independent study are undertaken. The following table shows an estimate of students' workload:

Work Type (Activities)	Quantity	Duration (Hrs.)	Total (Hrs.)
Wider reading (independent)	6 chapters	2	12
Wider reading (directed)	6 chapters	1.5	9
Exam revision / preparation	2 Exams	6	12
Peer assisted learning	4 sessions	1.5	6
Advances preparation for classes	10 weeks	1	10
Preparation for tutorials	6 tutorials	1	6
Preparation for presentations	1	3	3
Preparation for seminars	--	---	---
Preparation for performance	--	--	--
Preparation of practical report	4 -6 reports	2	8-12
Completion of formative assessment tasks	6 quizzes	1	6
Revision and preparation for in-class or end of module examination	6 chapters	1	6
Group study tasks	4	2	8

	sessions		
Carry-out research project	---	----	----
Dissertation writing	---	----	----
Essay preparation – may include conducting research, analyzing data, editing the finished product	---	---	---
Reflection – for example, lecture consolidation or engaging with feedback	---	---	---
Total hours by term			
Module total hours			

ECTS based on Student Workload

Activates	Quantity	Duration (Hrs)	Total Workload (Hrs)
Course Duration	14	3	42
Tutorial	14	1	14
Practical	7	3	21
Mid-term Examination	1	2	2
Final Examination	1	2	2
Assignments	5	5	25
Hours for off-the-classroom study	13	1	13
Term Projects	1	40	40

Weekly Syllabus

week	topic	Description	Week's learning outcomes that fit course learning outcomes	Teaching and Learning Activities	Assessment	Note
Week one Week two Week three	**Mineralogy and Petrology**	Study of minerals and rocks, their formation, and characteristics relevant to engineering.	Students will identify common minerals and rocks and understand their formation, building a foundation for practical engineering applications.	Lectures with visual aids and mineral/rock samples Laboratory sessions for hands-on identification and analysis	Quiz/ lab report	

				Field trips to collect and study rock specimens		
Week four Week five	**Geological Structures**	Overview of faults, folds, and joints, and their effects on ground stability.	Students learn to recognize faults, folds, and joints, and assess their impact on ground stability and design decisions.	Interactive lectures with diagrams and case studies Geological mapping exercises Group discussions on real-world structural impacts	Quiz, field report	
Week six Week seven	**Site investigation**	Methods for assessing soil and rock conditions to support safe engineering design.	Students develop skills to plan and conduct site investigations and interpret geotechnical data for real-world projects.	Demonstrations of field investigation techniques Practical site visits for data collection Workshops on data analysis and reporting	Quiz, lab report	
Midterm Exam						
Week eight Week nine	**Mechanics and properties of rock material**	Examination of rock strength and behavior under different stresses.	Students study rock behavior and apply tests to evaluate strength and stability for engineering use.	Lab experiments testing rock strength and properties Problem-solving sessions with real engineering cases Software tutorials for rock mechanics simulations	Quiz, report	
Week ten Week eleven	**Rock mass classification**	Techniques to categorize rock masses to inform construction decisions.	Students classify rock masses using standard systems to assess ground quality and guide design choices.	Case study reviews of classification systems (RMR, Q-system) Hands-on exercises classifying rock masses from sample data Group projects analyzing site	Quiz, field report	

				conditions		
Week twelve Week thirteen	**Ground control**	Strategies to ensure stability and safety during excavation and construction activities.	Students learn ground control techniques focused on safety and stability during construction and excavation.	Lectures on ground control methods and safety protocols Simulated design exercises for excavation support Safety drills and risk assessment workshops	Quiz, field report	
Week fourteen	**Preparation**					
Week fifteen	**Final Exam**					

Guidelines on grading policy					
ECTS Grade	Definition	US Grade	US %	IRQ%	Grade point Average
A – Excellent	Outstanding performance	A	90-100%	90-100%	5.0
B – Very Good	Above average with some errors	B	80-89%	80-89%	4.0
C - Good	Sound work with notable errors	C+	75-79%	70-79%	3.0
D – Satisfactory	Fair but with major shortcomings	C	70-74%	60-69%	2.0
E – Sufficient	Work meets minimum criteria	D	60-69%	50-59%	1.0
FX - Fail	More work required but credit awarded			0-49	0.0
F- Fail	Considerable amount of more work required				

Important Note

- *Students are requested to monitor the comprehensive fulfilment of the learning outcomes as outlined in the coursebook on a weekly basis. The evaluation of your academic performance is finally aligned with these outcomes, as exam questions will be derived from them. Should you come across any binding item of the learning outcomes that has not adequately addressed, it is incumbent upon you to promptly communicate this to the module lecturer, informing them of your difficulty in achieving the specified outcome.*

- *Please note that this coursebook serves as a binding academic contract; both lecturers and students are required to sign a form demonstrating their full commitment to adherence to the provisions detailed therein.*

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