



Ministry of Higher Education and
Scientific Research - Iraq

University of Warith Al_Anbiyaa....
College of Engineering
Oil and Gas Department



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Structure geology		
Module Type	Basic		
Module Code	OGE215		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGII	Semester of Delivery	1
Administering Department	OGE	College	Engineering
Module Leader	Salam Jabbar Hussain	e-mail	salam.jabar@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PH.D
Module Tutor	NA	e-mail	
Peer Reviewer Name		e-mail	

Scientific Committee Approval Date	01/06/2023	Version Number	1.0			
Relation with other Modules						
العلاقة مع المواد الدراسية الأخرى						
Prerequisite module	GEGE122	Semester	2			
Co-requisites module	None	Semester				
Module Aims, Learning Outcomes and Indicative Contents						
أهداف المادة الدراسية ونتائج التعلم والمحفوظات الإرشادية						
Module Aims أهداف المادة الدراسية	<p>Explain basic concepts related to structural geology</p> <p>Study the relationship between structure geology and petroleum engineering</p>					
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ul style="list-style-type: none"> * An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. * An ability to develop the confidence necessary to successfully solve Mathematical problems. * An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. 					
Indicative Contents المحفوظات الإرشادية	<p>The outcomes of this course are used to study the stress and ductile deformation, thus understand rock mechanic and relation with petroleum engineering. Also, study the concepts of folds and fractures, thus understand hydrocarbon migration and traps. A successful petroleum engineers needs a broad background, and a willingness to learn and apply a wide range of information and techniques to the problems of finding, developing, and exploiting a petroleum reservoir.</p>					
Learning and Teaching Strategies						
استراتيجيات التعلم والتعليم						
Strategies	<p>1- Explain fundamental concepts relevant to structure geology</p>					

	2- Explain the concepts of stress and brittle deformation
	3- Explain the concepts of stress and ductile deformation
	4- Explain the fault connectivity during hydrocarbon migration
	5- Explain naturally fractured Reservoirs
	6- Explain the concepts of folds and hydrocarbon traps

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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 7
	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)	7	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	Stress in rocks: Introduction, Traction, Stress components.
Week 2	Stress in two dimensions, Biaxial stress, Uniaxial stress, Pure shear stress, Stress in three dimensions
Week 3	Deformation and strain, homogeneous strain and the strain ellipsoid, strain path, Coaxial and non-coaxial strain accumulation, superimposed strain,
Week 4	Strain quantities: Longitudinal Strain, Volumetric Strain, Angular Strain, Other Strain Quantities
Week 5	Faults: introduction, Fault components/Terminologies, the attitude of fault, classification of fault, Dip Slip Faults, Listric Normal Fault, Strike slip fault, Transfer fault, Tear Fault, Transform fault, Scissors fault
Week 6	Principal stress orientation for three main fault types: Normal Fault systems (Horst and graben and Half-Graben Blocks), Geometric classification of fault, Classification based on rake of net slip, Classification Based on attitude of fault relative to altitude of adjacent beds, Classification Based on fault pattern, Classification Based on angle at which fault dips, Fault activity
Week 7	Geological factors in characterizing fault connectivity during hydrocarbon migration, Parameters characterizing fault connectivity, Parameterization of geological factors controlling fault connectivity, case study (Effectiveness of selected parameters in assessing fault connectivity), Fault traps
Week 8	Joints: introduction, Joint patterns, Master joints, Plumose Structure, Twist hackle, Systematic and Non-systematic Joints, Joint Sets and Joint Systems, Cross-Cutting Relations between Joints, Joint Spacing in Sedimentary Rocks,
Week 9	Origin and interpretation of joints (Joints Related to Uplift and Unroofing, Formation of Sheeting Joints, Natural Hydraulic Fracturing, Stylolite joints), Mechanics of jointing
Week 10	The Nature of Naturally Fractured Reservoirs, Open and healed fractures, naturally fractured reservoirs classification, Fractured Rocks Properties (porosity, permeability, Compressibility)
Week 11	Fold: introduction, Folding processes, Mechanical role of layers: Active / passive folding, Folding mechanisms (Bending, Lithospheric-scale flexures, Buckling (Single layer buckling, Multilayer

	buckling, Influence of spacing) Flexural Folding. Flowage Folding, Shear Folding, Folding Due to intrusions, Folding Due to Differential Compression,
Week 12	Fold types, Geometric of folded surface, classification of fold based on Shape and orientation, Classification of folds relative to hinge curvature is referred to as bluntness, Classification based on the orientation of the hinge line and the axial plane, Fold axis orientation, Classification based on Interlimb angles, Fold Symmetry
Week 13	Fold dimensions (draw and calculations), Orientation of a plane (dip and strike), Draw and calculations thickness and depth of beds
Week 14	Dom, hydrocarbon traps
Week 15	Structural basin geology
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Structural maps
Week 2	Calculation the thickness of layers from maps
Week 3	Calculation the thickness of layers (case one)
Week 4	Calculation the thickness of layers (case two)
Week 5	Calculation the thickness of layers (case three)
Week 6	Calculation the depth of layers (case one , two)
Week 7	Calculation the depth of layers (case three)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Natural Fractured Reservoir Engineering The Nature of Naturally Fractured Reservoirs	No
Recommended Texts	Structure geology	No
Websites		

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.

كلية الهندسة