Ministry of Higher Education and
Scientific Research - Iraq

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

		Module Delivery	
Module Title	Well Logging and Formation Evaluation II	**Module Delivery**	
Module Type	Core learning activity	☒ Theory	
Module Code	OGE322	☐ Lecture	
ECTS Credits	6	☒ Lab	
		☒ Tutorial	
SWL (hr/sem)	150	☐ Practical	
		☐ Seminar	

Module Level	UGIII	**Semester of Delivery**	2	
Administering Department	OGE	**College**	College of Engineering	
Module Leader	Salam Khalid	**e-mail**	salam.khalid@uowa.edu.iq	
Module Leader's Acad. Title	Asst.Lecturer	**Module Leader's Qualification**	M.SC	
Module Tutor	NA	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	

Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	OGE312	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Formation evaluation is the application of scientific principles, engineering concepts, and technological innovations in the exploration and prospecting of hydrocarbon resources in geological formations in an environmentally sustainable and responsible manner. It involves detailed and systematic data acquisition, gathering, analysis, and qualitative and quantitative interpretation while applying scientific and engineering principles. It is an ever-growing and evolving field of petroleum engineering. The applications of well-logging tools in formation evaluation should be covered in this module. Furthermore, modern software such as IP, Tech-log, and Geo-log Should be used in the evaluation
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To detect reservoir type (lithology) and thickness. 2- To determine clay volume from well logging data. 3- To estimate the porosity and permeability. 4- To determine the fluid type present in the pores and saturation level. 5- To find the prospective zones of hydrocarbon. 6- To economically establish the existence of producible hydrocarbon reservoirs (oil and gas).

	7- Have skills to use modern software in formation evaluation
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: **Part I: well logs interpretation** Learn how to interpret the data of well logs and calculate the petrophysical properties using these data **Part II: Formation evaluation** Gathering the calculated petrophysical properties and evaluating the underground formation. Furthermore, determine the perforation intervals.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as train students to implement many practical exercises in the laboratory (which covers most of what is studied in theoretical lectures), which in turn gives students the ability to carry out the work required of them in the future in their practical life.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem)	150		

	الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and Steps to Evaluate the Formation
Week 2	Determination of petrophysical properties
Week 3	Digitizing log data, Depth matching, and environmental corrections
Week 4	Lithology identification using the cross-plots method
Week 5	Mineralogy identification and clay distribution

Week 6	Clay volume calculation using single and double clay indicators
Week 7	Porosity Determination using well logs data
Week 8	Permeability and relative permeability concept
Week 9	Permeability prediction using the flow zone indicator method
Week 10	Reservoir fluid saturation
Week 11	Fluid saturation estimation correlations
Week 12	Hingle and Pickett Methods
Week 13	Net pay with cut off
Week 14	Determination of initial oil and gas in place
Week 15	Fracture porosity determination
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	How to import the Las files to an IP program
Week 2	Make environmental corrections to well-log data
Week 3	Clay volume determination using log data
Week 4	Porosity determination using log data
Week 5	Permeability prediction using log data
Week 6	Fluid saturation estimation using log data

Week 7	Cut-off values calculation and net pay

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Ellis, D. V., and Singer, J. M. (2007).Well Logging for Earth Scientists, the Netherland, 2nd Edition, Springer.	Yes
Recommended Texts	1. Richard Bateman, "Open-hole Log Analysis and Formation Evaluation", IHRDC Publishers New York 2. Hilchie, D. W. (1982). Applied open-hole log interpretation (for geologists and engineers), USA DW Hilchie. 3. Serra, O. (2008). Well logging handbook. Editions Technip. 4. Serra, O. E. (1983). Fundamentals of well-log interpretation. Elsevier 5. Bessiouni, Z. (1994). Theory, Measurement and Interpretation of Well Logs, Texas, SPE text book series, Vol.4. 6. Kadhim F.S., and Samsuri A. (2015), Cementation Factor Relationships to Carbonate Rock Properties, Lambert Academic Publication , Germany 7. Schlumberger, (1989). Log Interpretation-Principles/Applications, Eight Printing, Sugar Land,Texas. 8. Toby, D. (2005). Well Logging and Formation Evaluation, USA, Elsevier.	No

	9. Pradyut B. (2012). Formation Evaluation Based on Logging Data,	
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.