	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	Production Engineering I	**Module Delivery**	
Module Type	**Core learning activity**		☒ **Theory**
Module Code	OGE313		☐ **Lecture**
ECTS Credits	**4**		☐ **Lab**
SWL (hr/sem)	**100**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	UGIII	**Semester of Delivery**	5
Administering Department	OGE	**College**	ENG
Module Leader	Dr.Salam Jabar	**e-mail**	salam.jabar@uowa.edu.iq
Module Leader's Acad. Title	Ass. Prof. Dr	**Module Leader's Qualification**	PhD
Module Tutor	2	**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	ENG223, OGE224	**Semester**	4
Co-requisites module	1- It provides abroad foundation in the basic of science and engineering.	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of the production engineering module in the third grade of the petroleum engineering department is to provide students with a comprehensive understanding of the principles and practices involved in the production of oil and gas. The module focuses on developing students' knowledge and skills related to the design, optimization, and management of oil and gas production systems. Well Completion and Stimulation: Students will gain knowledge of well completion techniques and stimulation methods. This includes understanding different types of well completions, hydraulic fracturing, and acidizing. Field Development Planning: Students will gain an understanding of field development planning processes. They will learn how to evaluate reservoir potential, estimate recoverable reserves, and design production strategies for optimal field development.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand the fundamental principles of production engineering: Students should be able to demonstrate a comprehensive understanding of the basic principles and concepts of production engineering, including reservoir characteristics, fluid flow, well completion, and artificial lift methods. Analyze and interpret production data: Students should be able to collect and analyze production data from oil and gas wells, interpret the results, and identify potential production issues or opportunities for optimization. Design well completions: Students should be able to design and optimize well completions, considering factors such as reservoir characteristics, wellbore stability, and production objectives. They should also be able to evaluate different completion techniques and select the most appropriate ones for specific reservoir conditions.

	Evaluate and select artificial lift methods: Students should be able to assess different artificial lift methods, including gas lift, sucker rod pumps, electric submersible pumps (ESPs), and hydraulic pumps. They should be able to analyze well performance and reservoir characteristics to select the most suitable artificial lift method for maximizing production. Identify and troubleshoot production problems: Students should be able to identify common production problems, such as scaling, sand production, and wax deposition, and propose effective solutions to mitigate or eliminate these issues. They should also be familiar with troubleshooting techniques to address equipment failures or operational challenges. Understand production optimization techniques: Students should be aware of various production optimization techniques, such as well stimulation, hydraulic fracturing, and workover operations. They should be able to evaluate the potential benefits and limitations of these techniques and apply them to enhance production rates and ultimate recovery. Apply health, safety, and environmental practices: Students should demonstrate a strong commitment to health, safety, and environmental practices in the production engineering field. They should be aware of relevant regulations and industry standards and incorporate them into their decision-making process to ensure safe and environmentally responsible operations. Communicate effectively: Students should be able to communicate technical concepts, analysis results, and recommendations effectively, both orally and in written form. They should be able to present their findings and ideas to both technical and non-technical audiences, demonstrating clarity, coherence, and professionalism.
Indicative Contents المحتويات الإرشادية	Introduction to Production Engineering: Overview of production engineering in the petroleum industry, its importance, and its role in maximizing hydrocarbon recovery. Reservoir Fluid Properties: Understanding the behavior of reservoir fluids, including oil, gas, and water, their physical properties, phase behavior, and their impact on production. Well Performance: Analyzing the performance of oil and gas wells, studying inflow and outflow performance relationships, wellbore flow, and pressure behavior. Well Completion: Techniques and technologies for completing and optimizing oil and gas wells, including completion design, perforation strategies, and well stimulation.

	Artificial Lift Systems: Introduction to artificial lift methods, such as rod pumping, gas lift, and electric submersible pumps (ESP), and their application in enhancing production from oil and gas wells. Wellbore Hydraulics: Understanding the fluid flow behavior in wellbores, pressure drop calculations, and optimization of production rates through proper design and selection of tubing and flow control equipment. Production Facilities: Introduction to surface production facilities, including separators, storage tanks, pumps, compressors, and pipelines, and their role in the processing and transportation of hydrocarbons. Production Optimization: Techniques for optimizing production rates and enhancing hydrocarbon recovery, such as nodal analysis, artificial lift optimization, water and gas injection strategies, and reservoir management. Well Surveillance and Production Monitoring: Methods for monitoring well performance, data acquisition, analysis, and interpretation, and the use of surveillance tools to diagnose and troubleshoot production issues. Production Forecasting: Introduction to production forecasting techniques, decline curve analysis, material balance, and numerical simulation for predicting future production rates and reservoir behavior.

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. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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	Type of well – total production system and its component
Week 2	Types of completion single, dual, triple zones(advantage and disadvantage of each of the completion)
Week 3	- Gathering line on the surface, and Types of storage tanks, requirement and definition.

Week 4	Separator definition, Separator types and classification, Separator and the separation mechanism, the effect on separation mechanism
Week 5	Separator sizing and calculation of each phase area.
Week 6	Conning definition and different methods to calculate the critical flow
Week 7	Choke performance, type of chokes, importance of choke for production practice.
Week 8	Different methods to calculate the choke performance(Gilbert and Ros).
Week 9	Introduction to well stimulation, types of well stimulation.
Week 10	Hydraulic fracture and its calculation (dimension of hydraulic fracture)
Week 11	Drill Stem Test: introduction to well test, requirement to well test.
Week 12	Calculation of permeability (k), skin factor(S), initial pressure(Pi) and pressure drop due to skin.
Week 13	Practice to calculate different parameters from DST
Week 14	- Final Project and Exam Preparation - Completion of a well test project
Week 15	Exam preparation and review
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Pressure transient testing, John Lee, John Rollins, John Spivey. SPE Textbook service, Vol. 9 2. Reservoir Engineering Handbook; Tarek Ahmed; Gulf publishing.	Yes

	3. Artficial-lift-methods-vol-4. 4. Beggs-d-Production-Optimization-Using-Nodal-analysis	
Recommended Texts		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.