

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية لمادة الفيزياء

Module Information			
معلومات المادة الدراسية			
Module Title	Physics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	PE125		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	PE	College	COENG
Module Leader	Dhifaf Jaafar Sadeq		e-mail
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module aims to: 1- Introduce foundational physics principles essential for petroleum engineering. 2- Develop analytical and problem-solving skills through theoretical and applied contexts. 3- Connect physical laws to petroleum systems such as fluid flow, heat transfer, and instrumentation.

	4- Prepare students for advanced engineering modules by building a strong conceptual and mathematical base.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students will be able to: 1- Apply conservation laws to analyze energy systems in petroleum operations. 2- Model oscillatory and wave phenomena relevant to subsurface diagnostics. 3- Analyze fluid behavior in static and dynamic conditions. 4- Evaluate thermal processes and heat transfer mechanisms in engineering systems. 5- Understand basic electrical principles for instrumentation and control in petroleum facilities. 6- Solve physics problems using appropriate mathematical techniques and physical reasoning.
Indicative Contents المحتويات الإرشادية	Energy and its conservation. - Simple harmonic motion. - Wave motion. - Fluids: statics and dynamics - Temperature and heat - Heat transfer: conduction, convection, radiation - Introduction to electricity and basic circuits

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ul style="list-style-type: none"> • Lectures: Conceptual explanations, derivations, and engineering applications. • Tutorials: Problem-solving sessions, guided exercises, and peer discussion. • Active Learning: Use of simulations, demonstrations, and real-world petroleum case studies. • Formative Assessment: Weekly quizzes, tutorial participation, assignments, and project-based evaluation. • Summative Assessment: Midterm exam and final exam.
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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	2
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<ul style="list-style-type: none"> Introduction to Physics in Petroleum Engineering: Importance of physics in petroleum systems, SI units and dimensional analysis, Scalars, vectors, and basic kinematics, Measurement techniques and error analysis
Week 2	<ul style="list-style-type: none"> Work and Energy: Definition of work and energy, Work-energy theorem, Kinetic and potential energy and Gravitational and elastic potential energy.
Week 3	<ul style="list-style-type: none"> Conservation of Energy: Law of conservation of mechanical energy, Power and efficiency, Energy transformations in petroleum systems, Energy losses and friction
Week 4	<ul style="list-style-type: none"> Simple Harmonic Motion (SHM): Characteristics of SHM, Mathematical modeling of SHM, Spring-mass systems and pendulums, Phase, amplitude, frequency, and period
Week 5	<ul style="list-style-type: none"> Applications of SHM: Resonance and damping, Forced oscillations, Vibration analysis in downhole tools, SHM in artificial lift systems
Week 6	<ul style="list-style-type: none"> Wave Motion Fundamentals: Types of waves (transverse and longitudinal), Wave parameters (speed, frequency, wavelength), Wave equations and propagation, Superposition principle
Week 7	<ul style="list-style-type: none"> Standing Waves and Interference: Constructive and destructive interference, Standing wave formation, Seismic wave applications, Acoustic logging and wave-based diagnostics
Week 8	<ul style="list-style-type: none"> Midterm Review and Exam
Week 9	<ul style="list-style-type: none"> Fluid Statics: Pressure in fluids, Pascal's and Archimedes' principles, Buoyancy and applications, Manometers and pressure measurement
Week 10	<ul style="list-style-type: none"> Fluid Dynamics: Continuity equation, Bernoulli's equation, Viscosity and flow regimes, Laminar vs. turbulent flow
Week 11	<ul style="list-style-type: none"> Temperature and Heat: Temperature scales and conversions, Thermal expansion, Heat capacity and specific heat, Phase changes and latent heat
Week 12	<ul style="list-style-type: none"> Heat Transfer Mechanisms: Conduction: Fourier's law, Convection: Newton's law of cooling, Radiation: Stefan-Boltzmann law, Thermal conductivity of rocks and fluids
Week 13	<ul style="list-style-type: none"> Applications in Petroleum Systems: Heat exchangers and thermal insulation, Thermal recovery methods, Temperature control in surface facilities, Heat transfer in drilling operations

Week 14	<ul style="list-style-type: none"> Introduction to Electricity: Electric charge and Coulomb's law, Electric current and voltage, Ohm's law and resistance, Basic DC circuits and power calculations
Week 15	<ul style="list-style-type: none"> Final Exam or Assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamental of College Physics by Beter Nolan	yes
Recommended Texts		
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.