MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Physics**			**Module Delivery**	
Module Type	**Core**			☑ **Theory** ☑ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PE125**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Petroleum Engineering Department		**College**	College of Engineering	
Module Leader	Hanaa.m.hadad		e-mail	hanna.mohammedhaddad@alayen.edu.iq	
Module Leader's Acad. Title	Msc.		Module Leader's Qualification	Ph.D.	
Module Tutor	Hanaa.m.hadad		e-mail	hanna.mohammedhaddad@alayen.edu.iq	
Peer Reviewer Name					
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	1
Co-requisites module		**Semester**	4

<table>
<tr><th colspan="4">Module Aims, Learning Outcomes and Indicative Contents</th></tr>
<tr><td>Module Objectives</td><td colspan="3">To understand basics for physics
To understand theoretical and practical on the various branches of physics and their development in all its types and applications.
To Give students the tool for Universal forces Units and physics Quantities
To Know the basics for analysis and serve specific problems
To learn the general law and application of physics</td></tr>
<tr><td rowspan="3">Module Learning Outcomes</td><td>Knowledge</td><td>A2</td><td>A2.1 Define Vector ,Physical Quantities Units and conversion.
A2.2 Classify of Types of waves (transverse and longitudinal).
A2.3 illustrate Electric charge and Coulomb's law, Electric current and voltage.</td></tr>
<tr><td>skills</td><td>B2</td><td>B1.1 Function efficiently as an individual.
B1.2 Function as a member of multidisciplinary and multicultural teams.</td></tr>
<tr><td>Ethics</td><td>C1</td><td>C1.1Define professional and ethical responsibilities.
C1.2 Demonstrate diversity in their commitment to ethical responsibilities.</td></tr>
<tr><td>Indicative Contents</td><td colspan="3">Part A- Measurements and Units
Basic and derived physical quantities.
The International System of Units (SI).
Accuracy and errors in testing.
Dimensional analysis.

Part B- Heat and Thermodynamics
Concepts of heat and temperature.
Thermal expansion.
Basic laws of thermodynamics.
Heat transfer (conduction, convection, radiation).

Part C- Work, Energy, and Momentum
The concept of work and kinetic energy.
Conservation of energy.
Linear momentum and the law of conservation of momentum.</td></tr>
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	Part D- Light and Optics Reflection and Refraction of Light Lenses and Mirrors Interference, Diffraction, and Polarization

Learning and Teaching Strategies	
Strategies	•Presentations • Discussions • Tutorial and graphics • Problem solving • Brain storming • Research and reporting • Problem Solving

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	37	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	100		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
	Material Covered	**LOs**
Week 1	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	A2 B1C1
Week 2	Work and Energy: Definition of work and energy, Work-energy theorem, Kinetic and potential energy and Gravitational and elastic potential energy.	A2 B1 C1
Week 3	Conservation of Energy: Law of conservation of mechanical energy, Power and efficiency, Energy transformations in petroleum systems, Energy losses and friction	A2B1 C1
Week 4	Simple Harmonic Motion (SHM): Characteristics of SHM, Mathematical modeling of SHM, Spring-mass systems and pendulums, Phase, amplitude, frequency, and period	A2 B1 C1
Week 5	Applications of SHM: Resonance and damping, Forced oscillations, Vibration analysis in downhole tools, SHM in artificial lift systems	A2B1 C1

Week 6	Wave Motion Fundamentals: Types of waves (transverse and longitudinal), Wave parameters (speed, frequency, wavelength), Wave equations and propagation, Superposition principle	A2 B1 C1
Week 7	Standing Waves and Interference: Constructive and destructive interference, Standing wave formation, Seismic wave applications, Acoustic logging and wave-based diagnostics	A2 B1 C1
Week 8	Midterm Review and Exam	A2 B1 C1
Week 9	Fluid Statics: Pressure in fluids, Pascal's and Archimedes' principles, Buoyancy and applications, Manometers and pressure measurement	A2 B1C1
Week 10	Fluid Dynamics: Continuity equation, Bernoulli's equation, Viscosity and flow regimes, Laminar vs. turbulent flow	A2 B1 C1
Week 11	Temperature and Heat: Temperature scales and conversions, Thermal expansion, Heat capacity and specific heat, Phase changes and latent heat	A2 B1 C1
Week 12	Heat Transfer Mechanisms: Conduction: Fourier's law, Convection: Newton's law of cooling, Radiation: Stefan-Boltzmann law, Thermal conductivity of rocks and fluids	A2 B1 C1
Week 13	Applications in Petroleum Systems: Heat exchangers and thermal insulation, Thermal recovery methods, Temperature control in surface facilities, Heat transfer in drilling operations	A2 B1 C1
Week 14	Introduction to Electricity: Electric charge and Coulomb's law, Electric current and voltage, Ohm's law and resistance, Basic DC circuits and power calculations	A2 B1 C1
Week 15	Final Exam or Assessment	A2 B1 C1

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	University Physics, Sear - Zemasky - Young Seventh Edition ,Volum 1 ,1987—2000— 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.