MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Physics**			**Module Delivery**	
Module Type	**Basic learning activities**			☒**Theory** ☒**Lecture** ☒ **Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	UOMU0210022				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	UOMU0210		**College**	1	
Module Leader	Sameer Saad Raheem		**e-mail**	E-mail: Sameer.Saad.Raheem@uomus.edu.iq	
Module Leader's Acad. Title	Asst. Lect.		**Module Leader's Qualification**	Master degree	
Module Tutor			**e-mail**	E-mail:	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/02/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop basic understanding for the main engineering materials, principles. 2. To understand nature of matter, states, change between phases. 3. To build basic understanding of engineering mechanics (static, dynamics). 4. To build basic understanding of thermo and fluid mechanics (thermodynamics, fluid). 5. To build basic understanding of engineering optics. 6. To build basic understanding of waves.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize construction of the materials, chemical and physical properties of material. 2. Ability to analyses the mechanical systems and determine resultant of force system. 3. Describe scientifically the thermal behave of different systems. 4. Discuss the fluid properties systems, pressure and forces. 5. Describe dynamic system, gyroscopic and friction. 6. Define ideal gas law. 7. Identify the basic optics principle and laws. 8. Discuss the optic and light systems. 9. Discuss the various properties of light and laser and fiber optics. 10. Explain waves laws used in physics. 11. Identify the speed of sound and transfer through media, Mach number .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **1 Matter** Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states. **2 Mechanics** 2.1 Statics Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers). 2. 2 Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency. 2. 3 Dynamics (a) Mass Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency; (b) Momentum, conservation of momentum;

	Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance) 2.2.4 Fluid dynamics (a) Specific gravity and density; (b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi. **2.3 Thermodynamics** (a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition. (b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume & constant pressure, refrigerators & heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion. **2.4 Optics (Light)** Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses; Fibre optics. **2.5 Wave Motion and Sound** Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: 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 types 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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3,5,8,11,13 and 15	LO #2, #4, #7, #8 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #1, #5 and #9
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #6, #10
Summative assessment	**Midterm Exam**	2hr	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	Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.
Week 2	Statics Forces, moments and couples, representation as vectors; Centre of gravity.
Week 3	Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid.
Week 4	fluid and gas; Pressure and buoyancy in liquids (barometers). Fluid dynamics (a) Specific gravity and density; (b) Viscosity, fluid resistance, effects of streamlining.
Week 5	Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.
Week 6	Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.
Week 7	Dynamics (a) Mass Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency; (b) Momentum, conservation of momentum; Impulse
Week 8	Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance)

Week 9	Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition. (b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics;
Week 10	Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas
Week 11	Isothermal, adiabatic expansion and compression, engine cycles, constant volume & constant pressure, refrigerators & heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.
Week 12	Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces
Week 13	reflection by spherical mirrors, refraction, lenses; Fibre optics.
Week 14	Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves
Week 15	Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Physics for Scientists & Engineers & Modern Physics, 9th Ed by Serway, Jewett	Yes
Recommended Texts	Fundamentals of Physics Textbook David Halliday	yes
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.