	Ministry of Higher Education and Scientific Research - Iraq University of Technology Chemical Engineering Department	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	PHYSIS & STRENGTH OF Materials			**Module Delivery**	
Module Type	Basic			**Theory** **Lecture** **Tutorial** **Seminar**	
Module Code	**UOMU0102013**				
ECTS Credits	٧				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	1	
Administering Department	CES.PR		**College**	CES	
Module Leader	Zainab hassan		**e-mail**	Zainab.Hassan.Ali@uomus.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Master	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Zainab hassan		**e-mail**	Zainab.Hassan.Ali@uomus.edu.iq	
Review Committee Approval	08/ 06/2023		**Version Number**	1.0	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Secondary School	**Semester**	

Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Determine the components of linear motion (displacement, velocity, and acceleration). 2. Solve problems involving forces and work. 3. Apply Newton's laws to physical problems. 4. Identify the different types of energy. 5. Solve problems using principles of conservation of energy. 6. Define the principles of momentum and collisions. 7. This class is designed to study the effects of external forces on a group of solid objects. 8. This class is designed to study the resistance of materials and their applications in chemical engineering
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will demonstrate basic understanding of basics and definitions of physics. 2. The student should be able to describe the motions of objects using generalized coordinates, power, forces and energy. 3. To familiarize the students with basic concepts of the thermodynamics and their applications in engineering problems 4. The student should be able to apply the Newtonian laws using various mathematical formulations 5. The student should be able to identify the mathematical quantities which effect the momentum and be able to calculate momentum from mass and velocity. 6. A student should be able to appreciate that physics is relevant to the real world and is a useful tool for solving problems 7. The student should be able to identify the resistance of materials and their applications in chemical engineering
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Motion in one Dimension: • Position• Displacement• Velocity• Acceleration• Derivation: creating new equations• Motion equations for constant acceleration• Free-fall acceleration (3hr) Work, Energy, and Power: • Energy• Kinetic energy• Work-kinetic energy theorem• Power• potential energy• Work and gravitational potential energy• Conservation of energy (3hr) Thermodynamics and Thermal Stress: • Temperature and Heat• Temperature and thermometers• Temperature scales• Temperature scale conversions• Heat• Zeroth law of thermodynamics• Internal energy • Thermal expansion and its types• Specific capacity• Phase changes• Latent heat• Modes of heat transfer• Global warming and the greenhouse effect (5hr) Force and Newton's Laws: Surface Tension, Viscosity. Newton's first law• Gravitational force: weight• Newton's second law• Newton's third law• Normal force• Tension• Newton's

	second and third laws (5hr) Momentum: • Linear momentum• Conservation of momentum• Collisions Force Vectors and Force System Resultants (4hr) Properties of matter Equilibrium of Rigid Bodies :Moment of a Force: Introduction Force in Rigid Bodies: Poisson Ratio, Composite Stresses: (30hr) Modern Physics (5hr) Chemical Effect of Electricity: (4hr)

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 problems and design involving activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	15% (5)	3,8	1, 3,6
	Assignments	6	20% (20)	5	1,3,
	Seminar	1	5% (10)	13	1-7
Summative assessment	**Midterm Exam**	1 hr/2	10% (10)	4,10	1-5
	Final Exam	3hr/1	50% (50)	16	1-7
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered

Week 1	Motion in one Dimension: • Position• Displacement• Velocity• Acceleration• Derivation: creating new equations• Motion equations for constant acceleration• Free-fall acceleration
Week 2	Work, Energy, and Power: • Energy• Kinetic energy• Work-kinetic energy theorem• Power• potential energy• Work and gravitational potential energy• Conservation of energy
Week 3	Thermodynamics and Thermal Stress: • Temperature and Heat• Temperature and thermometers• Temperature scales• Temperature scale conversions• Heat• Zeroth law of thermodynamics• Internal energy • Thermal expansion and its types• Specific capacity• Phase changes• Latent heat• Modes of heat transfer• Global warming and the greenhouse effect
Week 4	Force and Newton's Laws: Surface Tension, Viscosity. Newton's first law• Gravitational force: weight• Newton's second law• Newton's third law• Normal force• Tension• Newton's second and third laws
Week 5	Momentum: • Linear momentum• Conservation of momentum• Collisions Force Vectors and Force System Resultants
Week 6	Equilibrium of Rigid Bodies
Week 7	Moment of a Force: Moment about a point, Resultant moment of multiple forces, Moment of Couple
Week 8	Friction and Friction on an Inclined Plane
Week 9	Internal Forces and Centroid & Center of Gravity
Week 10	Introduction Force in Rigid Bodies: Definitions of Stress and Strain, Stress-Strain Diagrams Elastic limit, Stiffness elasticity, Plasticity, Hardness and working stress.
Week 11	Hooke's law and spring force• Air resistance • Free body diagram• Static and kinetic friction
Week 12	Poisson Ratio, Composite Stresses: Volumetric Stress, Bulk Modulus, Thin-Walled Cylinders Shear and Bending Moments in Beam
Week 13	Modern Physics: Electron, thermionic, emission, photoelectric emission,• X-ray• The nucleus• Structure of nucleus and atom• Radioactivity• Nuclear energy• Ionizing radiation• Health hazards
Week 14	Introduction to IS units and DC circuit:Materialuseinelectriccomponent,ohmslaw,temperatureCoefficient,Review of Kirchhoff's Laws, Series and Parallel circuit, Resistance and resistivity Electrolysis, Electroplating, Electrical Cells
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1 Shipman, James, Jerry D. Wilson, Charles A. Higgins, and Bo Lou. An introduction to physical science. Cengage Learning, 2013. **2.** Principle of Physics, Kinetic Books Company, 2007	yes
Recommended Texts	Principles of physics Kinetic book (1-877-4kbooks) Engineering Physics I&II Engineering mechanics by Ferdinand Engineering mechanics by R.C. Hibbeler	no

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.