	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Physics	**Module Delivery**	
Module Type	CORE		**Theory** **Lab** **Tutorial**
Module Code	ENG113		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	**Semester of Delivery**	1
Administering Department	**Aircraft Engineering**	**College**	**Engineering**
Module Leader	Mohammed Wahhab Kazim	**e-mail**	dr.mohammad.wahab@uokerbala.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Review Committee Approval	26/09/2024	**Version Number**	2024

Relation With Other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To assist students to understand the fundamental principles of engineering mechanics (Statics and Dynamics) as applied to Physics. 2. To develop problem solving skills and understanding of principles of Physics theory through the application of techniques as they relate to the different fields of engineering. 3. To develop problem solving skills and understanding of Newton's law through the application of techniques. 4. To understand how analysis of vectors, forces, resultant, moments, couples, and equilibrium in two and three dimensions' problems. 5. To comprehend how clarification of friction and analysis in two dimensions' problems. 6. To understand the motion of particles (kinematics and kinetic), and the other subjects as it sequenced.
Module Learning Outcomes	1. Enable the student to learn and understand the basic physical concepts, mass, forces, quantities and vectors at Mechanical Engineering 2. The student should understand and be able to apply Newton's Laws. 3. The student should Know the analysis of forces in Two Dimensions 4. The student should Know the analysis of System Isolation and the Free-Body Diagram 5. The student should Know how can find the Equilibrium Conditions 6. The student should Know the analysis of forces in Three Dimensions 7. The student should know the analysis of the Friction forces and their types, and the other subjects as it sequenced by the Course Materials and Schedule. 8. The student should understand and be able to relate the kinematics of particles 9- The student should study the Kinematics of particles Introduction and Rectilinear motion of dynamics problems in straight line 10- The student should study the Kinematics of particles as a Curvilinear motion. 11- The student should understand and be able to apply Newton's Laws to particles to solve problems related to dynamic behavior.
Indicative Contents	Indicative content includes the following. Part A - Introduction to Physics: The basic physical concepts, mass, forces, quantities and vectors at Mechanical Engineering [6 hrs]. Part B - Statics Two-Dimensional Force Systems:

	External and Internal Effects, Principle of Transmissibility, Force Classification, Rectangular Components, Moments and Couples, and Resultants [18 hrs]. Equilibrium in Two Dimensions: System Isolation, the Free-Body Diagram, and Equilibrium Conditions [12 hrs]. Friction: Introduction, and type of friction, and Dry Friction [6 hrs]. Three-Dimensional Force Systems: Rectangular Components, Moments and Couples, and Resultants [12 hrs]. Equilibrium in Three Dimensions: System Isolation, the Free-Body Diagram, Equilibrium Conditions and the Categories of Equilibrium [7 hrs]. Part C - Kinematics of particles: Rectilinear motion [5 hrs]. Curvilinear motion: x-y coordinates, Normal – tangential coordinates, and Polar – coordinates [5 hrs]. Relative Motion (Translating Axes) Relative motion, Motion relative to a frame in translation, and Constrained Motion of Connected Particles [5 hrs]. Part D - Kinetics of Particles: Newton's 2nd law, Rectangular Components, Tangential and normal components, Radial and transverse components [6 hrs]. Kinetics of particles: Introduction, Force, Mass, Acceleration, Newton's 2nd law, Rectangular components, Tangential and normal components, Radial and transverse components and problems [10 hrs].
Learning and Teaching Strategies	
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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
Structured SWL (h/sem)	108	**Structured SWL (h/w)**	7
Unstructured SWL (h/sem)	92	**Unstructured SWL (h/w)**	6.2
Total SWL (h/sem)	200		

Module Evaluation					
		Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	20% (20)	3, 6, 9, 12	LO #1-11
	Assignments	2	10% (10)	5, 10	LO #1-11
	Projects / Lab.	Lab. 5	10% (10)	Continuous	LO #1, 2, 3, 4, 7, 10, 11
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	LO #1-11
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**Introduction to Physics:** Basic concepts, Newton's Law, and Vectors
Week 2	**Two-Dimensional Force Systems:** External and Internal Effects , Principle of Transmissibility, and Force Classification
Week 3	**Two-Dimensional Force Systems:** Rectangular Components, and Moments and Couples.
Week 4	**Two-Dimensional Force Systems:** Resultants
Week 5	**Equilibrium in Two Dimensions:** System Isolation and the Free-Body Diagram
Week 6	**Equilibrium in Two Dimensions:** Equilibrium Conditions
Week 7	**Friction:** Introduction, and type of friction, and Dry Friction.
Week 8	**Three-Dimensional Force Systems:** Rectangular Components, and Moments and Couples.
Week 9	**Three-Dimensional Force Systems:** Resultants

Week 10	**Equilibrium in Three Dimensions:** System Isolation and the Free-Body Diagram, and Equilibrium Conditions and the Categories of Equilibrium
Week 11	**kinematics particles:** Introduction and Rectilinear motion.
Week 12	**Curvilinear motion:** Plane Curvilinear Motion Rectangular Coordinates (x-y), Normal – tangential coordinates (n-t) , and Polar – coordinates (r-Θ).
Week 13	**Relative Motion (Translating Axes)** Motion relative to a frame in translation, Constrained Motion of Connected Particles
Week 14	**Kinetics of particles:** Introduction, Force, Mass, and Acceleration Newton's 2nd law. Rectangular components.
Week 15	**Kinetics of particles:** Tangential and normal components. Radial and transverse components.
Week 16	**Preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: THE STIFFNESS OF LINEAR SPRING (HOOKE'S LAW)
Week 2	Exp. 2: FORCE RESULTANT OF TWO-DIMENSIONAL FORCE SYSTEMS
Week 3	Exp. 3: STATIC FRICTION COEFFICIENT OF SIMILAR AND DISSIMILAR SURFACES
Week 4	Exp. 4: ACHIEVING THE BASIC LAW OF THE ROTATIONAL MOVEMENT
Week 5	Exp. 5:
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	ENGINEERING MECHANICS VOLUME 1 STATICS EIGHTH EDITION (2016) VOLUME 2 DYNAMICS EIGHTH EDITION (2015)	Yes

	Publisher: John Wiley & Sons Singapore Pte. Ltd By James L. Meriam (Author), L. G. Kraige (Author), J. N. Bolton (Author)	
Recommended Texts	VECTOR MECHANICS FOR ENGINEERS: STATICS AND DYNAMICS Publisher : McGraw Hill; 12th edition (2018) by Ferdinand Beer (Author), E. Johnston (Author), David Mazurek (Author), Phillip Cornwell (Author), Brian Self (Author)	No
Websites		

APPENDIX:

GRADING SCHEME				
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.