	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	Engineering Mechanics	**Module Delivery**	
Module Type	CORE		
Module Code	ENG123		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	**Semester of Delivery**	2
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Mohammed Wahhab	**e-mail**	dr.mohammad.wahab@uokerbala.edu.iq
Module Leader's Acad. Title	Prof	**Module Leader's Qualification**	PhD.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Review Committee Approval	26/09/2024	**Version Number**	2024

Theory
Lab
Tutorial

Relation With Other Modules

Prerequisite module	ENG113	**Semester**	1
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). 2. To develop problem solving skills and understanding of principles of Dynamics Kinematics of rigid bodies: 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 Structures, Trusses, Frames, Machines, Centers of Mass and Centroids, and Area Moments of Inertia. 5. To comprehend how clarification of Mass Moments of Inertia and analysis in two dimensions' problems. 6. To understand the motion of bodies (kinematics), and the other subjects as it sequenced.
Module Learning Outcomes	1. Enable the student to learn and understand the basic Engineering Mechanics 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 Structures, Trusses, Frames, Machines. 4. The student should be able to find the Centers of Mass and Centroids. 5. The student should know how can we find the Area Moments of Inertia, and the other subjects as it sequenced by the Course Materials and Schedule. 6. Understanding the basic principles of particles and solid body's motion 7. The ability to make a mathematical model of the motion of the mechanical systems. 8. Calculating the motion resulting from applying forces and moments, as well as calculating the forces and moments to describe the characteristics of motion. 9. The student should understand and be able to relate the kinematics of bodies to the solution of dynamics problems in impulse and momentum of particles. 10. The student should understand and be able to study the Absolute and relative acceleration 11. The student should understand and be able to apply Newton's Laws to particles to solve problems related to work and energy of

	particles.
Indicative Contents	Indicative content includes the following. Part A - Statics Structures: Plane Trusses, Method of Joints, Method of Sections, and Frames and Machines [9 hrs]. Centers of Mass and Centroids: Centroids of Lines, Centroids of Areas, Centroids of Volumes, and Composite Bodies and Figures [9 hrs]. Area Moments of Inertia: Rectangular Moments of Inertia, Polar Moments of Inertia, Composite Areas, Products of Inertia, and Rotation of Axes [5 hrs]. Part B - Dynamics Work and energy of particles: Work of a force, Kinetic energy of a particle, Principle of work and energy, and Potential energy [8 hrs]. Impulse and momentum of particles: Rate of changed of angular momentum. Conservation of angular momentum, Rate of changed of angular momentum. Conservation of angular momentum [8 hrs]. Impact: Central impact, Oblique Impact [8 hrs]. Kinematics of rigid bodies: Translation and Rotation of rigid bodies, General motion. Absolute and relative velocity in plane motion, Instantaneous center of rotation, and Absolute and relative acceleration [12 hrs]. Mass Moments of Inertia: Rectangular Mass Moments of Inertia, Polar Mass Moments of Inertia, and Composite Masses [8 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)	67	**Unstructured SWL (h/w)**	4.5
Total SWL (h/sem)	175		

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, 3, 4, 5, 6, 8, 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	**Structures:** Plane Trusses, Method of Joints and Method of Sections
Week 2	**Structures:** Frames and Machines
Week 3	**Centers of Mass and Centroids:** Centroids of Lines, Areas. and Volumes..
Week 4	**Centers of Mass and Centroids:** Centroids of Composite Bodies and Figures.
Week 5	**Area Moments of Inertia:** Rectangular Moments of Inertia. Polar Moments of Inertia. Composite Areas. Products of Inertia Rotation of Axes.
Week 6	**Work and energy of particles:** Work of a force.

	Kinetic energy of a particle.
Week 7	**Work and energy:** Principle of work and energy. Potential energy.
Week 8	**Impulse and momentum of particles:** Rate of changed of angular momentum.
Week 9	**Impulse and momentum of particles:** Conservation of angular momentum.
Week 10	**Impact:** Central impact.
Week 11	**Impact:** Oblique Impact.
Week 12	**Kinematics of rigid bodies:** Translation and Rotation of rigid bodies.
Week 13	**Absolute motion:** General motion. Absolute and relative velocity in plane motion. Instantaneous center of rotation.
Week 14	**Absolute motion:** Absolute and relative acceleration.
Week 15	**Mass Moments of Inertia:** Rectangular Mass Moments of Inertia. Polar Mass Moments of Inertia. Composite Masses.
Week 16	**Preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: ACHIEVING THE LAW OF CONSERVATION OF ENERGY (MAXWELL'S WHEEL)
Week 2	Exp. 2: EQUILIBRIUM FORCES IN THREE DIMENSIONS
Week 3	Exp. 3: DETERMINING THE CENTROID FOR DIFFERENT GEOMETRIC SHAPES
Week 4	Exp. 4: DETERMINING THE CENTER OF GRAVITY FOR DIFFERENT GEOMETRIC SHAPES
Week 5	Exp. 5: THE EXPERIMENTAL DETERMINATION OF THE MASS MOMENT OF INERTIA FOR SOLID AND HOLLOW DISKS
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) Publisher: John Wiley & Sons Singapore Pte. Ltd By James L. Meriam (Author), L. G. Kraige (Author), J. N. Bolton (Author)	Yes
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.