Northern Technical University
College of Oil & Gas Techniques Engineering/Kirkuk
Department of Renewable energy Techniques Engineering

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mechanics Engineering /Dynamic's**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	RETE 101				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	RETE		**College**	College of Oil & Gas Techniques Engineering/Kirkuk	
Module Leader	Afrah Turki Awad		**e-mail**	afrah.turki@ntu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Aims أهداف المادة الدراسية	This module is designed to impart essential mechanical science knowledge applicable to all engineering disciplines. It also serves as a foundational steppingstone for advanced studies in mechanical engineering, with a particular emphasis on dynamics. The course equips students with the fundamental knowledge and understanding of mechanical and physics principles and methodologies necessary to support their education in various mechanical and related engineering fields. Topics covered in the course encompass a wide range of dynamics mechanics subjects, including various types of motion (linear, circular, and projectile), as well as concepts related to force, momentum, impulse, rotational motion, work, power, torque, angular momentum, and energy. Throughout the course, students will learn and apply various analytical and numerical methods for addressing typical mechanical structures and problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Grasp and employ fundamental terminology for describing the motion of particles, vector functions, and the fundamental principles of Newtonian mechanics. 2. Resolve mechanical problems in one dimension involving forces such as gravity, friction, and air resistance. 3. Comprehend the concept of terminal velocity and utilize it to solve one-dimensional mechanics problems. 4. Apply Newton's second law in vector form to address problems in multiple dimensions. 5. Resolve problems concerning the motion of a projectile in the absence of air resistance. 6. Explore how displacement, velocity, and acceleration vary with time in linear motion. 7. Examine how displacement, velocity, and acceleration change with time in curvilinear motion. 8. Provide a concise summary of key dynamics components. 9. Elaborate on the concepts of work and energy. 10. Identify power and efficiency considerations for mechanical components and their practical applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Its objective is to familiarize students with the analysis of moving mechanical bodies by imparting an understanding of the theories and laws governing mechanical systems. • Introducing students to this curriculum complements the field of engineering mechanics. • It serves as an introductory foundation for materials engineering, equipping students with essential knowledge required to achieve optimal design for

	engineering structures and materials capable of withstanding various loads and environmental conditions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies for a Dynamics module in engineering are designed to help students grasp complex concepts related to motion, forces, and mechanical systems effectively. Here are the common strategies used in this module: • **Lectures:** Traditional lectures provide an overview of key concepts and theories in dynamics. Instructors use visual aids, examples, and real-world applications to explain complex topics. • **Tutorials and Workshops:** Small group tutorials or workshops allow students to work on problem-solving exercises and engage in discussions. Tutors can provide guidance and clarification on challenging concepts. • **Computer Simulations:** Simulation software and tools help students visualize and analyze dynamic systems. They can explore how different variables impact the behavior of mechanical systems. • **Case Studies:** Analyzing real-world case studies involving dynamic systems and structures helps students see the practical applications of the concepts they learn in class. • **Group Projects:** Collaborative projects encourage teamwork and problem-solving. Students may work together to design, analyze, and present solutions for complex engineering problems. • **Homework Assignments:** Regular assignments challenge students to practice problem-solving and reinforce their understanding of course materials. Instructors can provide feedback and discuss solutions in class. • **Peer Teaching and Learning:** Encouraging students to explain concepts to their peers can deepen their understanding and enhance communication skills. • **Self-Study and Reading:** Students are encouraged to read textbooks, research papers, and additional materials to supplement their understanding of course topics. • **Assessment:** Regular quizzes, tests, and examinations assess students' understanding and mastery of course content. These assessments help identify areas where additional support may be needed. • **Online Resources:** Course materials, lecture notes, and additional resources are often made available online, allowing students to review and reinforce their learning independently. • **Problem-Solving Sessions:** Dedicated problem-solving sessions focus on tackling challenging exercises and developing problem-solving skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	122	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	5	20% (20)	2, 4, 8,10, 12	LO #1, 2, 10 and 11
	Assignments	2	20% (20)	3, 5, 7, 9, 13	LO # 3, 4, 6 and 7
Summative assessment	**Midterm Exam**	2hr	10% (10)	10	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1-2	Introduction of Dynamic Rectilinear Motion Plane curvilinear motion Rectangular Coordinates Normal and tangential coordinates Polar coordinates.
Week 3	Space curvilinear motion Space motion Relative motion Constrained motion

Week 4	Generalized Newton's Second
Week 5-7	Force, Mass, Acceleration Newton's second law Equation of motion and solution problem
Week 8-9	Work and kinetic energy Potential energy
Week 10	Mid-term exam
Week 11	Linear Impulse and Linear momentum
Week 12	Work-Energy Impulse- Momentum
Week 13	Conservation of Energy and Momentum
Week 14	Rotation Absolute motion Relative velocity
Week 15	Preparatory week before the final Exam
Week 16	The final Exam week

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Engineering Mechanics Dynamics, J.L. Meriam, L.G. Kraige, Sixth Edition	Yes
Recommended Texts	. 2. Engineering Mechanics Dynamic, R. C. Hibbeler, Twelfth Edition	yes
Websites	https://www.noor-book.com/en/ebook-Engineering-Mechanics-Dynamics-14th-pdf	

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.