



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanics & Robotics I		Module Delivery
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	AI009		
ECTS Credits	8		
SWL (hr/sem)	60		
Module Level	2	Semester of Delivery	
Administering Department	Department of AI	College	College of Engineering
Module Leader	Omar C. Kadhum	e-mail	Omar.Jasib@alayen.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Ph.D
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	28/10/2024	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. Enabling students to grasp the fundamental concepts of forces, vectors, moments, and static equilibrium. 2. Enhancing the ability to analyze both simple and complex engineering systems 3. Developing the ability to calculate centers of gravity, distributed forces, and analyze friction in engineering systems. 4. Improving the ability to break down complex problems into simpler issues and solve them using engineering analysis. 5. Preparing students to understand how to apply mechanical principles in the design of robots and automated systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enabling students to understand the basic terms and concepts such as force, vectors, moment, and equilibrium. 2. Enabling students to learn how to calculate the center of gravity and distributed forces on engineering structures. 3. Providing knowledge about the different types of friction and their effects in engineering systems and how to analyze them. 4. Equipping students with the necessary knowledge to connect mechanical concepts to the design and analysis of robots and systems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Integration of Theory and Practice: Emphasize the connection between theoretical mechanical concepts and their practical application in robotics design and engineering analysis. 2. Problem-Solving Approach: Encourage students to break down complex engineering and robotic challenges into manageable components to develop effective solutions. 3. Interdisciplinary Relevance: Highlight the interdisciplinary nature of mechanics and robotics, demonstrating its relevance to fields such as automation, manufacturing, and artificial intelligence.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	60		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)		
	Assignments	4	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2hr	10% (10)		
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definitions, Resolution of a force in plane, Resolution of a force in space, Moment of a force.
Week 2	Resolution of a force in plane, Resolution of a force in space, Moment of a force.
Week 3	Couples, Transformation of a couple, Resolution of a Force into a Force and a Couple
Week 4	Introduction for the Resultant of Force Systems, Resultant of a Concurrent Coplanar Force System Resultant of a Non Concurrent Coplanar Force System,
Week 5	the Resultant of Force Systems, Resultant of a Concurrent Coplanar Force System Resultant of a Non Concurrent Coplanar Force System,
Week 6	Resultant of a Parallel Non Coplanar Force System, Resultant of a System of Couples in Space
Week 7	Resultant of a Parallel Non Coplanar Force System, Resultant of a System of Couples in Space
Week 8	Resultant of a Non concurrent Non Parallel Non Coplanar Force System, Introduction to Equilibrium, Equilibrium of a Concurrent Coplanar Force System

Week 9	Resultant of a Non concurrent Non Parallel Non Coplanar Force System, Introduction to Equilibrium
Week 10	Equilibrium of a Concurrent Coplanar Force System
Week 11	Equilibrium of a Concurrent Coplanar Force System
Week 12	Friction, Laws of Friction, Types of Problems Involving Friction
Week 13	Friction, Laws of Friction, Types of Problems Involving Friction
Week 14	Centroid
Week 15	Centroid
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Arduino Platform and Basic Circuitry
Week 2	Lab 2: Getting Started with C++ Programming on Arduino Platform
Week 3	Lab 3: Hands-on Experiment with Buttons and Switches for Input Control
Week 4	Lab 4: Understanding and Implementing Analog Sensors with Arduino
Week 5	Lab 5: Controlling LED with PWM Signals on Arduino
Week 6	Lab 6: Programming and Controlling Servo Motors with Arduino
Week 7	Lab 7: Using Ultrasonic Sensors for Distance Measurement with Arduino
Week 8	Lab 8: Precise Control of Stepper Motors with Arduino Programming

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Engineering Mechanics by Meriam	Yes
Recommended Texts	Engineering Mechanics, Statics by R.C. Hibbler, 4th Edition, Macmillan publishing company, 1986.	No
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.				