

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Theory of Machines		Module Delivery
Module Type	S		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ATU13066		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	ATU13	College	Type College Code
Module Leader	Name	e-mail	E-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Essam Oun Ali Al-Zaini	e-mail	dr.essam.alzaini@atu.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/02/2024	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	A. Course Objectives Mechanical devices are characterized by the fact that they have mobility and must move to perform their function. This differentiates mechanical engineering from other fields of engineering such as aeronautical technical engineering, in which structures are generally immobile The study of kinematics and dynamics of machines is an applied field of mechanical engineering that is concerned with understanding the relationship between the geometry and the motions of the parts of a machine and the forces that produce this motion. The overall objective of this course is to learn how to analyze the motions of mechanisms, design mechanisms to have given motions, and analyze forces in machines. This includes relative motion analysis and design of gears, gear trains, cams, and linkages, simultaneous graphical and analytical analysis of position, velocity, and acceleration, considering static and inertial forces. On completing the course, the student will be able to: 1. Understand the fundamentals of the theory of kinematics and dynamics of machines. 2. Understand techniques for studying motion of machines and their components. 3. Use computer software packages in modern design of machines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	B. Learning Outcomes Upon successful completion of this course, the student will be able to: 1. Distinguish kinematic and kinetic motion. 2. Identify the basic relations between distance, time, velocity, and acceleration. 3. Apply vector mechanics as a tool for solving kinematic problems. 4. Create a schematic drawing of a real-world mechanism. 5. Determine the degrees-of-freedom (mobility) of a mechanism. 6. Use graphical and analytic methods to study the motion of a planar mechanism. 7. Use computer software to study the motion of a mechanism. 8. Design basic gear trains. 9. Design basic cam systems. This course contributes to the assessment of the following program (student) outcomes: a. an ability to apply knowledge of mathematics, science and engineering e. an ability to identify, formulate, and solve engineering problem
Indicative Contents المحتويات الإرشادية	Al-Furat Al-Awsat Technical University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services on Al-Furat Al-Awsat Technical University's Diversity, Equity, and Inclusion

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	C. Assessment 1. ATTENDANCE Attendance is considered very important for maximizing the learning benefits of this course and therefore regular attendance is expected. Learning is motivated through active discussion, demonstration and practice of the topics being studied. Students are responsible for all completed work, schedule adjustments and assigned work addressed during class. Please inform your instructor if you are unable to attend any scheduled class session, and obtain notes from any missed lecture (s). It is your responsibility to make arrangements for any planned or unplanned absences (i.e. interviews, illnesses, personal emergencies, etc.). 2. HOMEWORK Homework is considered very important for understanding the course material. Homework will be assigned from the text or the references after completing the discussion of an independent topic or chapter. All homework will be collected, graded and returned. You are encouraged to work with your friends for better understanding of the material. HOWEVER, YOU ARE REQUIRED TO COMPLETE THE ASSIGNMENTS INDIVIDUALLY IN YOUR OWN WAY. IDENTICALLY LOOKING ASSIGNMENTS WILL BE CONSIDERED COPIED WORK UNLESS PROVED OTHERWISE BY THE STUDENTS. A ZERO GRADE WILL BE GIVEN TO ALL SUCH DUPLICATES IRRESPECTIVE OF THE REASONS. Homework is due the class period after it has been assigned unless another due date is announced. Circumstances beyond your control (i.e. illness, computer system failure, weather, acts of nature, etc.) will be addressed as required. As well: • Each problem must have clearly identified sections: Given, Find, Solution. • The units must be clear for every numeric value. • All computations must first show equations symbolically and then with numeric values, without any rearrangement of variables. • All vector equations must clearly distinguish vector variables and show vector diagrams. Solutions with missing vector diagrams will not be graded. • Submitted work must be neat, on engineering paper. Use a ruler and compass for diagrams; underline or put boxes around answers. • Convince me you have the correct answer. 3. EXAMS Two mid-term exams will be given during the semester and a final exam will be given during exam week. All exams will be closed-book, closed-notes, but self-written formula sheet (s) will be allowed. (The maximum number of pages will be stated in class.) The formula sheet (s) may contain figures, equations, formulas, procedures, etc.; but they may not contain any numerical solutions or worked examples. The mid-terms will be in-class during the regular lecture time. The final exam will be given according to the university / college and department schedule.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	52		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 7, and 10	LO #1-4, LO#5-6, and LO#7-9
	Assignments	2	10% (10)		
	Projects / Lab.	2	10% (10)		
	Report	2	10% (10)		
Summative assessment	Midterm Exam	2hr	10% (10)	14	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Mechanisms - Machine - Theory of machines - Structure - Links - Kinematics pair - Kinematics chain
Week 2	Velocity of Mechanisms -1 - Velocity diagram. - Relative velocity of two bodies moving in straight line

	- Relative velocity of point on link - Relative velocity of slider cranks mechanism. - Rubbing velocity of a pin joint
Week 3	Velocity of Mechanisms -2 - Relative velocity of slider cranks mechanism. - Rubbing velocity of a pin joint
Week 4	Acceleration in mechanisms - Acceleration diagrams - Tangential component - Radial component
Week 5	Balancing of rotating masses -1 - Single mass rotating in same plane - Several masses rotating in same plane - Graphical solution - Masses rotating in different planes
Week 6	Balancing of rotating masses -2 - Masses rotating in different planes
Week 7	Friction Belts - 1 - Belt drive - Types of belts - Velocity ratio of belt - Power transmitted
Week 8	Friction Belts - 2 - Ratio of driving tension for flat belt - Angle of contact
Week 9	Friction Belts - 3 - The effect of centrifugal tension - The effect of initial tension
Week 10	Spur Gear -1 - Pitch circle diameter - Condition for transmission of constant velocity ratio - Velocity of sliding
Week 11	Spur Gear -2 - Path of contact - Arc of contact - Interference
Week 12	Gear Trains -1 - Simple gear trains - Compound gear trains
Week 13	Gear Trains -2 - Simple epicyclic gear trains - Compound epicyclic gear trains
Week 14	Semester exam
Week 15	Preparatory week before the final Exam
Week 16	Final Exam
Learning and Teaching Resources	

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	R.S.KHURMI A Textbook of Theory of Mach	Yes
Recommended Texts	R.S.KHURMI A Textbook of Theory of Mach	yes
Websites	https://www.academia.edu/43543661/R_S_KHURMI_A_Textbook_of_Theory_of_Mach	

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.				