MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Materials**			**Module Delivery**	
Module Type	**BASIC**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU21012				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level		UG I	**Semester of Delivery**		1
Administering Department		MET	**College**	TCM	
Module Leader	Tayser Sumer Gaaz		**e-mail**	taysersumer@atu.edu.iq	
Module Leader's Acad. Title		Assist. Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Shaymaa AbdulKhader Hamzah Al-Jumaili		**e-mail**	shaimaaal-jumaili@atu.edu.iq	
Peer Reviewer Name		Badr kamoon Dabis	**e-mail**	com.bdr@atu.edu.iq	
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 Objectives أهداف المادة الدراسية	To teach the fundamentals of material science and properties of materials used in engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduction to materials science and engineering. 2. Recognize the Atomic structure and interatomic bonding. 3. Defines Crystal and amorphous structures in materials. 4. Classify Imperfections in solids. 5. Define Thermally activated processes and diffusion in solids. 6. Classify Mechanical properties of metals. 7. Sketch Phase diagrams and transformations. 8. Defines Engineering alloys. 9. Recognize Polymeric materials. 10. Classify Ceramics and composite materials.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Materials and Crystal Structure: ● Understand the concepts of ores, elements, and engineering materials. ● Identify and classify engineering materials. ● Explain crystal structures and the imperfections in crystals, including point defects, dislocations, and grain boundaries. ● Describe the solidification process of metals and alloys and the structure of ingots. 2. Phase Diagrams and Solid Solutions: ● Interpret thermal equilibrium diagrams and understand solubility in the solid state. ● Identify phases, solid solutions, compounds, and mechanical mixtures in materials.

	● Apply the lever rule to analyze eutectic, eutectoid, and peritectic reactions in binary phase diagrams. 3. Mechanical Testing and Properties of Metals: ● Understand mechanical properties of metals, including normal and shear stress, strain, and tensile and compression tests. ● Analyze stress-strain diagrams and interpret hardness tests (Brinell, Rockwell, and Vickers) and impact tests (Izod and Charpy). ● Apply mechanical testing to determine Young's modulus, yield stress, ultimate tensile strength, fracture stress, ductility, hardness, and impact toughness. ● Explain non-destructive inspection techniques such as liquid penetrant, magnetic particle, X-rays, and ultrasonic testing. 4. Iron and Steel, Heat Treatment: ● Describe the properties and characteristics of carbon steel, cast iron, and alloy steel. ● Understand the principles and methods of heat treatment for steel. 5. Metals and Alloys: ● Study the properties and applications of copper and its alloys, as well as aluminum and its alloys. 6. Nano Materials: ● Explore the basics of nanomaterials, their properties, and applications. 7. Plastics: ● Gain an understanding of plastics technology, including microstructure, polymerization, and structure of plastic materials. ● Classify plastics based on their properties and uses. 8. Ceramics and Glass: ● Describe the structure, defects, properties, and uses of ceramics. ● Explore the structure, properties, and uses of glass materials. 9. Composite Materials: ● Classify composite materials based on matrix type (metal, ceramic, polymer) and reinforcing phase (fibers, flakes, particles). ● Understand the composite structure, volume fraction, properties, and applications.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #8, #9
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

Summative assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to ores, elements and materials, Iron ores, Periodic table of elements, Engineering materials.
Week 2	Classification of engineering materials + Crystal structure
Week 3	Imperfections in crystals, point defects, Dislocations and grain boundaries, Solidification of metals and alloys + Structure of ingots chilled
Week 4	Thermal equilibrium diagrams, Solubility in the solid state, Phases, Solid solutions, compounds and mechanical mixtures. + Lever rule (Eutectic, Eutectoid and Peritectic reactions).
Week 5	Applications on binary phase diagrams (Components completely soluble, completely insoluble or partially soluble in the solid state).
Week 6	Mechanical properties of metals (Specifications and standards, Normal stress and shear stress, Strain, Tensile and compression tests - Stress-strain diagram, Hardness tests: Brinell, Rockwell and Vickers, Impact tests: Izod and Charpy)
Week 7	**Mid-term Exam** + Application on mechanical testing and properties (Determination of Young's modulus, Yield stress)

Week 8	Application on mechanical testing and properties (Proof stress, Ultimate tensile strength, Fracture stress, ductility, Hardness and impact toughness) + Non- destructive inspection (Liquid penetrant, Magnetic particle, X-rays, Ultrasonic).
Week 9	Iron and Steel (carbon steel, cast Iron, alloy steel)
Week 10	Heat treatment of steel
Week 11	Metals Alloys (Copper and its alloys, Aluminum and its alloys)
Week 12	Nano materials
Week 13	Plastics (Introduction to plastics technology, Microstructure and polymerization, Structure of plastics materials, Classification, properties and uses of plastics)
Week 14	Ceramics and glass (Structure, defects, properties and uses of ceramics, Structure, properties and uses of glasses)
Week 15	Composite Materials (Classification: metal matrix, ceramic matrix and polymer matrix composites, reinforcing phase: fibers, flakes, and particles, Composites structure and volume fraction, Properties and uses of composites)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Sample preparations
Week 2	Lab 2: Tensile Test
Week 3	Lab 3: Impact tests: Izod and Charpy
Week 4	Lab 4: Hardness tests: Brinell
Week 5	Lab 5: Hardness tests: Rockwell

Week 6	Lab 6: Hardness tests: Vickers
Week 7	Lab 7: Shear Test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Callister, W., Materials Science and Engineering: An Introduction, Wiley, 2006.	Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing**			**Module Delivery**	
Module Type	**BASIC**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU21015				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level		UG I	**Semester of Delivery**		1
Administering Department		MET	**College**	TCM	
Module Leader	Tayser Sumer Gaaz		**e-mail**	taysersumer@atu.edu.iq	
Module Leader's Acad. Title		Assist. Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Hiyam Adil Habeeb		**e-mail**	Hiyamadil84@atu.edu.iq	
Peer Reviewer Name		Badr kamoon Dabis	**e-mail**	com.bdr@atu.edu.iq	
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 Objectives أهداف المادة الدراسية	To teach the fundamentals concepts of engineering drawing and its importance in engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main goals of studying engineering drawing are as follows: 1. To understand the importance of engineering drawing in engineering application 2. To know engineering operations 3. To draw 2D shapes on the board 4. To draw 3D shapes on the board 5. Drawing projections of 3D shapes on the board 6. To know the basic concepts and drawing tools of the AutoCAD program 7. To draw 2D, 3D geometric shapes and projections using AutoCAD program
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Introduction to engineering drawing and eng. drawing equipment, Lettering, Applied geometry, Pictorial drawing (Real model in true dimension), Exercise in pictorial drawing, Exercise in pictorial drawing, Orthographic projection , First angle projection, Dimensions, Rules in dimension position for arcs and circles, Exercise in applied dimension on projection view, Exercise in projection, Exercise in projection, Mid-term

	Exam, Sections, Third view estimate, Exercise in estimate third unknown projection, Exercise in estimate third unknown projection, Exercise in estimate third unknown projection, Exercise in estimate third unknown projection. [36 hrs] Part B – Introduction to CAD packages, Drawing area, Coordinate system (absolute and relative Coordinate).[hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #8, #9
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to engineering drawing and eng. drawing equipment** - Introduction to engineering drawing and its importance to the engineer - History of eng. drawing - The standard drawing equipment **Lettering**

	- The lettering and circles kind - The paper type and design with title table - Draw eng. Lines type and circles
Week 2	**Applied geometry** - Applied geometry in eng. Drawing - Draw important eng. Geometry - Exercise in engineering geometry - Exercise in engineering geometry
Week 3	**Pictorial drawing (Real model in true dimension)** - Draw cube shape with ovals by used four center method. - Non standard letters - **Exercise in pictorial drawing**
Week 4	- **Exercise in pictorial drawing** **Orthographic projection** - Projection theory with definition standard planes (Horizontal and Vertical) - Exercise in projection
Week 5	**First angle projection** - Three projection definition (front, top and side view) - Draw in first angle - Exercise in projection **Dimensions** - Main rules in dimensions position and details in drawing

	- Exercise in applied dimension on projection view
Week 6	**- Rules in dimension position for arcs and circles** **- Exercise in applied dimension on projection view**
Week 7	**Mid-term Exam + Exercise in projection , - Exercise in projection**
Week 8	**Sections** - Sections definition - Find sections and section planes and half section projection - Exercise in sections - Exercise in sections - Exercise in sections
Week 9	- Exercise in sections - Exercise in sections
Week 10	**Third view estimate** - Important steps to estimate third unknown projection depending on the known two projection - Estimate real model - Exercise in estimate third unknown projection
Week 11	**- Exercise in estimate third unknown projection** **- Exercise in estimate third unknown projection**
Week 12	**- Exercise in estimate third unknown projection** **- Exercise in estimate third unknown projection**
Week 13	**CAD I** **Introduction to CAD packages**

	- Menus - Tool bars **Drawing area** - Command window / Command line - Status bar
Week 14	**Coordinate system (absolute and relative Coordinate)** - Cartesian - Cylindrical - Spherical - Setting up drawing limits **Two dimensional drawing** - Drawing bar (line, circle, rectangle, …etc) - Modify bar (erase, copy, mirror,…etc
Week 15	**Drawing aids** - Grid - Snap mode - Object snap - Object snap tracking - Orthogonal mode - Polar tracking
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		no
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics (I)**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU21014				
ECTS Credits	8				
SWL (hr/sem)	**200**				
Module Level		UG I	**Semester of Delivery**		1
Administering Department		MET	**College**	TCM	
Module Leader	Kussay Ahmed Subhi		**e-mail**	kussaysubhi@atu.edu.iq	
Module Leader's Acad. Title		LECTUER	**Module Leader's Qualification**		Ph.D.
Module Tutor	Ali Talib shomran		**e-mail**	Com.ali4@atu.edu.iq	
Peer Reviewer Name		Badr Kamoon Dabis	**e-mail**	com.bdr@atu.edu.iq	
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 Objectives أهداف المادة الدراسية	To teach the fundamentals of the study of the effects of forces acting on bodies (objects).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this course, students will be able to understand and apply the principles of Engineering Mechanics. 1. Understand the fundamental concepts: Students will grasp the basic principles of Engineering Mechanics, including concepts such as force, moment, equilibrium, and motion. 2. Analyze static systems: Students will be able to analyze and solve problems related to static equilibrium, including the calculation of forces and moments acting on a body. 3. Calculate internal forces: Students will be able to determine internal forces, such as axial forces, in structural members using methods like the method of sections or the moment distribution method. 4. Apply engineering mechanics principles to real-world problems: Students will develop the skills to apply the principles of Engineering Mechanics to solve real-world engineering problems, such as analyzing the stability of structures, designing mechanical systems, and predicting the behavior of mechanical components. 5. Analyze equilibrium: Students will be able to determine the equilibrium conditions of a system 6. Calculate forces and moments: Students will be able to calculate the forces, moments, and reactions in various structural elements such as trusses, beams, and frames. 7. Understand the including both concurrent and non-concurrent force systems.

	8. Analyze mechanical systems: Students will be able to analyze and solve problems related to equilibrium of mechanical systems, including simple machines. 9. Solve problems using vector analysis: Students will be able to solve engineering mechanics problems using vector analysis techniques, including the addition and resolution of forces and moments. 10. Understand the friction and rope friction. 11. Understand the analysis of pin jointed plane frames (Method of Section) and (Method of Joints). 12. Understand the centroid of a section and center of gravity. 13. Understand the moment of inertia of area.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Introduction to Analyze Mechanical Systems (Static): 1. Introduction to Statics: • Definition and importance of statics in engineering • Types of forces and moments • Concept of equilibrium • [4 hrs] 2. Forces and Equilibrium: • Scalar and vector quantities • Resultant and component forces • Free body diagrams • Equilibrium equations (sum of forces and sum of moments) • [6 hrs] 3. Analysis of Trusses: • Definition and characteristics of trusses • Method of joints and method of sections • Analysis of simple truss structures • Determination of member forces and reactions • [8 hrs] 4. Frames and Machines: • Classification and analysis of frames • Types of machines (simple, compound, and complex) • Analysis of machines using equilibrium equations • Calculation of support reactions and member forces • [6 hrs] 5. Friction: • Introduction to friction and its types

	• Laws of friction (Coulomb's laws) • Static and kinetic friction • Frictional forces in equilibrium analysis • [8 hrs] 6. Moments and Couples: • Definition and properties of moments and couples • Calculation of moments and couples • Equivalent systems of forces and moments • Couples and their effects on rigid bodies • [8 hrs] 7. Center of Gravity and Centroids: • Definition and calculation of center of gravity • Determination of centroids of simple geometric shapes • Composite bodies and determination of centroids • Applications of centroids in equilibrium analysis • [8 hrs] 8. Structural Analysis: • Introduction to structural analysis • Determination of support reactions • Analysis of determinate structures (beams and frames) • Calculation of internal forces (shear forces and bending moments) • [8 hrs] 9. Moment of inertia [4 hrs] Part B – Engineering Mechanic Lab: [30 hrs] Part C – Engineering Mechanic Tutorial: [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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**	4	10% (10)	4, 7, 12 and 14	LO #2, #3 and #8, #12
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #7, #8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #9
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	GENERAL PRINCIPLES OF STATIC.
Week 2	VECTOR QUANTITIES & FORCE ANALYSIS.
Week 3	MOMENT OF AFORCE.
Week 4	COUPLE
Week 5	FORCE SYSTEM RESULTANTS.
Week 6	FORCE SYSTEM RESULTANTS.
Week 7	**Mid-Term** + EQUILIBRIUM OF FORCE SYSTEM.
Week 8	EQUILIBRIUM OF FORCE SYSTEM.
Week 9	EQUILIBRIUM OF ARIGID BODY.
Week 10	FRICTION.
Week 11	FRICTION.
Week 12	CENTER OF GRAVITY AND CENTROID.
Week 13	CENTER OF GRAVITY AND CENTROID.

Week 14	PRINCIPLES OF WORK.
Week 15	MOMENT OF INERTIA.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-3	Lab 1: Introduction to Forces and vectors
Week 4-5	Lab 2: Forces in 3D Applications
Week 6-7	Lab 3: Moments and couples Applications
Week 8-9	Lab 4: Resultant and Equilibrium
Week 10-11	Lab 5: Joint Method and section method
Week 12-13	Lab 6: Trusses in 3D
Week 14-15	Lab 7: Frames and Machines

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	[R.C._Hibbeler]_Engineering_Mechanic_STATICS__(Sol(b-ok.org) 2017	Yes

Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية					
Module Title	**English for Academic**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☐ **lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU21016				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		1	**Semester of Delivery**		1
Administering Department		ME	**College**	TCM	
Module Leader	Salam Obaid Dhahi		**e-mail**	salam.obaid@atu.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor	Omar Mohsin Rashid		**e-mail**	Omar.Mohsin@atu.edu.iq	
Peer Reviewer Name		Ahmed Hamza Umran	**e-mail**	Com.ahmd2@atu.edu.iq	
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 Objectives أهداف المادة الدراسية	1. Teaching the student, the basic principle of English Language. 2. Teaching students the exits of letters. 3. Teach the student the basic rules of the subject .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Listening, Question, Cities and Countries, Numbers, Reading, Every Day English . 2. The Family, Possessives, Possessives Adjectives Vocabulary, Listening, Reading, Everyday English. 3. Sport, Food and Drinks, Present Simples, Number and Price, Listening. 4. Questions, Pronouns and Possessives. 5. Prepositions, Everyday English, Past Simple Irregular Verbs,. 6. Times Past, Reading, Past Simple- Regular, Everyday English, Vocabulary, Grammar,. 7. Present Continuous, Present Simple and Continuous, Reading, Opposite Verbs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Introduction , Listening, Question, Cities and Countries, Numbers, Reading, Every Day English, Jobs, Question and Negatives, Address, Phone Remember, Listening, Pronunciation, Listening, Everyday English, Sport, Food and Drinks, Present Simples, Number and Price, Listening, Object Pronouns, Questions Words, Why and Because, Vocabulary, Reading, Writing, Everyday English. Part B - Prepositions, Everyday English, Past Simple Irregular Verbs, Times Past, Reading, Past Simple- Regular, Everyday English, Vocabulary, Grammar, Past Simple, Making Conversation, Time Expression, Reading, Everyday English, Present Continuous, Present Simple and Continuous, Reading, Opposite Verbs.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
	Quizzes	2	20% (20)	5 and 10	LO #1, #2 and #10, #11

Formative assessment	**Assignments**	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	-	-	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Basics of Present simple tense
Week 3	Spelling of –S and –ES and Exercises.
Week 4	**Present continuous tense** and Exercises.
Week 5	**Spelling of –ing and Spelling of –ed.**
Week 6	**Past simple tense and Exercises.**
Week 7	Mid-term Exam
Week 8	**Past continuous tense and Exercises.**
Week 9	EXPRESSIONS OF QUANTITY.
Week 10	Present perfect tense
Week 11	COMPARE THE PAST SIMPLE AND PRESENT PERFECT
Week 12	Verb Patterns

Week 13	The Second Conditional
Week 14	Past Perfect Tense
Week 15	Present Perfect Continuous
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Headway**	Yes
Recommended Texts		
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Mathematics (I)**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU21013		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		

Module Level	UG I	**Semester of Delivery**	1
Administering Department	MET	**College**	TCM
Module Leader	Haneen Hamed Oda	e-mail	h.hamid9993@gmail.com
Module Leader's Acad. Title	Asist. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Ali Talib shomran	**e-mail**	Com.ali4@atu.edu.iq
Peer Reviewer Name	Badr Kamoon Dabis	**e-mail**	com.bdr@atu.edu.iq
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 Objectives أهداف المادة الدراسية	The aim of this course is to give an introductory course on basics of analysis, to teach general concepts such as Slopes, Limits, Continuity, Matrix, solving equations, complex number, Logarithmic, Exponential and Hyperbolic functions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define basic functions, take the limit of functions and investigate their continuity, 2. Sketch and interpret the graph of functions. 3. Define Matrices and vectors. 4. classify Determinants and Properties 5. Solving of system of Equations 6. Defines complex numbers 7. Knowing the mathematical operations of complex numbers. 8. Define the main functions and theorem (Demaiver's, Trigonometric, Logarithmic and exponential functions, Hyperbolic).
Indicative Contents المحتويات الإرشادية	1. General Concepts, Slope, Cartesian Coordinates, Slope of a line, Equations, and Distances: • Understand and apply the concepts of slope and Cartesian coordinates. • Calculate and interpret the slope of a line using the rise over run formula. • Solve equations involving slopes and distances on the coordinate plane. 2. Graphing of Functions, Limits, Graphs of Equations, Limits, and Intervals: • Graph functions and equations on a coordinate plane. • Understand the concept of limits and calculate limits of functions. • Determine the intervals of continuity and analyze the behavior of functions within those intervals. 3. Matrices, Elementary Operations with Matrices, and Vectors: • Understand the properties and operations of matrices. • Perform elementary operations on matrices, including addition, subtraction, scalar multiplication, and matrix multiplication. • Apply vector concepts and operations, such as addition, subtraction, and scalar multiplication.

	4. Determinants and Properties, Transpose, and Inverse of Matrices: • Calculate determinants of matrices and understand their properties. • Find the transpose and inverse of matrices. • Apply properties of determinants and matrix operations to solve mathematical problems. 5. Solution of System of Equations using Gramer's Rule Method: • Understand and apply Gramer's Rule for solving systems of equations. • Solve systems of equations using determinants and Cramer's Rule. • Apply the solution to real-world problems involving systems of equations. 6. Complex Numbers, Mathematical Operations, Argand Diagrams, and Product Quotients: • Understand the concept of complex numbers and their representation. • Perform mathematical operations, including addition, subtraction, multiplication, and division, with complex numbers. • Interpret and construct Argand diagrams to represent complex numbers. • Apply complex number operations to solve mathematical problems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #2 and #6
	Assignments	2	10% (10)	3 and 8	
	Projects / Lab.	0	0% (10)		
	Report	0	0% (10)		
Summative assessment	**Midterm Exam**	2hr	30% (30)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	General Concepts, Slope, Cartesian Coordinates, Slope of a line, Equations and distances
Week 2	Graphing of functions, Limits, Graphs of equations, Limits and intervals
Week 3	Continuity, Domain and Range, Continuity test
Week 4	Matrices, Elementary Operations with matrices and Vectors
Week 5	Determinants and Properties, Transpose and inverse of matrices
Week 6	Solution of System of Equations (Solution of system of equations using Gramer's rule method)
Week 7	Mid-term Exam
Week 8	Complex Numbers Introduction to complex numbers
Week 9	Mathematical Operations for Complex Numbers, Argand diagrams and product quotients
Week 10	Demaiver's Theorem (Powers and roots)
Week 11	Trigonometric functions (Trigonometric functions, Properties, Rules, Graphing)
Week 12	Inverse trigonometric functions (Applications, Rules, Properties)
Week 13	Logarithmic and exponential functions (Logarithmic and exponential functions, Properties, Rules)
Week 14	Hyperbolic functions (Graphing, Properties, Rules)
Week 15	Inverse hyperbolic functions (Properties, Rules, Graphing)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Thomas, Calculus and Analytic Geometry, Addison-Wesley 1996	Yes
Recommended Texts	Adams, R.A, Calculus, a complete course, Addison-Wesley 2003	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Workshops (I)**			**Module Delivery**	
Module Type	**BASIC**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	ATU21011				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level		UG I	**Semester of Delivery**		1
Administering Department		MET	**College**	TCM	
Module Leader	Salam Obaid Dhahi		**e-mail**	salam.obaid@atu.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc
Module Tutor	Talib Alwan Hardan		**e-mail**	Talaalwan200@atu.edu.iq	
Peer Reviewer Name		Talib Ameer Eesa	**e-mail**	talbA.eesa@atu.edu.iq	
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 Objectives أهداف المادة الدراسية	To teach the fundamentals of material science and properties of materials used in engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Proficiency in various welding techniques to produce high-quality welds on different materials and thicknesses. 2- Adherence to safety protocols, industry standards, and welding-related hazard awareness. 3- Interpretation of technical drawings, blueprints, and welding symbols for accurate execution of welding tasks. 4- Selection and utilization of mechanical fittings for proper installation and assembly. 5- Proficiency in pipefitting techniques, including measuring, cutting, threading, and alignment. 6- Compliance with industry standards and practices for mechanical fitting installation. 7- Fundamental knowledge and practical skills in machining operations, such as milling, drilling, and turning. 8- Use of appropriate tools and equipment to produce accurate and precise components. 9- Adherence to technical specifications and industry standards in machining processes.
Indicative Contents المحتويات الإرشادية	1. Demonstrate proficiency in various welding techniques, such as shielded metal arc welding (SMAW), gas metal arc welding (GMAW), and gas tungsten arc welding (GTAW), to produce high-quality welds on different materials and thicknesses. 2. Apply appropriate safety protocols and adhere to industry standards when operating welding equipment, including proper use of personal protective equipment (PPE), fire prevention measures, and knowledge of welding-related hazards. 3. Understand and interpret technical drawings, blueprints, and welding symbols to accurately execute welding tasks and meet specifications. 4. Develop skills in selecting and utilizing mechanical fittings, including threaded fittings, flanges, couplings, and valves, for various industrial applications, ensuring proper installation and assembly. 5. Demonstrate proficiency in pipefitting techniques, including measuring, cutting, threading, and aligning pipes, to effectively install mechanical fittings

	in compliance with industry standards. 6. Acquire fundamental knowledge and practical skills in machining operations, such as milling, drilling, and turning, including the use of appropriate tools and equipment, to produce accurate and precise components based on technical specifications.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	7	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	0			
	Assignments	0			
	Projects / Lab.	15	10% (10)	Continuous	All
	Report	0			
Summative assessment	**Midterm Exam**	0			
	Final Exam	0			All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Workshop Syllabus) المنهاج الاسبوعي للورش الهندسية	
	Material Covered
Week 1-4	welding workshop
Week 5-11	Mechanical fitting workshop
Week 12-15	Machining workshop

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		No
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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