Module Description Form

نموذج وصف المادة الدراسية

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**CAD Drawing**			**Module Delivery**	
Module Type	**Support (S)**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**AFU12016**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1 1		**Semester of Delivery**	1	
Administering Department	AFU12		**College**	Technical Eng. Collage	
Module Leader	Ehab Aied		**e-mail**	ehabaiedl@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	Senior lecturer		**Module Leader's Qualification**	Ms.c.	
Module Tutor	Sarah Jamal Belal		**e-mail**	ehabaied@uoalfarahidi.edu.iq	
Peer Reviewer Name	Dr. Mokdad Hahman		**e-mail**	m.rahman@uoalfarahidi.edu.iq	
Scientific Committee Approval Date	20/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	AFU12042, ATU12062, ATU12076, ATU12081, ATU12086	**Semester**	1, 6, 7, 8, 8

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To present a brief vision of Computer-Aided Design (CAD) and the tools of this term. 2. Highlighting the mathematical modeling principles of line, arc, spline, and other segments. 3. Covering the significant programs utilized in the modeling and comparing these programs. 4. Defining the SOLIDWORK program's tools and modeling outcomes. 5. Explaining global and local coordinate systems in modeling. 6. Explain the objectives of drawing views. 7. Enabling the students to have skills in modeling 2D and 3D. 8. Enabling the students to assemble the parts drawn. 9. Presenting theories of fit and tolerances in a drawing. 10. Presenting theories of bearings, gears, belts-pulleys, and cams.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Control of CAD principles as background programming of each segment, such as line or arc. 2. Controlling the main and sub-tools of the SOLIDWORKS program as a professional designer. 3. Contributing to knowing the methodology of drawing accuracy and technology terms. 4. Presenting the best factual knowledge for using the views and assembly techniques. 5. Create a valid basis for modeling cams, gears, ... etc. 6. Showing the right path to control in putting the dimensions. 7. Training the students to construct sub and major-projects of the designated modeling system.
Indicative Contents المحتويات الإرشادية	The indicative contents of this subject are: Part (A) CAD theories: DDA algorithm for line, Bresenham's algorithm, Spline theories, Matrices of drawing views, and Overlapping and topology problems. (8 hrs) Part (B) Introduction to modeling system in SOLIDWORKS: Drawing planes, Preparing sheet drawings, Line commands, circle commands, Arc commands, Rectangle commands, straight slot commands, Ellipse commands, Spline commands, and 3D sketch planes. (12 hrs) Part (C) Modifies commands in SOLIDWORKS: Trim commands, Convert entities commands, Offsite entities, Mirror, Pattern commands, and Miscellaneous commands. (6 hrs) Part (D) Main-Features commands: References Geometry commands, Curves, Extruded, Revolved, Swept, loft, Cut extruded, Hole wizard commands, Cut revolved, Cut loft, and Cut swept. (13 hrs) Part (E) Modify-Features commands: Fillet, Pattern, Rib, Draft, Shell, Wrap, Intersection, and Mirror. (5 hrs)

	Part (F) Surfaces commands: Extruded surface, Revolved surface, Swept surface, Loft surface, Boundary surface, Filled surface, Planar surface, Offset surface, Ruled surface, Flatten surface, and Fillet commands. (9 hrs) Part (G) Modify-Surfaces commands: Extend surfaces, Trim and Un-trim commands, knit surface, and Thicken commands. (5 hrs) Part (H) Assembly commands: Edit component, Insert components, Mate, Pattern, Smart features, Miscellaneous commands, Show and hidden components, Assembly features, Bill of Materials, and Exploded. (8 hrs) Part (I) Drawing sheet commands: Sheet size, 3D standard view, Model view, Projected view, Auxiliary, Section view, Detail view, Break commands, and Annotations commands. (6 hrs) Part (J) Tolerance Conceptual: Tolerance Methods, Tolerance expression, Plus and minus concept, Limit concept, Chain and baseline, Cases studies. (3 hrs) Part (K) Fit conceptual: Transition, Clearance, and Interference. (3 hrs) Part (L) Bearing, Cams, Gears, and Belts, bolts, Welding conceptual (12 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy of this subject is to study the principles of computer-aided design (CAD) by employing one of the popular programs. The tools of SOLIDWORKS program contribute to developing the users' skills in 2D and 3D drawing. Besides, this program utilizes the assembly and sheet representation for sketched parts with annotation technologies. Furthermore, this program boosts the modeling of belts, coupling, gears, and cams. Consequently, prepare the students in the aeronautical field in the advanced modeling of airplanes.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	115	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	85	**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**	2	10% (10)	4 and 12	
	Assignments	2	10% (10)	3 to 12	
	Projects / Lab.	2	10% (10)	6 and 11	
	Report	1	10% (10)	0	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	25% (25)	15	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	CAD theories.
Week 2	CAD theories, Introduction to modeling system in SOLIDWORKS.
Week 3	Introduction to modeling system in SOLIDWORKS
Week 4	Introduction to modeling system in SOLIDWORKS, 2D Modifies commands in SOLIDWORKS.
Week 5	2D Modifies commands in SOLIDWORKS, Main-Features commands.
Week 6	Main-Features commands.
Week 7	Main-Features commands, Mid-Term Exam.
Week 8	Modify-Features commands, Surfaces commands.
Week 9	Surfaces commands.
Week 10	Surfaces commands, Modify-Surfaces commands.
Week 11	Assembly commands.
Week 12	Assembly commands, Drawing sheet commands.

Week 13	Feet and clearance commands
Week 14	Modeling of Bearing, Cams, and Gears.
Week 15	Modeling of Belts, Bolts, and Welding.
Week 16	Final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	DDA Algorithm for line, Bresenham Algorithm for arc, HC-Spline.
Week 2	Bezier spline, Preparing sheet and plane for drawing by SOLIDWORK program.
Week 3	2D drawing tools.
Week 4	2D drawing tools, 2D modify tools.
Week 5	3D drawing tools.
Week 6	3D drawing tools.
Week 7	3D drawing tools, Mid-Test.
Week 8	3D Modify-Features tools.
Week 9	Surfaces tools.
Week 10	Surfaces tools, Modify-Surfaces tools.
Week 11	Modify-Surfaces tools, Assembly tools.
Week 12	Assembly tools, Drawing Sheet tools.
Week 13	Feet and clearance tools.
Week 14	Bearing, Cams, and Gears tools
Week 15	Belts, Bolts, and Welding tools
Week 16	Final test.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Radhakrishnan, P., Subramanyan, S. and Raju, V., 2008. CAD/CAM/CIM. New Age International. Bethune, James D. Engineering Design and Graphics with SolidWorks 2016. United States: Pearson, 2016.	Yes
Recommended Texts	Purdue Univ, Prof Sham Tickoo. Solidworks 2016: A Tutorial Approach. United States: CADCIM Technologies, 2016.	Yes
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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Computer Principals**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**AFU12012**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	AFU12		**College**	TEC	
Module Leader	Sara Jmal		**e-mail**	sarajamal@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ms.c.	
Module Tutor	None		**e-mail**	E-mail	
Peer Reviewer Name	Dr. mokdad rahman		**e-mail**	m.rahman@ uoalfarahidi.edu.iq	
Scientific Committee Approval Date	25/06/2023		**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-The aim of this course is to provide English learners with integrated language skills such as reading, listening and writing resulting in a level of basic language knowledge. 2-This course will focus on grammar rules, basic word knowledge and usage, reading comprehension, reading out of the lesson, and Paragraph writing. 3- A student may be able to listen to native speakers and speak English Language. 4- A student may be able to write and have creativity in his writing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- Uses expressions of Quantity in elementary level of English. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task. 3- Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Translates sentences in elementary level from English to another language. 5- Interprets the texts written in elementary level of English.
Indicative Contents المحتويات الإرشادية	**Language** is a rule-governed behavior. It is defined as the comprehension and/or use of a spoken (i.e., listening and speaking), written (i.e., reading and writing), and/or **other communication symbol system** (e.g., American Sign Language). **Spoken and written language** are composed of receptive (i.e., listening and reading) and expressive (i.e., speaking and writing) components. Spoken language, written language, and their associated components (i.e., receptive and expressive) are each a synergistic system comprised of individual language domains (i.e., phonology, morphology, syntax, semantics, pragmatics) that form a dynamic integrative whole **Phonology** study of the speech sound (i.e., phoneme) system of a language, including the rules for combining and using phonemes. **Morphology** study of the rules that govern how morphemes, the minimal meaningful units of language, are used in a language. **Syntax** the rules that pertain to the ways in which words can be combined to form sentences in a language. **Semantics** the meaning of words and combinations of words in a language.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Uses the available material to increase his efficiency. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task.

	3-Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Develop and enhance students' language skills to communicate in English properly. 5- Interprets the texts written in elementary level of English.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 #10, #11
	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 programming using (Matlab)** - Introduction to (Matlab) Menu bar , tool bar, and program windows
Week 2	**Format & numbers**

	- Real, Integer , Inf ,NaN, Complex numbers
Week 3 **Week 4** **Week 5**	**Variables** - Variable Names - Examples on variable names - Show the results - Examples on (+ , - , * , /) - Outputs Intermediate results during calculations
Week 6	**Built-in-functions** - Trigonometric Functions (sin , cos , tan , sec) Elementary Functions (abs, log10 , log, exp, sqrt)
Week 7 **Week 8**	**Functions** - polyarea (X,Y) - polygon - Standard Deviation - abs function - (max) - (min) (mean)
Week 9	**Logical commands** - Logical Operations > greater than >= greater than or equal < less than <= less than or equal = = equal = ~ not equal - Logical commands or (|), and (&)
Week 10	**Strings manipulation** - Creating Strings save
Week 11 **Week 12**	**Conditional commands** - if end If elseif else function - Examples Problems
Week 13 **Week 14**	**loops** - for - while - Program control - Example Problems
Week 15	**Matrices** - Matrices manipulation

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 book for learning English	Yes
Recommended Texts	Skills in writing and Learning English	Yes
Websites	https://www.bbc.co.uk/learningenglish/	

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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Electricity**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**AFU1٢026**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	AFU1٢		**College**	TEC	
Module Leader	**Estabrq Ali**		**e-mail**	**E-mail:** estabrqali@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	**lecturer**		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nawfal Mohammed		**e-mail**	nawfalmohammed@uoalfarahidi.edu.iq	
Scientific Committee Approval Date	**25/02/2024**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	AFU12052	**Semester**	5

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
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. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs.] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs.] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs.] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs.]

	Revision problem classes [6 hrs.] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs.] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs.] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs.]

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 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 #10, #11
	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 - Difference between Circuit Theory and Field Theory
Week 2	Basics of Network Elements
Week 3	Resistance and Resistivity, Ohm's Law and Inductance, Capacitance
Week 4	Review of Kirchhoff's Laws, Circuit Analysis - Nodal and Mesh
Week 5	Linearity and Superposition, Source Transformations, Thévenin and Norton Equivalents
Week 6	Review of Inductor and Capacitor as Circuit Elements, Source-free RL and RC Circuits, Transient Response
Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	Sinusoidal Forcing, Complex Forcing, Phasors, and Complex Impedance, Sinusoidal Steady State Response
Week 9	Nodal and Mesh Revisited, Average Power, RMS, Introduction to Polyphase Circuits
Week 10	Mutual Inductance, Linear and Ideal Transformers, Circuits with Mutual Inductance
Week 11	Frequency Response of Series/Parallel Resonances, High-Q Circuits
Week 12	Complex Frequency, s-Plane, Poles and Zeros, Response Function, Bode Plots
Week 13	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 14	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 15	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Electronic Workbench and Multisim
Week 2	Lab 2: Thevenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: Δ-Y and Y-Δ circuit conversions
Week 4	Lab 4: Superposition Theorem
Week 5	Lab 5: RLC series circuit
Week 6	Lab 6: RLC parallel circuit
Week 7	Lab 7: Resonance in parallel circuits

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-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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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	AVIATION ENGLISH I			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	AFU12011				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		1	**Semester of Delivery**		1
Administering Department		AFU12	**College**	TEC	
Module Leader	Hasan ahmed		**e-mail**	hasanahmed@uoalfarahidi.edu.iq	
Module Leader's Acad. Title		Asst. Lect.	**Module Leader's Qualification**		Master degree
Module Tutor	None		**e-mail**	E-mail	
Peer Reviewer Name		Dr.Abbas Fadhil	**e-mail**	E-abbasfadhil@ uoalfarahidi.edu.iq l	
Scientific Committee Approval Date		25/06/2023	**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	**MO-1**	Having the knowledge of basic principles, rules and laws of aircraft and aerospace systems.
	MO-2	The ability of recognizing and using the structural characteristics of the aircraft and the aircraft related maintenance and tools.
	PO-3	Applying the knowledge of basic issues related to aircraft electronics.
	MO-4	Technical drawing and know the rules of civil aviation
	MO-5	Applying the relevant standards for aircraft maintenance and repairment
	MO-6	Aircraft automatic control methods
	MO-7	By performing algorithms and programming to set microcontroller circuits
	MO-8	Ensuring operational safety of electronic material and performing basic measurements
	MO-9	The ability of analyzing aircraft electrical-electronic systems, materials and failure
	MO-10	Installing digital, analog and power electronics circuits
	MO-11	Performing cyber communication of control system and setting sensor systems
	MO-12	Applying standards and assurance of quality, ability of using foreign languages
	MO-13	Values of professional ethics, using communication technologies and performing researches
	MO-14	Performing first aid /wounded patients İn Case of emergency and protecting the environment
	MO-15	Performing magmatic applications
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**LO-1**	To enable students to use English correctly and fluently.
	LO-2	To ensure that students have sufficient professional English knowledge in scientific and technical fields.
	LO-3	To enable students to use appropriate English phrases while performing technical maintenance, repair and assembly.
	LO-4	To enable students to communicate in English with foreign technicians and business partners.
	LO-5	To enable students to use the target language in solving sudden problems.
Indicative Contents المحتويات الإرشادية	**Language** is a rule-governed behavior. It is defined as the comprehension and/or use of a spoken (i.e., listening and speaking), written (i.e., reading and writing), and/or **other communication symbol system** (e.g., American Sign Language). **Spoken and written language** are composed of receptive (i.e., listening and reading) and expressive (i.e., speaking and writing) components.	

	Spoken language, written language, and their associated components (i.e., receptive and expressive) are each a synergistic system comprised of individual language domains (i.e., phonology, morphology, syntax, semantics, pragmatics) that form a dynamic integrative whole **Phonology** study of the speech sound (i.e., phoneme) system of a language, including the rules for combining and using phonemes. **Morphology** study of the rules that govern how morphemes, the minimal meaningful units of language, are used in a language. **Syntax** the rules that pertain to the ways in which words can be combined to form sentences in a language. **Semantics** the meaning of words and combinations of words in a language.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Uses the available material to increase his efficiency. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task. 3-Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Develop and enhance students' language skills to communicate in English properly. 5- Interprets the texts written in elementary level of English.

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	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #3, #5
	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 the Course : Visual and audio presentation, student-centered, eclectic, interactive
Week 2	Unit 1: Check-up : Visual and audio presentation, student-centered, eclectic, interactive
Week 3	Unit 1: Check-up : Visual and audio presentation, student-centered, eclectic, interactive
Week 4	Unit 2: Parts (1) : Visual and audio presentation, student-centered, eclectic, interactive
Week 5	Unit 2: Parts (1) : Visual and audio presentation, student-centered, eclectic, interactive
Week 6	Review Unit A: Visual and audio presentation, student-centered, eclectic, interactive
Week 7	Unit 3: Parts (2): Visual and audio presentation, student-centered, eclectic, interactive
Week 8	Mid-Term Exam: Written Exam
Week 9	Unit 3: Parts (2): Visual and audio presentation, student-centered, eclectic, interactive
Week 10	Unit 4: Movement: Visual and audio presentation, student-centered, eclectic, interactive
Week 11	Unit 4: Movement: Visual and audio presentation, student-centered, eclectic, interactive
Week 12	Review Unit B: Visual and audio presentation, student-centered, eclectic, interactive
Week 13	Unit 5: Flow: Visual and audio presentation, student-centered, eclectic, interactive
Week 14	Unit 5: Flow: Visual and audio presentation, student-centered, eclectic, interactive
Week 15	**Review**
Week 16	Final Exam: Written 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	Technical English 1, (Course Book, Teacher's Book, CDs) by David Bonamy – Pearson Education Limited 2008	Yes
Recommended Texts	Essential Grammar in Use Elementary, Raymond Murphy Fundamentals of English Grammar, Betty Schrampfer Azar Handouts, Videos	Yes
Websites	https://www.bbc.co.uk/learningenglish/	

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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Multi Variable Calculus**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	AFU12022				
ECTS Credits	٥				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	AFU12		**College**	TEC	
Module Leader	Sabah Ali		**e-mail**	sabahali@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	E-mail	
Peer Reviewer Name	None		**e-mail**	E-mail	
Scientific Committee Approval Date	25/06/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Single variable calculus	**Semester**	1
Co-requisites module	Algebra	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of mathematical Equations through the application of techniques. 2. The ability to apply knowledge in mathematics, science, and engineering. 3. To understand **Differential Equations**, Double Integrals and Triple Integrals, etc. 4. To understand **Polar Coordinates** and **Special Functions** problems. 5. To Sketching of Geometric Shapes
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. Selects and applies knowledge of mathematics, engineering, technology, and other sciences to solve engineering problems that require the application of applied principles, procedures, or methodologies. 2. To Recognize between type of Differential Equations. 3. understanding with solving skills of Differential Equations. 4. To understand various method associated with Non-Homogeneous Differential Equations**.** 5. Definition with understand the Mechanism **Partial Differentiation** 6. understanding Chain Rule and Total Differential. 7. Learning how to Sketch the Geometric Shapes 8. Understanding the Double Integrals, Triple Integrals and Applications. 9. Learning how to solve Gama Function, Beta Function. 10. To recognize Special Curve (Line, Circle, Conic Section) and Rotation of Axis
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **Part A -Ordinary Linear Differential Equations.** - 1st order differential equations. {Separable, Homogeneous, Exact, Linear Bernoulli}, 2nd Order Differential Equations. {Reducible to 1st order, Homogeneous. Non-Homogeneous} Higher Order Differential Equations. {Homogeneous, Non-Homogeneous, Applications}. [16 hrs], **Part B - Partial Differentiation** Definition, Mechanism of Differentiation, Functions of Two Variables, Functions of Higher Variables., Transformation {Chain Rule, Total Differential}, Directional Derivative {Maxima, Minima and Saddle Points, Lagrange Theorem}. [15 hrs] **Part C – Integrals:** Sketching of Geometric Shapes, Double Integrals and Triple Integrals, Applications. [6 hrs] **Part D – Special Functions:** Gama Function and Beta Function. [6 hrs]. **Part E– Polar Coordinates:** Polar Curve Representation, Sketching of Polar Curve, General Curve., Special Curve (Line, Circle, Conic Section), Rotation of Axis, The Arc Length of Polar Curve, Surface

	Area of Rotation, The Angle Between the Tangent Line and Radius Vector for a Polar Curve, Slope of Tangent {Asymptotes, Plane Area} [15 hrs]

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 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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	6,10 and 14	LO #1, #2 and #5, LO #6, #7 and #10 LO #11, #12 and #13
	Assignments	5	10% (10)	2 and 13	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10	0	0
	Report	2	10% (10	0	0
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	**Ordinary Linear Differential Equations** - 1st order differential equations - Separable - Homogeneous.
Week 2	- Exact - Linear - Bernoulli
Week 3	- 2nd Order Differential Equations - Reducible to 1st order - Homogeneous.
Week 4	- Non-Homogeneous
Week 5	- Higher Order Differential Equations - Homogeneous - Non-Homogeneous - Applications
Week 6	**Partial Differentiation** - Definition - Mechanism of Differentiation - Functions of Two Variables - Functions of Higher Variables
Week 7	- Transformation - Chain Rule - Total Differential
Week 8	-Gradient, Divergence, and Curl of Vector - Equation of Normal Line and Tangent Plane
Week 9	- Directional Derivative - Maxima, Minima and Saddle Points - Lagrange Theorem
Week 10	- Sketching of Geometric Shapes - Double Integrals - Triple Integrals - Applications
Week 11	**Special Functions** - Gama Function - Beta Function
Week 12	**Polar Coordinates** - Polar Curve Representation - Sketching of Polar Curve - General Curve
Week 13	- Special Curve (Line, Circle, Conic Section)

	- Rotation of Axis
Week 14	- The Arc Length of Polar Curve - Surface Area of Rotation - The Angle Between The Tangent Line and Radius Vector For a Polar Curve.
Week 15	- Slope of Tangent - Asymptotes - Plane Area
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas Calculus Early Transcendentals Single Variable 13th	Yes
Recommended Texts	Engineering Mathematics - 5th Edition [K A Stroud].	No
Websites	https://www.khanacademy.org/math/calculus-1. https://www.mathsisfun.com/	

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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics-Static**			**Module Delivery**	
Module Type	**Support learning activity**			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐ **Lab** ☐ **Practical** ☐ **Seminar**	
Module Code	**AFU12025**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		1	**Semester of Delivery**		2
Administering Department		AFU12	**College**	TEC	
Module Leader	Ihsan Kadhim		**e-mail**	dr.ihsan@uoalfarahid.edu.iq	
Module Leader's Acad. Title		Assist.Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ihsan Kadhim	**e-mail**	dr.ihsan@uoalfarahid.edu.iq	
Scientific Committee Approval Date		25/6/2023	**Version Number**		1

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Engineering Mechanics-Applied of Dynamics	**Semester**	٤

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering 2. To understand and use the general ideas of force vectors and equilibrium of rigid body and particle 3. To understand and use the general ideas of structural analysis and internal force friction 4. To understand and use the general ideas of centre of gravity, centroids and moment of inertia
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Determine the components of a force in rectangular or nonrectangular coordinates. 2. Determine the resultant of a system of forces. 3. Draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram. 4. Determine the support reactions on a structure. 5. Determine the connection forces in trusses and in general frame structures. 6. Determine the internal reactions in a beam 7. Analyze systems that include frictional forces. 8. Locate the centroid of an area. 9. Calculate the second moment of an area, calculate the principal second moments of an area.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – forces</u> vectors ,Forces ,3D forces ,Moments OF FORCES ,Couples ,Resultant of a force system, (56 hrs) Equilibrium of a force system and analysis of internal force (8 hrs) Friction ,Application of friction on bearings (16 hrs) <u>Part B – truss</u> Trusses, planes, joint method , Frame and Machines (16 hrs) <u>Part C – centroid</u> Centered of line, area and volume, Moment of inertia, Theory of parallel axes(24 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	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
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**	٥	10% (10)	٢ - 10 Every other lecture	All
	Assignments	2	10% (10)	2 and 12	LO#3, LO#7 and LO#9
	Projects / Lab.	١	10% (10)		
	Report	٢	10% (10)	13	LO #5, #8 and #9
Summative assessment	**Midterm Exam**	2hr	١٠% (٢٥)	7	LO #1 - #5
	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 static , vectors
Week 2	Forces
Week 3	3D forces
Week 4	Moments
Week 5	Couples
Week 6	Resultant
Week 7	Resultant
Week 8	Equilibrium
Week 9	Trusses, planes, joint method
Week 10	Frame and Machines
Week 11	Friction
Week 12	Application of friction on bearings
Week 13	Centered of line, area and volume
Week 14	Moment of inertia
Week 15	**Theory of parallel axes**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	ENGINEERING MECHANICS, statics by R. C. HIBBELER	Yes
Recommended Texts	ENGINEERING MECHANICS, statics by J. L. MERIAM	No
Websites	https://www.mathsisfun.com/	

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Physics For Engineer**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**AFU12015**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	2		**College**	1	
Module Leader	Yaser Mohammed		**e-mail**	Yaser.mohammed0086@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	Assist. Lecture		**Module Leader's Qualification**	Ms.c	
Module Tutor	None		**e-mail**		
Peer Reviewer Name	Dr.Ihsan Kadhim		**e-mail**	E-mail: dr.ihasa@uoalfarahidi.edu.iq	
Scientific Committee Approval Date	25/02/2024		**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	1. To develop basic understanding for the main engineering materials, principles. 2. To understand nature of matter, states, change between phases. 3. To build basic understanding of engineering mechanics (static, dynamics). 4. To build basic understanding of thermo and fluid mechanics (thermodynamics, fluid). 5. To build basic understanding of engineering optics. 6. To build basic understanding of waves.
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. Recognize construction of the materials, chemical and physical properties of material. 2. Ability to analyses the mechanical systems and determine resultant of force system. 3. Describe scientifically the thermal behave of different systems. 4. Discuss the fluid properties systems, pressure and forces. 5. Describe dynamic system, gyroscopic and friction. 6. Define ideal gas law. 7. Identify the basic optics principle and laws. 8. Discuss the optic and light systems. 9. Discuss the various properties of light and laser and fiber optics. 10. Explain waves laws used in physics. 11. Identify the speed of sound and transfer through media, Mach number .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **1 Matter** Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states. **2 Mechanics** 2.1 Statics Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers). 2. 2 Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency. 2. 3 Dynamics (a) Mass Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency; (b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of

	friction (rolling resistance) 2.2.4 Fluid dynamics (a) Specific gravity and density; (b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi. **2.3 Thermodynamics** (a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition. (b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume & constant pressure, refrigerators & heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion. **2.4 Optics (Light)** Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses; Fibre optics. **2.5 Wave Motion and Sound** Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.

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 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem)	**150**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3,5,8,11,13 and 15	LO #2, #4, #7, #8 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #1, #5 and #9
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #6, #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	Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.
Week 2	Statics Forces, moments and couples, representation as vectors; Centre of gravity.
Week 3	Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid.
Week 4	fluid and gas; Pressure and buoyancy in liquids (barometers). Fluid dynamics (a) Specific gravity and density; (b) Viscosity, fluid resistance, effects of streamlining.
Week 5	Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.
Week 6	Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.
Week 7	Dynamics (a) Mass Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency; (b) Momentum, conservation of momentum; Impulse
Week 8	Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance)
Week 9	Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition. (b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics;

Week 10	Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas
Week 11	Isothermal, adiabatic expansion and compression, engine cycles, constant volume & constant pressure, refrigerators & heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.
Week 12	Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces
Week 13	reflection by spherical mirrors, refraction, lenses; Fibre optics.
Week 14	Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves
Week 15	Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Physics for Scientists & Engineers & Modern Physics, 9th Ed by Serway, Jewett	Yes
Recommended Texts	Fundamentals of Physics Textbook David Halliday	yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Thermodynamics**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**AFU12024**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		1	**Semester of Delivery**		2
Administering Department		ATU12	**College**	TEC	
Module Leader	Hasan ahmed		**e-mail**	hasanahmed@uoalfarahidi.edu.iq	
Module Leader's Acad. Title		Assist. Lecture	**Module Leader's Qualification**		Ms.c
Module Tutor			**e-mail**		
Peer Reviewer Name		Dr Mokdad Rahman	**e-mail**	m.rahman@uoalfarahidi.edu.iq	
Scientific Committee Approval Date		25/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	AFU12046, AFU12064, AFU12065, AFU12082	**Semester**	4,6,8

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Basic terms and definitions: energy, thermodynamic system, properties, state and thermodynamic equilibrium. Units. The zeroth law of thermodynamics 2. Microscopic forms of energy. The basic axiom of thermodynamics. Work and heat, moving boundary work. The first law of thermodynamics for closed systems 3. Specific heat, enthalpy, ideal gas equation of state, characteristic thermodynamic processes 4. The first law of thermodynamics for open systems (control volume). The concept of entropy, causes of entropy change, reversible and irreversible processes, entropy as a function of the state. 5. The second law of thermodynamics. Examples of thermodynamic cycles: gas power cycles, refrigeration and heat pump cycles. 6. Phases of a pure substance, saturated liquid, saturated liquid-vapor mixture, critical parameters, triple point, property diagrams for phase-change processes, properties of gas and two-phase mixtures. 7. Unconventional sources of energy
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. On completion of the course, students will have basic knowledge on energy, thermodynamic system and thermodynamic parameters, thermodynamic equilibrium, work and heat as methods of energy transport between systems 2. A student will have skills concerning basic laws of physics relating to thermodynamics and the laws of thermodynamics for closed and open systems. 3. A student will have a fundamental knowledge of the ideal gas equation, polytropic processes and characteristic processes. 4. A student will have the skills to utilize the procedures for energy balancing and methods of energy transport between systems. 5. A student will be able to utilize mathematical tools to solve problems related to the principles of thermodynamics. A student can interpret the obtained results. 6. A student will have the skills to computations in the field of typical issues of heating of a system by work transfer or by heat transfer 7. A student will have learning skills to utilize the ideal gas equation 8. A student will be able to present graphs of thermodynamic processes 9. A student will be aware of the method of generating energy and the operation of energy devices (heat engines, etc.) on the natural environment. 10. A student will be able to work in a team during measurements and to analyse the results; a student will be aware of the importance of knowledge concerning the principles of teamwork
Indicative Contents المحتويات الإرشادية	1. Basic terms and definitions: energy, thermodynamic system, properties, state and thermodynamic equilibrium. Units. The zeroth law of thermodynamics. 2. Microscopic forms of energy. The basic axiom of thermodynamics. Work and heat, moving boundary work. The first law of thermodynamics for closed systems. 3. Specific heat, enthalpy, ideal gas

	equation of state, characteristic thermodynamic processes. 4. The first law of thermodynamics for open systems (control volume). The concept of entropy, causes of entropy change, reversible and irreversible processes, entropy as a function of the state. 5. The second law of thermodynamics. Examples of thermodynamic cycles: gas power cycles, refrigeration and heat pump cycles. 6. Phases of a pure substance, saturated liquid, saturated liquid-vapor mixture, critical parameters, triple point, property diagrams for phase-change processes, properties of gas and two-phase mixtures.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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 #10, #11
	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	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7

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** - Introduction to Thermodynamics - Thermodynamics System - Dimensions, Units & symbols , units system
Week 2	**Properties of System** - Thermodynamic Process - Intensive & extensive Variables - Specific Value, Mole Independent & dependent properties
Week 3	**Thermal Equilibrium, Temperature** - Thermal & thermodynamic equilibrium - Zero Law - Thermometers Temperature Scale
Week 4	**Energy** - Types and source of energy - Kinetic & potential energy The conservation of energy, use
Week 5	**Kinetic Theory of Gases** - Molecular Motion of Gases - Internal Energy, joule's law Molecular Energy
Week 6	**Heat** - Specific Heat - Relation between (q,Q,Q) - Sensible & Latent Heat Joule's Equivalent
Week 7	**Work** - Displacement Work - Work & (p-v) Diagram - State & Path Function - Electrical Work Relation Between (Q, W)
Week 8	**Ideal (Perfect) Gas**

	- Actual & Ideal Gas Boyle's & Charles Law - Equation of Ideal Gas Absolute Scale
Week 9	**Enthalpy** - Enthalpy Joule's Experiment
Week 10	**The First Law of Thermodynamic** - Joule's Law of Internal Energy - The First Law Statements Energy Equation
Week 11	**Application of the First Law on the Closed Systems** - Constant Volume Process - Constant Pressure Process Constant Temperature Process - Adiabatic Process Polytrophic Process
Week 12	**Open systems** - Motion of Fluid - Steady & none Steady Flow - Flow, Shaft Work - Energy Equation
Week 13	**Application of steady flow Energy Eq.** - Boiler & Condenser Compressor & Turbine - Nozzle & throttling Heat Exchanger
Week 14	**The Second Law of Thermodynamics** - Friction Reversible & Irreversible Process
Week 15	- Heat Engine - Reversed Heat Engine - Engine Thermal Efficiency Coefficient of Performance
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 book for learning English	Yes
Recommended Texts	Skills in writing and Learning English	Yes
Websites	https://www.bbc.co.uk/learningenglish/	

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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Human Right and Democracy**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**AFU12021**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	AFU12		**College**	TEC	
Module Leader	Mohammed Jasim		**e-mail**	mohammedjasim@uoalfarahfi.edu.iq	
Module Leader's Acad. Title	Assist.Lecturer		**Module Leader's Qualification**	Ms.c	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	2
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. To develop problem solving skills and understanding of differential equation . 2. To understand infinite series and its applications. 3. To understand vectors and vector valued functions. 4. To understand functions of several variable. 5. To understand double integral , line integral and vector analysis.
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. Solving ordinary differential equations. 2. Converting functions to power series forms such us Taylor's series. 3. Using polar coordinates to solve problems. 4. Solving problems related to vector algebra. 5. Solving problem related to double integrals. 6. Solving problems of multi-variable functions.
Indicative Contents المحتويات الإرشادية	

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 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	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	
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
Formative assessment	Quizzes	2	15% (15)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	15% (15)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	----	--	--	--
	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	**Freedom & Democracy** - An introduction to freedom and democracy in multiple societies and on different ages, its types and how changes in regime occurred **Relativity in freedom** - Freedom is not an absolute idea but it is variable with respect to time, place regime…etc.
Week 2	**General Freedom guaranties** - Freedom has political and legal guaranties. **General freedom divisions** - Natural freedoms, private freedoms, intellectual freedoms, collective freedoms and political freedoms
Week 3	**Individual Freedoms** - Opinion freedom, expression freedom, press freedom…etc. **Democracy & political systems** - Overview about democracy and its history
Week 4	**Democracy types** - Direct and indirect **Dictatorship and its specification** - Overview and specification
Week 5	**Concepts about democracy** - Traditional meaning and modern meaning. **Democracy in Greek Civilization VS.**

	Current democracy
Week 6	**Current crisis of democracy** - Economical, social, cultural and political difficulties **Civil & political rights** - Which includes life right, personal freedom, possessing, contracting family…etc.
Week 7	**Individual importance and its relation with nation and regime** **Importance and specifications of sovereignty**
Week 8	**Main portions of a country** - People, land, government and sovereignty **Human rights in human history** - Human rights in ancient ages like Mesopotamian, Greek, and Roman civilizations
Week 9	**Human rights in divine religions** - In Christian and Islamic - Overview, properties and types
Week 10	**International confession of human rights** **Territorial confession of human rights** - international and legal resources from international agreements
Week 11	**NGO and its role in the protection of human rights** **Women rights** - In Islamic time
Week 12	**Children Rights** - In old civilizations - In divine religions In international agreement on 1989
Week 13	**Elections and human rights** - Human rights is a concept of free elections
Week 14	**Human rights resources in Iraq** - Basics of human rights in Iraq from the Iraqi constitution, year 2005 **Civil Rights** - Equality, life freedom rights and house and personal privacy
Week 15	**Political & economical rights** - Election rights government critique **Social & cultural rights** - This includes the right of family creation, social and health care, and the right of clean environment
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		Yes
Recommended Texts		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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Materials**			**Module Delivery**	
Module Type	Support or related learning activity			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	AFU12023				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	AFU12		**College**	TEC	
Module Leader	Yaser Mohammed Hassan		**e-mail**	Yasser.mohammed0086@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	Assist. Lectyrer		**Module Leader's Qualification**	Ms.c	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Ahmed Ali Akbar		**e-mail**	Ahmed.a.akbar@uoalfarahidi.edu.iq	
Scientific Committee Approval Date	25/06/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module	Manufacturing Processes and Strength of Materials	**Semester**	3 4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Materials Science & Engineering is the study of mechanical, physical, and chemical properties of engineering materials, such as metals, ceramics, polymers, and composites. 2. The objective of a Materials Engineer is to predict and control material properties through an understanding of atomic, molecular, crystalline, and microscopic structures of engineering materials. 3. A Materials Engineer is an essential member of an engineering team responsible for synthesis and processing of advanced materials for manufacturing. 4. A graduate's work may be in areas as diverse as automobile, aerospace, biomedical, or microelectronics manufacturing. Opportunities are available through these industries in the area of research, quality control, product development, design, synthesis, and processing operations.
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. Utilize the structure-properties relationship to predict the properties of a material. 2. Select the materials and properties appropriate for a specific application. 3. Assess needs, formulate problem statement, structure and evaluate solutions in solving real-world materials engineering problems. 4. Apply thermodynamics and kinetics in the process design of materials system in order to produce desired structure and properties. 5. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. 6. Select appropriate materials characterization tools, utilize the tool safely, and interpret experimental results. 7. Utilize modern tools and techniques to alter, characterize, and measure materials properties and to design processes according to accepted standards. 8. Demonstrate use of materials engineering in emerging applications. 9. Design and analyze appropriate experiments to measure or optimize specific engineering properties, incorporating statistical procedures. 10. Select and evaluate economic impact of the materials, design, and/or processes.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **Part A - Engineering materials:** -Introduction to ores, elements and materials {Iron ores, Periodic table of elements, Engineering materials}., **Classification of engineering materials** **-Crystal structure**: atomic arrangement {BCC, FCC and HCP structures}, Atomic packing factor. **-Imperfections in crystals**: {Point defects, Dislocations and grain boundaries},

	Solidification of metals and alloys **- Structure of ingots chilled** {Columnar and central equi-axed grains, Dendritic segregation.} [8 hrs], **Part B - Thermal equilibrium diagrams** -Solubility in the solid state, Phases, Solid solutions, compounds and mechanical mixtures. -**Lever rule**: {Eutectic, Eutectoid and Peritectic reactions}., **Applications on binary phase diagrams**, Components completely soluble, completely insoluble or partially soluble in the solid state. [5hrs] **Part C – Mechanical properties of metals:** - Specifications and standards, Normal stress and shear stress, Strain, Tensile and compression tests, Stress-strain diagram. **-Application on mechanical testing and properties,** Determination of Young's modulus, Yield stress, Proof stress, Ultimate tensile strength, Fracture stress, ductility - Hardness and impact toughness [4 hrs] **Part D – Iron and Steel:** - Fe-Fe3C phase diagram, Allotropy, Microstructure of carbon steels, Effect of carbon content on microstructure & mechanical properties of carbon steel. **Carbon steel** -Types, Properties and uses of carbon steel, Low, medium, and high carbon steel, Tool carbon steel. **-Cast Iron** Types, properties and uses of cast iron White, grey, nodular and malleable cast iron. [4 hrs]. **Part E– Non- destructive inspection:** - Liquid penetrant, Magnetic particle, X-rays, Ultrasonic. [2 hrs] **Part F–Materials** **-Nano materials**, Characterization of nano particles and nano structures, Classification, Applications of nano materials in technology and medicine. **-Plastics**, Introduction to plastics technology, Microstructure and polymerization , Structure of plastics materials., Classification, properties and uses of plastics. - **Ceramics and glass**, Structure, defects, properties and uses of ceramics., Structure, properties and uses of glasses. **-Composite Materials**, Classification: metal matrix, ceramic matrix and polymer matrix composites, Reinforcing phase: fibers, flakes, and particles. Composite's structure and volume fraction, Properties and uses of composites [7 hrs]

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 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	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	5,17 and 14	LO #1, #2, #3 and #4, LO #5, and #6 LO #11, #12 and #13
	Assignments	2	10% (10)	4 and 13	LO #3, #4 and #6, #7
	Projects / Lab.	١	10% (10)	0	0
	Report	2	10% (10)	6,10	0
Summative assessment	**Midterm Exam**	2hr	١٠% (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** -Introduction to ores, elements and materials -Iron ores -Periodic table of elements -Engineering materials. **-Classification of engineering materials**
Week 2	**Crystal structure**

	- Atomic arrangement - BCC - FCC and HCP structures - Atomic packing factor.
Week 3	**Imperfections in crystals** - Point defects - Dislocations and grain boundaries - Solidification of metals and alloys
Week 4	- **Structure of ingots chilled** - Columnar and central equi-axed grains - Dendritic segregation.
Week 5	**Thermal equilibrium diagrams** - Solubility in the solid state - Phases - Solid solutions, compounds and mechanical mixtures.
Week 6	**Lever rule** - Eutectic, Eutectoid and Peritectic reactions. **Applications on binary phase diagrams** -Components completely soluble, completely insoluble or partially soluble in the solid state.
Week 7	**Mechanical properties of metals** - Specifications and standards - Normal stress and shear stress - Strain - Tensile and compression tests - Stress-strain diagram.
Week 8	**Application on mechanical testing and properties** - Determination of Young's modulus - Yield stress - Proof stress - Ultimate tensile strength - Fracture stress, ductility - Hardness and impact toughness
Week 9	- **Iron and Steel** - Fe-Fe_3C phase diagram - Allotropy - Microstructure of carbon steels - Effect of carbon content on microstructure & mechanical properties of carbon steel. -**Heat treatment of steel** - Non-equilibrium cooling - TTT diagrams - Annealing, normalizing, hardening and tempering of steel.
Week 10	**Carbon steel** - Types, Properties and uses of carbon steel - Low, medium, and high carbon steel - Tool carbon steel. **Cast Iron** - Types, properties and uses of cast iron - White, grey, nodular and malleable cast iron
Week 11	**Non- destructive inspection**

	- Liquid penetrant - Magnetic particle - X-rays - Ultrasonic.
Week 12	**Nano materials** - Characterization of nano particles and nano structures - Classification - Applications of nano materials in technology and medicine.
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**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	E I G H T H E D I T I O N Materials Science and Engineering An Introduction [William D. Callister, Jr. and David G. Rethwisch]	No
Recommended Texts	Essentials of Materials Science and Engineering Second Edition, SI	No
Websites	https://youtube.com/@WkhalifaMr	

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

جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	**single variables calculus**			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	AFU12013				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	ATU12		**College**	TEC	
Module Leader	Sabah Ali		**e-mail**	sabahali@uoalfarahidi.edu.iq	
Module Leader's Acad. Title	Assistant teacher		**Module Leader's Qualification**	Master	
Module Tutor	None		**e-mail**		
Peer Reviewer Name	None		**e-mail**		
Scientific Committee Approval Date	25/06/2023		**Version Number**	1	

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. To introduce the student to the basic and advanced principles of calculus and integrations and its various applications 2. To develop his mental abilities when solving exercises. 3. Linking data with information to reach a solution to issues and benefit from them in other subjects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define the determinants and be able to solution of linear equation 2. Recognize trigonometric functions and some applications. 3. Summarize what is meant by a scalar and vector product and projections. 4. Discuss the Limit and continuity. 5. Describe derivative theory. 6. Define Chain rule. 7. Identify the inverse function and its derivative. 8. Discuss Derivative of logarithmic and hyperbolic functions. 9. Discuss the definite and indefinite integral. 10. Explain the Retail integration. 11. Identify the Integration by completing the square. 12. Discuss the approximate area using the trapezoidal rule and Simpsons.
Indicative Contents المحتويات الإرشادية	

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 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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	**125**		

الحمل الدراسي الكلي للطالب خلال الفصل	

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 #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0%		
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (20)	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	Determinants and solution of linear equation by Gramer's rule
Week 2	Trigonometric functions and some applications
Week 3	Vectors, scalar and vector product and projections, mechanical applications to vectors
Week 4	Limit and continuity, and some applications
Week 5	Derivative theory, derivatives of algebraic and implicit functions
Week 6	Chain rule, mechanical applications on the derivative
Week 7	The inverse function and its derivative
Week 8	Derivative of logarithmic and hyperbolic functions
Week 9	Integration, definite and indefinite integral, integration of trigonometric and logarithmic functions
Week 10	Retail integration
Week 11	Integration by division of fractions
Week 12	Integration by trigonometric function method

Week 13	Integration by completing the square
Week 14	Simplified differential equations
Week 15	Approximate area using the trapezoidal rule and Simpsons
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	Calculus, R. Mohammed and A. Abdulaali, 2002	
Recommended Texts	Advanced calculus, Murray R. Splegel, 1962	
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

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MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية
جامعة الفراهيدي/الكلية التقنية الهندسية/قسم هندسة تقنيات الطيران

Module Information معلومات المادة الدراسية					
Module Title	ENGINEERING WORKSHOPS			**Module Delivery**	
Module Type	BASIC			**Theory** **Lab** **Tutorial**	
Module Code	AFU12014				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	AFU12		**College**	TEC	
Module Leader	Adnan Naji		**e-mail**	adnannaji@uoalfarahi.edu.iq	
Module Leader's Acad. Title	Prof.		**Module Leader's Qualification**	Ph. D	
Module Tutor	Dhia aldin		**e-mail**	dhiaaldin@uoalfarahi.edu.iq	
Peer Reviewer Name	Adnan naji		**e-mail**	adnannaji@uoalfarahi.edu.iq	
Review Committee Approval	25/06/2023		**Version Number**	1.0	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	AFU12023, AFU120344	**Semester**	3,5
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	1. Develop practical skills in electronics workshop operations, focusing on safety measures and proficiency in using measuring devices and tools. 2. Acquire knowledge and techniques related to welding, soldering, and handling electronic components on printed boards. 3. Gain familiarity with various electronic components, circuits, and their behaviors through hands-on manufacturing and experimentation.		

	4. Understand the principles of parallel and series circuits involving resistors and capacitors, and apply them in practical scenarios. 5. Enhance the ability to read and interpret electronic boards, and design and assemble electronic circuits on printed boards.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a thorough understanding of the fundamental concepts and principles of electronics, including measuring devices, soldering techniques, and electronic components. 2. Apply knowledge and skills in conducting welding and soldering operations with precision and adherence to safety guidelines in an electronics workshop. 3. Construct and analyze various electronic circuits, including resistive, capacitive, and semiconductor circuits, using appropriate tools and materials. 4. Evaluate and troubleshoot electronic circuits, identify faults, and apply effective problem-solving techniques to rectify issues. 5. Develop proficiency in reading and interpreting electronic boards, designing and assembling circuits, and effectively communicating ideas and findings related to electronics.
Indicative Contents المحتويات الإرشادية	1. Electronic Workshop: Acquire practical skills in electronics, including the use of measuring devices, soldering techniques, and working with electronic components. 2. Mechanical Workshop: Develop hands-on knowledge and skills in mechanical engineering, including working with different tools, understanding mechanical systems, and performing various mechanical operations.
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 showing the students how the construction members exposed to external loads. This can be done by films or videos or by the ready structural software.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	27	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	27/15 =1.8

Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	48	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	62/15=3.2
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week	**Syllabus**
	•
	•
	•
	•
	•

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي المختبري

	Material Covered
Week	**Syllabus**
1-7	• Occupational Safety, Foundry Workshop, Files type Workshop, Carpentry Workshop, Turnery workshop, Welding types Workshop
8	• Learn how to use different measuring devices in the workshop, Learn how to use caustic, types of caustic, welding by using caustic
9	• Types of welding, Auxiliary materials for welding, wires welding between them and

	with other components. • Sucker solder and Solder removal, Training to remove some of the electronic components of the printed board
10	• Learn different types of printing board through printing method, drilling operation, Install the various components.
11	• Different types of electronics components through manufacturing for example the resistance and its power, measure the value of resistance in different methods, rheostat, Parallel resistance circuit - series resistance circuit - parallel and series resistance circuits - and check it.
12-13	• Types of capacitance • 14-15 Parallel capacitance circuit - series capacitance circuit - parallel and series capacitance, circuit - check it on the board, Switch types, Fuses types, Inductor types, Transformer types
14-15	• Learn how to read electronic board, Students learn to design electronic board on the printed board, install the component on the board, and welding the components on the board.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Digital principles and applications, by Albert Paul Malvino, 2nd Edition. ¬ 2. Digital Logic Circuits by D.A.Godse A.P.Godse, Technical Publications 2008	Yes
Recommended Texts	1. Digital principles and applications, by Albert Paul Malvino, 2nd Edition. ¬	Yes
Websites		

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group	**A** - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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.