	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Thermodynamics II	**Module Delivery**	
Module Type	CORE	**Theory** **Lab** **Tutorial**	
Module Code	AIE233		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	3
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Basim Sachit Atiyah	**e-mail**	basim.sa@uowa.edu.iq
Module Leader's Acad. Title	Asst. Lec.	**Module Leader's Qualification**	MSc
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/06/2024	**Version Number**	2024

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	AIE114	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Definition of the second stage students in the Mechanical Engineering Department concepts of science thermodynamic. 1. To develop rules for determining gas mixture properties from knowledge of mixture composition and the properties of the individual components. 2. To define the quantities used to describe the composition of a mixture such as mass fraction, molar fraction, and volume fraction. 3. To understand the concept of pure substance and phase; the process of steam generation and properties of steam; analysis the process of steam; determination of dryness fraction of wet steam and apply the accounts as well as the use of steam and steam schemes. 4. To perform analysis of thermodynamic steam and gas cycles (e.g., Carnot, Rankine, and Brayton cycles). 5. To perform psychrometric analysis for heating/cooling processes. 6. To explain the working and calculations of single and multi-stage reciprocating compressor; clearance volume; volumetric efficiency.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to understand the concept of mole and mass fraction; partial pressure; Daltons law of partial pressure, and to setup the relation between partial pressure, mole fraction and volume fraction; the relations for gas constant, molecular mass, specific heats, and entropy of the gas mixture. 2. Able to use steam tables and charts as well as tables and charts cooling. Also, how to work the accounts of steam and use steam schemes. 3. Able to identify the components or parts of steam and gas stations . 4. Able to identify the application of the equations for the flow of energy to the stable parts of the plant steam. 5. Able to know the basic thermodynamic calculations on steam and gas cycles. 6. Able to perform psychrometric analysis for heating/cooling processes.

	7. Able to identify all parts of reciprocating air compressors and rotary as well as the accounts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - **Mixtures of gases** Physical mixing of pure substances, Avogadro's hypothesis, The mole and the molecular properties, Dalton's law of partial pressures Gibbs-Dalton law of apparent properties of mixture (u,h,s), Volumetric analysis, Gravimetric analysis, Average properties of mixture. [12hrs] Part B - **Two-Phase system** Phase change process, Basic definitions, Property diagram and tables Fundamentals - **Processes on Two-Phase system:** Constant volume process, Constant pressure process, Constant temperature process, Polytropic process, Isentropic process. [4hrs] - **Steady flow devices**: Boiler and Condenser, Nozzle and Diffuser, Turbine and Compressor, Mixing chamber. [4hrs] - **Throttling:** Throttling process, Measurement of steam quality, Separating and throttling calorimeters, Combined calorimeter. [5hrs] Part C - **Power production cycle by Vapour** Concept of heat engine and Criteria of cycle performance, Carnot cycle for a vapour. [4hrs] **Simple Rankine steam power cycle**, Deviation of actual Rankine steam power Cycle from Idealized One. [10hrs] Part D - **Air standard cycles** Configuration of reciprocating engine, Air standard approximation, Carnot power cycle, Otto standard cycle, Diesel standard cycle, Dual (Mixed) standard cycle, Mean effective pressure, Simple gas turbine cycle (Joule-Brayton cycle), Deviation of actual gas-turbine cycle from idealized one. [14hrs] Part E - **Psychrometrics:** Gas-vapour mixtures, Characteristics of humid air, Adiabatic saturation, Psychrometric chart. [7hrs] Part F - **Reciprocating air compressors:** Description of reciprocating components, Indicated power input, Condition of minimum work and Isothermal efficiency, Effect of clearance volume and volumetric efficiency, Actual indicator diagram, Inter-cooling in multi-stage compressor, Steady flow analysis of a compressor. [14hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Teaching Method 1 – Lectures (Description: Attendance Recorded: Yes) 2. Teaching Method 2 – Tutorials (Description: Attendance Recorded: Yes) 3. Teaching Method 3 – Practical (Description: Practical homework assignments. Attendance Recorded: No) 4. Teaching Method 4 – Unscheduled Directed Student Hours (time spent away from the timetabled sessions but directed by the teaching staff). 5. Teaching Method 5- Laboratory sessions (Providing experimental supplementary to promote the engineering sense of students)

Student Workload (SWL) الحمل الدراسي للطالب			
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	4.2
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**	4	20% (20)	3, 6, 9, 12	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	Lab. 5	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Mixtures of gases:** Physical mixing of pure substances, Avogadro's hypothesis, The mole and the molecular properties, Dalton's law of partial pressures
Week 2	Gibbs-Dalton law of apparent properties of mixture (u,h,s), Volumetric analysis, Gravimetric analysis, Average properties of mixture
Week 3	**Two-Phase system:** Phase change process, Basic definitions, Property diagram and tables
Week 4	**Processes on Two-Phase system:** Constant volume process**,** Constant pressure process**,** Constant temperature process**,** Polytropic process**,** Isentropic process
Week 5	**Steady and unsteady flow processes:** Application of steady unsteady flow energy equation: **Steady flow devices**: Boiler and Condenser, Nozzle and Diffuser, Turbine and Compressor, Mixing chamber
Week 6	**Throttling:** Throttling process, Measurement of steam quality**,** Separating and throttling calorimeters, Combined calorimeter
Week 7	**Power production cycle by Vapour:** Concept of heat engine and Criteria of cycle performance, Carnot cycle for a vapour.
Week 8	**Simple Rankine steam power cycle**, Deviation of actual Rankine steam power Cycle from Idealized One
Week 9	**Air standard cycles:** Configuration of reciprocating engine, Air standard approximation, Carnot power cycle.
Week 10	Otto standard cycle.
Week 11	Diesel standard cycle, Dual (Mixed) standard cycle, Mean effective pressure.
Week 12	Simple gas turbine cycle (Joule-Brayton cycle), Deviation of actual gas-turbine cycle from idealized one
Week 13	**Psychrometrics:** Gas-vapour mixtures, Characteristics of humid air, Adiabatic saturation, Psychrometric chart.
Week 14	**Reciprocating air compressors:** Description of reciprocating components, Indicated power input, Condition of minimum work and Isothermal efficiency.
Week 15	Effect of clearance volume and volumetric efficiency, Actual indicator diagram, Inter-cooling in multi-stage compressor, Steady flow analysis of a compressor.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Exp. 1: Thermodynamic relation between the saturation pressure and temperature for the pure water.
Week 2	Exp. 2: Measuring the dryness fraction for wet steam.

Week 3	Exp. 3: Study the performance of the steam power plant. Part-1.
Week 4	Exp. 4: Study the performance of the steam power plant. Part-2.
Week 5	Exp. 5: Energy balance of two-stage reciprocating air compressor.
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	➢ Yunus A. Cengel Michael A. Boles, "Thermodynamics An Engineering Approach" Fifth Edition, 2006.	Yes
	➢ Rajput, R. K. A textbook of engineering thermodynamics. Laxmi Publications, 2005.	Yes
Recommended Texts	➢ Estop T. and McConckyA., "Applied thermodynamics for engineering technologists", 2009. ➢ Roger's & Mayhew, "Engineering thermodynamics work and heat transfer", 4th Edition, 1992. ➢ Michael J. Moran, Howard N. Shapiro, Daisie D. Buettner, Margaret B. Bailey, "Fundamentals of Engineering Thermodynamics", 5th Edition, 2006.	Yes
Websites		

APPENDIX:

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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Fluid Mechanics		**Module Delivery**	
Module Type	CORE		**Theory** **Lab** **Tutorial**	
Module Code	ENG232			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	**Semester of Delivery**	3	
Administering Department	Aircraft Engineering	**College**	Engineering	
Module Leader	Dr. Mohammed Aljibory	**e-mail**	Dr.mohamma.wahab@uokerbala.edu.iq	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	None	**e-mail**	None	
Peer Reviewer Name		**e-mail**		
Review Committee Approval	01/06/2024	**Version Number**	2024	

Relation with Other Modules

Prerequisite module	**	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To develop problem solving skills and understanding of fluid mechanics theory through the application of techniques. 2. Explain the concept of manometers and apply appropriate equations to determine pressures. 3. Calculate the hydrostatic pressure force on a plane or submerged surface. 4. Understand and describe the fundamental principles and governing equations of fluid. 5. Analysis the Friction losses in pipes. 6. Understand and describe the momentum Equation, applications of momentum, principal Analysis 7. Explain Dimensional analysis and similarity
Module Learning Outcomes	1. Recognize how fluid static effect on the system that contain fluid. 2. List the various terms associated with fluid static from pressure and properties of fluid. 3. Summarize the means to calculate the hydrostatic pressure force. 4. Fluid dynamics involves the application of mathematical equations and models to describe fluid behavior. 5. Fluid dynamics enables learners to analyze and interpret fluid flow patterns. They gain the ability to identify and understand different types of flow, including laminar flow, turbulent flow, and transitional flow. This understanding helps in predicting and characterizing fluid behavior in various scenarios. 6. Summarize the means to. The Bernoulli Equation and it Application. 7. Discuss Liner momentum Equation, Applications of momentum principle. 8. Explain Friction losses in pipes and Analysis of piping system
Indicative Contents	1. General introduction to fluid science, Dimensions, Dimensional Homogeneity, and Units, Viscosity, Vapor Pressure, cavitation, Surface Tension. [4 hrs] 2. Pressure at a point. Variation of pressure in a static fluid with Depth. Pressure measurement (barometer pressure, Bourdon pressure gages, manometers). Hydrostatic Force on submerged Plane Surface. [16 hrs] 3. Classification of fluid flow, The continuity equation. Euler's equation of motion along streamline. Bernoulli's equation and its applications. Pitot and Pitot static tube, Orifice and Venture Meter (Flow Measurement). Energy equation. [16 hrs] 4. Laminar flow and Turbulent flow. Pump and turbine Major and secondary losses in pipes Connecting pipes in series, parallel and mixed. [16hrs]

	5. Impact of a jet on a plane surface. Force due to flow round a curved vane. Force due to the flow of fluid round a pipe bend. [10 hrs] 6. The Pi-theorem, Dimensionless parameters. Models study. [10 hrs]

Learning and Teaching Strategies

Strategies	The main strategy that will be adopted in delivering this module is Encourage students to pay attention to the subject by linking it to the daily reality in which a person lives and the importance of studying this course because of its impact on his real life real world .

Student Workload (SWL)

Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	4.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,6,9,12	All
	Assignments	2	10% (10)	5,8	All
	Projects / Lab.	Lab. 4	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	General definitions, Newton's law of viscosity, Surface tension, Vapor Pressure, cavitation.
Week 2	Pressure at a point in a static fluid, Variation of pressure in a static fluid with depth.
Week 3	Pressure measurement (barometer pressure, Bourdon pressure gauge ,manometers).

Week 4	Hydrostatic Force on submerged Plane Surface.
Week 5	Classification of fluid flow, The continuity equation. Euler's equation of motion along streamline. Bernoulli's equation
Week 6	Bernoulli's equation and its applications. Pitot and Pitot static tube, Orifice and Venture Meter (Flow Measurement).
Week 7	Energy equation.
Week 8	Laminar flow and Turbulent flow.
Week 9	Major and secondary losses in pipes Connecting pipes in series, parallel and mixed.
Week 10	Pump and turbine
Week 11	Impact of a jet on a plane surface.
Week 12	Force due to flow round a curved vane.
Week 13	Force due to the flow of fluid round a pipe bend.
Week 14	The Pi-theorem, Dimensionless parameters.
Week 15	Models study.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: Determination of coefficient of viscosity for a liquid by stokes method.
Week 2	Exp. 2: Borden gauge calibration.
Week 3	Exp. 3: Center of pressure.
Week 4	Exp. 4: Volume flow rate measurement/Flow through Venturi meter.
Week 5	Exp. 5: Discharge through an orifice.
Week 6	Exp. 6: Impact of jet.
Week 7	Exp. 7: Friction loss along pipes.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	White, "Fluid Mechanics", 7th Edition, McGraw Hill, 2011. 2- Cengel and Cimbala, Fluid Mechanics, Fundamentals	Yes

	and Applications, 2nd Edition, McGraw Hill, 2013.	
Recommended Texts	Fundamentals of Fluid Mechanics, Bruce R. Munson, Ted H. Okiishi,	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Materials Properties			**Module Delivery**	
Module Type	SUPLEMENT			**Theory**	
Module Code	AIE235				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Aircraft Engineering		**College**	Engineering	
Module Leader	Hayder Adnan Abdulhussein		**e-mail**	Eng.hayder.a@gmail.com	
Module Leader's Acad. Title	Asist Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor	None		**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**		

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	1. The foundation for understanding classification of engineering material and crystal structure. 2. Topics are designed to explore the mechanical properties of metals and their alloys, composites and advanced material. 3. The means destructive and nondestructive testing, as well as knowing the main testing of material such as tensile and hardness test. 4. The foundation for understanding the heat treatment for steel 5. Concepts of use of ferrous and none ferrous materials for various applications are highlighted.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the mechanical properties of metals, and their alloys and various crystal structures. 2. Understand the microstructures of ferrous and non-ferrous alloy. 3. Apply phase diagrams to read them and from the diagram predict the microstructure after different heat treatments. 4. Explain the processes of heat treatment of various alloys. 5. Explain the different types of non-destructive tests for metal and alloy. 6. Know about composite materials and Nano and smart material as well as applications.		
Indicative Contents المحتويات الإرشادية	1. Describe how different kinds of materials (metals including alloys, ceramics and polymers) are structured in terms of atomic bonding and crystal structure and also describe how the structure will affect some of their properties; Recognize		

	product-related problem that requires taking into account the material's microstructure [9 hrs]. 2. Describe how mechanical properties of the materials are influenced by a change of the microstructure; to relate this change to the specific hardening mechanism [9 hrs]. 3. Understand the test mechanisms of different types of hardness test methods and how to select the suitable kind for each material [9 hrs] 4. Apply phase diagrams to read them and from the diagram predict the microstructure after different heat treatments [9 hrs]. 5. Choose suitable heat treatment methods for specific properties and microstructure; discuss the choices of criteria to reach a good result [6hrs].

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the seminars.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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	4	20% (20)	3,5,9,11	All
	Assignments	2	10% (10)		All
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	8	All
Summative assessment	Midterm Exam	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Classification of engineering material** Crystal Structure Unit cell , space lattice Crystal systems Body Centered Cubic Face Centered Cubic, Hexagonal Closed Pack structures.
Week 2	**Mechanical and physical properties** Tensile and compression test Engineering Stress-strain diagram Actual stress strain diagram Toughness Ductility.
Week 3	**Micro and macro hardness test** Types of hardness test Brinell, test Rockwell test Vickers test Knoop hardness test
Week 4	**Impact test** Izod test Charpy test The difference between izod and test Calculate the impact energy
Week 5	**Nondestructive Testing of Materials** Types of NDTs Principle, procedure, advantages, Limitations The non-destructive testing (NDT) methods:

	X-rays and Gamma-rays Radiography, Magnetic particles inspection Ultrasonic testing, Dye penetrate inspection
Week 6	**Thermal equilibrium diagrams** Solubility in the solid state Phase Solid solutions, compounds and mechanical mixtures Lever rule Applications on binary phase diagrams Components completely soluble, Completely insoluble or partially soluble in the solid state.
Week 7	**Thermal equilibrium diagram for Fe- Fe3C** Types of transformations: - Eutectic transformation Eutectoid transformation Pertectic transformation Lever rule
Week 8	**Alloy steel** Classification of steel. Effect of alloying elements on the properties of steel. Carbon Steel and alloy steel, stainless steel, tool and die steel, high temperature alloys etc. Selection of steel for power plants Application and various machine components
Week 9	**Heat treatments** The aim of heat treatment Types of heat treatments Annealing, Normalizing, Hardening,
Week 10	**Cast Iron** Classification of cast iron. Properties and uses of grey, white, malleable, and spheroidal graphite cast iron. Heat treatment of cast iron. Use of specific grades of cast iron in power plants and different engine parts
Week 11	**Nonferrous alloy –Aluminum alloy and its application** Classification Properties Application of -Aging and precipitation hardening Al-Si, Al-Mg and Al-Cu alloys in industry
Week 12	**Copper alloy and its application** Classification

	Properties Applications
Week 13	**Composite material** Classification of composites, Metal matrix composite Polymer matrix composite, Ceramic matrix composite Properties and applications of composites.
Week 14	**Ceramic and polymer Materials** Properties of ceramics, types and applications of ceramics. Properties of polymers, types and applications of polymers
Week 15	**Nano materials, Selection of Material and applications Smart materials** Introduction to Nano materials, Smart materials. How to select material in specific application and industrial application
Week 16	**Final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	William D. Callister "Materials science and engineering: An Introduction", 9th Edition, Willy, 2012	Yes

Recommended Texts	Michael F. Ashby and David R. H. Jones, "Engineering materials: An Introduction their properties and applications", 2nd Edition, 1998	
Websites		

APPENDIX:

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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	English Language II		**Module Delivery**	
Module Type	BASIC			
Module Code	UOW207		**Theory**	
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	2	**Semester of Delivery**	3	
Administering Department	Aircraft Engineering	**College**	Engineering	
Module Leader	Alaa Akram Jawad	**e-mail**	alaa.ak@uowa.edu.iq	
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	MSc	
Module Tutor		**e-mail**		
Peer Reviewer Name	None	**e-mail**		
Review Committee Approval	1/06/2024	**Version Number**	2024	

Relation With Other Modules

Prerequisite module	UOW107	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	In the realm of communication today, English plays a unique and important function. It has a distinct character in the realm of education as well. For an English instructor, teaching English is a very desirable job. It is necessary for the instructor to ascertain his or her goals and objectives prior to beginning instruction. The objective of the present module is to improve the communication skills of students whose proficiency in English is at the pre-intermediate level. In order to help students communicate effectively on a variety of themes, there will be a special emphasis on strengthening each of the four language skills—speaking, listening, reading, and writing—as well as expanding their vocabulary and syntactical repertoire.
Module Learning Outcomes	Students will benefit from the current semester by increasing their understanding of the subject matter, which will allow them to comprehend sentences and paragraphs and use grammar correctly as well as analyze language elements and determine the proper relationships between them. Thus, the following will be the learning objectives: 1. The class addresses the fundamental language and communication skills students require for success in technical areas of specialization; 2. Students will be able to express their viewpoints and take part in debates on a wide variety of current subject matters; 3. efficiently convey ideas in writing on a variety of modern subjects, particularly technological ones, 4. quickly and easily comprehend the main ideas of a variety of somewhat complicated written and spoken sources. 5. interact with others in a multicultural group with effectiveness, 6. using an array of digital tools and gadgets to organize, decipher, and generate meaning
Indicative Contents	**Part A - Competencies in communication** **Listening**: Within the parameters of the curriculum, comprehend and list the essential ideas of conversations ranging from 250 to 300 words that cover well-known subjects that are frequently encountered in life, in the workplace, in educational institutions, etc. - Pay attention to well-known monologues and discussions in daily life and infer meanings from the speakers' facial expressions and emotions. - Recognize the essential ideas presented in plain language or with the use of illustrative graphics in news broadcasts, interviews, etc. on well-known subjects. [3 Hours] **Speaking**: Deliver brief discussions with reasonable accuracy and clarity. - Discuss and engage with other speakers on subjects you are acquainted with, share your personal opinions, and exchange knowledge about the subjects taught in the curriculum. Explain well-known subjects in plain language and tell

	a little tale that is directly relevant to the subjects discussed. - Prepare and deliver the projects on the subjects covered in the curriculum. [2 Hours] **Reading**: Read and understand the major ideas and particular contents of a 250-word passage on themes that are relevant and well-known. - Read and comprehend the writings' argumentative flow; use plain language to identify the texts' primary conclusions. - Use the phrases and structures from the original texts to locate and summarize brief documents that are commonly used, such as basic letters and posters. [2 Hours] **Writing:** - compose paragraphs using block and indented styles. Write 200-250 word simple, logical writings; create brief reports based on recommendations, supporting the recommendations with facts and reasoning; compile brief material from numerous resources and summarize it. - Fill out (write/fill in) administrative forms, including emails, job application letters, resumes, and CVs. - Create evocative descriptions for basic tables and charts. [2 Hours] **Part B- Linguistic knowledge** **Pronunciation**: utterances with distinct syllables, vowel and consonant sounds, Special instances of stressed words: stressed words, Assimilation, sentence stress, and vowel connecting Inquiry, tone, homophones, vocabulary drills, and terminology, phrases, and sentences pertaining to the major of the pupils. [3 hrs] **Vocabulary**: this part includes terms with various meanings and pronunciations, collocations, and words linked to the course's themes and subjects, also it entails using a bilingual dictionary and knowing strategies to develop and record vocabulary. [2 hrs]. **Grammar:** Tenses- Present time tenses, Parts of speech (Nouns-Verbs-Adjectives-Adverbs), Tenses- Past Time Tenses, Parts of speech (Prepositions-Articles-Pronouns-Conjunctions-Interjections), Tenses- Future time tenses, sentence pattern (nine patterns), Irregular verbs, Passive and Active voice in scientific writing, Conditionals, verbs and nouns go together and verbs used in academic writing, Language Function (requests-suggestions, offers…etc.), Modal and semi modal verbs, Idioms and Idiomatic Expressions, Phrasal verbs, collocations, Comparative and Superlative. (3 hrs)
Learning and Teaching Strategies	
Strategies	There should be some preparation from the instructor for the students to listen to and study academic texts (spoken and written). Together with it, students should

	use their speaking, writing, reading, and listening skills to engage in the lecture, it is preferable here to create a student-centered class. **Student-Centered class and Communicative Language Teaching (CLT),** which encourages learners to speak and communicate the target language with one another, are used to instruct students. It is imperative that students have maximum exposure to the target language in order to comprehend and utilize it in authentic contexts. The teaching of Technical English to the students will take several forms and the focus should be one student's participation. To help students communicate in the target language, for instance, have them work in groups and practice various activities, discussions, and presentations. They can also use visual aids like pictures, images, and spatial understanding to support their learning. Aural (auditory-musical) learning involves employing sound and music, and verbal (linguistic) learning involves using words in both written and spoken forms. In addition to improving their interpersonal abilities, students must have faith in their ability to utilize the target language.

Student Workload (SWL)

Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	1.2
Total SWL (h/sem)	50		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,6,9,12	All
	Assignments	2	10% (10)	5, 10	All
	Project / Lab.	-	-	-	-
	Report	1	10%	8	All
	Midterm Exam	2 hrs.	10% (10)	7	All

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

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Tenses- Present time tenses, Parts of speech ((Nouns-Verbs-Adjectives-Adverbs), Unit One of the Book (The New Headway-Pre-intermediate level)
Week 2	Tenses- Past time Tenses, Parts of speech (Prepositions-Articles-Pronouns-Conjunctions-Interjections), Unit Two of the Book (The New Headway-Pre-intermediate level)
Week 3	Tenses- Future time tenses , sentence pattern (nine patterns), Irregular verbs, Unit Three of the Book
Week 4	Passive and Active voice in scientific writing, reading comprehension, listening (conversations in shops) , Unit Four of the book .
Week 5	Conditionals, paragraph writing and writing basics, describe places, speaking (talking about plans and ambitions), Unit five of the book
Week 6	verbs and nouns go together and verbs used in academic writing, give directions, reading comprehension, Unit six of the book.
Week 7	Listening skills-engaging in different themes- dialogue starters, speaking skills –Role-play, Unit seven of the book
Week 8	Writing Skills- Punctuation- linking words-emails and formal letters- paragraph writing, Unit eight of the Book
Week 9	Review and Mid-term Exam
Week 10	Language Function(requests-suggestions, offers…etc.), Reading Comprehension, unit ten of the book
Week 11	Modal and semi modal verbs, reading comprehension, exchanging ideas and group discussion , unit eleven of the book
Week 12	Phrasal verbs, collocations, good and bad communicator, unit twelve of the book
Week 13	Comparative and Superlative, making a telephone conversation and news giving , unit thirteen of the book
Week 14	Writing CV-Cover letter, Essay styles and types , unit fourteen of the book
Week 15	Reading comprehension (predicting, guessing the main idea, looking for specific information), Essay writing
Week 16	**Revision and Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1- New Headway, English Course, (pre-intermediate level), John and Liz Soars and Mike Sayer, Oxford University Press. 2- Selected ESP materials and listening extracts.	Yes
Recommended Texts	Murphy, R. (1985). Grammar in Use, Rapid Review of Grammar, Infotech: English for Computer Users. (4th edition). Cambridge. Market Leader (Pre-intermediate English Business Course) by David Cotton, David Falvey, Simon Kent	Online
Websites	Randall's ESL Cyber Listening Lab - English Listening	

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research – Iraq University of Warith Al-Anbiyaa College of Engineering Aircrafts Engineering Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Crimes of the Baath Regime in Iraq			**Module Delivery**	
Module Type	BASIC			**Theory**	
Module Code	UOW201				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Aircraft Engineering		**College**	Engineering	
Module Leader	Musa Ali		**e-mail**	mousa.ali@uowa.edu.iq	
Module Leader's Acad. Title	Assist. Lect.		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**		

Relation With Other Modules العالقة مع المواد الدراسية ألخرى			
Prerequisite module		**Semester**	

Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Introducing students to the most important crimes of the Baath regime in Iraq. 2. Confronting the systematic campaign that aims to glorify the criminal Baath regime and polish its image. 3. Shedding light on the Baath regime's violations of human rights. 4. Clarifying the facts of the crimes committed by the defunct regime.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Study the most important crimes committed by the Baath regime 2. Reveal the nature of the criminal Baath regime. 3. Focus on the mechanisms used in committing crimes. 4. Clarify the effects of the crimes of the former regime on Iraqi society
Indicative Contents المحتويات الإرشادية	**The guiding contents include the following:** **1. The concept of human rights, its characteristics and categories** **2. Human rights in history and human heritage** **3. Human rights in divine religions and civil rights** **4. Prohibition of weapons of mass destruction** **5. Political, economic, social and cultural rights** **6. Elections and human rights** **7. International recognition of human rights and legal sources of human rights** **8. Non-governmental organizations and their role in defending human rights**

	9. Democracy and political systems 10. Democracy in Greek civilization and its comparison with modern democracy 11. Concepts of democracy 12. Types of democracy 13. The relationship between human rights and democracy 14. Guarantees of public freedoms 15. General review

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Lectures are given in a live format, in addition to viewing visual or film material.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خالل الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خالل الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خالل الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3, 6, 9, 12	LO #1 - 5
	Assignments	2	10% (10)	5, 10	LO #1 - 5
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	LO #1 - 5
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO #1 - 5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج االسبوعي النظري	
	Material Covered
Week 1	Introduction to the crimes of the Baath regime
Week 2	The concept of crimes
Week 3	Categories of crimes
Week 4	Crime in language and terminology
Week 5	Types of international crimes
Week 6	The Supreme Criminal Court
Week 7	The most important decisions of the Supreme Criminal Court
Week 8	Social, psychological and environmental crimes
Week 9	Mechanisms of psychological, social and environmental crimes
Week 10	Effects of the crimes of the defunct Baath
Week 11	The Baath regime's violation of Iraqi laws
Week 12	Pictures of Baath violations of human rights
Week 13	Events of the Shaaban Uprising
Week 14	Mass graves
Week 15	Events of 1963-2003
Week 16	Preparatory week before the final exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Crimes of the Baath regime in Iraq / Prepared by a specialized committee in the Ministry of Higher Education and Scientific Research	Yes
Recommended Texts	Archive of the Political Prisoners Foundation Archive of the Martyrs Foundation. Archive of the Iraqi Center for Documenting Crimes of Extremism at the Holy Abbasid Shrine. Salim Matar / Encyclopedia of the Iraqi Environment Civilization of the Tigris and Euphrates Valley Raed Abis and Dr. Abbas –Attia United Nations reports condemning the Baath regime of human rights violations for the period from 1991 AD 2003 AD and other sources	Yes
Websites		

APPENDIX:

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	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.

UNIVERSITY OF WARITH AL-ANBIYAA
COLLEGE OF ENGINEERING
2017
كلية الهندسة

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	WORKSHOPS II		**Module Delivery**	
Module Type	SUPLEMENT		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ■ Practical ☐ Seminar	
Module Code	ENG206			
ECTS Credits	4			
SWL (hr/sem)	94			
Module Level	2	**Semester of Delivery**	3	
Administering Department	Aircraft Engineering	**College**	Engineering	
Module Leader	Ahmad Saddy Mohamad	**e-mail**	ahmad.saddy@uowa.edu.iq	
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Aymen Hussien Salh	**e-mail**	aymen.hussien@uowa.edu.iq	
Peer Reviewer Name		**e-mail**		
Review Committee Approval		**Version Number**	1	

Relation with Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Workshops I	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-Preparing applied engineers in the field of engineering sciences who are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. 2. Enable the student to know and understand work systems, risks, and the factors surrounding them. 3. Enable the student to know and understand theoretical principles in handicrafts and measurements.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work. 2- Acquisition of the student's manual operation skills, for example (Filings and Tinsmith workshops), and mechanical operation skills, for example (Turning). 3- Acquisition of the student's mechanical forming skills, for example (Casting and Blacksmithing). 4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field. 5- Enabling the student to operate the various machines and devices in mechanical operations and formation. 6- Cooperative learning by working collectively.
Indicative Contents المحتويات الإرشادية	1. Introducing the student to the basics of the art of turning and milling, types of cold working machines, the skill of dealing with them, choosing metals, operational tools, and methods of measurement and standardization 2. Introducing the student to the basics of the art of casting, hot forming, metal selection, method of working on casting furnaces and tools, and manufacturing casting molds 3. Familiarize students with the basics of cars and the systems they use, as well as maintenance, disassembly, and assembly processes. 4. Introducing students to the basics of household and industrial electrical appliances, the skill of using tools, and designing electrical circuits and control panels 5. Introducing the student to the basics of the art of plumbing, leveling surfaces, the skill of using tools, manufacturing and installing geometric shapes, and methods of measurement and standardization

	6. Introducing the student to the basics of the art of blacksmithing, cold and hot forming of metals, the method of hardening them, and the skills of dealing with hand tools, forming machines, and heating furnaces 7. Introducing the student to the basics of the art of filing and manual operation of metals with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and the methods of measurement and standardization 8. Introducing the student to the basics of the art of welding, the installation and assembly of metals, the types of welding machines, the skills of dealing with them, the types of welding, and the methods of measurement and standardization Introducing the student to the basics of the art of carpentry and woodworking with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and methods of measurement and standardization

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	3	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	5% (5)	Continuous	All
	Assignments	5	5% (5)	Continuous	All
	Projects / Lab.	5	25% (25)	Continuous	All
	Report	5	5% (5)	Continuous	All
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	All
	Final Exam	2 hr	50% (50)	16	All

Total assessment	100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Welding workshop. -Occupational safety and its importance in welding workshops. -Introduction to the basics of welding. -Electric arc exercise. -An exercise for welding straight lines in a circular motion (helical).
Week 2	Welding workshop - An exercise for welding straight lines with a crescent movement and other welding methods -Construction welding exercise.
Week 3	Welding workshop. -Welding two pieces together. -Written exam in practical exercises.
Week 4	Casting workshop -Occupational safety and its importance in plumbing workshops. -Introduction to the basics of metal casting. -Simple wooden disc exercise. Half workout.
Week 5	Casting workshop Wheel exercise. Pushing arm exercise.
Week 6	Casting workshop. -Complete pulley exercise. -Circular pole exercise. -Written exam in practical exercises.
Week 7	Blacksmith Workshop -Occupational safety and its importance in blacksmithing workshops. -Introduction to the Basics of Blacksmithing. - Barbell adjustment exercise. -Eight-star exercise. - Exercise forming the number eight in English. -Six formation exercises in English.
Week 8	Blacksmith Workshop -An exercise forming the number five in English. - Exercise forming the number nine in English. . -An exercise in forming an iron model in the form of a circle
Week 9	Blacksmith Workshop - S-shape exercise. - Air hammer hot barbell exercise. - Exercise to form a circle on an electric bending machine.

	- Exercising cold and hot ornament formation. .- A written exam in practical exercises
Week 10	Automotive Workshop -Occupational safety and its importance in car maintenance workshops. -An introduction to cars and their basic parts. -Parts of the engine, how it works, types of engines, and methods of classification.
Week 11	Automotive Workshop - Open the engine and identify the parts -Lubrication system -Cooling system.
Week 12	Automotive Workshop -The fuel system. -The old and new ignition circuits. -Written exam in practical exercises.
Week 13	Turning Workshop -Introduction to lathe machines and identifying their parts -Measuring tools and the use of an oven measuring instrument -Circular column lathing exercise on different diameters.
Week 14	Turning Workshop -Exercise using the pen (semicircular R) brackets. An exercise in making different angles using a pen (square + angle pen 55).
Week 15	Turning Workshop - Making shaft with different diameter exercises using (left and right pen) - Workout (Tube Connection). -Written exam in practical exercises.
Week 16	**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	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	Yes
Recommended Texts		
Websites		

APPENDIX:

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	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.

	Ministry of Higher Education and Scientific Research – Iraq University of Warith Al-Anbiyaa College of Engineering Aircrafts Engineering Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Mathematics III	**Module Delivery**	
Module Type	CORE		
Module Code	ENG231	**Theory** **Tutorial**	
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	3
Administering Department	Aircrafts Engineering	**College**	Engineering
Module Leader	Dr. Aws Akram Al-Akam	**e-mail**	aws@uowa.edu.iq
Module Leader's Acad. Title	Assist. Prof	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/06/2024	**Version Number**	2024

Relation with Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	ENG122	**Semester**	2

Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To provide a course of high academic quality in Mathematics in a challenging and supportive learning environment that encourages students to reach their full potential, personally and academically. 2. To provide a course that is suitable both for students aiming to pursue research and for students going into other careers. 3. To provide an integrated system of teaching which can be tailored to the needs of individual students. 4. To develop in students the capacity for learning and clear logical thinking. 5. To continue to attract and select students of outstanding quality. 6. To provide an intellectually stimulating environment in which students have the opportunity to develop their skills and enthusiasm to their full potential.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and Understanding: This Course will develop learners' ability to: 1. Use mathematical models 2. Understand and use mathematical concepts in solving mathematical differential equations kinds. 3. Select and apply skills in dealing with geometric series, power series and Fourier series. 4. Use mathematical reasoning skills to interpret information, select a strategy to solve a problem, and communicate solutions. Subject-specific skills: It is expected that learners will develop the following: 5. Skills for Learning, and drawn from the main skills areas listed below. 6. Skills for Life 7. and Skills for Work These must be built into the Course where there are appropriate opportunities.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Ordinary Linear Differential Equations:** 1st order differential equations, Separable, Homogeneous, Exact, Linear, Bernoulli, 2nd Order Differential Equations, Homogeneous, Non-Homogeneous. [32 hrs] **Sequences and Series:**

	Sequence, Series, Geometric Series, Tests of Convergence, Definition, The General Term Test, The Integral Test, The Comparison Test, The Limit Comparison Test, The Ratio Test, The Root Test, Alternating Series, Power Series, Interval of Convergence, Taylor Series, Maclaurin Series, Applications. [24 hrs] **Fourier Series:** Periodic Function, Even and Odd Functions, Half Range Expansion Function. [9 hrs] **Partial Differentiation** Definition, Mechanism of Differentiation, Functions of Two Variables, Functions of Higher Variables. [6 hrs] **General Applications.** [6 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	All lectures reflect the higher values, purposes and principles. They offer flexibility, provide more time for learning, focus on skills and applying to learn, and scope for personalization and choice. In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practices, enabling learners to achieve the highest standards they can. This course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.2
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**	4	20% (20)	3,5,9,11	LO #1, 2, 3, and 4
	Assignments	2	10% (10)	6, 12	LO # 5
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	8	LO # 6
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	LO # 1-4
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**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 Homogeneous
Week 4	Non-Homogeneous
Week 5	Higher Order Differential Equations Homogeneous
Week 6	Non-Homogeneous Applications
Week 7	**Sequences and Series** Sequence Series Geometric Series Tests of Convergence
Week 8	Definition The General Term Test The Integral Test The Comparison Test

Week 9	The Limit Comparison Test The Ratio Test The Root Test
Week 10	Alternating Series Power Series Interval of Convergence
Week 11	Taylor Series Maclaurin Series Applications
Week 12	**Fourier Series** Periodic Function
Week 13	Even and Odd Functions Half Range Expansion Function
Week 14	**Partial Differentiation** Definition Mechanism of Differentiation Functions of Two Variables Functions of Higher Variables
Week 15	**General Applications**
Week 16	**Final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. George B. Thomas, Jr., Maurice D. Weir and Joel Hass, Thomas' calculus, 12th edition, AddisonWesley, 2010. 2. Erwin Kreyszig,"Engineering mathematics", McGRAW-HILL ,9thedition, 2006.	Yes
Recommended Texts		
Websites		

APPENDIX:

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	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.

UNIVERSITY OF WARITH AL-ANBIYAA
COLLEGE OF ENGINEERING
وارث الانبياء
جامعة
2017 اسست
كليـــة الهندســـــة

	Ministry of Higher Education and Scientific Research – Iraq University of Warith Al-Anbiyaa College of Engineering Aircrafts Engineering Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	Mechanical Drawing and CAD	**Module Delivery**	
Module Type	CORE	**Lab** **Practical**	
Module Code	AIE234		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	3
Administering Department	Aircraft Engineering	**College**	College of Engineering
Module Leader	Dr. Aws Al-Akam	**e-mail**	aws@uowa.edu.iq
Module Leader's Acad. Title	Assist. Prof	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/06/2024	**Version Number**	2024

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	ENG124	**Semester**	2

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Educate the student in the second stage the fundamental of mechanical drawing. 2. Explore the standard element of mechanical drawing such as bolts, keys, springs, and different types of gears. 3. Draw the assembled mechanical parts and determine the mechanism or method of assembly 4. Helping to understand the map of mechanical drawing and the symbols which it contain such as welding, fit and tolerance, and surface finishing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the components and fundamentals of mechanical drawing. 2. Learn how to interpret maps in mechanical drawing. 3. Recognize and understand all symbols and standards associated with mechanical drawing. 4. Identify the various methods of mechanical drawing. 5. Learn how to select the optimal parameters for calculations to suit the drawing. 6. Identify all types of gears, such as spur gears, bevel gears, worm gears, and helical gears, and their calculations. 7. Evaluate the student's ability to illustrate the subject explained to them through drawing. 8. Establish connections between what is learned and real-world applications. 9. Complete drawings within specified time frames. 10. Develop the student's abilities to use computers and designated programs in the field of mechanical drawing, linking them to manual drawing. 11. The ability to represent mechanical parts individually, collectively and assembled.
Indicative Contents المحتويات الإرشادية	*** Mechanical Drawing [9 hrs]** **Fastening Tools and Method of Drawing Them:** - Bolts and Screws, Nuts and Washers, Stud Bolts.

	Joining by Bolts or Screws **Assembly Drawing** *** CAD [2 hrs]** **Application on computer:** Drawing of primitives: box, cylinder, cone …. etc. *** Mechanical Drawing [3 hrs]** **Rivets:** - Classifications of Rivets, Method of Drawing and Joining Rivets *** Mechanical Drawing [3 hrs]** **Keys:** - Classifications of Keys, Method of Drawing and Joining Keys. *** CAD [2 hrs]** **Application on computer:** Features : extrude , revolve, ……etc. *** Mechanical Drawing [4 hrs]** **Springs:** - Classifications of Springs, Method of Drawing Compression Spring. *** Mechanical Drawing [4 hrs]** **Welding Signs:** - Types of Welding, Representing Welding Signs on Bodies. *** CAD [2 hrs]** **Application on computer:** Boolean operation. Union , subtract and intersect. Applications of Boolean operation. *** Mechanical Drawing [3 hrs]** **Pins:** Classifications of pins **Surface Finishing:** Representing Welding Signs on Bodies *** Mechanical Drawing [4 hrs]** **Tolerances:** - Basic Size, Deviations, Limits of Size, Tolerance, Representing Deviations on Zero Line. *** CAD [2 hrs]** **Application on computer:** Basic concepts on 3D. 3D view.

	*** Mechanical Drawing [3 hrs]** **Fits:** **-** Types of Fits *** CAD [2 hrs]** **Application on computer:** Projection definition *** Mechanical Drawing [12 hrs]** **Gears:** - Classifications of Gears, Drawing of Spur Gear, Bevel Gear and worm gear, Gears Assembly Drawing *** CAD [2 hrs]** **Application on computer:** Modify of 3D solid: move, rotate, array, mirror ….. etc. UCS with applications. *** Mechanical Drawing [3 hrs]** **Detailed Drawing** *** CAD [2 hrs]** **Application on computer:** Draw welding assembly.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Provide the student with theoretical lectures prepared by the lecturer, explaining the subject of drawing in detail and demonstrating it in front of the students. - Bring some samples of the drawing subject to the class to confirm understanding and illustrate how it works. - Discuss some students' mistakes and how to avoid them.

Student Workload (SWL) الحمل الدراسي للطالب			
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	4.2

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**	2	10% (10)	5, 10	LO # 1-11
	Assignments	15	15% (15)	Continuous	LO # 1-11
	Projects / Lab.	Lab. 7	10% (10)	Continuous	LO # 1-11
	Report	5	5% (5)	Continuous	LO # 1-11
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	LO # 1-11
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Fastening Tools and Method of Drawing Them:** Bolts and Screws Nuts and Washers Stud Bolts
Week 2	**Joining by Bolts or Screws** **Assembly Drawing**
Week 3	**Rivets:** Classifications of Rivets Method of Drawing and Joining Rivets **Keys:** Classifications of Keys Method of Drawing and Joining Keys
Week 4	**Springs:** Classifications of Springs Method of Drawing Compression Spring
Week 5	**Welding Signs:** Types of Welding Representing Welding Signs on Bodies
Week 6	**Pins:** Classifications of pins **Surface Finishing:** Representing Welding Signs on Bodies

Week 7	**Tolerances:** Basic Size Deviations Limits of Size Tolerance Representing Deviations on Zero Line
Week 8	**Fits:** Types of Fits
Week 9	**Gears:** Classifications of Gears **Spur Gear:** Drawing of Spur Gear
Week 10	**Spur Gears Assembly Drawing**
Week 11	**Bevel Gear:** Drawing of Bevel Gear
Week 12	**Bevel Gears Assembly Drawing**
Week 13	**Worm and Worm Wheel** Drawing of Worm and Worm Wheel
Week 14	**Detailed Drawing**
Week 15	**Exercise in Assembly Drawing**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Application on computer:** Drawing of primitives: box, cylinder, cone …. etc.
Week 2	**Application on computer:** Features : extrude , revolve, ……etc.
Week 3	**Application on computer:** Boolean operation. Union , subtract and intersect. Applications of Boolean operation.
Week 4	**Application on computer:** Basic concepts on 3D. 3D view.
Week 5	**Application on computer:** Projection definition.
Week 6	**Application on computer:** Modify of 3D solid: move, rotate, array, mirror ….. etc. UCS with applications.
Week 7	**Application on computer:**

	Draw welding assembly.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. K . MORLING, "Geometric and Engineering Drawing", Third Edition, ELSEVIER Publications, 2010. 2. David Martin, "Mechanical Drawing Using AutoCAD® 2016" ,1st Edition, Autodesk Publications , 2016.	Yes
Recommended Texts		No
Websites	https://me.uotechnology.edu.iq/index.php/ar/	

APPENDIX:

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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Aircraft Engines I	**Module Delivery**	
Module Type	CORE		
Module Code	AIE243		
ECTS Credits	5		
SWL (hr/sem)	150		

Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Dr. Aws Akram Mahmood	**e-mail**	aws@uowa.edu.iq
Module Leader's Acad. Title	Assist. Prof	**Module Leader's Qualification**	Ph.D.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/01/2025	**Version Number**	2024

Relation With Other Modules

Prerequisite module	AIE233	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	

	1. Knowledge of the basics concepts in constructing and modifying piston type aircraft engines. 2. Awareness of theoretical concepts dealing with the operating cycle analysis and improving performance. 3. Providing the knowledge in the engine testing under various conditions and identifying the evaluation parameters. 4. Understanding the concepts of engagement between the normal engines with supercharging aiming higher outputs. 5. Providing the knowledge of the different types of compressors encountered in turbocharged piston type aircraft engines.
Module Learning Outcomes	1. Applying the concepts of thermodynamic cycles according to the second law of thermodynamics. 2. Achieving the principle of energy conservation and the thermal balance for different aircraft engines involving piston type. 3. Complete awareness of the determination techniques of each kind of piston engines using basic formulation with testing procedures. 4. Applying the first and second law concepts to the thermodynamic processes associated with the combustion systems in piston type engines. 5. Exploitation of the acquired knowledge in turbocharged engines including description and cycle analysis of various kinds of compressors involved.
Indicative Contents	Indicative content includes the following. • Applying the governing laws in cycle analysis of piston type aircrafts. Realizing thermodynamics processes and subject it to energy production procedures. [13 hrs] • Using the basic concepts of evaluation procedures on piston engines to formulate the tests conducted and providing the design parameters and selection procedure. [13 hrs] • Using the air-standard cycles to approximate the actual internal combustion aircraft engines and driving the evaluation approach related to them. [13 hrs] • Formulation for heat and work transfer in thermodynamic Fuel-Air cycles and deriving the performance characteristics. [13 hrs] • The engineering application of thermodynamics and fluid dynamics in various processes in work and heat exchange in piston type engines. [13 hrs] • Applying the operational concepts of supercharging on the cycle analysis of piston type aircraft engines. [11 hrs] • Providing the essential knowledge in design and operating various kinds of compressors used in turbocharged aircraft engines. [11 hrs]

Learning and Teaching Strategies

Strategies	1. Class active discussions during comprehensive presentations. 2. Home works and technical reports related to the explored course items. 3. Quizzes and prepared exams to motivate student's realization. 4. Organization of semester examinations. 5. Laboratory oral discussions.

Student Workload (SWL)

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	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3, 6, 9, 12	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	Lab. 4	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs	10% (10)	7	All
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to the piston type aircraft engines
Week 2	Two and four stroke operation cycles in reciprocating internal combustion engines.
Week 3	Description of Otto standard cycles, and actual cycle spark ignition engine.
Week 4	Deviation in operational characteristics between ideal and actual cycles.

Week 5	Basic parameters involved in testing piston type aircraft engines.
Week 6	Energy balance and performance evaluation of piston type engines.
Week 7	Constant speed and variable speed test procedures
Week 8	Fuels used in aircraft engines along with combustion theory.
Week 9	Calculation formulae of the heat of combustion of fuels.
Week 10	Combustion process involved in piston type aircraft engines, exhaust gas analysis.
Week 11	Concept of supercharging applied to piston type aircraft engines.
Week 12	Turbocharging theory and analysis.
Week 13	Methods and limitations applied to the turbocharged piston type aircraft engines.
Week 14	Roots blower and its indicator diagram, cycle analysis of Roots blower.
Week 15	Vane type compressor and its indicator diagram, cycle analysis of vane type compressor.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: Study parts of the different engine types & determination of valve timing diagram.
Week 2	Exp. 2: Diesel engine test at constant speed
Week 3	Exp. 3: Diesel engine test at variable speed
Week 4	Exp. 4: Petrol engine test at constant speed
Week 5	Exp. 5: Petrol engine test at variable speed
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	J.B. Heywood, "Internal combustion engine fundamentals", McGraw-Hill publications, 1988.	Yes
Recommended Texts	• R.J. Rajput, "A text book for internal combustion engines", 2nd Edition, Laxmi publications Ltd, 2008. • Sadhu Singh, "Internal combustion engines and gas	No

	turbines", Kataria & Sons Co, 2012	
Websites		

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Engineering and Numerical Analysis		**Module Delivery**	
Module Type	CORE		**Theory** **Lab**	
Module Code	AIE241			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	**Semester of Delivery**	4	
Administering Department	Aircraft Engineering	**College**	Engineering	
Module Leader	Ahmed Mohamed Merza	**e-mail**	ahmed.merza@uowa.edu.iq	
Module Leader's Acad. Title	Assist. Lec.	**Module Leader's Qualification**	MSc.	
Module Tutor	None	**e-mail**	None	
Peer Reviewer Name		**e-mail**		
Review Committee Approval	01/01/2025	**Version Number**	2024	

Relation With Other Modules

Prerequisite module	AIE231	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To provide a course of high academic quality in Engineering and Numerical Analysis in a challenging and supportive learning environment that encourages students to reach their full potential, personally and academically. 2. To provide a course that is suitable both for students aiming to pursue research and for students going into other careers. 3. To provide an integrated system of teaching which can be tailored to the needs of individual students. 4. To develop in students the capacity for learning and clear logical thinking. 5. To continue to attract and select students of outstanding quality. 6. To provide an intellectually stimulating environment in which students have the opportunity to develop their skills and enthusiasm to their full potential.
Module Learning Outcomes	Knowledge and Understanding: This Course will develop learners' ability to: 1. Understand and use the relationships to define the principle of Engineering and Numerical analysis 2. Select and apply operational skills in algebra, geometry, and trigonometry within mathematical contexts 3. Select and apply skills in solving the non-linear and linear equations. 4. Use numerical models 5. Use engineering analysis reasoning skills to interpret information, select a strategy to solve a problem, and communicate solutions. 6. To apply the numerical analysis on the data tables, which are obtained from experimental work. Subject-specific skills: It is expected that learners will develop the following: 7. Broad, generic skills through this Course. 8. Skills for Learning, and drawn from the main skills areas listed below. 9. Skills for Life 10. and Skills for Work These must be built into the Course where there are appropriate opportunities.
Indicative Contents	Indicative content includes the following. **Engineering Analysis** **Laplace Transformations:**

	Introduction. Definition of L.T., Definition of I.L.T. Examples. [8hrs] **Solution of differential equations using L.T:** Method of solution. Using L.T. for solving practical problems. [5hrs] **Solution of 2nd order D.E. using power series method:** Solution near the ordinary point. Solution near the singular point. [5hrs] **Solution of partial D.E:** Definition. Solution methods of P.D.E. Examples. [5hrs] **Using of separation method:** Definition of separation method. Examples. [5hrs] **Applications of the solution of P.D.E:** Solution of unsteady one-dimensional heat equation. Solution of vibrating string. [5hrs] **Numerical Analysis** **Solution of non-linear equations:** Simple iteration method, Examples. Newton –Raphson method, Derivation, Square Roots, Reciprocal of any number. [5hrs] **Solution of simultaneously linear equations:** Definition and Methods of Solution. Direct methods: Gauss- Elimination, Gauss -Jordan Elimination. Indirect methods: Jacob's method. Gauss- Seidle method. [5hrs] **Numerical interpolation:** Linear interpolation. Quadratic interpolation. [5hrs] **Newton and Lagrange forms:** Using this method for equal segment and unequal segments. [5hrs] **Numerical differentiation** First derivative. Second derivative. [5hrs] **Numerical Integration** trapezoidal rule, Simpson Rule (1/3). Simpson Rule (3/8). [5hrs] **Curve fitting** linear Regression. Applications of linear regression. Polynomial curve fitting. [4hrs] **Solution of ordinary differential equations O.D.E.** Taylor series method. Simple Euler method. Runge-kutta method. [5hrs]
Learning and Teaching Strategies	
Strategies	All lectures reflect the higher values, purposes and principles. They offer flexibility, provide more time for learning, focus on skills and applying to learn, and scope for personalization and choice. In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practices, enabling learners to achieve the highest standards they can. This course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

Student Workload (SWL)			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	4.8
Total SWL (h/sem)	150		

Module Evaluation					
		Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	20% (20)	3,5, 7,10	LO #1, 2, 3,4,5 and 10
	Assignments	2	10% (10)	6, 11	LO # 3, 4, 7 and 9
	Projects / Lab.	Lab. 5	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	9	LO # 1-7
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
Week	**Material Covered**
Week 1	**Laplace Transformations (L.T):** Introduction. Definition of L.T. Examples.
Week 2	**Inverse Laplace Transformations (I.L.T.):** Introduction. Definition of I.L.T. Examples.
Week 3	**Solution of differential equations using L.T:** Method of solution. Using L.T. for solving practical problems Examples.
Week 4	**Solution of 2nd order D.E. using power series method:** Introduction. Solution near the ordinary point. Solution near the singular point.
Week 5	**Solution of partial D.E:** Definition. Solution methods of P.D.E.

	Examples.
Week 6	**Using of separation method:** Definition of separation method. Examples.
Week 7	**Applications of the solution of P.D.E:** Solution of unsteady one-dimensional heat equation. Solution of vibrating string.
Week 8	**Solution of non- linear equations:** Introduction Simple iteration method, Examples. Newton –Raphson method, Derivation, Square Roots, Reciprocal of any number. Applications.
Week 9	**Solution of simultaneously linear equations:** Definition and Methods of solution. Direct methods: Gauss- Elimination, Gauss -Jordan Elimination. Indirect methods: Jacob's method. Gauss- Seidle method.
Week 10	**Numerical interpolation:** Linear interpolation. Quadratic interpolation.
Week 11	**Newton and Lagrange forms:** Using this method for equal segment and unequal segments
Week 12	**Numerical differentiation** First derivative Second derivative
Week 13	**Numerical Integration** Trapezoidal rule Simpson Rule (1/3) Simpson Rule(3/8)
Week 14	**Curve fitting** Linear Regression Applications of linear regression Polynomial curve fitting
Week 15	**Solution of ordinary differential equations O.D.E.** Taylor series method Simple Euler method Runge-kutta method
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: Solution of non-linear equations by using MATLAB program (Simple iteration method and Newton –Raphson method)

Week 2	Exp. 2: Solution of linear equations by using MATLAB program (Gauss- Elimination and Gauss- Seidle method)
Week 3	Exp. 3: Newton forwards interpolation method for equal segment by using MATLAB program
Week 4	Exp. 4: Solution of Numerical Integration (Simpson Rule (1/3)) by using MATLAB program.
Week 5	Exp. 5: Solution of ordinary differential equations O.D.E. by using MATLAB program (Runge-kutta method).

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1. Chapra C. S., "Numerical Methods for Engineers",Mc Graw-Hill, Inc., 2006.	Yes
Recommended Texts	2. د.حسن مجيد الدلفي ود. محمود عطاء الله مشكور, " التحليل الهندسي والعددي التطبيقي" دار انشر الوطنية , الطبعة الثانية 2016. 3. Erwin Kreyszig, "Engineering mathematics",McGRAW-HILL, 9th edition, 2006.	Yes
Websites		

APPENDIX:

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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Manufacturing Processes	**Module Delivery**	
Module Type	SUPLEMENT	**Theory**	
Module Code	AIE245		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Zahraa Salah	**e-mail**	zahraasalahjassim@gmail.com
Module Leader's Acad. Title	Asst. Lec.	**Module Leader's Qualification**	M.Sc.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/01/2025	**Version Number**	2024

Relation With Other Modules

Prerequisite module	AIE235	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. Describe the various manufacturing processes that are used for the production of Mechanical parts and products. 2. Classify manufacturing processes according to the needs of products construction. 3. Understand how to use the theoretical knowledge of various manufacturing processes 4. Analyze, compare and finally gain theoretical experience for the advantages and limitations of different manufacturing processes. 5. Evaluate the better way of manufacturing and construction of mechanical parts or products by means of various manufacturing processes and the corresponding manufacturing Machines. 6. Design the production of a mechanical component or a specific product using the Manufacturing processes of casting, bulk deformation, sheet metal forming, joining CNC machine.
Module Learning Outcomes	**Knowledge and Understanding** 1. Classification of the different types of manufacturing processes. 2. Distinguish between different types of casting and differentiate between their output product characteristics. 3. Knowledge of, the sheet metal forming such as bending ,starching squeezing ,plunge and the bulk forming methods such as rolling, extrusion ,forging . 4. Characterize the major machining operations of turning, milling, and drilling via description of cutting tools used and basic components of the machine tools. 5. Have a thorough knowledge of the different operating processes such as turning, milling and cutting by describing the cutting tools used and the basic components of the machine tools. 6. Knowledge of cutting tools and various traditional and advanced cutting processes. 7. Knowledge and distinction between different welding methods such as gas welding, resistance welding, different types of electric arc welding and advanced welding methods such as laser welding and plasma welding. 8. Knowing the types, and how to operate automated CNC machines. **Specific skills** 1. How to choose the suitable type of manufacturing process. 2- Enable the student to learn and understand the Classification and the major of the manufacturing processes

	3- Correlate the material type with the possible fabrication processes. 4- Describe the operations and tools for major manufacturing processes. 5- Highlight the process design parameters to eliminate defective products. 6- Enable the student to know the traditional and non-traditional manufacturing process
Indicative Contents	1. Describe the various manufacturing processes that are used for the production of Mechanical parts and products [6 hrs]. 2. Understand the different types of casting process types such as: sand casting, shell casting, pressure die casting, and continuous casting [6 hrs]. 3. Understand the different types of defects that occurs in sand casting and the methods to prevent defects generation [9 hrs] 4- Understand the metal forming methods that used with the mechanical parts such as rolling process, extrusion process, wire drawing, sheet drawing and deep drawing processes [9 hrs]. 5- Evaluate the better way of welding techniques that used with metals and how to select the suitable welding type for each kind of materials with understanding their welding mechanism [6 hrs]. 6- Understand the non-traditional cutting methods that available and how to use [6 hrs].
Learning and Teaching Strategies	
Strategies	The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the seminars.

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	42	**Unstructured SWL (h/w)**	2.8
Total SWL (h/sem)	75		

Module Evaluation				
	Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	4	20% (20)	4, 6,10,12	All
	Assignments	2	10% (10)	5,11	All
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	8	All
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**metal process** Introduction of metal process. Classification of the main types of manufacturing process
Week 2	**Casting process** Sand Casting : Sand mold Type of patterns Pattern Materials Pattern allowances
Week 3	Molding sand Properties Cores –Types and applications Molding machines– Types and applications; Melting furnaces : Blast and Cupola Furnaces;
Week 4	**Principle of special casting processes :** Shell casting Investment casting Continues casting Pressure die casting Centrifugal Casting
Week 5	**Defects** General defects in all casting methods. Defects in Sand casting.
Week 6	**Metal forming** Introduction for cold and hot working Recrystallization temperature effect Rolling process Types of rolling mill
Week 7	**Extrusion process** Direct extrusion Indirect extrusion Impact extrusion Hydrostatic extrusion

Week 8	**Forging process**
Week 9	**Drawing processes:** Wire drawing. Tube drawing. Deep drawing
Week 10	**Machining operations (Cutting):** Cutting conditions. Cutting tools. Turning operations. Milling operations. Drilling operations
Week 11	**Welding processes:** Classification of welding processes. Fusion welding processes. Electric Arc Welding. Metal Arc Welding. Tungsten and Metal Inert gas welding
Week 12	**Fusion welding:** Oxy acetylene welding. Thermite welding. Laser welding. Diffusion welding. Brazing and soldering
Week 13	**Welding by pressure:** Electric resistance welding. Friction welding. Explosion welding
Week 14	**Non-traditional cutting processes:** Cutting with ultrasonic pulses.
Week 15	Electrochemical operation process. Operation process by laser
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Exp. 1:
Week 2	Exp. 2:
Week 3	Exp. 3:

Week 4	Exp. 4:
Week 5	Exp. 5:
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	H. C. F. Fritz, Manufacturing Processes 1 and 2, Springler, 2011.	Yes
Recommended Texts	H. N. Gubta, R. C. Gubta and Arun Mittal, Manufacturing Processes, 2nd. Edition, New Age International (P) Limited, Publishers, 2010	No
Websites		

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Strength of Materials	**Module Delivery**	
Module Type	CORE		**Theory** **Lab** **Tutorial**
Module Code	AIE242		
ECTS Credits	6		
SWL (hr/sem)	150		

Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Ghanim Kadhim Abdulsada	**e-mail**	Ghanim.sada@uowa.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/01/2025	**Version Number**	2024

Relation With Other Modules

Prerequisite module	**	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To assist students to understand the fundamental principles of all kind of Stresses. 2. To develop problem solving skills and understanding of principles of Tensile test through the description of material behavior during the test. 3. To develop problem solving skills and understanding of thermal stresses through the application of techniques. 4. To understand how analysis of torsional shear stress and shear strain. 5. To comprehend how clarification of beam, and loading types. Draw the Shear force and Bending Moment diagrams in beams. 6. Analyze the stresses on beam: bending stress, transverse shear stress, combine stress with drawing Mohr's circle. 7. To develop problem solving skills and understanding of Beam Deflection. 8. Study the stress induced in relatively long Columns (Euler's Column Equation).
Module Learning Outcomes	1. Enable the student to learn and understand the simple stress and simple strain 2. The student should understand and be able to apply Hook's Laws. 3. Enable the student to learn and solve the Statically Indeterminate Problems: 4. The student should Know the thermal stress and thermal deformation connecting with simple stress. 5. The student should Know the analysis of Circular shaft which is suffered from torsional shear stress. 6. The student should Know how can find the Stresses and deformations in pressure vessels. 7. The student should Know the beams and loading types on them. Draw the Shear force and Bending Moment diagrams in beams. 8. The student should study the Study the stress induced in beams due to lateral loads and shear stress due to bending induced in beams. 9. The student should understand and be able to apply Equation of elastic curve using double integration method and using Macaulay's Method. 10. Enable the student to learn and understand Stresses at a Point and Complex Stresses and Graphical representation of stress at a point using Mohr's circle 11. Enable the student to learn and understand stress induced in

	relatively long Columns (Euler's Column Equation).
Indicative Contents	Indicative content includes the following. Part A - Introduction to Simple Stresses, Strains: Study of simple stresses and strains. To know where the Hooke's law apply. And solved Statically Indeterminate Problems: [9 hrs]. Thermal Strain and Stress: Study the strain and stress induced due to temperature changes. Solve statically indeterminate problems due to temperature changes [5 hrs]. Part B - Torsion of Circular Shaft: Study the pure torsion for solid and hollow circular shafts. Study the stress induced due to torsion. Study the angular deformation induced due to torsion. [10 hrs]. Part C- Pressure Vessels: Stresses and deformations in pressure vessels. [5 hrs]. Part D- Beams: Introduction to beams and loading types. Draw the Shear force and Bending Moment diagrams in beams. [9 hrs]. Bending Stresses in Beams: Study the stress induced in beams due to lateral loads. Calculating the second moment of area. [5 hrs]. Shear Stress due to Bending in Beams: Study the shear stress due to bending induced in beams. [5 hrs]. Deflection in Beams: Equation of elastic curve using double integration method. Finding the elastic curve for complex loading using Macaulay's Method. [9 hrs]. Stresses at a Point and Complex Stresses: Study the stresses at a point. Basic principles for calculating the combined stresses at a point. [5 hrs]. Mohr's Circle: Graphical representation of stress at a point using Mohr's circle. Systematic procedure of graphical representation of stresses at a point using Mohr's circle. [5 hrs]. Part E - Buckling of Columns:

	Study the stress induced in relatively long Columns (Euler's Column Equation). Buckling for medium columns using Rankine method. [5 hrs].

Learning and Teaching Strategies

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

Student Workload (SWL)

Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	4.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,6 ,9,11	All
	Assignments	2	10% (10)	5, 8	All
	Projects / Lab.	Lab. 4	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	**Stresses, Strains, Hooke's Law:** Study of simple stresses and strains, to know where the Hooke's law apply
Week 2	**Statically Indeterminate Problems:**

	Basic principles for solving statically indeterminate Problems.
Week 3	**Thermal Strain and Stress:** Study the strain and stress induced due to temperature changes. Solve statically indeterminate problems due to temperature changes
Week 4	**Torsion of Circular Shaft:** Study the angular deformation induced due to torsion.
Week 5	**Torsion of Circular Shaft:** Study the angular deformation induced due to torsion.
Week 6	**Pressure Vessels:** Stresses and deformations in pressure vessels.
Week 7	**Beams: S.F. and B.M. Diagrams:** Introduction to beams and loading types.
Week 8	**Beams: S.F. and B.M. Diagrams:** Draw the Shear force and Bending Moment diagrams in beams.
Week 9	**Bending Stresses in Beams:** Study the stress induced in beams due to lateral loads. Calculating the second moment of area.
Week 10	**Shear Stress due to Bending in Beams:** Study the shear stress due to bending induced in beams.
Week 11	**Deflection in Beams:** Equation of elastic curve using double integration method.
Week 12	**Deflection in Beams:** Finding the elastic curve for complex loading using Macaulay's Method.
Week 13	**Stresses at a Point and Complex Stresses:** Study the stresses at a point. Basic principles for calculating the combined stresses at a point.
Week 14	**Mohr's Circle:** Graphical representation of stress at a point using Mohr's circle. Systematic procedure of graphical representation of stresses at a point using Mohr's circle.
Week 15	**Buckling of Columns:** Study the stress induced in relatively long Columns (Euler's Column Equation). Buckling for medium columns using Rankine method.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: Tensile test
Week 2	Exp. 2: Torsion test

Week 3	Exp. 3: Thick pressure vessel
Week 4	Exp. 4: Bending test
Week 5	Exp. 5:
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Hibbeler R.C., "*Mechanics of Materials*", Prentice Hall, Eighth Edition, 2011.	Yes
Recommended Texts	Hearn E.J., "*Mechanics of Materials*", Butterworth, Third Edition, 1997.	Yes
Websites		

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	WORKSHOPS II	**Module Delivery**	
Module Type	SUPLEMENT		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ■ Practical ☐ Seminar
Module Code	AIE206		
ECTS Credits	4		
SWL (hr/sem)	94		

Module Level	2	**Semester of Delivery**	1
Administering Department	Training and Workshops Center	**College**	Engineering
Module Leader	Ahmad Saddy Mohamad	**e-mail**	ahmad.saddy@uowa.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Aymen Hussien Salh	**e-mail**	aymen.hussien@uowa.edu.iq
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	1

Relation with Other Modules

Prerequisite module	AIE106	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1-Preparing applied engineers in the field of engineering sciences who

	are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. 2. Enable the student to know and understand work systems, risks, and the factors surrounding them. 3. Enable the student to know and understand theoretical principles in handicrafts and measurements.
Module Learning Outcomes	1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work. 2- Acquisition of the student's manual operation skills, for example (Filings and Tinsmith workshops), and mechanical operation skills, for example (Turning). 3- Acquisition of the student's mechanical forming skills, for example (Casting and Blacksmithing). 4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field. 5- Enabling the student to operate the various machines and devices in mechanical operations and formation. 6- Cooperative learning by working collectively.
Indicative Contents	1. Introducing the student to the basics of the art of turning and milling, types of cold working machines, the skill of dealing with them, choosing metals, operational tools, and methods of measurement and standardization 2. Introducing the student to the basics of the art of casting, hot forming, metal selection, method of working on casting furnaces and tools, and manufacturing casting molds 3. Familiarize students with the basics of cars and the systems they use, as well as maintenance, disassembly, and assembly processes. 4. Introducing students to the basics of household and industrial electrical appliances, the skill of using tools, and designing electrical circuits and control panels 5. Introducing the student to the basics of the art of plumbing, leveling surfaces, the skill of using tools, manufacturing and installing geometric shapes, and methods of measurement and standardization 6. Introducing the student to the basics of the art of blacksmithing, cold and hot forming of metals, the method of hardening them, and the skills of dealing with hand tools, forming machines, and heating furnaces 7. Introducing the student to the basics of the art of filing and manual operation of metals with the help of manual, electrical, and mechanical

	tools, the skills of dealing with them, and the methods of measurement and standardization 8. Introducing the student to the basics of the art of welding, the installation and assembly of metals, the types of welding machines, the skills of dealing with them, the types of welding, and the methods of measurement and standardization Introducing the student to the basics of the art of carpentry and woodworking with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and methods of measurement and standardization

Learning and Teaching Strategies

Strategies	

Student Workload (SWL)

Structured SWL (h/sem)	47	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	3	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	50		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	5% (5)	Continuous	All
	Assignments	5	5% (5)	Continuous	All
	Projects / Lab.	5	25% (25)	Continuous	All
	Report	5	5% (5)	Continuous	All
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	All
	Final Exam	2 hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Fitting workshop Occupational safety and its importance in filing workshops -An introduction to the basics of filing -Pen holder exercise “preparation and preparation”

Week 2	Fitting workshop Pencil holder exercises finishing and assembling.
Week 3	Fitting workshop -The catcher exercise. - Clamping exercise. Written exam in practical exercises.
Week 4	Carpentry workshop -Occupational safety and its importance in carpentry workshops. - An introduction to carpentry, its types, types of wood, tools used, and preparation Preparing the tools used Face modification exercise using the reindeer
Week 5	Carpentry workshop Garden fence work and how to connect its parts, the eight-star exercise
Week 6	Carpentry workshop - Wood smoothing exercise using smoothing paper - Wood dyeing exercise in three stages Final smoothing and varnishing exercise Written exam in practical exercises
Week 7	The tinsmith workshop Occupational safety and its importance in plumbing workshops An introduction to plumbing, its tools, and plumbing stages Planning and marking exercise on metal plates
Week 8	The tinsmith workshop Geometric shapes Types of individuals and methods of individuals Geometric shape individuals exercise on a metal board
Week 9	The tinsmith workshop Cone members exercise - Exercise of cylinders with an oblique cut Roll forming operations Connection without the use of an intermediary Written exam in practical exercises
Week 10	Electric Workshop Occupational Safety and its importance in electrical workshops An introduction to the basics of electrical installations - Linking a simple circuit consisting of a lamp to the control of a single-way switch. Connect two lamps in series with one-way switch control. Connecting two lamps in parallel with the control of a single road switch. Connect two lights with one-way dual switch control.
Week 11	Electric Workshop Connect a fluorescent lamp circuit to a one-way switch control Connecting an electric supply socket circuit to the control of a separate or combined one-way switch Written exam in practical exercises

Week 12	Electric Workshop Occupational Safety and its importance in blacksmithing workshops Introduction to the basics of Blacksmithing - Barbell adjustment exercise Eight-star exercise - Exercise forming the number eight in English Exercise forming the number six in English
Week 13	supplementary training curriculum Welding workshop Plumbing workshop Blacksmith's workshop
Week 14	supplementary training curriculum - Automotive workshop - Turning workshop Fitting workshop
Week 15	supplementary training curriculum Carpentry workshop The plumbing workshop electric Workshop
Week 16	**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	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	Yes

Recommended Texts		
Websites		

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Arabic language	**Module Delivery**	
Module Type	SUPLEMENT	**Theory**	
Module Code	UOWA103		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Natik aziz	**e-mail**	Natik.a@uowa.edu.iq
Module Leader's Acad. Title	Asst. Lect	**Module Leader's Qualification**	MS.c.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/01/2025	**Version Number**	2024

Relation With Other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1- Enabling the student to understand the correct grammar rules. 2- Preserving the tongue from mistakes and correct pronunciation of the Arabic letter. 3- Applying the grammatical and spelling rules that the student understands correctly. 4- Developing his literary tendencies and talents. 5- Aesthetic taste and distinguished linguistic abilities.
Module Learning Outcomes	1- Knowledge and understanding 2- Understanding the rules of the language 3- The student's pride in the Arab and Islamic nation 4- Preserving the Islamic identity 5- Understanding the reality of the miracle of the Qur'an. 6- Enabling the student to know the rules of the language 7- To acquire a linguistic wealth that enables him to express himself correctly in the situations he goes through in his life
Indicative Contents	1- The student acquires the skill of mastering the grammar rules. 2- Able to give an example for each chapter of the language 3- To practice extracting language topics from texts 4- The student is proud of his national and Islamic identity and his language.
Learning and Teaching Strategies	
Strategies	1- Explanation, clarification and use of the board 2- Method of presenting the material and the lecture 3- The traditional method, the textbook in addition to external sources

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	50		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1 and 4
	Seminar	2	10% (10)	2, 10	LO # 1, 3 and 4
	Online assignments	2	10% (10)	3, 7	LO # 2, 4 and 7
	Report	1	10% (10)	13	LO # 1 and 3

Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1,3 and 4
	Final Exam	3 hr	50% (50)	16	LO # 1,3 and 4
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	مهارات اللغة العربية ومميزاتها
Week 2	الادب والشعر في العصر الجاهلي (قصيدة للحفظ من العصر الجاهلي)
Week 3	اللغة العربية لغة القرآن الكريم (نص قرآني كريم للحفظ وقصيدة للحفظ من العصر الاسلامي)
Week 4	اللغة العربية لغة الضاد – الفروقات في اللغة العربية
Week 5	اسماء الاشارة وحروف الجر والعطف ومعانيها
Week 6	المبتدأ والخبر
Week 7	كان واخواتها
Week 8	ان واخواتها
Week 9	العدد والمعدود
Week 10	الاخطاء الشائعة باللغة العربية
Week 11	امتحان منتصف الفصل
Week 12	الاملاء في اللغة العربية
Week 13	علامات التنقيط في اللغة العربية
Week 14	كيفية كتابة الانشاء بلغة صحيحة
Week 15	**قصيدة من الشعر العربي الحديث**
Week 16	الامتحان النهائي

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites		

APPENDIX:

GRADING SCHEME				
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	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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Computer Sciences ||	**Module Delivery**	
Module Type	SUPLEMENT	**Theory**	
Module Code	UOWA201		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Alaa Akram	**e-mail**	alaa.ak@uowa.edu.iq
Module Leader's Acad. Title	Asst. Lect	**Module Leader's Qualification**	MS.c.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/01/2025	**Version Number**	2024

Relation With Other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	• **Understanding the fundamentals of computer networks:** This includes learning about network topologies, protocols, and devices, as well as how data is transmitted and routed across networks. • **Understanding the fundamentals of artificial intelligence:** This includes learning about different AI techniques, such as machine learning, natural language processing, and computer vision, as well as how to apply them to solve real-world problems. • **Integrating network and AI concepts:** This involves learning how to use AI techniques to improve network performance, security, and reliability, as well as how to use networks to support AI applications. • **Developing practical skills:** This includes gaining hands-on experience with network and AI tools and technologies, as well as learning how to design, implement, and evaluate network and AI systems. • **Exploring ethical and societal implications:** This involves considering the ethical and societal implications of network and AI technologies, such as privacy, security, and bias. Overall, the aim of a network and AI course is to provide students with the knowledge and skills they need to design, develop, and deploy innovative solutions that leverage the power of both networks and AI.
Module Learning Outcomes	**Knowledge and Understanding:** • **Network Fundamentals:** Demonstrate a comprehensive understanding of network topologies, protocols (TCP/IP, HTTP, etc.), addressing schemes (IPv4, IPv6), and network devices (routers, switches, firewalls). • **AI Fundamentals:** Explain core AI concepts such as machine learning (supervised, unsupervised, reinforcement learning), deep learning, natural language processing, and computer vision. • **Network and AI Integration:** Describe how AI techniques can be applied to network management, security, optimization, and traffic analysis. Conversely, explain how network infrastructure supports AI applications (e.g., distributed training, data collection). • **Ethical Considerations:** Discuss the ethical and societal implications of network and AI technologies, including privacy, security, bias, and

	job displacement. **Skills (Practical and Cognitive):** • **Network Configuration and Management:** Configure and manage network devices, troubleshoot network issues, and implement network security measures. • **Problem Solving:** Apply network and AI principles to solve real-world problems, such as network optimization, intrusion detection, or predictive maintenance. • **Critical Thinking:** Critically evaluate the strengths and weaknesses of different network and AI approaches. • **Communication:** Effectively communicate technical concepts related to networks and AI, both orally and in writing. **Other Potential Outcomes (Attitudes/Professional Skills):** • **Teamwork:** Collaborate effectively with others on network and AI projects. • **Lifelong Learning:** Demonstrate an ability to keep up with the rapidly evolving fields of networks and AI. • **Professional Ethics:** Adhere to ethical principles in the development and deployment of network and AI systems.
Indicative Contents	**Networks:** Basic types, how data travels, simple devices (routers, switches), and intro to security. **AI:** What it is, basic machine learning (supervised/unsupervised), and simple algorithms. **Network & AI Integration:** AI for network optimization/security, networks for AI (cloud). **Ethics:** Basic concepts of responsible AI, bias, and privacy. **Hands-on:** Simple network simulations and exploring AI demos. Focus on concepts, not deep technical details.
Learning and Teaching Strategies	
Strategies	The course will use the following teaching and learning methods • Board (Normal or Smart) • Computers • Presentation software such as PowerPoint

Student Workload (SWL)			
Structured SWL (h/sem)	48	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	27	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	75		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,6,9,12	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	Lab. 4	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Security and Networking: What is a network? Types of networks. Basic network components.
Week 2	Security and Networking (Cont.): Network Security Basics. Understanding network threats.
Week 3	E-Commerce: Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking
Week 4	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter.
Week 5	Computer Troubleshooting (Cont.): Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 6	Introduction to Al: Definition of Al, History of Al, Al Techniques and Approaches.
Week 7	Introduction to Al(Cont.): Key Characteristics of Al, Benefits of Al, Challenges and Ethical considerations.
Week 8	The Role of Al in Modern Smartphones: Al-Driven Mobile Technologies, Virtual Assistants (Siri, Google Assistant, Alexa).
Week 9	The Role of Al in Modern Smartphones (Cont.): Adaptive Learning, Real-Time

	Translation Services.
Week 10	Applications and Tools of Al: Overview of Al Applications in Various Industries, Education and Healthcare.
Week 11	Applications and Tools of Al (Cont.): Transportation, Marketing and Advertising.
Week 12	Applications and Tools of Al(Cont.): Finance, Robotics and Automation Technologies.
Week 13	Al and Society: How Al affects social, Al and international relations, Al and the future of humanity.
Week 14	Ethical Challenges in Al: Al ethics, privacy and surveillance, the impact of Al on the job market.
Week 15	The Future of Al: Future trends in Al, recent research and emerging technologies.
Week 16	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020) 2. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete". 16th Edition (2020). 3. Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024). 4. Microsoft Office 2019 Step by Step 1st Edition by Curtis Frye & Joan Lambert	Yes
Recommended Texts	" الخضر علي الخضر بحاث " أساسيات الحاسوب" 2016 الدكتور عادل عبد النور, مدخل إلى عالم الذكاء الاصطناعي " 2005	No
Websites		

APPENDIX:

GRADING SCHEME				
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	**FX** – Fail	مقبول بقرار	(45-49)	More work required but credit awarded

(0 – 49)	**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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Fundamentals of Aeronautics		**Module Delivery**	
Module Type	CORE			
Module Code	AIE244			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	**Semester of Delivery**	4	
Administering Department	Aircraft Engineering	**College**	Engineering	
Module Leader	Ahmad Saddy Mohamad	**e-mail**	ahmad.saddy@uowa.edu.iq	
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Ph.D.	
Module Tutor	None	**e-mail**	None	
Peer Reviewer Name		**e-mail**		
Review Committee Approval	01/01/2025	**Version Number**	2024	

Relation With Other Modules

Prerequisite module	AIE232	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To help students learn as much introduction to flight and flight theory principle as possible in which this subject is regarded as the base for all aeronautic subjects.

	2. The development of the basic principles of aeronautics is the entry point for consolidating the necessary principles of specialized aircraft mechanics engineering subjects and providing the necessary materials for them, which include topics of aerodynamic, flight theory, design, control and stability of aircraft, gas dynamic, jet propulsion theory and aircraft performance.
Module Learning Outcomes	1. Knowledge and understanding. - Standard Atmosphere. - Principles of Aviation. - Aerodynamic forces and moments on the aircraft. - Wings and infrasound sections - and ultrasonic / characterization and characteristics. - Aerodynamic forces in stable horizontal flight. - Performance curves in terms of propulsion and performance curves in terms of power. 2. Subject-specific skills. - Explanation of the flight principles of fixed-wing and rotary-wing aircraft (helicopters). - Determination of the anaerobic forces acting on a fixed-wing and rotary-wing aircraft. - Determining the required thrust, the available thrust, the lift to drag ratio. 3. Thinking Skills. - To fully comprehend the scientific material and develop students' engineering sense. - Understand and comprehend the applications of the scientific material on the fuselage (structure), power station (engines), control surfaces, wing, aircraft systems and instrumentation. - Understand the limits of the aircraft's performance. - To prepare students for psychological connection and a feeling of satisfaction, happiness and reassurance for the department and the branch in which they are studying 4. General and Transferable Skills. Develop the student's ability to use software, modern equipment, information technology, and the use of the Internet to obtain advanced, promising and future knowledge, assimilate and understand and link its relationship to engineering applications.
Indicative Contents	Lectures are used to deliver the fundamental knowledge in relation to various aspects of aerodynamic characteristics for aircraft as well as their influence in determining the aircraft performance for atmospheric flight (All Outcomes). Indicative content includes the following.

	Part A - Fundamentals Aircraft Nomenclature History of aeronautics; Physical properties of atmosphere; Airfoil lift, drag and moments; Airfoil data; Compressibility correction; Finite wing aerodynamics; Induced drag; High-lift mechanisms. [25 hrs] Part B - Aircraft Performance Drag polar; Typical steady level flight; Thrust and power requirements for cruising flight; Altitude effects; Indicated and True Air Speed. [27 hrs]

Learning and Teaching Strategies

Strategies	Develop the student's ability to understand aircraft theory and arrange knowledge related to aircraft mechanics from a correct and logical understanding and analysis of the various sciences related to aircraft, understanding hypotheses, and interpreting the performance of the aircraft physically, to obtain the initial knowledge necessary to understand the specialized topics in the field of aircraft mechanics engineering. Develop the student's ability and familiarize him with the pattern of exam questions and the arrangement and sequence of the solution in order to be able to correctly analyze the question and thus outline the appropriate solution sequence through method books, auxiliary books and theoretical lectures, in addition to solving exercises and getting used to the method of reaching the correct solution.

Student Workload (SWL)

Structured SWL (h/sem)	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	52	**Unstructured SWL (h/w)**	3.5
Total SWL (h/sem)	100		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,6,9,12	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	Lab. 4	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**Fundamentals:** Introduction History of aeronautics Pilot's Operating Handbook
Week 2	**Standard atmosphere (ISA):** The atmosphere. Physical properties of gases in atmosphere.
Week 3	**Airplane types:** Airplane classification. Airplane parts.
Week 4	**Nomenclature:** Airfoils-Nomenclature. Wings-Nomenclature. Flaps. Types of airfoils. Modern airfoils.
Week 5	**Wings and airfoils characteristics:** Mean aerodynamic chord. Wing Area. Aerodynamic center. Center of pressure.
Week 6	**Aerodynamic forces and moments on airplane:** The airplane as a rigid body. Airplane axis system. Forces and moments.
Week 7	**Flight principles:** Bernoulli's principle. Venturi effect. Relative wind.
Week 8	**Lift:** Lift coefficient. Lift curves characteristics. Change of lift coefficient with the angle of attack.
Week 9	**Drag:** Drag estimation at low speeds. Drag estimation at high speeds. **Types of drag:** Parasite drag. Induced drag. Wave drag.
Week 10	**Aerodynamic forces on steady level flight:** Lift force. Drag force.

	Gravity force. Thrust force.
Week 11	**Level flight Performance:** Steady level flight. Typical steady level flight. Cruise flight.
Week 12	Holding flight. Mach number. Indicated Air Speed. True Air Speed.
Week 13	**Performance curves in terms of thrust:** Change of required thrust with airspeed. Change of required thrust with altitude. Change of available thrust with airspeed and altitude.
Week 14	**Performance curves in terms of power:** Change of required power with airspeed. Change of required power with altitude.
Week 15	Change of available power with airspeed and altitude. Minimum power required.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Exp. 1: Atmosphere calculator
Week 2	Exp. 2: Airfoil design and analysis
Week 3	Exp. 3: Wing design and analysis
Week 4	Exp. 4: Airplane Performance
Week 5	Exp. 5: Wind Tunnel
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	John D. Anderson, "Introduction to Flight", McGraw-Hill, 7th Edition, 2012	Yes
Recommended Texts	W. Austyn Mair, David L. Birdsall, "Aircraft performance", Cambridge University Press, 2003	Yes
Websites		

APPENDIX:

GRADING SCHEME				
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	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.