



University of Technology
Department of Communication Engineering
Division of Optical Communication
Engineering Systems



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Fundamentals	Module Delivery	
Module Type	BASIC	Theory Lab	
Module Code	COFU108		
ECTS Credits	2		
SWL (hr/sem)	75		
Module Level	1		
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Lect. Yousra Abd Mohammed	e-mail	Yousra.a.mohammed@uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MS.c.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. To develop problem solving skills by writing a programs and understanding of computers through the application of techniques. 2. To understand how computers development. 3. This course deals with the basic concept of computer science. 4. This is the basic subject for all hardware and software of computer. 5. To understand C++ instructions. 6. To perform different programs in C++ language. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Summarize what is meant by computer generations. 2. Recognize how computer develops. 3. List the various terms associated with computers. 4. Describe computer Hardware. 5. Define computer Software. 6. Identify the levels in computer Languages. 7. Learn how to make algorithms and flowcharts for any program. 8. Discuss the various properties of C++ programming Language. 9. Explain the programming terms used in C++ (data types, operators, keywords, Mathematical Function, Arrays program control statements, and strings). 10. Finally learning how to solve any problem in any field by writing program and execute it. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A - General Concepts</u></p> <p>Hardware, software, and information technology, Types of computers (mainframe, network computer, personal computer, laptop, personal digital assistant) in terms of capacity, speed, cost, and use. [6 hrs]</p> <p><u>Part B- Computer Languages & The Origins of The C++ Language</u> Low Level Language, High Level Language, Middle Level Language, and Compiler. Flowchart Introduction & Method of Problem Solving, Definition of Algorithm and Flowchart, Basic Symbols of flowchart. The Form of C++ Language Program, Basic Elements of C++ Language,</p>		

	<p>Keywords. Data Types of C++ Language (Identifiers, Numeric Constants, Integer Numbers, Octal Numbers, Hexadecimal Numbers, Floating Points Numbers, Non-Numerical Constants, Characters, ACSII Tables, Local and Global Variables). The C++ Language Operators (Arithmetic Operators, Relational and Logical Operators, Bitwise Operators, Other Operators) [9 hrs]</p> <p><u>Part C – The Programming in C++</u></p> <p>Selection Statements, Iteration Statements (Loops), Jump Statements, Label, Expressions, Blocks, Functions (The General Form, Return Statements, Call by Value, Call by Reference, Calling Function with Arrays, Function Prototypes), Arrays (Single-Dimensional arrays, Two-Dimensional Arrays, Multi-dimensional Arrays, Sorting Array, Index Searching), Pointers and References, Strings (The String Class, Basic String Manipulations, searching a String, Comparing Strings.) [15 hrs]</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their programming thinking skills. This will be achieved through classes, interactive Exercise and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

<p>Student Workload (SWL) الحمل الدراسي للطالب</p>			
<p>Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل</p>	33	<p>Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا</p>	2
<p>Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل</p>	17	<p>Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا</p>	1h and 8min
<p>Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل</p>	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: General Concepts, important of computer, types of computers.
Week 2	Personal computer System (Hardware).
Week 3	Software: Type of software, Operating System Software, Applications Software
Week 4	Computer Languages: Low, High, and Middle Level Language Compiler. Flowchart and Algorithm.
Week 5	The Origins of The C++ Language.
Week 6	Data Types of C++ Language.
Week 7	Mid-term Exam + The C++ Language Operators.
Week 8	Program Control Statements: Selection Statements.
Week 9	Program Control Statements: Iteration Statements (Loops).
Week 10	Program Control Statements: Jump Statements, Label, Expressions, Blocks.
Week 11	Functions: The General Form, Return Statements, Call by Value, Call by Reference, Calling Function with Arrays, Function Prototypes.
Week 12	Pointers and References: The References, The Pointers, Derived Types, Pointers and Arrays.
Week 13	Arrays: Single-Dimensional arrays, Two-Dimensional Arrays,
Week 14	Arrays: Multi-dimensional Arrays, Sorting Array, Index Searching.
Week 15	The Strings: The String Class, Basic String Manipulations, searching a String, Comparing Strings.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to C++
Week 2	Lab 2: Introduction to C++
Week 3	Lab 3: C++ Operators
Week 4	Lab 4: C++ Operators
Week 5	Lab 5: C++ Operators
Week 6	Lab 6: Selection Statements
Week 7	Lab 7: Selection Statements
Week 8	Lab 8: Iteration Statements
Week 9	Lab 9: Iteration Statements
Week 10	Lab 10: Arrays
Week 11	Lab 11: Arrays
Week 12	Lab 12: Functions & Mathematical Functions
Week 13	Lab 13: Functions & Mathematical Functions
Week 14	Lab 14: Strings
Week 15	Lab 15: Strings

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<ol style="list-style-type: none"> 1. Herbert Schildt, Gregory L. Guntle, "Borland C++ Builder: The Complete Reference", McGRAW-Hill companies, 2001. 2. Ira Pohl, "C++ By Dissection: the essentials of C++ Programming", Addison-Wesley, 2001. 3. Irv Englander, "The Architecture of Computer Hardware and Systems Software: An Information Technology Approach", John Wiley & Sons, Inc., publisher, 3rd edition, 2003. 	Yes
Recommended Texts	C# & C++: 5 Books in 1 - The #1 Coding Course from Beginner to Advanced (2023) (Computer Programming) by Mark Reed.	No
Websites	https://ninja-ide.org/c-plus-plus-books-pdf-download/	

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:				
<p>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.</p>				



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Engineering Systems



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نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	ELECTRICAL ENGINEERING FUNDAMENTALS II		Module Delivery
Module Type	CORE		Theory Lab
Module Code	ELEF124		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Mustafa Ghanim		e-mail Mustafa.g.rzooki@uotechnology.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Engineering Fundamentals I	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	<p>The aim of this course is not to introduce electrical and electronics engineering, but to introduce the basic subjects of Electrical and Electronics Engineering to students who will constantly interact with this engineering field in their profession. In this context, an overview of the wide area of Electrical and Electronics engineering will be provided, basic circuits and systems will be explained, computational theories and applications will be taught, and examples specific to some specialties will be given. At the end of this course, students will be able to research solutions and evaluate the solutions offered to them when they encounter a problem related to electrical and electronics engineering in their fields.</p>		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. To be able to define the basic concepts of Electrical and Electronics Engineering, Ac circuits. 2. Calculate Peak, Ac and rms Values, Period, Frequency and Phase of Alternating Signals. 3. Demonstrate how to use an Oscilloscope for measurement of various Signals. 4. Define complex numbers. 5. Ability to understand Resonance in Ac circuits. Series & Parallel Circuits. 6. Define Filters (Low Pass & High Pass). 7. Locus Diagrams. 8. Classical Method. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A - Circuit Theory</u></p> <p>DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining. [6 hrs]</p> <p>AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [12 hrs]</p>		

	<p>AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. <u>[9 hrs]</u></p> <p>RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. <u>[9 hrs]</u></p> <p>Revision problem classes <u>[6 hrs]</u></p> <p><u>Part B - Analogue Electronics</u></p> <p>Fundamentals</p> <p>Techniques of circuits analysis (loop current, node voltage, circuits theorems). [12 hrs]</p> <p>Locus Diagrams concept, locus diagrams of simple series and parallel circuits. [12hrs]</p> <p>Electric Transients (Classical Method) the natural and forced of series and parallel circuits with zero initial conditions. [9hrs]</p> <p>Revision problem classes <u>[6hrs]</u></p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>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.</p>

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	80	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4h and 40min
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3,6,8, 11	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	3, 8	LO # 3, 4, 6 and 7
	Projects / Lab.	1/1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to AC circuits.
Week 2	Series and Parallel Ac circuits
Week 3	Complex numbers
Week 4	(R-L&R-C)
Week 5	Resonance in Ac circuits
Week 6	Series Resonant Circuit, Parallel Resonant Circuit
Week 7	Filters low pass
Week 8	Filters high pass
Week 9	Mid-term Exam

Week 10	Two - Port Network (T.P.N.)
Week 11	Equivalent circuits, interconnected two ports
Week 12	Locus Diagrams series and parallel
Week 13	Circuits with mutual inductance
Week 14	Classical Method series and parallel
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: A.C. circuits using the oscilloscope and function generator
Week 2	Lab 2: (R-L) series circuit
Week 3	Lab 3: (R-c) series circuit
Week 4	Lab 4: series resonance
Week 5	Lab 5: parallel resonance
Week 6	Lab 6: Low pass filter
Week 7	Lab 7: high pass filter
Week 8	Lab 8: band pass filter
Week 9	Lab 9: stop pass filter
Week 10	Lab 10: Port Network (T.P.N.)
Week 11	Lab 11: Series and Parallel Locus Diagrams
Week 12	Lab 12: Circuits with mutual inductance
Week 13	Lab 13: Classical series and parallel Circuits
Week 14	Preparatory Week
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Required Texts	Boylestad, R. L. " Introductory Circuit Analysis", 4th Edition, Charles E. Merrill Publishers.	Yes
Required Texts	James W. Nilsson, and Susan A. Riedel, 'Electric Circuits', Last Edition, Pearson Prentice Hall, 2004	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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.



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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	OPTICAL PHYSICS	Module Delivery	
Module Type	BASIC	Theory	
Module Code	OPPH122		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1		
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Halah Hassan Rashed	e-mail	Halah.H.Rashed@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MS.c.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval	/ /	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<p>1- Recognizing the importance of practical experiments in the science of light and what is related to all its physical phenomena</p> <p>2- Application of the most important laws of geometric and wave optics in the laboratory</p> <p>3- Benefiting from most of the experiences of this course by graduate studies in measurements that help them in their practical research</p> <p>4- Benefiting from the link between wave and engineering optics in various fields of work, especially the communication field</p>		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>1. understand basic principles of optics used for example in beam splitters, multibio metric mirrors or filters, gratings, interferometers, optical devices.</p> <p>2. use optics to solve problems of diffraction ;</p> <p>3. measure temporal of spatial coherence of light sources.</p> <p>4. calculate the propagation of lights ;</p> <p>5. recognize the necessary conditions to build a continuous-wave laser</p> <p>6. Recognizing the importance of optometry and its role in the medical and educational aspects of life</p> <p>7. Helping the student keeping up with the scientific development in all fields of optics.</p> <p>8. Helping the student to link between the field and the practical side in the field of presentation.</p>		
Indicative Contents المحتويات الإرشادية	<p>Passive Optical Materials 9Hrs. Glasses: silicates, fluoride, chalcogenides, origin of color in glasses, Polymers: optical constants, specialty optical applications, polarization, Crystals: polarization, birefringence, wave plates, liquid crystals , Metals: physical origin of the dielectric constant, reflectance, surface plasmons , Passive optical components: lenses; optical coatings; mirrors; gratings , Optical waveguides: thin films (slab); optical fibers; mode equations and profiles, mode cutoff</p> <p>Active Optical Materials 9Hrs. Semiconductors: interband absorption; direct, indirect bandgap; Si, III-V; II-V , Semiconductors: nanoscale phenomena , excitons, quantum</p>		

	<p>confinement ,Semiconductors: organic semiconductors; small molecules; conjugated polymers .</p> <p>Geometrical optics 9Hrs. Optical rays, Refractive index, Fermat's principle, Reflection and refraction from planar mirrors and boundaries between media of different refractive indexes , Snell's Law ,Total internal reflection.</p> <p>Electromagnetic Nature of light 9Hrs. Light as an Electromagnetic wave , spectrum of EM waves ,Wave Equation, The Poynting Vector; Reflection and Refraction of Electromagnetic waves, Normal and Oblique Incidence, Fresnel's Relations; Idealization of Waves as Light Rays,Polarization of Light.</p> <p>Principle of Superposition of Waves 9Hrs. Young's Experiment, Fringe Width, Intensity Distribution; Interference with White Light, Fresnel's Biprism and Lloyd's Single Mirror; Interference by Division of Amplitude, Phase Change on Reflection, Interference with Multiple Reflection.</p> <p>Fresnel's Diffraction 9Hrs. Fresnel's construction, Fresnel's Half Period Zones, Zone Plate; Diffraction Patterns of Simple Obstacles; Fraunhofer's Single Slit Diffraction Pattern, Intensity Distribution; Diffraction by a Circular Aperture and Double Slit, Intensity Distribution, Position of Maxima, Missing Orders; Diffraction by N-Parallel and Identical Slits.</p> <p>Coherence and Observable Interference of Waves 6Hrs. Temporal Coherence, Coherence Time and Coherence Length, Width of a Spectral Line, Spatial Coherence, Lateral Coherence Width, Angular Diameter of Stars; Visibility of Fringes. Emission and Absorption of Light, Stimulated Emission, Einstein's Relations, Population Inversion; Optical Pumping.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<ul style="list-style-type: none"> • Clarifying and explaining the study materials through the white board and presenting the lectures, Or through e-learning programs on LCD screens and Power Point displays using a program • Asking the students to solve some physics problems during the lecture • Providing students with knowledge and performing homework • Requiring students to visit the library to obtain academic knowledge • Improving students' performance by encouraging them to visit websites.

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	4h and 8min
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 13	LO #1-4
	Assignments	2	10% (10)	3, 10	LO # 2,4,5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 5,6
Summative assessment	Midterm Exam	2 Hrs.	10% (10)	8	LO # 1-4
	Final Exam	2 Hrs.	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Passive Optical Materials 9Hrs. Glasses: silicates, fluoride, chalcogenides, origin of color in glasses, Polymers: optical constants, specialty optical applications, polarization, Crystals: polarization, birefringence, wave plates, liquid crystals
Week 2	Metals: physical origin of the dielectric constant, reflectance, surface plasmons, Passive optical components: lenses; optical coatings;

Week 3	mirrors; gratings, Optical waveguides: thin films (slab); optical fibers; mode equations and profiles, mode cutoff
Week 4	Active Optical Materials 6Hrs. Semiconductors: interband absorption, direct, indirect bandgap; Si, III-V; II-V , Semiconductors: nanoscale phenomena
Week 5	excitons, quantum confinement, Semiconductors: organic semiconductors; small molecules; conjugated polymers
Week 6	Electromagnetic Nature of light 6Hrs. Light as an Electromagnetic wave, spectrum of EM waves, Wave Equation, The Poynting Vector; Reflection and Refraction of Electromagnetic waves
Week 7	Normal and Oblique Incidence, Fresnel's Relations; Idealization of Waves as Light Rays, Polarization of Light
Week 8	Principle of Superposition of Waves 6Hrs. Young's Experiment, Fringe Width, Intensity Distribution; Interference with White Light, Fresnel's Biprism and Lloyd's Single Mirror;
Week 9	Interference by Division of Amplitude, Phase Change on Reflection, Interference with Multiple Reflection
Week 10	Fresnel's Diffraction 6Hrs. Fresnel's construction, Fresnel's Half Period Zones, Zone Plate; Diffraction Patterns of Simple Obstacles; Fraunhofer's Single Slit Diffraction Pattern,
Week 11	Intensity Distribution; Diffraction by a Circular Aperture and Double Slit, Intensity Distribution, Position of Maxima,
Week 12	Missing Orders; Diffraction by N-Parallel and Identical Slits
Week 13	Coherence and Observable Interference of Waves 9Hrs. Temporal Coherence, Coherence Time and Coherence Length, Width of a Spectral Line, Spatial Coherence, Lateral Coherence Width
Week 14	Angular Diameter of Stars; Visibility of Fringes. Emission and Absorption of Light,
Week 15	Stimulated Emission, Einstein's Relations, Population Inversion; Optical Pumping

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-F.Sears, Addison-Wesley publishing company ,.Optics 1964 2-F.Jenkins& H.White, Fundamentals of Optics by ,McGraw Hill book company,4 th .edition ,1985	Yes

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GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
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MODULE DESCRIPTOR FORM
 نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	MATHEMATICS II		Module Delivery
Module Type	BASIC		Theory
Module Code	MATH123		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Faez Fawwaz Shareef	e-mail	Faez.f.shareef@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval	//	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. to provide students with a comprehensive understanding of various techniques and methods used in the process of integration. It focuses on developing students' ability to recognize and apply appropriate integration techniques for different types of functions and integrals. 2. to develop the skills necessary for performing arithmetic operations with complex numbers. This includes addition, subtraction, multiplication, and division of complex numbers. Students learn how to manipulate complex numbers using both algebraic and geometric representations. 3. to introduce students to the concept of vector spaces and their properties. It focuses on understanding vector space axioms, subspaces, basis, dimension, and linear independence. 4. to develop students' knowledge of matrix properties and operations. It covers topics such as matrix transpose, trace, and rank. 5. to equip students with the tools and techniques to solve systems of linear equations using matrix methods. It emphasizes the connection between matrices and systems of linear equations, providing students with the ability to solve equations using matrix operations and techniques such as Gaussian elimination. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Students should be able to communicate their mathematical ideas and solutions effectively. They should be able to explain the steps involved in integrating a function, justify their choices of integration techniques, and present their solutions clearly and coherently. 2. Students should gain knowledge of complex functions and equations. They should be able to work with complex algebra, solve complex equations, and understand properties of complex functions such as complex exponentials and logarithms. 3. Students should be able to apply vector algebra to solve problems in various contexts. This may include analyzing forces and moments, or working with electromagnetic fields. They should be 		

	<p>able to model and solve real-world problems using vector algebra techniques.</p> <p>4. Students should understand the concept of determinants and their role in matrix theory. They should be able to compute determinants of matrices, understand the properties of determinants, and use them to determine invertibility and solve systems of equations.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<ul style="list-style-type: none"> • Methods of Integration [12 Hrs.]: <ol style="list-style-type: none"> 1. <u>Integration by Substitution</u>: Trigonometric substitution, and Quadratics substitutions. 2. <u>Integration of rational functions by trigonometric substitution.</u> 3. <u>Integration by parts.</u> 4. <u>Numerical methods</u>: Introduction to numerical methods for approximating integrals, such as the trapezoidal rule and Simpson's rule. • Application of Definite Integral [12 Hrs.]: <ol style="list-style-type: none"> 1. <u>Area under a curve.</u> 2. <u>Volume of solids of revolution.</u> 3. <u>Length of curves.</u> • Complex Numbers [12 Hrs.]: <ol style="list-style-type: none"> 1. <u>Introduction to complex numbers</u>: Complex plane and geometric representation. Modulus and argument of complex numbers. 2. <u>Arithmetic operations with complex numbers</u>: Addition, subtraction, multiplication, and division of complex numbers. Complex conjugate and its properties. Simplification and manipulation of complex expressions. Powers and roots of complex numbers. 3. <u>Polar form and exponential form</u>: Polar representation of complex numbers. Conversion between rectangular and polar forms. De Moivre's theorem and its applications. • Vector Algebra [12 Hrs.]: <ol style="list-style-type: none"> 1. <u>Introduction to vectors</u>: Definition and representation of vectors. Geometric interpretation of vectors in space. Unit vector. 2. <u>Vector operations</u>: Vector dot product (inner product) and its properties. Vector cross product (outer product) and its properties • Matrices and Determinants [12 Hrs.]: <ol style="list-style-type: none"> 1. <u>Introduction to matrices</u>: Definition and notation of matrices. Matrix dimensions (rows and columns). Basic matrix operations. 2. <u>Determinants and inverses</u>: Definition and properties of determinants. Computing determinants for 2x2 and 3x3

	<p>matrices. Cofactor expansion and properties of determinants. Inverse of a matrix and conditions for invertibility.</p> <p>3. <u>Systems of linear equations</u>: Matrix representation of linear systems. Gaussian elimination. Solving linear equations systems using matrices.</p> <p>4. <u>Rank of the matrix</u>.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<ul style="list-style-type: none"> • <u>Clear Communication</u>: Clearly communicate the learning objectives, expectations, and instructions to the students. Use clear and concise language to explain mathematical concepts and techniques. • <u>Interactive Lectures</u>: Make the lectures interactive by incorporating questions, examples, and activities that encourage student participation. Engage students in discussions and problem-solving activities to promote active learning. • <u>Visual Aids and Demonstrations</u>: Use visual aids, such as charts, diagrams, graphs, and illustrations to help students visualize abstract concepts and make connections between different mathematical ideas. • <u>Problem-Solving Sessions</u>: Dedicate specific class time to problem-solving sessions where students can actively apply mathematical concepts and techniques to solve problems. Encourage collaborative problem-solving activities that promote peer learning and teamwork. • <u>Formative Assessment</u>: Incorporate regular formative assessments, such as quizzes, class exercises, or short assignments, to gauge student understanding and provide timely feedback. Use the feedback to identify areas where students may be struggling and adjust your teaching accordingly. • <u>Encourage Reflection</u>: Encourage students to reflect on their learning process, problem-solving strategies, and understanding of mathematical concepts. Promote metacognitive thinking by asking students to explain their reasoning and approaches to solving problems. • <u>Stay Organized</u>: Maintain organized records of lesson plans, instructional materials, and student assessments. Create a system to track student progress, strengths, and areas for improvement. This organization will help you effectively manage the course and monitor student learning.

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	4h and 8min
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)	6, 13	LO #1-4
	Assignments	2	20% (10)	3, 10	LO # 2,4,5
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 5,6
Summative assessment	Midterm Exam	2 Hrs.	10% (10)	8	LO # 1-4
	Final Exam	2 Hrs.	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Methods of Integration. Trigonometric Substitutions
Week 2	Integration by Parts. Rational functions and Partial fractions
Week 3	Numerical Integration (Trapezoidal and Simpson) rules.

Week 4	Applications of the Definite Integral. Areas between Curves
Week 5	Volumes of Revolution. Length of the Curve.
Week 6	Surface Area by Revolution.
Week 7	Complex Numbers. Definition and Properties.
Week 8	Complex Numbers Addition, Subtraction, Product, Quotient, Power, and Roots.
Week 9	Demoiver's theorem.
Week 10	Representation of Vectors in space. Unit Vector
Week 11	Scalar Product. Vector Product.
Week 12	Matrices. Definitions and Properties.
Week 13	Rank of a matrix.
Week 14	Determinants. Inverse of a matrix.
Week 15	System of Linear Equations (Gauss elimination).

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	G. B. Thomas, M. D. Weir, J. Hass, and F. R. Giordano, Thomas' Calculus, Addison-Wesley, 2005.	Yes
Recommended Texts	E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.	No

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 Technology
Department of Communication Engineering
Division of Optical Communication
Engineering Systems



MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	ENGINEERING STATISTICS	Module Delivery	
Module Type	BASIC	Theory	
Module Code	ENST121		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGIII	Semester of Delivery	2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader		e-mail	
Module Leader's Acad. Title	Prof.	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Review Committee Approval	25/09/2023	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Learn the language and core concepts of probability theory. 2. Understand basic principles of statistical inference (both Bayesian and frequentist). 3. Build a starter statistical toolbox with appreciation for both the utility and limitations of these techniques. 4. Use software and simulation to do statistics (R). 5. Become an informed consumer of statistical information. 6. Prepare for further coursework or on-the-job study.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>After completing this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Correctly analyze managerial business problems through their comprehension of data and data distributions using the following concepts: <ol style="list-style-type: none"> 1. Descriptive statistics 2. Probability analysis 3. Binomial data distributions 4. Normal data distributions 5. Chi-square data distributions 6. Confidence intervals and hypothesis testing 7. Difference between two means analysis 8. Correlation and regression analysis 9. Multiple regression analysis 2. Evaluate data, claims, and/or problem statements using Excel, the Excel statistical functions, and 2010 Data Analysis ToolPak. 3. Perform and document a real-world statistical study.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Descriptive Statistics [<u>2 hrs</u>] Probability [<u>2hrs</u>] Discrete and Continuous Probability Distributions [<u>4 hrs</u>] Confidence Intervals, Hypothesis Testing, Sample Size [<u>4 hrs</u>] Revision problem classes [<u>3 hrs</u>] Comparisons Involving Population Means [<u>2hrs</u>] Chi-square Goodness-of-Fit and Independence Tests [<u>3hrs</u>] Linear and Multiple Regression [<u>2 hrs</u>] Revision problem classes [<u>4hrs</u>]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

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 أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1h and 8min
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3,6, 9,11	LO #1, 2, 10 and 11
	Online Assignments		10% (10)	3, 8	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	
	Onsite Assignments		10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Statistical and Critical Thinking, Types of Data and Data Collection, Frequency Distributions and Histograms
Week 2	Graphs That Enlighten and Graphs That Deceive
Week 3	Scatterplots, Correlation, Regression
Week 4	Basic Concepts of Probability , Probability Distributions
Week 5	Discrete and Continuous Probability Distributions
Week 6	Complements, Conditional Probability, and Bayes' Theorem
Week 7	Confidence Intervals, Hypothesis Testing, Sample Size
Week 8	Mid-term Exam
Week 9	Comparisons Involving Population Means
Week 10	Chi-square Goodness-of-Fit and Independence Tests
Week 11	Linear and Multiple Regression
Week 12	Estimating a Population Proportion
Week 13	Estimating a Population Mean and Variance
Week 14	Basics of Hypothesis Testing
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	David R. Anderson, Dennis J. Sweeney, and Thomas A Williams, Essentials of Modern Business Statistics with Microsoft Excel, 5th ed. (CENGAGE/South-Western, 2011.	Yes
Required Texts	Triola, Elementary Statistics, 13th edition, Pearson Publishing	Yes
Recommended Texts		
Websites		

APPENDIX:

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	C - Good	جيد	70 - 79	Sound work with notable errors
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	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.				

First and second Semester

Module 1

Module Information			
Module Title	Workshops		Module Delivery
Module Type	Support		<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	WORSH11		
ECTS Credit/year	8		
SWL/year	200		
Module level	1	Semester of Delivery	
Module Leader	Training and Workshops Center	College	
Module Leader Academic Title	Prof.	e-mail	twc@uotechnology.edu.iq
Module Tutor		Module Leader's Qualification	Ph.D.
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/6/2023	e-mail	
		Version Number	1

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive 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.

<p>Module Learning Outcomes</p>	<p>1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work.</p> <p>2- Acquisition of the student’s manual operation skills, for example (Filings and Tinsmith workshops), and mechanical operation skills, for example (Turning).</p> <p>3- Acquisition of the student’s mechanical forming skills, for example (Casting and Blacksmithing).</p> <p>4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field.</p> <p>5- Enabling the student to operate the various machines and devices in mechanical operations and formation.</p> <p>6- Cooperative learning by working collectively.</p>
<p>Inductive Contents</p>	<ol style="list-style-type: none"> 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 9. 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)	93	Structured SWL (h/w)	6.00
Unstructured SWL (h/sem)	7	Unstructured SWL (h/w)	0.46
Total SWL (h/sem)	100		
Structured SWL (h/year)	186	Structured SWL (h/w)	6.00
Unstructured SWL (h/year)	14	Unstructured SWL (h/w)	0.46
Total SWL (h/year)	200		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes				
	Assignments				All
	Projects / Practice	Every 3 weeks	60%	Continuous	
	Report				
Summative Assessment	Midterm Exam				
	Exam	Every 3 weeks	40%	Continuous	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Materials 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	<p>Casting workshop</p> <ul style="list-style-type: none"> -Occupational safety and its importance in plumbing workshops. -Introduction to the basics of metal casting. -Simple wooden disc exercise. <p>Half workout.</p>
Week 5	<p>Casting workshop</p> <ul style="list-style-type: none"> Wheel exercise. Pushing arm exercise.
Week 6	<p>Casting workshop.</p> <ul style="list-style-type: none"> -Complete pulley exercise. -Circular pole exercise. -Written exam in practical exercises.
Week 7	<p>Blacksmith Workshop</p> <ul style="list-style-type: none"> -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	<p>Blacksmith Workshop</p> <ul style="list-style-type: none"> -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	<p>Blacksmith Workshop</p> <ul style="list-style-type: none"> - 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	<p>Automotive Workshop</p> <ul style="list-style-type: none"> -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	<p>Automotive Workshop</p> <ul style="list-style-type: none"> - Open the engine and identify the parts -Lubrication system -Cooling system.
Week 12	<p>Automotive Workshop</p> <ul style="list-style-type: none"> -The fuel system. -The old and new ignition circuits. -Written exam in practical exercises.
Week 13	<p>Turning Workshop</p>

	<ul style="list-style-type: none"> -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	<p>Turning Workshop</p> <ul style="list-style-type: none"> -Exercise using the pen (semicircular R) brackets. <p>An exercise in making different angles using a pen (square + angle pen 55).</p>
Week 15	<p>Turning Workshop</p> <ul style="list-style-type: none"> - Making shaft with different diameter exercises using (left and right pen) - Workout (Tube Connection). <p>-Written exam in practical exercises.</p>
Week 16	<p>Fitting workshop</p> <p>Occupational safety and its importance in filing workshops</p> <ul style="list-style-type: none"> -An introduction to the basics of filing -Pen holder exercise “preparation and preparation”
Week 17	<p>Fitting workshop</p> <p>Pencil holder exercises finishing and assembling.</p>
Week 18	<p>Fitting workshop</p> <ul style="list-style-type: none"> -The catcher exercise. - Clamping exercise. <p>Written exam in practical exercises.</p>
Week 19	<p>Carpentry workshop</p> <ul style="list-style-type: none"> -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 <p>Face modification exercise using the reindeer</p>
Week 20	<p>Carpentry workshop</p> <p>Garden fence work and how to connect its parts, the eight-star exercise</p>
Week 21	<p>Carpentry workshop</p> <ul style="list-style-type: none"> - Wood smoothing exercise using smoothing paper - Wood dyeing exercise in three stages <p>Final smoothing and varnishing exercise</p> <p>Written exam in practical exercises</p>
Week 22	<p>The tinsmith workshop</p> <p>Occupational safety and its importance in plumbing workshops</p> <p>An introduction to plumbing, its tools, and plumbing stages</p> <p>Planning and marking exercise on metal plates</p>
Week 23	<p>The tinsmith workshop</p> <p>Geometric shapes</p> <p>Types of individuals and methods of individuals</p> <p>Geometric shape individuals exercise on a metal board</p>

Week 24	<p>The tinsmith workshop</p> <p>Cone members exercise</p> <ul style="list-style-type: none"> - Exercise of cylinders with an oblique cut <p>Roll forming operations</p> <p>Connection without the use of an intermediary</p> <p>Written exam in practical exercises</p>
Week 25	<p>Electric Workshop</p> <p>Occupational Safety and its importance in electrical workshops</p> <p>An introduction to the basics of electrical installations</p> <ul style="list-style-type: none"> - Linking a simple circuit consisting of a lamp to the control of a single-way switch. <p>Connect two lamps in series with one-way switch control.</p> <p>Connecting two lamps in parallel with the control of a single road switch.</p> <p>Connect two lights with one-way dual switch control.</p>
Week 26	<p>electric Workshop</p> <p>Connect a fluorescent lamp circuit to a one-way switch control</p> <p>Connecting an electric supply socket circuit to the control of a separate or combined one-way switch</p> <p>Written exam in practical exercises</p>
Week 27	<p>electric Workshop</p> <p>Occupational Safety and its importance in blacksmithing workshops</p> <p>Introduction to the basics of Blacksmithing</p> <ul style="list-style-type: none"> - Barbell adjustment exercise <p>Eight-star exercise</p> <ul style="list-style-type: none"> - Exercise forming the number eight in English <p>Exercise forming the number six in English</p>
Week 28	<p>supplementary training curriculum</p> <p>Welding workshop</p> <p>Plumbing workshop</p> <p>Blacksmith's workshop</p>
Week 29	<p>supplementary training curriculum</p> <ul style="list-style-type: none"> - Automotive workshop - Turning workshop <p>Fitting workshop</p>
Week 30	<p>supplementary training curriculum</p> <p>Carpentry workshop</p> <p>The plumbing workshop</p> <p>electric Workshop</p>

Learning and Teaching Resources		
	Text	Available in the library

Required Texts	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	yes
Recommended Texts		
Websites		



University of Technology
Department of Communication
Engineering
Division of Optical Communication
Engineering Systems



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				معلومات المادة الدراسية			
Module Title	ENGINEERING DRAWING	Module Delivery					
Module Type	CORE	Theory Lab Practical					
Module Code	ENDR125						
ECTS Credits	5						
SWL (hr/sem)	125						
Module Level	1	Semester of Delivery		2			
Administering Department	Type Dept. Code	College	Type College Code				
Module Leader	Dr. Ammar A. Yahya	e-mail	11196@uotechnology.edu.iq				
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification		Ph.D.			
Module Tutor	None	e-mail	None				
Peer Reviewer Name		e-mail					
Review Committee Approval		Version Number		1.0			

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. Introduce students to the principles and techniques of geometric drawing in the context of engineering. 2. Familiarize students with the tools and instruments used in engineering drawing and their proper usage. 3. Develop students' ability to accurately plan and organize a drawing sheet. 4. Enable students to draw various geometric shapes, lines, circles, squares, and ellipses with precision. 5. Teach students the fundamental operations in geometric drawing, such as bisecting lines and angles, and drawing tangents to circles. 6. Provide students with practice exercises to reinforce their understanding and skills in geometric drawing. 7. Introduce students to three-dimensional drawing techniques and the principles of isometric projection. 8. Develop students' ability to interpret and create orthographic projections and sectional views of objects. 9. Enhance students' spatial visualization skills through three-dimensional drawing exercises. 10. Teach students the concepts and techniques of cutting planes and sectioning in engineering drawing. 11. Provide comprehensive exercises that integrate various aspects of geometric drawing, including projections, sectioning, and dimensions. 12. Assess students' understanding and proficiency in geometric drawing through regular exercises and a final assessment. <p>By the end of this module, students should have a solid foundation in geometric drawing principles and techniques, as well as the ability to create accurate engineering drawings.</p>		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>Upon completing this module, students should be able to achieve the following learning outcomes:</p> <ol style="list-style-type: none"> 1. Demonstrate a comprehensive understanding of the principles and techniques of geometric drawing in the context of engineering. 2. Effectively use the tools and instruments required for engineering drawing, including drawing boards, rulers, compasses, and 		

	<p>protractors.</p> <ol style="list-style-type: none"> 3. Apply proper measurement techniques and scale factors to accurately represent objects and dimensions in drawings. 4. Create well-organized and appropriately labeled drawing sheets, including title blocks and other necessary annotations. 5. Draw lines of different types, such as straight lines, parallel lines, perpendicular lines, and inclined lines, with precision and accuracy. 6. Construct circles, arcs, and ellipses of various sizes and proportions using appropriate methods and techniques. 7. Perform geometric operations, including bisecting lines and angles, and drawing tangents to circles, with accuracy and attention to detail. 8. Generate orthographic projections and sectional views of objects, ensuring proper alignment and dimensioning. 9. Utilize three-dimensional drawing techniques, such as isometric projection, to represent objects in three dimensions. 10. Interpret and create cutting planes and section views, effectively communicating the internal features of objects. 11. Demonstrate proficiency in creating accurate and detailed engineering drawings that adhere to industry standards and conventions. 12. Apply problem-solving skills and spatial visualization abilities to solve complex drawing tasks and exercises. 13. Work effectively as part of a team, collaborating with peers in group drawing projects and critiques. 14. Demonstrate awareness of safety practices and procedures related to engineering drawing, including proper handling and storage of drawing tools and materials. 15. Reflect on their own learning and identify areas for improvement in geometric drawing skills. <p>These learning outcomes aim to equip students with the necessary knowledge, skills, and competencies to create accurate and professional engineering drawings that meet industry standards and requirements.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of this module include the following topics:</p> <ol style="list-style-type: none"> 1. Introduction to Engineering Drawing: [5hrs] <ul style="list-style-type: none"> • Importance and role of engineering drawing in various fields • Overview of drawing instruments and their uses 2. Drawing Techniques and Measurement: [5hrs] <ul style="list-style-type: none"> • Basic drawing techniques and principles • Measurement systems and units used in engineering drawing • Scaling and dimensioning techniques

3. Types of Lines and Their Uses: [5hrs]
 - Different types of lines (e.g., visible, hidden, center, dimension, construction)
 - Line conventions and line thickness
4. Drawing Layout and Sheet Organization: [5hrs]
 - Layout of drawing sheets and border design
 - Title blocks, part lists, and revision history
5. Basic Geometric Shapes: [5hrs]
 - Drawing straight lines, angles, and polygons
 - Constructing and dividing circles and arcs
6. Orthographic Projection: [5hrs]
 - Principles and rules of orthographic projection
 - Drawing orthographic views (top, front, side) of objects
7. Sectional Views and Conventions: [5hrs]
 - Sectional views and their types (full, half, offset)
 - Cutting planes and sectioning techniques
8. Isometric Projection: [5hrs]
 - Isometric drawing principles and techniques
 - Drawing objects in isometric projection
9. Geometric Constructions: [5hrs]
 - Bisecting lines and angles
 - Tangents and normal lines to circles
10. Three-Dimensional Drawing Techniques: [5hrs]
 - Axonometric projections (e.g., isometric, dimetric, trimetric)
 - Oblique projections and perspectives
11. Engineering Drawing Standards and Conventions: [5hrs]
 - International standards and practices (e.g., ISO, ASME, DIN)
 - Dimensioning and tolerancing standards
12. Drawing Interpretation and Symbolism: [5hrs]
 - Interpretation of engineering drawings
 - Understanding drawing symbols, abbreviations, and notations
13. CAD (Computer-Aided Design) and Drawing Software: [5hrs]
 - Introduction to CAD software and its applications
 - Basic functions and tools in CAD software

	<p>14. Teamwork and Collaboration in Drawing Projects: [5hrs]</p> <ul style="list-style-type: none"> • Working effectively in a team for drawing assignments • Peer reviews and critiques of drawings <p>15. Safety Considerations in Engineering Drawing: [5hrs]</p> <ul style="list-style-type: none"> • Safety practices in handling drawing instruments and materials • Proper storage and maintenance of drawing tools <p>These indicative contents provide an overview of the key topics and concepts covered in the module, focusing on developing students' proficiency in geometric drawing and understanding engineering drawing standards.</p>
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<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
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<p>Strategies</p>	<p>The learning and teaching strategies for this module aim to facilitate students' understanding and practical application of engineering drawing concepts. The strategies include:</p> <ol style="list-style-type: none"> 1. Lectures: Traditional lectures delivered by the instructor to introduce and explain key theoretical concepts, principles, and techniques of engineering drawing. Lectures may include multimedia presentations, demonstrations, and examples to enhance understanding. 2. Practical Sessions: Hands-on practical sessions where students can apply the concepts learned in lectures. These sessions may involve drawing exercises, sketching, and using drawing instruments and software tools. Students can receive guidance and feedback from the instructor during these sessions. 3. Group Work and Collaborative Learning: Assigning group projects or exercises that require students to work together to solve drawing problems or complete complex drawings. This encourages teamwork, communication, and the sharing of knowledge and skills among students. 4. Workshops and Tutorials: Conducting workshops or tutorials to provide additional support and guidance on specific topics or techniques. These sessions can involve step-by-step demonstrations, practice exercises, and individualized feedback to address students' needs. 5. Practical Assignments and Projects: Assigning practical drawing assignments or projects that require students to apply their knowledge and skills to real-world scenarios. This helps develop their problem-solving abilities, creativity, and attention to detail.
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6. Online Resources and Interactive Tools: Providing access to online resources, such as interactive tutorials, video demonstrations, and drawing software simulations, to supplement classroom learning. These resources can be accessed outside of class, allowing students to practice and reinforce their understanding at their own pace.
7. Assessment and Feedback: Regular assessments, such as quizzes, practical exams, and project evaluations, to gauge students' understanding and progress. Constructive feedback is provided to help students identify areas for improvement and reinforce their learning.
8. Independent Study: Encouraging students to engage in independent study, review lecture notes, practice drawing exercises, and explore additional resources to deepen their understanding of the subject matter.
9. Academic Support: Offering academic support through office hours, tutorials, or online platforms where students can seek clarification, ask questions, and receive individualized guidance from the instructor.

These learning and teaching strategies aim to create an interactive and engaging learning environment that fosters students' mastery of engineering drawing concepts and develops their practical drawing skills.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4h and 1min
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

(Please note that this is a general outline and can be adjusted based on the specific needs of my course)

	Material Covered
Week 1	<ul style="list-style-type: none"> introduction to the Principles of Engineering Drawing and its Tools Understanding the significance of engineering drawing and its applications Familiarization with the fundamental concepts of engineering drawing and its methodologies Exploring the essential tools used in engineering drawing
Week 2	<ul style="list-style-type: none"> Types of lines and their uses Drawing the layout of the drawing sheet Drawing the border Drawing the title block
Week 3	<ul style="list-style-type: none"> Organizing the drawing sheet Drawing lines Drawing circles Drawing squares Classroom exercises
Week 4	<ul style="list-style-type: none"> Geometrical operations (Bisecting lines and angles - Drawing tangents to concave and convex circles) Classroom exercises
Week 5	<ul style="list-style-type: none"> Geometrical operations (Drawing pentagons and hexagons) Classroom exercises
Week 6	<ul style="list-style-type: none"> Geometrical operations (Drawing an ellipse) Classroom exercises
Week 7	<ul style="list-style-type: none"> Drawing two-dimensional shapes using geometric operations Classroom exercises

Week 8	<ul style="list-style-type: none"> • Formative assessment to test the previous knowledge
Week 9	<ul style="list-style-type: none"> • Geometric projections • Types of projections and their respective methods for representation • Construction techniques for different types of projections
Week 10	<ul style="list-style-type: none"> • Orthographic projections in the first angle projection system • Isometric projection, dimetric projection, and trimetric projection • Construction techniques for isometric projection in the first angle projection system • Classroom exercises
Week 11	<ul style="list-style-type: none"> • Drawing exercises on three orthographic projections.
Week 12	<ul style="list-style-type: none"> • Dimension setting • The main rules for putting basic dimensions on the drawing • Dimension rules for circles and arcs • An exercise in putting the dimensions on the projections
Week 13	<ul style="list-style-type: none"> • Three-dimensional drawing • Three-dimensional drawing rules • Classroom exercise on 3D drawing
Week 14	<ul style="list-style-type: none"> • cutting • cutting mechanism • Cuts in one of the projections • Class exercises
Week 15	<ul style="list-style-type: none"> • Comprehensive exercises including projections, cuts and dimensions

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Material Covered	
Week 1	Lab 1: <ul style="list-style-type: none"> • Definition of the program. Explanation of the toolbars and main windows in the program interface • Configure the drawing interface • Units • Drawing borders • Taskbar • Grid drawing help
Week 2	Lab 2: <ul style="list-style-type: none"> • drawing bar • Types of coordinates • Drawing lines (Cartesian method - relative method) • Draw circles (center, radius - center, diameter- 2p - TTR - TTT)
Week 3	Lab 3: <ul style="list-style-type: none"> • drawing bar • Types of coordinates

Week 4	<p>Lab 4:</p> <ul style="list-style-type: none"> • Drawing lines (Cartesian method - relative method) • Draw circles (center, radius - center, diameter- 2p - TTR - TTT)
Week 5	<p>Lab 5:</p> <ul style="list-style-type: none"> • drawing bar • Curve drawing (2P,R - 3P)
Week 6	<p>Lab 6:</p> <ul style="list-style-type: none"> • Draw Ellipse (2P,R - 2P,D)
Week 7	<p>Lab 7:</p> <ul style="list-style-type: none"> • drawing bar • Polygon drawing • Draw the rectangle • Drawing aids
Week 8	<p>Lab 8:</p> <ul style="list-style-type: none"> • The dotted network • Jumping system • The object jumps • Tracks object jumps
Week 9	<p>Lab 9:</p> <ul style="list-style-type: none"> • Collaboration system • Polar tracking • Modify bar with all its details and applying them to direct classroom exercises
Week 10	<p>Lab 10:</p> <ul style="list-style-type: none"> • Two-dimensional drawing exercises • Dimension setting
Week 11	<p>Lab 11:</p> <ul style="list-style-type: none"> • The main rules for putting basic dimensions on the drawing • Dimension rules for circles and arcs
Week 12	<p>Lab 12:</p> <ul style="list-style-type: none"> • Three-dimensional drawing •
Week 13	<p>Lab 13:</p> <ul style="list-style-type: none"> • Three-dimensional drawing method
Week 14	<p>Lab 14:</p> <ul style="list-style-type: none"> • Three-dimensional drawing exercises
Week 15	<p>Lab 15:</p> <ul style="list-style-type: none"> • Computer drawing post-test

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	كتاب الرسم الهندسي/ عبد الرسول الخفاف	Yes
Recommended Texts	<ol style="list-style-type: none"> "Engineering Drawing and Design" by David A. Madsen and David P. Madsen. https://books.google.iq/books/about/Engineering_Drawing_and_Design.html?id=3cUaCgAAQBAJ&redir_esc=y "Technical Drawing with Engineering Graphics" by Frederick E. Giesecke, Alva Mitchell, Henry C. Spencer, Ivan L. Hill, and John T. Dygdon. https://www.amazon.com/Technical-Drawing-Engineering-Graphics-15th/dp/0134306414 "Fundamentals of Engineering Drawing" by Warren J. Luzadder and Jon M. Duff. https://www.goodreads.com/book/show/2654260-fundamentals-of-engineering-drawing-the 	No
Websites	<ol style="list-style-type: none"> Draftsperson.net: https://www.draftsperson.net/entry-page/ Engineering Drawing and Sketching (MIT): https://ocw.mit.edu/courses/2-007-design-and-manufacturing-i-spring-2009/pages/lecture-notes/ CADTutor: https://www.cadtutor.net/ 	

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.