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 SCIENCE	**Module Delivery**
Module Type	BASIC	Theory Lab
Module Code	COSC121	
ECTS Credits	2	
SWL (hr/sem)	50	

Module Level	1	Semester of Delivery	2
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	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	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	Indicative content includes the following. <u>Part A - General Concepts</u> 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] <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,

	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]
	Part C – The Programming in C++
	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]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their 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.

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

Module Evaluation تقييم المادة الدراسية					
s		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	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:				

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 wireless Communication Systems Engineering

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	ELECTRICAL ENGINEERING FUNDAMENTALS II	**Module Delivery**
Module Type	CORE	
Module Code	ELEF124	**Theory**
ECTS Credits	7	**Lab**
SWL (hr/sem)	175	

Module Level	1	Semester of Delivery	2
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	inmar natiq ghazi	**e-mail**	Inmar.n.ghazi@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Msc.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ELEF114	**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	1. Understanding the basic concepts of electric circuits and their behavior 2. Familiarizing students with different circuit elements such as resistors, capacitors, and inductors 3. Understanding how to use different mathematical and analytical techniques to solve circuit problems 4. Understanding the principles of electromagnetism and their application to electrical engineering 5. Understanding the basic principles of electronics and digital systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply critical thinking skills to analyze and solve electrical engineering problems, including calculating circuit impedances, power dissipation, and other important parameters. 2. Demonstrate a solid understanding of electrical circuit analysis, including the principles of voltage, current, resistance, capacitance, and inductance. 3. Describe the basic principles of electromagnetism and electromagnetic waves, including Maxwell's equations and wave propagation. 4. Use appropriate tools and software for circuit simulation, design, and analysis, including computer-aided design (CAD) tools and simulation software. 5. Develop effective written and oral communication skills needed to explain complex electrical engineering concepts to non-technical audiences. 6. Demonstrate a strong understanding of the ethical and professional responsibilities of an electrical engineer, including the importance of safety, environmental sustainability, and social responsibility. 7. Work effectively as part of a team, collaborating with others in the design, testing, and implementation of electrical engineering projects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Response of basic R, L, and C elements to a sinusoidal voltage or current ,frequency response of the basic elements (15Hrs) Complex Numbers, phasors, Series and Parallel ac Circuits, voltage divider rule and current divider rule, Series-Parallel ac Networks,(15Hrs)

| | Series resonance, the quality factor, frequency response and half power frequencies. Parallel resonance and frequency response. Introductory filter principals (15Hrs)

Introduction, terminal equations, two port parameters (z, y, h, and ABCD), equivalent circuits, interconnected two ports (15Hrs)

Electric Transients (Classical Method) (The natural and forced response of series and parallel circuits, circuits with zero initial conditions(15Hrs)

locus diagrams of simple series and parallel circuits(15Hrs) |

| **Learning and Teaching Strategies** |
| استراتيجيات التعلم والتعليم |

| **Strategies** | 1. Lectures: This is a common method of teaching in which the instructor presents material through speeches, discussions, and presentations.

2. Hand-on Training: This learning strategy involves giving students hands-on experience with electrical engineering concepts, through lab exercises, projects, etc.

3. Collaborative Learning: This is a student-centered learning approach that involves group work, discussions, and problem-solving activities.

4. Inquiry-Based Learning: This strategy involves encouraging students to ask questions, seek answers, and conduct their own research.

5. Flipped Classroom: In a flipped classroom, students are expected to learn the basics of electrical engineering concepts through online lectures outside of class time. Classroom time is then reserved for interactive activities like group discussions and problem-solving.

6. Visual Aids: Using visuals, such as diagrams, charts, and illustrations, can also help students to grasp and retain information more easily. |

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري للفصل الثاني

	Material Covered
Week 1	Response of basic R, L, and C elements to a sinusoidal voltage or current ,frequency response of the basic elements
Week 2	Complex Numbers, phasors
Week 3	phasors
Week 4	Series and Parallel ac Circuits ,voltage divider rule and current divider rule,
Week 5	Series-Parallel ac Networks
Week 6	Series resonance, the quality factor, frequency response and half power frequencies
Week 7	Parallel resonance and frequency response
Week 8	filter principals (low pass filter and high pass filter)
Week 9	filter principals (band pass filter and stop band filter)

Week 10	Introduction, terminal equations, two port parameters (z, y), equivalent circuits
Week 11	(h, and ABCD)parameters , equivalent circuits
Week 12	Electric Transients (R.C. circuit)(Classical Method) (The natural and forced response of series and parallel circuits, circuits with zero initial conditions
Week 13	Electric Transients (R.L. circuit)(Classical Method) (The natural and forced response of series and parallel circuits, circuits with zero initial conditions
Week 14	locus diagrams of simple series and parallel circuits
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر(الفصل الثاني)	
	Material Covered
Week 1-2	Introduction to AC Circuits using the Oscilloscope and Function Generator
Week 3-4	(R-c) series circuit
Week 5-6	(R-L) series circuit
Week 7-8	series resonance
Week 9-10	parallel resonance
Week 11-12	low pass filter
Week 13-14	high pas filter
Week 15	Review Week

Learning and Teaching Resources

	مصادر التعلم والتدريس		
	Text		**Available in the Library?**
Required Texts	INTRODUCTORY CIRCUIT ANALYSIS by Robert L. Boylestad 10th and 11th edition		Yes
Recommended Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education		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.

Ministry of Higher Education and
Scientific Research - Iraq
University of Technology
Department of Communication
Engineering
Wireless Communications Engineering

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	PHYSICS OF MICROWAVE MATERIALS	Module Delivery	
Module Type	BASIC	Theory tutorial	
Module Code	PHMM122		
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	Amenah ali salman	e-mail	Amenah.a.salman@uotechnology.edu.iq
Module Leader's Acad. Title	Assist.Professor	Module Leader's Qualification	MS.c
Module Tutor	None	e-mail	None
Peer Reviewer Name	none	e-mail	none
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	1. The aim of conducting and superconducting materials, as well as magnetic materials, is to explore and understand their unique properties and potential applications in various fields of science and technology. One particular area of interest is the study of Ferromagnetic Resonance (FMR) and the use of materials like Yttrium Iron Garnet (YIG) in related research. 2. Conducting materials, such as metals, possess the ability to conduct electric current with relative ease due to the presence of free electrons. They are widely used in electrical wiring, electronics, and other applications where the flow of electricity is essential. Conductors are characterized by their low resistance to electrical current and high conductivity. 3. Superconductors, on the other hand, exhibit an extraordinary property known as zero electrical resistance when cooled below a certain critical temperature. This property allows for the efficient transmission of electric current without any energy loss, making them highly desirable for applications like power transmission, energy storage, and magnetic resonance imaging (MRI) systems. 4. Magnetic materials, such as iron, nickel, and cobalt, possess inherent magnetic properties due to the alignment of their atomic spins. These materials can be used in various applications, including data storage (magnetic hard drives), electrical motors, transformers, and magnetic sensors 5. Ferromagnetic Resonance (FMR) is a phenomenon that occurs when a magnetic material is subjected to a high-frequency magnetic field. It involves the precession of the material's magnetic moments around an effective magnetic field, resulting in the absorption or emission of electromagnetic energy at a specific resonance frequency. 6. Yttrium Iron Garnet (YIG) is a ferrimagnetic material composed of yttrium, iron, and oxygen atoms. It exhibits a high level of crystalline perfection and is known for its low magnetic damping properties, making it an ideal material for FMR studies. YIG has been extensively used in microwave and spin-wave devices, magneto-optical systems, and microwave circulators due to its unique magnetic properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions 2. Knowledge of contemporary issues. 3. The ability to use techniques, skills and modern engineering tools required in various engineering practices. 4. Understanding the fundamental properties of conducting materials: By studying conducting materials, learners can gain a solid

	understanding of concepts such as electrical conductivity, resistivity, and the behavior of electrons in conductors 5. Exploring the principles of superconductivity: Learners can grasp the concept of superconductivity, including the critical temperature, critical magnetic field, and the Meissner effect. 6. Analyzing the properties and applications of magnetic materials: Students can acquire knowledge about the magnetic properties of materials, such as ferromagnetism, paramagnetism, and diamagnetism. 7. Understanding Ferromagnetic Resonance (FMR): Learners can gain insights into the phenomenon of FMR, including the resonance frequency, magnetic damping, and the interaction between magnetic moments and high-frequency magnetic fields. 8. Exploring Yttrium Iron Garnet (YIG) and its properties: Students can study the unique characteristics of YIG, including its low magnetic damping and excellent crystalline quality. 9. Applying knowledge to practical applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Conducting material: Relaxation time, electrical conductivity, sources of resistivity in metal and alloys, electrical conductivity at high frequency geometrical and magnetic field, effect on electrical conductivity, type of conducting metal (8Hrs) Dialectic material: Type of electric polarization, frequency and temperature effect on polarization, dielectric loss, dielectric breakdown, insulating material, ferro electric material, electret. (8Hrs) Magnetic material: Type of magnetic material, ferro and ferry magnetizem, hard and soft magnetic material, ferrite-microwave application, magnetic bubbles. (8Hrs) Super conducting material: Type of super conducting material, high Tc of super conductors and high frequency application. (9Hrs) Micro wave ferrites: FMR at low power, high power , high power microwave measurement, low power microwave. (9Hrs) Microwave lithium ferrite : Materials properties, chemistry of lithium ferrite, material preparation, type of lithium ferrite, high power device, single crystal and film. (9Hrs) Single crystal YIG: Application of YIG AND other allied material, crystal structure of garnet, magnetic properties of garnet, crystal growth YIG. (9Hrs)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Conceptual Understanding: Start by providing a clear explanation of the fundamental concepts and principles related to conducting and magnetic materials, dielectrics, ferro electricity, and ferrites. Focus on building a strong foundation of knowledge and understanding. Lithium Ferrite: Explain the composition, structure, and properties of lithium ferrite, which is a type of ferrite material. Discuss its magnetic properties, such as high magnetization, low coercivity, and its applications in devices like microwave devices and magnetic recording media. Demonstrate its use in practical applications, such as in microwave circulators, isolators, and filters. YIG (Yttrium Iron Garnet) Crystal: Introduce the crystal structure and composition of YIG, which is a ferromagnetic material. Discuss its unique properties, such as high magneto-optical effects and low magnetic damping. Explain its applications in various fields, including magneto-optical devices, microwave devices, and spintronics. Explore recent research and advancements in YIG-based technologies, such as YIG-based spintronics and magnetics.

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
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

<table>
<tr><th colspan="6" style="text-align:center">**Module Evaluation**
تقييم المادة الدراسية</th></tr>
<tr><th></th><th></th><th>Time/Number</th><th>Weight (Marks)</th><th>Week Due</th><th>Relevant Learning Outcome</th></tr>
<tr><td rowspan="4">**Formative assessment**</td><td>**Quizzes**</td><td>2</td><td>10% (10)</td><td>5, 10</td><td>LO #1, 2, 10 and 11</td></tr>
<tr><td>**Assignments**</td><td>2</td><td>10% (10)</td><td>2, 12</td><td>LO # 3, 4, 6 and 7</td></tr>
<tr><td>**Projects / Lab.**</td><td>1</td><td>10% (10)</td><td>Continuous</td><td></td></tr>
<tr><td>**Report**</td><td>1</td><td>10% (10)</td><td>13</td><td>LO # 5, 8 and 10</td></tr>
<tr><td rowspan="2">**Summative assessment**</td><td>**Midterm Exam**</td><td>2 hr</td><td>10% (10)</td><td>7</td><td>LO # 1-7</td></tr>
<tr><td>**Final Exam**</td><td>3hr</td><td>50% (50)</td><td>16</td><td>All</td></tr>
<tr><td colspan="2">**Total assessment**</td><td></td><td>100% (100 Marks)</td><td></td><td></td></tr>
</table>

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered	
Week 1	Introduction -The atom models, wave nature af light, dual nature of matter, Conducting material Relaxation time, electrical conductivity, sources of resistivity in metal and alloys, electrical conductivity at high frequency geometrical and magnetic field, effect on electrical conductivity, type of conducting metal	
Week 2	Dialectic material Type of electric polarization, frequency and temperature effect on polarization, dielectric loss, dielectric breakdown,	
Week 3	insulating material, ferro electric material, electret.	
Week 4	Magnetic material Type of magnetic material, ferro and ferry magnetizem,	
Week 5	Super conducting material Type of super conducting material,	
Week 6	Micro wave ferrites FMR at low power, high power	
Week 7	, high power microwave measurement, low power microwave	
Week 8	Microwave lithium ferrite Materials properties, chemistry of lithium ferrite, material preparation,	
Week 9	type of lithium ferrite, high power device, single crystal and film.	
Week 10	Single crystal YIG Application of YIG AND other allied material,	
Week 11	high Tc of super conductors and high frequency application	

Week 12	crystal structure of garnet, magnetic properties of garnet, crystal growth YIG,
Week 13	hard and soft magnetic material
Week 14	, ferrite-microwave application,
Week 15	magnetic bubbles
Week 16	Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Material sciences ,J.C. Anderson and K.D. ,Leaver, prentice Hall. Solid state electronic Device, B.G. streetman, prentice, Hall Electronic Device, R. J. Tcci, prentice Hall	Yes
Recommended Texts	Engineering physics – Cengage learning , B. K Pandey and S. Chaturvedi,	No
Websites	http://link.springer.com/book	

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
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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 wireless Communication** **Engineering Systems**	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2">MATHEMATICS II</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2">BASIC</td><td colspan="2" rowspan="3" align="center">Theory</td></tr>
<tr><td>Module Code</td><td colspan="2">MATH123</td></tr>
<tr><td>ECTS Credits</td><td colspan="2">5</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2">125</td><td colspan="2"></td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">2</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td colspan="2">Type College Code</td></tr>
<tr><td>Module Leader</td><td>Lec. Lamia Abd Al-Ameer</td><td>e-mail</td><td colspan="2">Lemia.a.hadi@uotechnology.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Lecturer</td><td>Module Leader's Qualification</td><td colspan="2">MS.C</td></tr>
<tr><td>Module Tutor</td><td>None</td><td>e-mail</td><td colspan="2">None</td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td colspan="2"></td></tr>
<tr><td>Review Committee Approval</td><td>/ /</td><td>Version Number</td><td colspan="2">1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>MATHEMATICS I</td><td>Semester</td><td>1</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

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

Module Aims أهداف المادة الدراسية	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	1. The ability to design and conduct experiments. Also, analyze and interpret data. 2. 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. 3. 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. 4. 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 able to model and solve real-world problems using vector algebra

	techniques.
	5. 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.
Indicative Contents المحتويات الإرشادية	• **Methods of Integration [12 Hrs.]:** 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 [12Hrs.]:** 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.]:** 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.]:** 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.]:** 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 matrices. Cofactor expansion and properties of determinants. Inverse of a matrix and conditions for invertibility. 3. <u>Systems of linear equations:</u> Matrix representation of linear systems. Gaussian elimination. Solving linear equations systems using matrices. 4. <u>Rank of the matrix.</u>

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	**Clear Communication:** Clearly communicate the learning objectives, expectations, and instructions to the students. Use clear and concise language to explain mathematical concepts and techniques. **Interactive Lectures:** 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. **Visual Aids and Demonstrations:** Use visual aids, such as charts, diagrams, graphs, and illustrations to help students visualize abstract concepts and make connections between different mathematical ideas. **Problem-Solving Sessions:** 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. **Formative Assessment:** 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. **Encourage Reflection:** 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. **Stay Organized:** 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	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	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	3 Hrs.	50% (50)	16	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. Rank of a matrix.
Week 13	Determinants. Inverse of a matrix.
Week 14	System of Linear Equations (Gauss elimination).
Week 15	Application of Linear Equations
Week 16	Final Exam

	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.

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGINEERING STATISTICS		Module Delivery	
Module Type	BASIC		Theory	
Module Code	ENST122			
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	Lecture	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

Module Aims أهداف المادة الدراسية	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.

Module Learning Outcomes
 	
مخرجات التعلم للمادة الدراسية
	After completing this course, students will be able to:
	
	1. Correctly analyze managerial business problems through their comprehension of data and data distributions using the following concepts:
	
	    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.

Indicative Contents المحتويات الإرشادية	Descriptive Statistics [4 hrs] Probability [4hrs] Discrete and Continuous Probability Distributions [4 hrs] Confidence Intervals, Hypothesis Testing, Sample Size [4 hrs] Revision problem classes [3 hrs] Comparisons Involving Population Means[2hrs] Chi-square Goodness-of-Fit and Independence Tests[6hrs] Linear and Multiple Regression [2 hrs] Revision problem classes [4hrs]

	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 أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	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	4	10% (10)	3,6, 9,11	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	3, 8	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	
	Report	1	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:

<table>
<tr><td colspan="5" align="center">**GRADING SCHEME**
مخطط الدرجات</td></tr>
<tr><td>**Group**</td><td>**Grade**</td><td>التقدير</td><td>**Marks (%)**</td><td>**Definition**</td></tr>
<tr><td rowspan="5">**Success Group (50 - 100)**</td><td>**A -** Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>**B -** Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>**C -** Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>**D -** Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>**E -** Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">**Fail Group (0 – 49)**</td><td>**FX** – Fail</td><td>مقبول بقرار</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>**F** – Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Note:</td><td colspan="3"></td></tr>
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</table>

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGINEERING DRAWING		Module Delivery	
Module Type	BASIC			
Module Code	ENDR125		Theory Lab	
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	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. 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completing this module, students should be able to achieve the following learning outcomes: 1. Apply problem-solving skills and spatial visualization abilities to solve complex drawing tasks and exercises. 2. Work effectively as part of a team, collaborating with peers in group drawing projects and critiques. 3. Demonstrate awareness of safety practices and procedures related to engineering drawing, including proper handling and storage of drawing tools and materials. 4. Reflect on their own learning and identify areas for improvement in

	geometric drawing skills.
	5. Demonstrate a comprehensive understanding of the principles and techniques of geometric drawing in the context of engineering.
	6. Effectively use the tools and instruments required for engineering drawing, including drawing boards, rulers, compasses, and protractors.
	7. Apply proper measurement techniques and scale factors to accurately represent objects and dimensions in drawings.
	8. Create well-organized and appropriately labeled drawing sheets, including title blocks and other necessary annotations.
	9. Draw lines of different types, such as straight lines, parallel lines, perpendicular lines, and inclined lines, with precision and accuracy.
	10. Construct circles, arcs, and ellipses of various sizes and proportions using appropriate methods and techniques.
	11. Perform geometric operations, including bisecting lines and angles, and drawing tangents to circles, with accuracy and attention to detail.
	12. Generate orthographic projections and sectional views of objects, ensuring proper alignment and dimensioning.
	13. Utilize three-dimensional drawing techniques, such as isometric projection, to represent objects in three dimensions.
	14. Interpret and create cutting planes and section views, effectively communicating the internal features of objects.
	15. Demonstrate proficiency in creating accurate and detailed engineering drawings that adhere to industry standards and conventions.
	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.
Indicative Contents المحتويات الإرشادية	The indicative contents of this module include the following topics: 1. Introduction to Engineering Drawing: (5Hrs) • Importance and role of engineering drawing in various fields • Overview of drawing instruments and their uses 2. Drawing Techniques and Measurement: (5Hrs) • 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

14. Teamwork and Collaboration in Drawing Projects: (5Hrs)
- Working effectively in a team for drawing assignments
- Peer reviews and critiques of drawings

	15. Safety Considerations in Engineering Drawing: (5Hrs) • Safety practices in handling drawing instruments and materials • Proper storage and maintenance of drawing tools 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.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies for this module aim to facilitate students' understanding and practical application of engineering drawing concepts. The strategies include: 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.

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 أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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, 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	3hr	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	• 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	• Types of lines and their uses • Drawing the layout of the drawing sheet • Drawing the border • Drawing the title block
Week 3	• Organizing the drawing sheet • Drawing lines • Drawing circles • Drawing squares • Classroom exercises
Week 4	• Geometrical operations (Bisecting lines and angles - Drawing tangents to concave and convex circles) • Classroom exercises
Week 5	• Geometrical operations (Drawing pentagons and hexagons) • Classroom exercises
Week 6	• Geometrical operations (Drawing an ellipse) • Classroom exercises
Week 7	• Drawing two-dimensional shapes using geometric operations • Classroom exercises
Week 8	• Formative assessment to test the previous knowledge

Week 9	• Geometric projections • Types of projections and their respective methods for representation • Construction techniques for different types of projections
Week 10	• 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	• Drawing exercises on three orthographic projections.
Week 12	• 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	• Three-dimensional drawing • Three-dimensional drawing rules • Classroom exercise on 3D drawing
Week 14	• cutting • cutting mechanism • Cuts in one of the projections • Class exercises
Week 15	• Comprehensive exercises including projections, cuts and dimensions
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	• 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 3-4	• drawing bar • Types of coordinates

	• Drawing lines (Cartesian method - relative method) • Draw circles (center, radius - center, diameter- 2p - TTR - TTT)
Week 5-6	• drawing bar • Curve drawing (2P,R - 3P) • Draw Ellipse (2P,R - 2P,D)
Week 7-8	• drawing bar • Polygon drawing • Draw the rectangle • Drawing aids •
Week 9-10	• The dotted network • Jumping system • The object jumps • Tracks object jumps
Week 11-12	• Collaboration system • Polar tracking • Modify bar with all its details and applying them to direct classroom exercises • Two-dimensional drawing exercises • Dimension setting
Week 13-14	• The main rules for putting basic dimensions on the drawing • Dimension rules for circles and arcs •
Week 15	• Three-dimensional drawing • Three-dimensional drawing method • Three-dimensional drawing exercises
	•

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	كتاب الرسم الهندسي/ عبد الرسول الخفاف	Yes
Recommended Texts	1. "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 2. "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 3. "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	1. Draftsperson.net: https://www.draftsperson.net/entry-page/ 2. Engineering Drawing and Sketching (MIT): https://ocw.mit.edu/courses/2-007-design-and-manufacturing-i-spring-2009/pages/lecture-notes/ 3. 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.