



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	DIGITAL TECHNIQUES		Module Delivery
Module Type	BASIC		Theory Lab
Module Code	DITE115		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Zainab Faydh		e-mail Zainab.faydh@yahoo.com
Module Leader's Acad. Title		Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail None
Peer Reviewer Name		e-mail	
Review Committee Approval	01/06/2023	Version Number	1.0

<b>Relation With Other Modules</b> العلاقة مع المواد الدراسية الأخرى			
<b>Prerequisite module</b>	None	<b>Semester</b>	
<b>Co-requisites module</b>	None	<b>Semester</b>	
<b>Module Aims, Learning Outcomes and Indicative Contents</b> أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. Able to perform the conversion among different number systems.</li> <li>2. Understand Boolean algebra and basic properties of Boolean algebra. Familiar with basic logic gates.</li> <li>3. Able to design simple combinational logics using basic gates.</li> <li>4. Analysis and design of combinational circuits.</li> <li>5. Analysis and design of sequential circuits.</li> <li>6. Able to perform the conversion among different number systems.</li> <li>7. Understand Boolean algebra and basic properties of Boolean algebra. Familiar with basic logic gates.</li> <li>8. Able to design simple combinational logics using basic gates.</li> <li>9. Analysis and design of combinational circuits.</li> <li>10. Analysis and design of sequential circuits.</li> </ol>		
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. Explain the concept of Binary systems and its application in Digital Design.</li> <li>2. Understand and recognize Digital Logic Gates.</li> <li>3. Describe the concepts of Combinational and sequential Circuits.</li> <li>4. Identify the different Application areas of Digital Design.</li> <li>5. Learn the essentials of the Logic Gates.</li> <li>6. Building the truth tables.</li> <li>7. Constructing the Boolean function.</li> <li>8. Gate-Level minimization</li> <li>9. Constructing the Digital Circuit</li> </ol>		
<b>Indicative Contents</b> المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><b>Introduction to Digital Technique 3Hrs.</b>  <b>Basic definitions 2Hrs.</b>  <b>System of numbers 5Hrs.</b>            General number formula: Binary, octal, decimal &amp; hexadecimal numbers.  <b>Numbers base conversion 5Hrs.</b>            Arithmetic operation in different numbers, complements, binary codes, BCD, Ex- 3, gray codes.  <b>Boolean algebra 5Hrs.</b>            Basic definitions, basic theorem and properties, Boolean functions.  <b>Canonical &amp; standard forms digital logic gates 5Hrs.</b></p>		

	<p><b>Karanough maps 5Hrs.</b> AND and OR implementation, don't care condition.</p> <p><b>Adder arithmetic Operation and Processes 10Hrs.</b> Subtractors, Half and Full Adders and Subtractors, Binary Parallel Adders, Binary Serial Adder, Addition and Subtraction of Signed BCD Number, ABCD Adder and Arithmetic Unit (ALU).</p> <p><b>Code conversion 5Hrs.</b> Even and odd parity logic, decoders, encodes comparator, multiplexers &amp; DE multiplexers.</p> <p><b>Combinational circuits: 5Hrs.</b> Analysis and synthesis of combinational circuits, multiplexer, de-multiplexer, encoder, decoder, code-converter, adder, subtractor, comparator, parity generator/checker, priority en-coder.</p> <p><b>Sequential Circuits: 10Hrs.</b> Flip-flops- SR, JK, D and T. Registers- buffer registers, shift registers etc. Counters asynchronous and synchronous counters.</p> <p><b>Interface circuits: 5Hrs.</b> Digital to analog converter (DAC) - weighted resistor method, R-2R ladder method; Analog to Digital converter (ADC) - parallel comparator method, counter method, successive approximation method, dual-slope method.</p> <p><b>Families of logic circuits 10Hrs.</b> The DL, RTL, DTL, TTL, ECL, I<sup>2</sup>L, MOS (PMOS, NMOS, CMOS).</p>
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### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	<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 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>
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### Student Workload (SWL)

الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	78	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	5
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4h and 48min
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

## 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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Number systems (decimal, binary, octal, hexadecimal, BCD, excess-3, gray code))
Week 2	Number systems (conversions, operations, complement's) Logic gates (AND, OR, NOT)
Week 3	Logic gates (NAND, NOR, XOR, XNOR) Logic gates (logic Simplification (Boolean, Demorgan's theorem))
Week 4	Karnaugh maps ( 2-variables, 3-variables) ,(4-variables, 5-variables)
Week 5	Karnaugh maps (SOP, POS, don't care)
Week 6	Arithmetic operations (adder, parallel binary adder), Arithmetic operations (subtractor)
Week 7	Arithmetic operations (decoder, encoder), (multiplexer, demultiplexer), (comparator)
Week 8	Flip-flops (SR latch, D latch), Flip-flops (T-latch, J-K F.F), Flip-flops (edge triggered)
Week 9	Counters (asynchronous), (synchronous), (decade, up/down), (cascade, counter decoding)
Week 10	Shift-registers (serial in/serial out, serial in/parallel out, parallel in/ serial out, parallel in/parallel out)
Week 11	Shift-registers (bidirectional, shift register counter (Johnson counter, Ring counter))
Week 12	Multivibrators (definition, astable, bistable,), (monostable, 555 timer)
Week 13	A/D and D/A convertors (R/2R DAC, R/2nR DAC, flash ADC)
Week 14	The DL, RTL, DTL, TTL, ECL, I2L, MOS (PMOS, NMOS, CMOS).
Week 15	<b>Preparatory Week</b>
Week 16	<b>Final Exam</b>

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Introduce tools, facilities and components needed for the experiments in digital electronics.
<b>Week 2</b>	Logic Gates (NOT, AND, OR) -Relate voltage levels and electrical connections to digital logic levels
<b>Week 3</b>	Logic Gates (NAND, NOR, EX-OR)- Relate voltage levels and electrical connections to digital logic levels
<b>Week 4</b>	Boolean Algebra-Implementation of the Given Boolean Function using Logic Gates in Both Sop and Pos Forms.
<b>Week 5</b>	Universal Gates Relate voltage levels and electrical connections to digital logic levels and verify the operation of the universal logic gates.
<b>Week 6</b>	Half Adder & Full Adder-Design &verify Operation of Half Adder &Full Adder.
<b>Week 7</b>	Half Subtractor & Full Subtractor-Study &verify Operation of Half Subtractor & Full Subtractor.
<b>Week 8</b>	Parallel Adder & Parallel Subtractor-Implementation of 4-Bit Parallel Adder& Parallel Subtractor Using Logic Gates.
<b>Week 9</b>	Comparator -Design & verify the Operation of Magnitude Comparator.
<b>Week 10</b>	Decoders-Implementation and verification of Decoder using Logic Gates.
<b>Week 11</b>	Multiplexers-Use the multiplexer to implement complex logical functions.
<b>Week 12</b>	Flip-Flop (S-R Flip-Flop, J-K Flip-Flop)-Review differences between logic circuits and persistent memory, review properties for the S-R flip-flop and J-K flip-flop, and construct a circuit using a flip-flop.
<b>Week 13</b>	Flip-Flop (T Flip-Flop, J-K Flip-Flop)-Review differences between logic circuits and persistent memory, review properties for the T flip-flop and J-K flip-flop, and construct a circuit using a flip-flop.
<b>Week 14</b>	Asynchronous Counter-Build and analyze various an asynchronous up and down counter, and change the model of the counter.
<b>Week 15</b>	Synchronous Counter-Build and analyze various a synchronous up and down counter, and change the model of the counter.

Learning and Teaching Resources مصادر التعلم والتدريس		
Required	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> <li>• <b>“Digital Fundamentals”</b>, Eleventh Edition, Thomas L. Floyd, 2015, Pearson Education, ISBN 13: 978-1-292-07598-3.</li> </ul>	Yes
Recommended Texts	<ul style="list-style-type: none"> <li>• <b>“Digital Design”</b>, FIFTH EDITION, M. Morris Mano &amp; Michael D. Ciletti, 2013, Pearson Education, ISBN-13: 978-0-13-277420-8.</li> </ul>	yes
Websites	<b>“Computer Logical Organization Tutorial”</b> , Tutorials Point website, <a href="http://www.tutorialspoint.com/computer_logical_organization/index.htm">http://www.tutorialspoint.com/computer_logical_organization/index.htm</a>	

### APPENDIX:

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

<b>Module Information</b> معلومات المادة الدراسية			
<b>Module Title</b>	<b>ELECTRICAL ENGINEERING FUNDAMENTALS</b>	<b>Module Delivery</b>	
<b>Module Type</b>	<b>CORE</b>	<b>Theory Lab</b>	
<b>Module Code</b>	<b>ELEF114</b>		
<b>ECTS Credits</b>	<b>7</b>		
<b>SWL (hr/sem)</b>	<b>175</b>		
<b>Module Level</b>	<b>1</b>	<b>Semester of Delivery</b>	<b>1</b>
<b>Administering Department</b>	<b>Type Dept. Code</b>	<b>College</b>	<b>Type College Code</b>
<b>Module Leader</b>	<b>Dr. Mustafa Ghanim</b>	<b>e-mail</b>	<b>Mustafa.g.rzooki@uotechnology.edu.iq</b>
<b>Module Leader's Acad. Title</b>	<b>Professor</b>	<b>Module Leader's Qualification</b>	<b>Ph.D.</b>
<b>Module Tutor</b>		<b>e-mail</b>	
<b>Peer Reviewer Name</b>		<b>e-mail</b>	
<b>Review Committee Approval</b>	<b>01/06/2023</b>	<b>Version Number</b>	<b>1.0</b>

<b>Relation With Other Modules</b> العلاقة مع المواد الدراسية الأخرى			
<b>Prerequisite module</b>	None	<b>Semester</b>	
<b>Co-requisites module</b>	None	<b>Semester</b>	
<b>Module Aims, Learning Outcomes and Indicative Contents</b> أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. To develop problem solving skills and understanding of circuit theory through the application of techniques.</li> <li>2. To understand how voltage, current and power from a given circuit.</li> <li>3. This course deals with the basic concept of electrical circuits.</li> <li>4. This is the basic subject for all electrical and electronic circuits subject.</li> <li>5. To understand Kirchoff's current and voltage Laws problems.</li> <li>6. To perform mesh and Nodal analysis.</li> </ol>		
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. To be able to define the basic concepts of Electrical and Electronics Engineering.</li> <li>2. Ability to analyze and design simple electrical and electronic circuits to solve a particular problem.</li> <li>3. Ability to understand potential and current laws in the field of Electrical and Electronics engineering and to make technical evaluations based on them.</li> <li>4. Ability to recognize, select, and evaluate measurement devices used in electrical and electronics engineering.</li> <li>5. Define Ohm's law.</li> <li>6. Identify the basic circuit elements and their applications.</li> <li>7. Discuss the operations of sinusoid and phasors in an electric circuit.</li> <li>8. Discuss the various properties of resistors, capacitors, and inductors.</li> <li>9. Explain the two Kirchoff's laws used in circuit analysis.</li> <li>10. Identify the capacitor and inductor phasor relationship with respect to voltage and current.</li> </ol>		



<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><u>Part A - Circuit Theory</u></p> <p>DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining. [6hrs]</p> <p>resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [12hrs]</p> <p>AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [12hrs]</p> <p>AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [12hrs]</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. [12hrs]</p> <p>Revision problem classes [6hrs]</p> <p><u>Part B - Analogue Electronics Fundamentals</u></p> <p>Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [12hrs]</p> <p>Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [12hrs]</p> <p>Revision problem classes [6hrs]</p>
	<p><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>
<p><b>Strategies</b></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>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	5h and 28min
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Introduction - Difference between Circuit Theory and Field Theory.
<b>Week 2</b>	Basics of Network Elements
<b>Week 3</b>	Resistance in series and parallel and Resistivity, Ohm's Law and Inductance, Capacitance. Delta -star and star -delta.
<b>Week 4</b>	Review of Kirchhoff's Laws Circuit Analysis
<b>Week 5</b>	Nodal and Mesh method, loop current method
<b>Week 6</b>	Linearity and Superposition, Source Transformations
<b>Week 7</b>	Thevenin and Norton Equivalent

<b>Week 8</b>	Mid-term Exam
<b>Week 9</b>	Electric fields and capacitor series and parallel
<b>Week 10</b>	Magnetic fields and inductors series and parallel
<b>Week 11</b>	Sinusoidal Forcing, Complex Forcing, Phasors, and Complex Impedance, Sinusoidal Steady State Response
<b>Week 12</b>	Nodal and Mesh Revisited, Average Power, RMS, Introduction to Polyphase Circuits
<b>Week 13</b>	Mutual Inductance, Linear and Ideal Transformers, Circuits with Mutual Inductance
<b>Week 14</b>	Frequency Response of Series/Parallel Resonances, High-Q Circuits
<b>Week 15</b>	<b>Preparatory Week</b>
<b>Week 16</b>	<b>Final Exam</b>

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

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
<b>Required</b>	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
<b>Required Texts</b>	Boylestad, R. L. " Introductory Circuit Analysis", 4th Edition, Charles E. Merill Publishers.	Yes

<b>Recommended Texts</b>	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
<b>Websites</b>	<a href="https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering">https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering</a>	

### APPENDIX:

<b>GRADING SCHEME</b> مخطط الدرجات				
<b>Group</b>	<b>Grade</b>	<b>التقدير</b>	<b>Marks (%)</b>	<b>Definition</b>
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
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<b>Fail Group (0 - 49)</b>	<b>FX – Fail</b>	مقبول بقرار	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	راسب	(0-44)	Considerable amount of work required
<b>Note:</b>				
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 Information					
معلومات المادة الدراسية					
<b>Module Title</b>	<b>MATHEMATICS I</b>			<b>Module Delivery</b>	
<b>Module Type</b>	<b>BASIC</b>			<b>Theory</b>	
<b>Module Code</b>	<b>MATH113</b>				
<b>ECTS Credits</b>	<b>5</b>				
<b>SWL (hr/sem)</b>	<b>125</b>				
<b>Module Level</b>	<b>1</b>		<b>Semester of Delivery</b>		
<b>Administering Department</b>	<b>Type Dept. Code</b>		<b>College</b>	<b>Type College Code</b>	
<b>Module Leader</b>	<b>Dr. Faez Fawwaz Shareef</b>		<b>e-mail</b>	<b>Faez.f.shareef@uotechnology.edu.iq</b>	
<b>Module Leader's Acad. Title</b>	<b>Lecturer</b>		<b>Module Leader's Qualification</b>	<b>Ph.D.</b>	
<b>Module Tutor</b>	<b>None</b>		<b>e-mail</b>	<b>None</b>	
<b>Peer Reviewer Name</b>			<b>e-mail</b>		
<b>Review Committee Approval</b>	<b>//</b>		<b>Version Number</b>	<b>1.0</b>	

<b>Relation With Other Modules</b> العلاقة مع المواد الدراسية الأخرى			
<b>Prerequisite module</b>	None	<b>Semester</b>	
<b>Co-requisites module</b>	None	<b>Semester</b>	
<b>Module Aims, Learning Outcomes and Indicative Contents</b> أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. to familiarize students with fundamental mathematical concepts and principles. This includes topics such as algebra, calculus, and geometry.</li> <li>2. to introduce calculus, including the concepts of limits and Derivatives. This forms the basis for understanding the fundamental principles of calculus and their applications. Also, this module aims to introduce students to important mathematical concepts and structures such Trigonometric Functions, Hyperbolic Functions, and Transcendental Functions.</li> <li>3. Mathematics is a language of its own, and effective communication of mathematical ideas is crucial. The module aims to enhance students' skills in expressing mathematical concepts clearly, both orally and in writing. This includes learning how to write mathematical proofs and explanations.</li> <li>4. This module includes applications of mathematics in various fields, such as physics, and engineering. This aims to demonstrate the relevance and practicality of mathematical concepts.</li> </ol>		
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. Use both the limit definition and rules of differentiation to differentiate functions.</li> <li>2. Sketch the graph of a function using asymptotes, critical points, the derivative test for increasing/decreasing functions, and concavity.</li> <li>3. Apply differentiation to solve applied max/min and related rates problems.</li> <li>4. Use L. Hospital's rule to evaluate certain indefinite forms.</li> <li>5. The students should be able to identify and access relevant mathematical resources, such as textbooks, online materials, or academic journals, to deepen their understanding of mathematical concepts beyond the classroom.</li> <li>6. Students should gain experience in formulating mathematical models to represent real-world problems or situations. They should be able to translate practical problems into mathematical terms, analyze the models, and interpret the results in the context of the original problem.</li> </ol>		

## Indicative Contents

المحتويات الإرشادية

- **Limits and continuity [12 Hrs.]:**
  1. Introduction to Limits: Definition of a limit and its notation. Evaluating limits using numerical, graphical, and algebraic methods. Basic Limit Laws. Infinite limits and their behavior
  2. L. Hospital's Rule: Evaluating limits involving indeterminate forms using Hospital's Rule. Applications of Hospital's Rule to solve limit problems.
  3. Introduction to Continuity: Definition and properties of continuity. Definition of continuity of a function at a point and over an interval. Understanding the concept of a continuous function. Identifying continuous and discontinuous points on a graph. Types of discontinuities.
- **Trigonometric functions [12 Hrs.]:**
  1. Introduction to Trigonometric functions: Definition, graphs, and basic identities of trigonometric functions.
  2. Trigonometric equations: Solving equations involving trigonometric functions.
  3. Differentiation and Integration of Trigonometric functions and their inverses.
- **Hyperbolic Functions [12 Hrs.]:**
  1. Introduction to Hyperbolic functions: Definition and notation of hyperbolic sine ( $\sinh$ ), hyperbolic cosine ( $\cosh$ ), hyperbolic tangent ( $\tanh$ ), and their reciprocals.
  2. Graphs and properties of hyperbolic functions, including symmetry, periodicity, and asymptotes.
  3. Differentiation and integration of hyperbolic functions and their inverses.
- **Transcendental Functions [12 Hrs.]:**
  1. Exponential Functions: Definition and properties of exponential functions, including the natural exponential function. Exponential growth and decay models. Logarithmic functions and their properties. Solving exponential and logarithmic equations.
  2. Differentiation and integration of transcendental functions, including exponential, logarithmic, and trigonometric functions.
- **Applications of Derivatives [12 Hrs.]:**
  1. Rates of Change and Tangent Lines: Average rate of change and instantaneous rate of change. Slope of a tangent line as the derivative.
  2. Curve Sketching: Analysis of functions and their graphs using derivatives. Identifying critical points. Sketching curves based on given information.
  3. Optimization Problems: Applications of optimization in real-life scenarios, such as maximizing area, minimizing cost, or maximizing profit.

## 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

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4h and 8min
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

### Module Evaluation

تقييم المادة الدراسية

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

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Fundamental mathematical concepts, and principles.
<b>Week 2</b>	Limits involving infinity.
<b>Week 3</b>	Definition of continuity, Continuous functions.
<b>Week 4</b>	Trigonometry, Trigonometric Functions, Graphs.
<b>Week 5</b>	Analytic Geometry, Inverse of trigonometric functions.
<b>Week 6</b>	Trigonometric Functions differentiation and integration.
<b>Week 7</b>	Hyperbolic functions definition, properties, and graphs.
<b>Week 8</b>	Inverse of hyperbolic functions, Hyperbolic functions differentiation and Integration.
<b>Week 9</b>	Transcendental functions.

<b>Week 10</b>	Transcendental Inverse functions.
<b>Week 11</b>	definitions, properties, and graphs of Natural Logarithmic, Exponential and Power
<b>Week 12</b>	Derivatives and Integrals of Natural Logarithmic, Exponential and Power
<b>Week 13</b>	Applications of derivatives, related rates of changes, maxima, minima, and mean value theorem.
<b>Week 14</b>	Curve sketching with $y'$ and $y''$ , Graphing rational functions-Asymptotes and Dominant terms
<b>Week 15</b>	Optimization

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	G. B. Thomas, M. D. Weir, J. Hass, and F. R. Giordano, Thomas' Calculus, Addison-Wesley, 2005.	Yes

### APPENDIX:



### GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX – Fail</b>	مقبول بقرار	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	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.

	<b>University of Technology</b> <b>Department of Communication Engineering</b> <b>Division of Optical Communication</b> <b>Engineering Systems</b>	
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## MODULE DESCRIPTOR FORM

## نموذج وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
<b>Module Title</b>	PHYSICS OF SEMICONDUCTORS AND MATERIALS			<b>Module Delivery</b>	
<b>Module Type</b>	BASIC			Theory Tutorial	
<b>Module Code</b>	PHSM112				
<b>ECTS Credits</b>	5				
<b>SWL (hr/sem)</b>	125				
<b>Module Level</b>	1		<b>Semester of Delivery</b>		
<b>Administering Department</b>		<b>Type Code</b>	<b>Dept.</b>	<b>College</b>	<b>Type College Code</b>
<b>Module Leader</b>	Halah Hassan Rashed		<b>e-mail</b>	Halah.H.Rashed@uotechnology.edu.iq	
<b>Module Leader's Acad. Title</b>		Lecturer		<b>Module Leader's Qualification</b>	
				MS.c.	
<b>Module Tutor</b>	None		<b>e-mail</b>	None	
<b>Peer Reviewer Name</b>				<b>e-mail</b>	
<b>Review Approval Committee</b>		/ /		<b>Version Number</b>	1.0

Relation With Other Modules			
		العلاقة مع المواد الدراسية الأخرى	
<b>Prerequisite module</b>	None	<b>Semester</b>	
<b>Co-requisites module</b>	None	<b>Semester</b>	
Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. To make conversant students of the foundations of the physics of semiconductor devices through the study of the crystal structure of semiconductors, energy bands, and the effect of adding impurities on the conductivity of semiconductors, etc.</li> <li>2. To identify student the importance of p–n junction modern semiconductor electronics, study the characteristics of the diode such as diode equation, current - voltage characteristic in the forward and reverse bias, Diode breakdown mechanisms AC/DC model, Dynamic resistance, Charge capacitance, Junction capacitance, Forward/reverse bias schematic, Breakdown voltages: Zener and Avalanche</li> <li>3. To introduce students to the importance of conductive materials, insulators, and superconducting materials in terms of its properties and applications in many devices in our daily lives.</li> </ol>		
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. The ability to use techniques, skills and modern engineering tools required in various engineering practices.</li> <li>2. Knowledge of contemporary issues.</li> <li>3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</li> <li>4. Knowledge of Crystal Structures: Learners should acquire knowledge of different crystal structures found in solid-state materials. They should understand the arrangement of atoms or molecules in various crystal lattice systems, including their symmetries, unit cells, and crystallographic planes.</li> <li>5. Understanding of Energy Bands: Learners should comprehend the concept of energy bands in solids and semiconductors. They should be able to explain the formation of valence and conduction bands and the role of energy bandgaps in determining the electrical properties of materials.</li> </ol>		

	<p>6. Familiarity with Charge Carrier Behavior: Learners should gain an understanding of charge carrier behavior in semiconductors, including the concepts of electron and hole conductivity, drift, diffusion, and recombination processes. They should be able to analyze the electrical transport properties of semiconductors.</p> <p>7. Knowledge of Semiconductor Devices: Learners should develop knowledge of various semiconductor devices and their operating principles. This may include diodes.</p> <p>8. Understanding of Doping: Learners should grasp the concept of doping in semiconductors and its effects on the electrical properties of materials.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<ul style="list-style-type: none"> <li>• <b>Energetic and crystal structure of semiconductors 9Hrs.</b> Historical and technical background of semiconductors atomic structure and Miller coefficients Atoms, electrons and the Bohr model Silicon crystal, insulator and conductor energy band model Electron-hole pair generation and recombination Electron Effective Mass Intrinsic Semiconductor Extrinsic semiconductor</li> <li>• <b>Charge carrier concentration and energy band description 9Hrs.</b> Steady state concentration Fermi function Steady state carrier distribution Degenerate semiconductor Energy band and Fermi level</li> <li>• <b>Charge carrier processes: Drift, Diffusion, Generation and Recombination 9Hrs.</b> Carrier drift and mobility Specific conductivity and resistivity Generation and recombination Transient state carrier concentration Minority carrier lifetime Carrier diffusion Drift -diffusion current Continuity equation Diffusion equation Steady state diffusion equation</li> <li>• <b>p-n junction diode 9Hrs.</b> Structure, Electrical characteristic, Variable/abrupt graded junction, Diode manufacturing Steady state p-n diode Current components, Energy band distribution, Potential, Charge, and Electrical field distribution in a p-n junction. Forward and Reverse biased p-n junction. Carrier injection Introduction to junction diffusion-drift processes, Minority carrier diffusion distribution, Diffusion current components equation, Diode equation Diode breakdown mechanisms AC/DC model, Dynamic resistance, Charge capacitance, Junction capacitance, Forward/reverse bias schematic, Breakdown voltages: Zener and Avalanche.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Conducting Materials 6Hrs.</b> Relaxation Time and Electrical Conductivity. Sources of Resistivity of Metals and Alloys, Electrical Conductivity at High Frequencies. Geometrical and Magnetic Field Effects on Electrical Conductivity. Types of Conducting Materials.</li> <li>• <b>Dielectric Materials 6Hrs.</b> Types of Electric Polarization, Frequency and Temperature Effects on Polarization, Dielectric Loss, Dielectric Breakdown, Insulating Materials, Ferro-electric Materials, Electrets.</li> <li>• <b>Magnetic Materials 6Hrs.</b> Types of Magnetic materials, Ferro and Ferri magnetism, Hard and Soft Magnetic materials, Ferrites – Microwave applications, Magnetic bubbles.</li> <li>• <b>Super Conducting Materials 6Hrs.</b> Types of Super Conductors, High Tc Super Conductors and High Frequency Applications.</li> </ul>
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### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ul style="list-style-type: none"> <li>• Lecture method: By clarifying and explaining subjects that are difficult for the student to understand, such as proves the laws,</li> <li>• Discussion Allow the student to participate in the group dialogue, and among the most important conditions that must be met in this method are the clarity of the objectives of the discussion.</li> <li>• Practical presentations by using the video to present the lesson, and this method contributes to making the student master the lesson quickly and the consolidation of information in the mind of the student.</li> </ul>
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### Student Workload (SWL)

الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4 h and 8 min
<b>Total SWL (h/sem)</b> 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	2 Hrs.	50% (50)	15	All
Total assessment			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<b>Introduction - Energetic and crystal structure of semiconductors</b> Historical and technical background of semiconductors Atomic structure and Miller coefficients Atoms, electrons and the Bohr model Silicon crystal.
Week 2	insulator and conductor energy band model Electron-hole pair generation and recombination Electron Effective Mass Intrinsic Semiconductor Extrinsic semiconductor
Week 3	<b>Charge carrier concentration and energy band description.</b> Steady state concentration Fermi function Steady state carrier distribution Degenerate semiconductor Energy band and Fermi level .
Week 4	<b>Charge carrier processes: Drift, Diffusion, Generation and Recombination.</b> Carrier drift and mobility Specific conductivity and resistivity Generation and recombination Transient state carrier concentration
Week 5	Minority carrier lifetime Carrier diffusion Drift -diffusion current Continuity equation Diffusion equation Steady state diffusion equation
Week 6	<b>p-n junction diode</b> Structure, Electrical characteristic, Variable/abrupt graded junction, Diode manufacturing Steady state p-n diode
Week 7	Current components, Energy band distribution, Potential, Charge, and Electrical field distribution in a pn junction forward and Reverse biased p-n junction
Week 8	Carrier injection Introduction to junction diffusion-drift processes, Minority carrier diffusion distribution, Diffusion current components equation, Diode equation
Week 9	Diode breakdown mechanisms AC/DC model, Dynamic resistance, Charge capacitance, Junction capacitance, Forward/reverse bias schematic, Breakdown voltages: Zener and Avalanche.

<b>Week 10</b>	<b>Conducting Materials</b> Relaxation Time and Electrical Conductivity. Sources of Resistivity of Metals and Alloys, Electrical Conductivity at High Frequencies. Geometrical and Magnetic Field Effects on Electrical Conductivity. Types of Conducting Materials.
<b>Week 11</b>	<b>Dielectric Materials</b> Types of Electric Polarization, Frequency and Temperature Effects on Polarization, Dielectric Loss, Dielectric Breakdown, Insulating Materials, Ferro-electric Materials, Electrets.
<b>Week 12</b>	<b>Magnetic Materials</b> Types of Magnetic materials, Ferro and Ferri magnetism, Hard and Soft Magnetic materials, Ferrites – Microwave applications, Magnetic bubbles.
<b>Week 13</b>	<b>Super Conducting Materials</b> Types of Super Conductors, High Tc Super Conductors and High Frequency Applications.
<b>Week 14</b>	<b>Introduction - Energetic and crystal structure of semiconductors</b> Historical and technical background of semiconductors atomic structure and Miller coefficients Atoms, electrons and the Bohr model Silicon crystal.
<b>Week 15</b>	<b>Preparatory Week</b>

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	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
<b>Recommended Texts</b>	Engineering physics – Cengage learning, B. K Pandey and S. Chaturvedi	yes
<b>Websites</b>	<a href="http://link.springer.com/book">http://link.springer.com/book</a>	



**APPENDIX:**

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

 <p>DEPARTMENT OF COMMUNICATION ENGINEERING UNIVERSITY OF TECHNOLOGY</p> <p>قسم هندسة الاتصالات الجامعة التكنولوجية</p>	<p><b>University of Technology</b> <b>Department of Communication Engineering</b> <b>Division of Optical Communication Systems</b> <b>Engineering</b></p>	 <p>UNIVERSITY OF TECHNOLOGY, IRAQ</p>
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MODULE DESCRIPTOR FORM  
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
<b>Module Title</b>	ENGLISH TECHNIQUES		<b>Module Delivery</b>
<b>Module Type</b>	BASIC		Theory
<b>Module Code</b>	ENTE111		
<b>ECTS Credits</b>	2		
<b>SWL (hr/sem)</b>	50		
<b>Module Level</b>	1	<b>Semester of Delivery</b>	
<b>Administering Department</b>	<b>Type Dept. Code</b>	<b>College</b>	<b>Type College Code</b>
<b>Module Leader</b>	Dr. Ali Shawket		<b>e-mail</b> ali.s.thiab@uotechnology.edu.iq
<b>Module Leader's Acad. Title</b>	Lecturer	<b>Module Leader's Qualification</b>	Ph.D.
<b>Module Tutor</b>		<b>e-mail</b>	
<b>Peer Reviewer Name</b>		<b>e-mail</b>	
<b>Review Committee Approval</b>		<b>Version Number</b>	

<b>Relation With Other Modules</b> العلاقة مع المواد الدراسية الأخرى			
<b>Prerequisite module</b>		<b>Semester</b>	
<b>Co-requisites module</b>		<b>Semester</b>	
<b>Module Aims, Learning Outcomes and Indicative Contents</b> أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. Introduce basics English language, rules and ways of social expressing, different types of conversations, listening and speaking.</li> <li>2. Enable the student to build up the vocabulary after study and understand the reading articles in detail and watching videos.</li> <li>3. Select some reading passages from communication and computer books to extend students learning skills and make it more interesting.</li> <li>4. Advanced rules and ways of social expressing, different types of conversations, listening and speaking.</li> </ol>		
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ul style="list-style-type: none"> <li>• An ability to communicate effectively with a range of audiences</li> <li>• An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</li> <li>• The ability to work in multi-disciplinary teams.</li> <li>• Parts of Speech (Noun, verb, adjective, adverb, etc), Structure and kinds of sentences, Tenses in English, Prepositions of time and place.</li> <li>• How to write and understand simple paragraphs on arrange of topics within the field of the study and interest or experience.</li> <li>• Develop the extensive intensive reading skills by taking different passages.</li> <li>• Expose to important technical vocabulary and Idioms from communication and computer resources.</li> </ul>		
	<p style="text-align: center;"><b>A- Communicative competences</b></p> <p><b>Listening</b> - Understand and identify the main points of dialogues of 230-250 words on familiar topics regularly encountered in life, work, school, etc., within the scope of the curriculum. - Listen and guess meanings (through the expressions and feelings of the speakers) in familiar monologues and conversations in everyday life - Understand the main points of news programs, broadcasts, interviews, etc., on familiar topics which are clearly delivered in simple language, or with illustrative images. (5Hrs)</p> <p><b>Speaking</b> - Pronounce clearly and relatively accurately short dialogues. - Speak and interact with fellow speakers about familiar topics, express personal views and exchange information about the topics covered in the curriculum. - Describe in simple discourse familiar topics, narrate a short story closely related to the topics covered. - Present preparedly the projects on the topics in the curriculum. (5Hrs)</p>		

<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Reading</b> - Read and comprehend the main points, specific contents of a text of 200 words on current and familiar topics. - Read and understand the argument flow of texts, identify main conclusions in texts using clear language. - Read to find and summarize short texts of everyday use such as simple letters, brochures, using words and structures from the original texts. (5Hrs)</p> <p><b>Writing</b> – write paragraphs (block and indented styles), Write simple connected and coherent texts of 180-200 words; write short reports based on suggestions, providing factual information and reasons for the recommendations made in the reports; collect short information from several sources and summarize it. - Complete (write/fill) administrative forms such as CVs and resumes, letter of application for employment, emails, etc. - Write descriptive texts of simple charts and tables. (5Hrs)</p> <p><b>B- Linguistic knowledge</b></p> <p><b>Pronunciation:</b> Vowel and consonant syllable, words with different syllables, Words with stress (specials cases) – Words without stress, Sentence stress, assimilation, linking vowels with vowels Question, intonation, Homophones, practicing words and terms, phrases, and sentences related to the students’ major. (4Hrs)</p> <p><b>Vocabulary:</b> Words related to themes and topics of the course, collocations, words with different meanings and pronunciations. (3Hrs)</p> <p><b>Grammar:</b> parts of speech, past, Present, and future tenses, Word structure (compound nouns), Countable and uncountable nouns. Types on sentences: simple, compound, complex sentences, Articles, language function: commands, requests, offers, advice and instructions. Modal verbs, Relative pronouns and Relative clauses with which-that-who-whom-whose-where-when. Prepositions, Phrasal verbs (including verbs, adverbs and prepositions), comparison showing changing things, Sentences of reason and results and Conjunctions: although, however etc, active and passive, Adverbial clauses of condition, Comparatives and superlatives of adjectives. (3Hrs)</p>
<p><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<p>The main strategy to adopt is to encourage students to participate in lectures and interact during lectures, while improving and expanding thinking skills at the same time. This will be achieved through classes and interactive tutorials particularly in relation to their exact specialization, and linking the English language curriculum to that in order to enhance vocabulary and terminology relevant to the field of Communications Engineering.</p>

## Student Workload (SWL)

الحمل الدراسي للطالب

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

## Module Evaluation

تقييم المادة الدراسية

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

## Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
<b>Week 1</b>	Grammar Review
<b>Week 2</b>	Technical Report Writing
<b>Week 3</b>	How to read numbers
<b>Week 4</b>	Computers
<b>Week 5</b>	Evolution of Telecommunications
<b>Week 6</b>	Telegraph
<b>Week 7</b>	Telephony
<b>Week 8</b>	Semiconductors
<b>Week 9</b>	The photoelectric cell
<b>Week 10</b>	Transmission Lines
<b>Week 11</b>	Satellite Transmission
<b>Week 12</b>	Optical Fiber Transmission

<b>Week 13</b>	Multimedia
<b>Week 14</b>	Radar Systems
<b>Week 15</b>	Artificial Intelligence
<b>Week 16</b>	<b>Final Exam</b>

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	A Course in English for Engineering and Science Students Aiad, Jihad Shams Al-Deen, University of Technology	Yes
<b>Recommended Texts</b>	1- New Headway plus for Student's beginner and intermediate Book by John and Liz Soars 2- New Headway plus for Student's beginner and intermediate workbook by John and Liz Soars	YES
<b>Websites</b>	<a href="https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering">https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering</a>	

### APPENDIX:

<b>GRADING SCHEME</b> مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX - Fail</b>	مقبول بقرار	(45-49)	More work required but credit awarded
	<b>F - Fail</b>	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	HUMAN RIGHTS & DEMOCRACY		Module Delivery	
Module Type	BASIC		Theory	
Module Code	HRAD112			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Lec. nihaya Mohammed		e-mail	<a href="mailto:nihayaMAbdAli@uotechnology.edu.iq">nihayaMAbdAli@uotechnology.edu.iq</a>
Module Leader's Acad. Title	lecture	Module Leader's Qualification	MSC	
Module Tutor	None		e-mail	None
Peer Reviewer Name				
Review Committee Approval			Version Number	

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



## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ul style="list-style-type: none"><li>– The student’s knowledge of the conceptual aspect and historical development of the human rights and democracy subject</li><li>- Developing the student’s analytical and critical skills regarding the reality and future of human rights and democracy</li><li>- Training students to be important participants in aspects of public life, such as those who adhere to the principles of human rights and participate in popular political life.</li><li>- Students prefer to understand the importance of education in spreading the culture of human rights and democracy in building a civilized society based on good governance, the most important components of which are faith, people, and their education, and they participate in governance through free and fair elections.</li></ul>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ul style="list-style-type: none"><li>–Familiarity with the concept of human rights and its related definitions, discussing them, dismantling most of them, and criticizing them in a scientific way to reach the most accurate and objective ones</li><li>–Identifying the historical development of the concept of human rights and the most important contributions of human civilizations such as Mesopotamia civilization, Greek civilization, Western Christian civilization, and Islamic civilization in this development.</li><li>– introducing the student to the most important international document in the field of human rights that has been ratified</li><li>–Distinguishing between the basic, natural rights that a person acquires as a human being and the acquired rights that he enjoys because he belongs to a specific group, such as the rights of workers, children, the elderly, and health care. The nature of political, civil, economic, social and cultural rights will also be learned</li><li>– Considering and respecting the rights of women and minorities in diverse societies and the importance of ensuring that these segments exercise their political, social and economic rights and are guaranteed by the state and its institutions.</li></ul> <p>The importance of awareness and respect for children’s rights</p> <ul style="list-style-type: none"><li>– Introduction to democracy and its general principles</li></ul> <p>Identifying the linguistic and terminological concept, the concept of democratic transformation, and concepts related to it</p> <ul style="list-style-type: none"><li>– Women's rights in ancient and modern civilizations</li><li>– Learn about public freedoms and organizations</li></ul>

<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following. Part A - human rights (hrs15) - Introducing the concept of human rights and concepts related to them - Historical framework for the development of the concept of human rights - Fundamental rights and acquired right Promoting human rights Child Rights Women's rights and minority rights -The importance of teaching human rights in Iraqi universities and schools Part B – democracy (hrs15) -Introduction to democracy And its concept -The historical development of the concept of democracy and its most important types -The basic features of the concept of democracy. -Democratic governments with the characteristics of a presidential system and a parliamentary system -Terrorism, sectarianism, and national reconciliation, general discussion</p>
<p><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<ul style="list-style-type: none"> <li>- Discussion and critical thinking of the subject’s vocabulary</li> <li>-Using the evaluation group method</li> <li>- Using the role-playing method (classroom or attendance only) and explaining some of the subject’s vocabulary</li> <li>- Writing analytical papers for the vocabulary of the subject or outside it, which are directly related to the topics of human rights and democracy</li> <li>-Collect examples and information from reality about human rights violations, discuss them in a scientific manner, and find solutions to the problems facing democratic practice in Iraq.</li> </ul>

<p><b>Student Workload (SWL)</b> الحمل الدراسي للطالب</p>			
<p><b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل</p>	33	<p><b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا</p>	2
<p><b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل</p>	17	<p><b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا</p>	1hur 8min
<p><b>Total SWL (h/sem)</b> 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, 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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Historical development of human rights
Week 2	Universal Declaration of Human Rights
Week 3	Human rights in ancient civilizations
Week 4	Human rights in heavenly religions
Week 5	Human rights in Judaism
Week 6	Human rights in Christianity Human rights in the Islamic religion
Week 7	Mid-term Exam
Week 8	International human rights agreements
Week 9	Human rights in the modern era
Week 10	Democracy Its concept and principles
Week 11	Women's rights in ancient civilizations in the modern era
Week 12	Public freedoms
Week 13	International organizations
Week 14	International organizations
Week 15	Preparatory Week
Week 16	Final Exam

## Learning and Teaching Resources

### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Maher Saleh Allawi, and others. Human Rights, Children and Democracy, 2009	Yes
<b>Recommended Texts</b>	ماهر صالح علاوي، وآخرون. حقوق الإنسان والطفل والديمقراطية، 2009	No
<b>Websites</b>	<a href="http://search.shamaa.org/FullRecord?ID=22247">http://search.shamaa.org/FullRecord?ID=22247</a>	

### APPENDIX:

## GRADING SCHEME

### مخطط الدرجات

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