MODULE DESCRIPTION FORM

Module Information

Module Title	**Computer science**	**Module Delivery**	
Module Type	**Core**	☐ **Theory** ☒ **Lecture** X **Lab** **Tutorial** **Practical** ☐ **Seminar**	
Module Code	**NVEEELM214**		
ECTS Credits	٤		
SWL (hr/sem)	**100**		

Module Level	1	**Semester of Delivery**	1
Administering Department	EI	**College**	NE
Module Leader	Asmaa Nabeel	**e-mail**	**asmaa.khaleel@uoninevah.edu.iq**
Module Leader's Acad. Title	Lecturer Assist	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	4/7/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	**General overview of personal computer architecture** **Computer peripherals, keyboard, screen, mouse, and storage media** **Computer busses, ports, interfaces** **Overview of MSDOS operating system** **MSDOS internal commands** **MSDOS external commands** **Introduction to computer languages** **Overview of windows operating system** **Windows desktop, changing settings, starting programs** **Creating, deleting, copying, moving, searching for files and folders** **Using my computer, my document, and help facility** **Using windows control panel** **Using the windows accessories paint, notepad, word pad, …..etc** **Setup applications to windows, remove applications from windows** **Connecting to the internet, using the windows explorer** **Using the Microsoft Word** **Using the Microsoft Excel** **Using the Matlab**
Module Learning Outcomes	1.Understanding the important components of the computer and its operating system. 2. Understanding the meaning of MSDOS operating system and its commands. 3. Understanding the windows operating system 4. Understanding the Microsoft office (word, power point, excel). 5. Understanding the high and low level languages 6. Learn about how the strings represented in C language. 7. introduction to matlab
Indicative Contents	1. explain the components of computer hardware and software 2.introduction to the types of computers 3. storage media 4. computer ports 5. computer networks and the types of it 6. the internal and external MSDOS commands 7. windows operating system 8. word office program 9.power point office program 10. Excel program

	11. Matlab

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)			
Structured SWL (h/sem)	125	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	65	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	190		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	٢, 4, 5,6	LO #1, 2, 10 and 11
	Assignments	1	10% (10)	14	LO # 3, 4, 6 and 7
	Projects / Lab.	٠	٠	٠	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	١	٢٠	١٤	
Summative assessment	**Midterm Exam**	١.5hr	30% (20)	10	LO # 1-4
	Final Exam	3hr	50% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	**Introduction to** the part of computers in hardware and software ,computer types, storage media
Week 2	**Explain the computer ports , computer networks**
Week 3	**Introduction to MSDOS operating system and the internal commands of it**
Week 4	**External Ms DOS command , file and folder related commands and the editor**
Week 5	Windows operating system
Week 6	Windows orders(change the background, screen saver, resolution), change the status of files, printing files, copy and save of files, backups, Recycle bin ,compressing files, viruses
Week 7	Microsoft office word (creating new word file, bars , types and styles of fonts, copy and select of texts ,save of word file)
Week 8	MS WORD: spell checking, inserting symbols, add borders, change the document setup , insert table, page numbering, insert equations and effects)
Week 9	MS Power point:(how to design professional presentation, change the layout of presentation and background of it, numbering slides, insert charts , insert table and audio)
Week 10	MS Power point(insert an effect to the object in slide, transition between slides , grouping of objects, insert equation, copy ,save and printing the slides then how to start the presentation)
Week 11	MS EXCEL (getting started with excel, how to create a spreadsheet, copy and rename the work book, entering and deleting of data in sheet, insert and delete of rows& columns, selecting cells, adding border to sheet)
Week 12	MS EXCEL:how to write a formule in sheet, functions, summation of data in row or column ,average function, max& min functions, count& counta, round function, save and print the spread sheet
Week 13	Overview of High &Low level languages
Week 14	**Matlab**
Week 15	
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	The application of each part of the covered drawing subject theoretically and according to the weekly sequence of the curriculum in the AutoCAD laboratory

	Note: By two hours a week

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1.“**Computer Science”**	No
Recommended Texts	**2.''MATLAB Handbook”**	No
Websites	https://www.tutorialsmate.com/2021/12/parts-of-computer https://www.koenig-solutions.com/matlab-programming	

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Digital Techniques**			**Module Delivery**	
Module Type	**Base**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**NVEE217**				
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	(Younis Saber Othman), (Noor Alhuda Saad Abbas)		**e-mail**		
Module Leader's Acad. Title	Lecturer Assistant		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	4/7/2023		**Version Number**	1.0	

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. To learn new number systems and how to convert between them 2. To identify and learn the logic gates and Boolean algebra 3. How to minimize the Boolean functions using Boolean algebra and Karnaugh maps 4. To understand, draw, and identify the combinational logic circuits using the discrete logic 5. To understand, draw, and identify the combinational logic circuits using the MSI integrated circuits 6. To use the 3-varaiables and 4-varaiables Karnaugh map for Boolean minimization
Module Learning Outcomes	Students will be able to: 1. Learning new number systems and how to convert between them 2. Identify the logic gates and learn the Boolean algebra 3. Minimize the Boolean functions 4. Understand, draw, and identify the combinational logic circuits using the discrete logic and MSI integrated circuits 5. Identify and use the 3-varaiables and 4-varaiables Karnaugh map
Indicative Contents	**Indicative content includes the following:-** **NUMBER SYSTEMS:- [10 Hrs]** Decimal number system; Binary; Octal and hexadecimal number systems; Conversion from one number to another number system; Addition; Subtraction; Multiplication and division using different number system; Representation of binary number insignia-magnitude; Sign 1's Complement and align 2's complement notation; Rules for addition and subtraction with complement Representation; BCD; EBCDIC; ASCII; Extended ASCII; Gray and other codes. **LOGIC GATES AND BOOLEAN ALGEBRA:- [10 Hrs]** AND; OR; NOT; NAND; NOR; Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; De-murrage's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean function; SOP and POS, forms; Realization of Boolean functions using only NAND and NOR gates. **BOOLEAN FUNCTION MINIMIZATION:- [10 Hrs]** Objectives of the minimization procedures; Karnaugh map method; The 3-Variable Karnaugh Map; The 4-Variable Karnaugh Map; Karnaugh Map SOP Minimization; Don't care conditions; Karnaugh Map POS Minimization; Converting Between POS and SOP Using the Karnaugh Map. **COMBINATIONAL LOGIC CIRCUITS USING DISCRETE LOGIC GATES:- [5 Hrs]**

	Parity generator and checker; Code converters; Majority circuits; magnitude comparator. **COMBINATIONAL LOGIC CIRCUIT USING MSI INTEGRATED CIRCUITS:- [10 Hrs]** Encoder; priority encoder; decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and Multiplexer; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory; Read only memory and erasable programmable ROMS

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	45	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	90		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	1-14	LO #1-14
	Assignments	1	5% (5)	6	LO # 1-6
	Projects / Lab.	10 Lab	10% (10)	5-14	LO # 5-14
	Report	3	5% (5)	5-14	LO # 5-14
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-10
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**NUMBER SYSTEMS:-** Decimal number system; Binary; Octal and hexadecimal number systems; Conversion from one number to another number system; Addition; Subtraction; Multiplication and division using different number system; Representation of binary number insignia-magnitude; Sign 1's Complement and align 2's complement notation; Rules for addition and subtraction with complement Representation; BCD; EBCDIC; ASCII; Extended ASCII; Gray and other codes.
Week 2	
Week 3	
Week 4	**LOGIC GATES AND BOOLEAN ALGEBRA:-** AND; OR; NOT; NAND; NOR; Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; De-murrage's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean function; SOP and POS, forms; Realization of Boolean functions using only NAND and NOR gates.
Week 5	
Week 6	
Week 7	**BOOLEAN FUNCTION MINIMIZATION:-** Objectives of the minimization procedures; Karnaugh map method; The 3-Variable Karnaugh Map; The 4-Variable Karnaugh Map; Karnaugh Map SOP Minimization; Don't care conditions; Karnaugh Map POS Minimization; Converting Between POS and SOP Using the Karnaugh Map.
Week 8	
Week 9	
Week 10	
Week 11	**COMBINATIONAL LOGIC CIRCUITS USING DISCRETE LOGIC GATES:-** Parity generator and checker; Code converters; Majority circuits; magnitude comparator.
Week 12	
Week 13	**COMBINATIONAL LOGIC CIRCUIT USING MSI INTEGRATED CIRCUITS:-** Encoder; priority encoder; decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and Multiplexer; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory; Read only memory and erasable programmable ROMS
Week 14	
Week 15	
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 5-14	Introduction to KL-31001 DIGITAL LOGIC LAB Exp. 1: Logic Gates Exp. 2: NAND, NOR, XOR Gates Exp. 3: AND-OR-INVERTER(A-O-I) Circuits Exp. 4: Bit Parity Generator Circuits Exp. 5: Comparator Circuits Exp. 6: Decoder Exp. 7: Encoder

	Exp. 8: Multiplexer Exp. 9: Demultiplexer

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	**Digital Fundamentals** | Eleventh Edition Global Edition | by Thomas L. Floyd | Pearson Education 2015	PDF
Recommended Texts	**Logic and Computer Design Fundamentals** | Fifth Edition Global Edition | by Morris Mano • Charles R. Kime • Tom Martin | Pearson Education 2016	PDF
Websites	(Telegram Group and Google classroom)	

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Electrical A.C circuits**			**Module Delivery**	
Module Type	**Base**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE216				
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	Zahraa Siddiq Yahya		**e-mail**		
Module Leader's Acad. Title	Lecturer assistant		**Module Leader's Qualification**		
Module Tutor	Zahraa Siddiq Yahya		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. To identify the basic concepts of energy storage elements. 2. To identify the basic of Alternating Current AC. 3. To understand and cover the basic AC circuit analysis methods and theorems.
Module Learning Outcomes	1. Explain the function of each element in AC Electrical circuits. 2. Use the basic circuit analysis methods to simplified the AC Electrical circuits. 3. Applying the appropriate analysis method to reach the aim in its simplest form.
Indicative Contents	Indicative content includes the following. Part A – energy storage elements: The capacitor; The Inductor; Analysis of RC-transient circuits; Analysis of RL-transient circuits; RLC transient circuits. [15 hrs] Part B - A.C. circuit analysis: the basic of Alternating Current AC; The Phasor equivalent circuit; series & parallel connections and equivalent impedance; Methods of Ac-circuit Analysis; superposition; Nodal & Mesh analysis; Thevenin's Theorem; Norton's Theorem; Power factor and average power in the sinusoidal Ac-circuits; Complex power; Series & parallel resonance. [35 hrs]

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

Student Workload (SWL)			
Structured SWL (h/sem)ل	30	**Structured SWL (h/w)** ا	4
Unstructured SWL (h/sem)	30	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	**60**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	The capacitor & The inductor
Week 2	Analysis of RC & RL -transient circuits
Week 3	Analysis of RLC transient circuits
Week 4	The basic of Alternating Current AC
Week 5	The Phasor equivalent circuit
Week 6	series & parallel connections and equivalent impedance
Week 7	Methods of Ac-circuit Analysis

Week 8	superposition
Week 9	Nodal & Mesh analysis
Week 10	Thevenin's Theorem
Week 11	Norton's Theorem
Week 12	Power factor and average power in the sinusoidal Ac-circuits
Week 13	Complex power
Week 14	Series & parallel resonance
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**" Engineering Circuit Analysis"** By W. Hayt	Yes
Recommended Texts	**"Introductory Circuit Analysis"** By Boylested	Yes

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Electrical D.C circuits**			**Module Delivery**	
Module Type	**Base**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE215				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		1	**Semester of Delivery**		1
Administering Department			**College**		
Module Leader	Zahraa Siddiq Yahya		**e-mail**		
Module Leader's Acad. Title		Lecturer assistant	**Module Leader's Qualification**		
Module Tutor	Zahraa Siddiq Yahya		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	4. To identify the basic concepts of DC Electrical Eng. circuits. 5. To understand how is the calculation of current, voltage, and power. 6. To understand and cover the basic DC circuit analysis methods and theorems.
Module Learning Outcomes	4. Explain the function of each element in DC Electrical circuits. 5. Use the basic circuit analysis methods and theorems to simplified the DC Electrical circuits. 6. Explain the different between transformation methods. 7. Applying the appropriate analysis method to reach the aim in its simplest form.
Indicative Contents	Indicative content includes the following. Part A – BASIC CONCEPTS: Voltage & current; Power & Energy; Dependent and Independent sources; Ohm's laws series & parallel connections; Delta- star connections and transformations. [15 hrs] Part B - D.C. Network Theorems: Source transformation; Linearity & superposition; Thevenin's & Norton's Theorems; Source transportation; source superposition; Nodal analysis; Mesh analysis. [35 hrs]

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

Student Workload (SWL)			
Structured SWL (h/sem)ل	30	**Structured SWL (h/w)** ا	4
Unstructured SWL (h/sem)	30	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	**60**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Voltage & current
Week 2	Power & Energy
Week 3	Dependent and Independent sources
Week 4	Ohm's laws
Week 5	series & parallel connections
Week 6	Delta- star connections and transformations

Week 7	Kirchhoff's Current & Voltage Laws (KCL), (KVL)
Week 8	Source transformation
Week 9	Linearity & superposition
Week 10	Nodal analysis
Week 11	Mesh analysis
Week 12	Thevenin's Theorem
Week 13	Norton's Theorem
Week 14	Max. power transfer
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**" Engineering Circuit Analysis"** By W. Hayt	Yes
Recommended Texts	**"Introductory Circuit Analysis"** By Boylested	Yes

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing**			**Module Delivery**	
Module Type	Core			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	NVEE201				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	2	
Administering Department			**College**		
Module Leader	Noor Yassar		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	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 Objectives أهداف المادة الدراسية	Students will be able to: 1. Drawing engineering shapes manually and clearly, including the effective use of the computer-aided drawing program (AutoCAD). 2. Develop a solid understanding of the basic principles of engineering drawing, Included the ability to work with concepts, analytically, and visualize them and a functional understanding of how these ideas will manifest in the real world. 3. Determine the strategies to be used and the assumptions to be made. 4. Use both manual and computer approaches in drawing figures. 5. Develop the ability to use engineering tools flexibly and creatively. 6. Develop an integrated understanding of the AutoCAD module. 7. Developing their ability to communicate scientific ideas. 8. Develop expertise in experimental methodologies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8. Understand and apply the basics of drawing types of lines. 9. Define, explain and apply engineering drawing operations. 10. Understand the basics of drawing an ogee curves 11. Understand and apply the basic idea of central projection theory. 12. Explanation of the central and parallel projection theory to understand the projection process. 13. Explain Different Views are Front View (FV), Top View (TV) and Side View (SV) FV is a view projected on VP. TV is a view projected on HP. SV is a view projected on PP. 14. Ability to draw using AutoCAD.
Indicative Contents المحتويات الإرشادية	**Introduction to engineering drawing and its tools** Introduction and introducing students to the subject of engineering drawing, which includes Identification of engineering tools and how to use them. **Engineering shapes and the arcs , lamina. , Dimensions:** - Various engineering operations: - - Drawing a straight line parallel to a known straight line - The division of the rectum into two halves - Angle division is known. - Drawing a straight line parallel to a known straight line from a point that does not belong to the known straight line. - Draw a tangent to a circle from a point that does not belong to it. - Draw a tangent to two contiguous circles from the outside.

	- Draw a tangent to two contiguous circles from the inside **Multi view projection** - Perpendicular Projection Theory of Objects: - Types of projections resulting from vertical projection and approved in the projection of various engineering objects - Front view - Side view. - Top view **Using AutoCAD** - Apply everything that has been explained in the manual engineering drawing on the AutoCAD program and drawing the three-dimensional models

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	55	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	20% (20)	5 and 10	LO #1, 2, 10 and 11
	Assignments	3	10% (10)	2 and 12	LO # 3, 4, 6 and 7
	Projects / Lab.	3	10% (10)	Continuous	All
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and introducing students to the subject of engineering drawing, which includes identification of engineering tools and how to use them.
Week 2	Teach students how to apply and draw the following engineering operations: Drawing a straight line parallel to a known straight line, the division of the rectum into two halves, angle division and drawing a straight line parallel to a known straight line.
Week 3	Teach students how to draw a tangent to two contiguous circles from the outside, Draw a tangent to two contiguous circles from the inside
Week 4	Draw a tangent to one circle from the inside and the other from the outside and draw a tangent to a circle passing through a straight line.

Week 5	Multi view projection Perpendicular Projection Theory of Objects: • Types of projection in drawing and its practical importance
Week 6	Types of projections resulting from vertical projection and approved in the projection of various engineering objects: Front view, Side view ,Top view
Week 7	Mid-term Exam + Introduction to AutoCAD
Week 8	Apply everything that has been explained in the manual engineering drawing on the AutoCAD program and drawing the three-dimensional models
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-15	The application of each part of the covered drawing subject theoretically and according to the weekly sequence of the curriculum in the AutoCAD laboratory

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	EGINEERING DRAWING AND GRAPHIC TECHNOLOGY", Fourteenth Edition, By: THOMAS E.FRENCH, CHARLES .VIERCK, ROBERT J.FOSTER,McGRAW-HILL	Yes
Recommended Texts	➢ William D.CallisterJr.&David D.Rethwisch.(2010)"Material Science and Engineering An introduction", eightEdition.	No
Websites	ENGINEERING DRAWING Any edition	

Grading Scheme

مخطط الدرجات

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Mathmatics1			**Module Delivery**	
Module Type	Base			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEE206**				
ECTS Credits	٦				
SWL (hr/sem)	**150**				
Module Level		UGx11 1	**Semester of Delivery**		1
Administering Department		Electronic Eng. Dep.	**College**	Electronics Engineering	
Module Leader	Hani M. S. Salman		**e-mail**	hani.mohamed@uoninevah.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. Gain proficiency in differentiating trigonometric function, inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function. 8. Master differentiation techniques for various types of functions. 9. To learn how to sketch curves and to deal with the transcendental functions. 10. To increase the skills related to differentiation applications. 11. Develop a strong foundation in Integration of trigonometric function, inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function. 12. Understand the concept of Application of the definite integral, including finding volumes of revolution, lengths of curves, and surface areas of revolution. 13. To learn the methods of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions. 14. Apply calculus principles to solve real-world engineering problems, developing problem-solving skills and the ability to apply calculus concepts to practical situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the concept of differentiation as a rate of change and slope of the curve. 2. Understand the basic differentiation rules, chain rule, implicit differentiation, higher order differentiation, partial differentiation, Differentiation of trigonometric functions and Hyperbolic Functions. 3. Learn the applications of differentiation. 4. Solve Maximum and Minimum problems. 5. Learn how to Plot the Curve. 6. Learn Transcendental functions: graphs, and derivative. 7. Understand the concept of integration: types of integrals. definite integrals, infinite Integrals. Integration of trigonometric function, inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function. 8. Apply definite integration to as areas between curves, volumes of revolution, length of the curve and surface area of revolution. 9. Learn Methods of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions. 10. Develop critical thinking and problem-solving skills by applying calculus.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following.

	Part A – Differentiation: Definitions and notations, basic differentiation rules, chain rule, implicit differentiation, higher order differentiation, partial differentiation, Differentiation of trigonometric functions and Hyperbolic Functions: . Applications of differentiation – slope tangents and normal, rate of change, velocity and acceleration, maxima and minima and inflexion points, and Curve plotting. [16 hrs] Transcendental Functions – definitions, properties, graphs, derivative. [4 hrs] Part B – Integration: Definitions and notations, types of integrals: definite integrals, infinite Integrals. Integration of trigonometric function, inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function. [12 hrs] Application of the definite integral – areas between curves, volumes of revolution, length of the curve and surface area of revolution. [12 hrs] Methods Of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions. [16 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module's major aim is to foster student engagement, improve critical thinking abilities, and promote collaborative learning. Interactive seminars, interesting tutorials, and exercises encourage active participation, allowing students to hone their critical thinking skills and apply engineering mathematics principles to problem solving. Furthermore, students collaborate on engineering mathematics issues, examine real-world scenarios, and explore the practical applications of the principles acquired through group activities, projects, and conversations. This method not only increases students' comprehension of engineering mathematical concepts, but it also fosters cooperation, communication, and key interpersonal skills that will be useful in their future engineering activities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.9
Total SWL (h/sem) 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	30% (30)	5 and 10	LO #1 #2 #3 and #4, #7, #8
	Assignments	1	10% (10)	12	LO #7 - #9
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	Introduction – Differentiation definitions and notations, review of basic differentiation rules, chain rule, and Implicit differentiation.
Week 2	Partial differentiation and higher order differentiation.
Week 3	Differentiation of trigonometric functions and Hyperbolic Functions. Applications of differentiation; slope, tangents and normal.
Week 4	Rate of change, velocity and acceleration, maxima and minima, inflexion points and Curve plotting
Week 5	Transcendental Functions – definitions, properties, and graphs, derivative.
Week 6	Definitions and notations of integration, Types of integrals: definite integrals and infinite integrals. Integration of trigonometric function.
Week 7	Integration of inverse trigonometric function, hyperbolic function. Mid-term Exam
Week 8	Integration of inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function.
Week 9	Application of the definite integral – areas between curves, volumes of revolution, length of the curve and surface area of revolution.
Week 10	
Week 11	
Week 12	Methods Of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions.
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	G. B. Thomas Jr., M. D. Weir, J. Hass, and F. R. Giordano, "Thomas' Calculus," 12th ed., Pearson, 2019.	Yes
Recommended Texts		
Websites	https://www.coursera.org/learn/introduction-to-calculus#syllabus https://www.edx.org/learn/calculus https://www.khanacademy.org/math/calculus-1	

Grading Scheme

مخطط الدرجات

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**MathematicsII**			**Module Delivery**	
Module Type	**Base**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEE 207**				
ECTS Credits	٦				
SWL (hr/sem)	١٥٠				
Module Level	UGx11 1		**Semester of Delivery**	1	
Administering Department	Electronic Eng. Dep.		**College**	Electronics Engineering	
Module Leader	Hani M. S. Salman		**e-mail**	hani.mohamed@uoninevah.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	NEEM1211	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To obtain a good knowledge of dealing with complex numbers. 2. Establish a strong foundation in matrices and their operations, determinants, and inverse matrices. This includes covering definitions, notations, properties, types, and basic operations on matrices, enabling effective application in problem-solving. 3. enhancing students' proficiency in matrix-based solutions for linear systems of equations using Cramer's rule, the inverse method, and the Gauss elimination method 4. To provide the students with the knowledge to deal with vectors and their mathematical operations. 5. To Learn about the polar coordinates, and the graphs of polar equations. 6. Apply calculus principles to solve real-world engineering problems, developing problem-solving skills and the ability to apply calculus concepts to practical situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	11. Comprehend and utilize complex numbers within the Argand diagram, and 12. master complex number operations (Addition, subtraction, product, quotient, power, and roots) and De Moivre's Theorem. 13. Understand the concept of linear algebra and matrices. 14. Identify the types of matrices such as square matrices, zero matrix and identity. 15. Perform the common matrix operations such as addition, subtraction, scalar multiplication, and multiplication. 16. Find the transpose of a matrix. 17. Compute the determinants. 18. Compute the inverse of the matrix. 19. Identify whether the matrix is invertible or singular. 20. Relate a matrix to a homogenous system of linear equation. 21. Solve a system of linear equations by matrices: using Cramer's rule. 22. Solve a system of linear equations by matrices: using the inverse method. 23. Solve a system of linear equations by matrices: using Gauss Elimination Method. 24. Identify the rank of the matrix and its relation to the solution of linear equations. 25. Find the eigenvalues and eigenvectors of a matrix. 26. Represent a vector in space. 27. Compute dot and cross products in vectors. 28. Understand the meaning of del operator, gradient, divergence, and curl and to compute the del operation, gradient, divergence, and curl. 29. Learn about the vector functions.

	30. Convert from Cartesian to Polar coordinates and vice versa. 31. Sketch in polar system. 32. Utilize mathematical reasoning and critical thinking skills to analyze and interpret mathematical concepts and their applications in Electronics engineering. 33. Develop proficiency in mathematical problem-solving, both independently and collaboratively, and communicate solutions effectively.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Review of Complex Numbers:</u> The Argand diagram, Addition, Subtraction; Product, Quotient, power and roots, and Demoiver's Theorem. [4hrs] <u>Part B – Matrices and Determinants:</u> Matrices and Determinants: Definitions and notations, Properties, types of matrices, basic operations on matrices, computation of the determinants of matrices, properties of determinants. [8 hrs] Inverse of the Matrices. [4 hrs] Solution of the system of linear equations-solution of the system of linear equation using Cramer's rule, solution of the system of linear equation using the inverse method. [12 hrs] Revision problem classes [4 hrs] solution of the system of linear equation using Gauss Elimination Method. [4 hrs] Eigenvalues and eigenvector. [4 hrs] <u>Part C – Review of Vectors:</u> Representation of vectors in space (i;j;k), unit vectors, Scalar product, and Vector product. [8 hrs] <u>Part D – Vector Calculus:</u> Vectors – del operator, Parametric Equations of Lines in Space, the distance from a Point to a line in Space, plane equation in space, the Distance from the Point to a Plane, Angles Between Planes, vector function versus Scalar function, del operator, Gradient, Divergence and Curl. [12 hrs]

	Part E – Polar Coordinates: Polar coordinates – polar coordinate system, transformation between polar and Cartesian coordinates, graphs of polar equations. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module's major aim is to foster student engagement, improve critical thinking abilities, and promote collaborative learning. Interactive seminars, interesting tutorials, and exercises encourage active participation, allowing students to hone their critical thinking skills and apply engineering mathematics principles to problem solving. Furthermore, students collaborate on engineering mathematics issues, examine real-world scenarios, and explore the practical applications of the principles acquired through group activities, projects, and conversations. This method not only increases students' comprehension of engineering mathematical concepts, but it also fosters cooperation, communication, and key interpersonal skills that will be useful in their future engineering activities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.9
Total SWL (h/sem) 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	30% (30)	6 and 14	LO #1 - #11, #16- #19
	Assignments	1	10% (10)	13	LO #12-#15
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #11
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	The Argand diagram, Addition, Subtraction; Product, Quotient, power and roots, and Demoiver's Theorem.
Week 2	Matrices and Determinants: Definitions and notations, Properties, types of matrices, basic operations on matrices, computation of the determinants of matrices, properties of determinants.
Week 3	
Week 4	Inverse of the Matrices.
Week 5	Solution of the system of linear equations-solution of the system of linear equation using Cramer's rule.
Week 6	solution of the system of linear equation using the inverse method.

Week 7	solution of the system of linear equation using Gauss Elimination Method.
Week 8	Revision problem classes, Mid-term Exam
Week 9	Eigenvalues and eigenvector. [4 hrs]
Week 10	Representation of vectors in space (i;j;k), unit vectors, Scalar product, and Vector product.
Week 11	
Week 12	Vectors – del operator, Parametric Equations of Lines in Space, the distance from a Point to a line in Space, plane equation in space, the Distance from the Point to a Plane, Angles Between Planes, vector function versus Scalar function, del operator, Gradient, Divergence and Curl.
Week 13	
Week 14	
Week 15	Polar coordinates – polar coordinate system, transformation between polar and Cartesian coordinates, graphs of polar equations.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**"Higher Engineering Mathematics", 7th edition by John Bird**	No
	G. B. Thomas Jr., M. D. Weir, J. Hass, and F. R. Giordano, "Thomas' Calculus," 12th ed., Pearson, 2019.	Yes
Recommended Texts	**"Introduction to Linear Algebra". 4th edition by Strang, Gilbert** **"Linear Algebra for Everyone". 2020 by Strang, Gilbert** **Zill, D. G., Wright, W. S., & Cullen, M. R. (2011).** **Advanced Engineering Mathematics. Jones & Bartlett Publishers.**	No
Websites	https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010	

	https://www.khanacademy.org/math/linear-algebra https://www.ohio.edu/mechanical-faculty/williams/html/PDF/MatricesLinearAlgebra.pdf

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Physics of semiconductor**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE219				
ECTS Credits	6				
SWL (hr/sem)	111				
Module Level		1	**Semester of Delivery**		1
Administering Department		Electronic	**College**	Ninevah university	
Module Leader	Hamsa Fawaz Thanoon		**e-mail**	hamsa.thanoon@uoninevah.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date		04/07/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. To develop problem solving skills and understanding of Atomic Structure 2. To understand Energy band structure of metal, insulator, and semiconductor. 3. To understand Properties of intrinsic P and N type semiconductors. 4. To understand Electrical conduction in intrinsic semiconductor. 5. To understand Properties of extrinsic semiconductors. 6. To understand Electrical conduction in extrinsic semiconductor
Module Learning Outcomes	1. Recognize how semiconductors works in electronics circuits. 2. List the various terms associated with electronics circuits. 3. Summarize what is meant by a basic of semiconductors. 4. Discuss the reaction and involvement of semiconductors in generate the currents. 5. Describe mobility of electrons and conductivity in metals. 6. Define Ohm's law. 7. Identify the pure semiconductors. 8. Identify the impure semiconductors 9. Discuss the impure semiconductors N and P types 10. Explain the type of electronic emission.
Indicative Contents	Indicative content includes the following. Part A - Energy Bands in Solids Describe the structure of an atom ◆ Discuss insulators, conductors, and semiconductors and how they differ. [9 hrs] Revision problem classes [3 hrs]

	Part B - Transport Phenomena in Semiconductor Describe how current is produced in a semiconductor ◆ Describe the properties of n-type and p-type semiconductors. [30 hrs]

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills.

Student Workload (SWL)			
Structured SWL (h/sem)	111	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	65	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	**176**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10	[2,4,5,6]	LO (#1- #12)
	Assignments	2	10	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	20% (20)	10	LO #(1-8)
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Energy Bands in Solids
Week 2	Fermi-Dirac distribution function

Week 3	Properties of intrinsic P and N type semiconductors
Week 4	Mobility and conductivity
Week 5	Electrical conduction in intrinsic semiconductor
Week 6	Hall Effect
Week 7	Generation and recombination of charges
Week 8	Diffusion current continuity equation
Week 9	Injection minority carrier charges
Week 10	N-type semiconductor
Week 11	Solved problems
Week 12	P-type semiconductor
Week 13	Solved problems
Week 14	Photo-conductivity
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1.“NTEGRATEDELECTRONICS"ByMILLMAN&HALKIES 2. “SEMICONDUCTOR DEVICES & CIRCUITS" ،JOHN WILEY & SONS	Yes
Recommended Texts	1. (Floyed) 2. ثيراجا فصل ٥١	Yes

Grading Scheme

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Principle of Mechanical Engineering**			**Module Delivery**	
Module Type	**Base**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE203				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	2/07/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Students will be able to: 7. Students will be able to: 8. Knowing the different methods of making calculations related to forces and their effects on two- and three-dimensional systems 9. Clarify that the subject represents a very important introduction to other subjects for the later stages of the student's study and building a scientific base for the student to ensure the possibility of understanding the relevant subjects in the later stages. 10. The student will learn different applications of commonly used Mechanical machinery. 11. The student will learn strong basics of Mechanical Engineering fundamentals.
Module Learning Outcomes	1. Have understood and overcome any misconceptions about basic concepts in physics (force, energy, work etc). 2. Restate existing problem solving skills in a form more suitable for engineering applications. 3. Interpret basic engineering applications of mechanics in more detail. 4. Acquire four basic thinking skills: 1. Perceive, or resolve, contradictions involving their preconceptions about mechanics. 2. Organize the basic ideas of mechanics in a form suitable for problem solving. 3. Apply basic principles in mechanics to realistic engineering situations. 4. Solve realistic engineering problems.
Indicative Contents	**Indicative content includes the following:-** **Statics – Introduction [25 hrs]** ○ Vectors ○ Newton's Laws ○ Fundamental Units ○ Types of force ○ Parallelogram law ○ Resultant forces ○ Moments and couples ○ Moment of couples ○ Eequilibriums

	○ Free body diagram ○ Coplanar system ○ Friction: Nature of friction; Theory of friction; Coefficient of friction **Dynamics – Introduction [20 hrs]** ○ Basic concepts ○ Newton's Laws ○ Formulation and solution of problems ○ Kinematics of Particles ○ Rectilinear motion ○ Curvilinear motion ○ Relative motion ○ Kinetics of Particles ○ Newton's second Law ○ Work and energy -

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)			
Structured SWL (h/sem)	25	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	20	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	45		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	5% (5)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11

	Assignments	6	5% (5)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	0	0%		
	Report	0	0%	0	
Summative assessment	**Midterm Exam**	3hr	30% (30)	10	LO # 1-7
	Final Exam	3hr	60% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Force system; Units system;
Week 2	Parallelogram law; Forces + components
Week 3	Resultant of coplanar forces
Week 4	Components of force in space
Week 5	Moment of a force
Week 6	Moment of a force
Week 7	Moment of a force
Week 8	Free body diagram; Coplanar system
Week 9	Friction: Nature of friction; Theory of friction
Week 10	Coefficient of friction
Week 11	Coefficient of friction
Week 12	Coefficient of friction
Week 13	Normal and tangential components of acceleration
Week 14	Normal and tangential components of acceleration
Week 15	
Week 16	Normal and tangential components of acceleration

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. Engineering Mechanics (statics) By: J.L. MERIAM 2. Engineering Mechanics (Dynamics) By: J.L. MERIAM	Yes
Recommended Texts	➢	No
Websites		

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Semiconductor devices**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NEEM1225**				
ECTS Credits	6				
SWL (hr/sem)	111				
Module Level		1	**Semester of Delivery**		1
Administering Department		EI	**College**	NE	
Module Leader	Hamsa Fawaz Thanoon		**e-mail**	hamsa.thanoon@uoninevah.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date		04/07/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. To develop problem solving skills and understanding of Atomic Structure 2. To understand Energy band structure of metal, insulator, and semiconductor. 3. To understand Properties of intrinsic P and N type semiconductors. 4. To understand Electrical conduction in intrinsic semiconductor. 5. To understand Properties of extrinsic semiconductors. 6. To understand Electrical conduction in extrinsic semiconductor
Module Learning Outcomes	1. Recognize how semiconductors works in electronics circuits. 2. List the various terms associated with electronics circuits. 3. Summarize what is meant by a basic of semiconductors. 4. Discuss the reaction and involvement of semiconductors in generate the currents. 5. Describe mobility of electrons and conductivity in metals. 6. Define Ohm's law. 7. Identify the pure semiconductors. 8. Identify the impure semiconductors 9. Discuss the impure semiconductors N and P types 10. Explain the type of electronic emission.
Indicative Contents	Indicative content includes the following. Part A - Energy Bands in Solids Describe the structure of an atom ◆ Discuss insulators, conductors, and semiconductors and how they differ. [9 hrs]

	Revision problem classes [3 hrs] Part B - Transport Phenomena in Semiconductor Describe how current is produced in a semiconductor ◆ Describe the properties of n-type and p-type semiconductors. [30 hrs]

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills.

Student Workload (SWL)			
Structured SWL (h/sem)	111	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	65	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	**176**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10	[2,4,5,6]	LO (#1- #12)
	Assignments	2	10	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	20% (20)	10	LO #(1-8)
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	PN junction in equilibrium

Week 2	Volt Ampere characteristics; Temperature dependence
Week 3	diffusion capacitance
Week 4	Non-linear properties; Ideal diode; Basic theory and analysis of simple diode circuit; DC load line; Small signal analysis and concept of dynamic resistance; AC load line
Week 5	Diode capacitance ;Temperature effects of diode
Week 6	Different types of diodes (Zener; schottckey);
Week 7	(Varactor diode; Tunnel and negative resistance diodes).
Week 8	Circuit analysis of half wave and full wave rectifiers
Week 9	Bridge rectifier; Ripple and form factor calculations
Week 10	Types of filters; C filters , L filter ,L .C. filter, PIE filter; Analysis of filter and calculation of ripple and regulation.
Week 11	Solved problems
Week 12	Clipping and Clam Ping Circuit:
Week 13	Transistors: PNP; NPN
Week 14	The BJT as an Amplifier
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1: " SOLID STATE DIVICES" ،PHI; 4TH EDITION ،1995.By STREETMAN ، 2: "SEMICONDUCTOR DEVICES & CIRCUITS" ،JOHN WILEY & SONS ،1992.By : M.S. TYAGI 3: " ELECTRONICS DEVICES & CIRCUITS THEORY" ،HI; By BOYLSTED & NASHELSKY	Yes
Recommended Texts	3. (Floyed) 4. ثيراجا فصل ٥١	Yes

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Differential equations and linear algebra**		**Module Delivery**	
Module Type	**Base**		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NEEM2222**			
ECTS Credits				
SWL (hr/sem)				
Module Level	2	**Semester of Delivery**	1	
Administering Department	Electronics dept	**College**	Electronics engineering college	
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date		**Version Number**		

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This course covers the following topics: ordinary differential equations, sequences and series, solution of differential equations by power series, and matrix analysis. Those areas of mathematics which are most important in connection with practical problems for modeling different areas of science, computer can be easily utilized to find the properties of such systems.
Module Learning Outcomes	Upon successful completion, students will: 1. Improve their problem-solving skills. 2. Apply that knowledge toward practical problems in different areas of science. 3. Utilize the computer capabilities to solve such problems using proper methods. 4. Learn how to represent any function as a power series, then use computer to solve it. 5. Learn the importance of differential equations for modeling almost any system, and how to solve it to find the properties of that system. 6. Learn the linear algebra and its importance in science.
Indicative Contents	Ordinary Differential Equations. Sequences and Series. Solution of Differential Equations by Power Series. Matrix Analysis.

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Ordinary Differential Equations: 1. First order (variables separable, homogeneous, linear and exact). 2. Second order homogeneous. 3. Second order nonhomogeneous; indeterminant coefficients, variation of parameters.
Week 2	
Week 3	
Week 4	
Week 5	Infinite Sequences and Series: 1. Limit laws, indeterminate forms and L'hospital rule. 2. Infinite series; convergence test. 3. Power series; Taylor and Maclaurin series.
Week 6	
Week 7	
Week 8	
Week 9	Solution of Differential Equations by Power Series: Power series method, Legendre's equation; Legendre s polynomials.
Week 10	
Week 11	
Week 12	
Week 13	Matrix Analysis: 1. Review of matrix theory, solving system of equations; Cramer's rule, inverse of the matrix method, Gauss elimination.
Week 14	
Week 15	

	2. Eigen values and eigen vectors. 3. Diagonalization of matrices 4. Application of matrices to electric circuits.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Advanced Engineering Mathematics By KREYSIK	Yes
Recommended Texts	Calculus By Finney& Thomas	Yes
Websites		

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Digital Design			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEE223**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Electronic Eng. Dep.		**College**	Electronics Engineering	
Module Leader	Amer Talal Ali		**e-mail**		
Module Leader's Acad. Title	Lecturer assistant		**Module Leader's Qualification**		
Module Tutor	Amer Talal Ali		**e-mail**		
Peer Reviewer Name	Name		**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	15. To understand Advanced Minimization techniques for large number of bits to simplify the large designs. 16. Understand how to Design an Arithmetic and Logic unit. 17. Understand how to Design using programmable logic device. 18. To understand the sequential Logic Circuits. 19. To understand how to Design synchronous and asynchronous counters. 20. To understand the Design of Registers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Using Advanced Minimization techniques for large number of bits to simplify the large designs. 2. Design an Arithmetic and Logic unit. 3. Design using programmable logic device. 4. Design sequential Logic Circuits synchronous and asynchronous. 5. Design Registers. 6. Design synchronous and asynchronous counters.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – minimization techniques for large number of bits [14 hrs] Part B – Initialization to design and Design an Arithmetic and Logic unit. [14 hrs] Part C – Design using programmable logic device. [6 hrs] Part D – sequential Logic Circuits. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking and digital designing skills. This will be achieved through classes and interactive tutorials.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	60	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**120**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)

	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	2 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Digital Design
Week 2	The 5-Variable Karnaugh Map; The 5-Variable Karnaugh Map with don't care conditions
Week 3	Map Entered variable Karnaugh Map
Week 4	ADDITIONAL MINIMAZATION TECNHNIQUES: Tabular method; Quine-McCluskey
Week 5	Design using multiplexer: - Shannon Expansion
Week 6	top-down desigin of combainaonal CIRCUITS: - Gate Level: Adders; Subtractor
Week 7	Design an Arithmetic and Logic unit
Week 8	memory and type of memories
Week 9	Design using programmable logic device (PLD): - PROM; PAL; PLA;

Week 10	sequential LOGIC: - Type of flip-flops; Timing Diagram; Basic concepts of counters; Binary counters; BCD counters; Up down counter
Week 11	sequential LOGIC: -Design of counters using state diagrams and tables;
Week 12	sequential LOGIC: -Mealy and Moore Circuits;
Week 13	synchrous CIRCUITS: Shift left and right register; Registers with parallel load; Serial –in arallel-out (SIPO) and parallel-in-serial-out (PISO).
Week 14	synchrous CIRCUITS: Shift Registers; Twisted Ring Counter; Maximum Length Shift Counter.
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	"Digital and analog communication" 2001 By L. W. Couch Sixth Edition	Yes
Recommended Texts	- Digital Communications Fifth Edition, 2008, John G. Proakis, and Masoud Salehi. Introduction to Communication Systems" 1992 By F. Stremler. -ELEMENTS OF INFORMATION THEORY" 2006 By THOMAS M. COVER and JOY A. THOMAS -Digital Communication, 2004 by Abbas Kattoush.	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**

Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**ELICTROMAGNETIC FIELDS**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE221				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		2	**Semester of Delivery**		2
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	SINAN KHALID SHANSHAL		**e-mail**	**sinan.mohammed@uoninevah.edu.iq**	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		02/07/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	To develop knowledge of the laws governing the behavior of magnetic and electro-magnetic fields, and to relate the laws governing the fields to applications in a range of electrical and electronic engineering application.
Module Learning Outcomes	On completion of the course the students should be able: • to have detailed knowledge of the physical background and terminology of the electromagnetic field theory for electrical engineering problems • to understand the electromagnetic field behavior • to select and use appropriate theoretical models for analysis, problem solving and finding solutions related to the electrostatic, magnetostatic and electromagnetic fields • to understand how laws of electromagnetism can be applied to problems arising in engineering.
Indicative Contents	Magnetic field and Ampere's Law Magnetic flux and Gauss's Law for magnetic fields Faraday's Law Inductance Maxwell's equations Applications of Electromagnetics

Learning and Teaching Strategies	
Strategies	Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

Student Workload (SWL)			
Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	?	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	?		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	15% (10)	5,8,10,12	LO #1-5,6-7, 9 and 11
	Assignments	4	15% (10)	6,9,11,13	LO # 1-5, 6, 10 and 12
	Projects	0	0% (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-8
	Final Exam	3hr	50% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Review of Vector Calculus
Week 2	Review of Vector Calculus
Week 3	Boit – Savart law
Week 4	Amperes law; Magnetic Flux & Magnetic Flux Density
Week 5	Inductance
Week 6	Force on Moving Charge; Force on Differential Current. Elements
Week 7	Force and Torque on a Closed Circuit
Week 8	Magnetization and Permeability; Magnetic Boundary Conditions; Magnetic Circuit.
Week 9	Faraday's Law;
Week 10	Maxwell's Equations
Week 11	Example of Maxwell's Equations
Week 12	Wave Equations; Wave Propagation in Lossy Dielectrics
Week 13	Plane Waves in Lossless Dielectrics; Plane Waves in Free Space
Week 14	Plane Waves in Good Conductors;
Week 15	Power and the Poynting Vector.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1-ENGINEERING ELECTROMAGNETICES, Mc- Graw Hill, By WILLAIM H. HAYT. 2-Elements of engineering electromagnetic, Prentice Hall, By Matthew N. O. SADIKU	No
Recommended Texts	1-Electromagnetics (Schaum's Outlines), McGraw-Hill Education, By Edminister, Joseph_ Nahvi, Mahmood.	No
Websites		

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	ElectronicI			**Module Delivery**	
Module Type	core			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	NVEEELM313				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		1	**Semester of Delivery**		1
Administering Department		Electronics	**College**	Electronic Engineering college	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Assistant Prof.	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	Ahmad.younis@uoninevah,edu,iq	
Scientific Committee Approval Date		12/06/2023	**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	NEEI2212	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	12. To understand the basic analysis of bipolar transistor amplifier 13. To be familiar with the dc and ac analysis of transistor amplifier 14. To understand the dc and ac analysis of FET amplifier 15. To illustrate and to understand the frequency response of amplifier 16. To understand the basic concept of feedback concept 17. To be able to deal with different feedback amplifier topologies 18. To study the advantages of negative feedback on amplifier performance 19. To be familiar with feedback amplifier ac analysis 20. To understand the construction and ideal characteristic of operational amplifier 21. To study and analyze op-amp equivalent circuit 22. To be familiar with basic op-amp applications 23. To start with studying power electronic devices
Module Learning Outcomes	5. Understand and apply the basic theory and operation of transistor amplifiers 6. Define and explain the frequency response of bipolar transistor amplifier 7. Understand the basic concept of negative feedback 8. Understand and analyze the feedback amplifier 9. Understanding the operation of ideal operational amplifier 10. Dealing with dc and ac op-amp equivalent circuit 11. Understanding the basic application of op-amp 12. Power electronic devices principle overview

Indicative Contents	**Transistor and FET amplifier analysis:** Small signal model analysis, low frequency and high frequency analysis, hybrid model, hybrid -Pi model analysis. **Amplifier with negative feedback:** Basic concept, feedback analysis, feedback configurations, Feedback effects on gain , bandwidth, input and output resistances **Operational amplifier:** Ideal Op-amp equivalent circuit; Operational Amplifier Specification; Circuit analysis of an Op-amp; Closed loop Op-amp Circuit (Inverting and Non-Inverting Circuit). **Op-amp Applications:** Summation & subtraction Circuit, Differential circuit Buffer circu Ideal and practical Integrator circuits, ideal and practical Differentiator circuits, Examples. **Power electronic devices:** UJT Construction, Operation and characterises; Thyrsistor Equivalent Circuit ; Thyrsistor Characteristics and operation ; Application of the devices.

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	101	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	175		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Small signal model analysis
Week 2	Low and high frequency response of transistor amplifier
Week 3	Hybrid and hybrid-Pie equivalent circuit analysis
Week 4	Negative feedback concept and analysis
Week 5	Advantages of negative feedback on amplifier

Week 6	Amplifier feedback topologies
Week 7	Feedback effect on amplifier gain, bandwidth, and on input-output resistances
Week 8	operational amplifier construction and operation
Week 9	ideal and practical op-amp equivalent circuit
Week 10	Inverting and non inverting closed loop amplifier
Week 11	Integration and differentiation active circuits
Week 12	Summation and subtraction op-amp circuits
Week 13	UJT transistor construction
Week 14	Thyristor equivalent circuit and characteristics
Week 15	Subject review
Week 16	**Subject review**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor amplifier frequency response at lo and high frequency** **To measure the effect of feedback on amplifier performance** **To measure the performance of different op-amp circuits.**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Electronic Devices By Millmann Electronic Devices By Floyd	yes
Recommended Texts	**SOLID STATE DIVICES", PHI; 4TH EDITION**, 1995.By STREETMAN, **SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992**.By : M.S. TYAGI	Yes
Websites	Electronic circuits	

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Electronic II**			**Module Delivery**	
Module Type	**core**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**NVEE223**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Electronics		**College**	Electronic Engineering college	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	Ahmad.younis@uoninevah,edu,iq	
Scientific Committee Approval Date	12/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	NEEI1223	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	24. To understand the basic theory and operation of bipolar transistor 25. To be familiar with current mechanism in an npn and pnp transistors 26. To concentrate transistor physical and electrical characteristics 27. To illustrate and design different dc biasing circuits 28. To understand the biasing stability conditions 29. To be able to deal with the mathematical behavior of transistor model 30. To understand small signal analysis of transistor amplifier 31. To deal with different transistor amplifier configuration 32. To be able to deal with the frequency response of transistor amplifier 33. To understand the basic operation of field effect transistor and MOS device 34. To understand the dc and ac behavior of FET and MOS amplifiers
Module Learning Outcomes	13. Understand and apply the basic theory and operation of transistor amplifiers 14. Define and explain the electrical characteristic of bipolar transistor 15. Understand the basic structure of npn and pnp transistors 16. Understand and analyze the electrical transistor model 17. Understanding the dc and ac analysis of transistor amplifier 18. Dealing with dc biasing and ac amplifiers 19. Understanding the effect of frequency on amplifier response 20. Familiar with other FET and MOS circuits

Indicative Contents	**Bipolar junction transistors,** Transistor construction, transistor operation, NPN & PNP Bipolar Transistor; Current Flow Mechanism in Transistor Junctions; Transistor configurations; Current Gain Calculation [Alpha] and [Beta]; Transistor input/ output characteri DC Load line ; Operating point; Different DC circuit biasing. Bias circuit, voltage divider circu bias with feedback **DC biasing,** Operating point, fixed bias circuit, emitter bias circuit, voltage divider circuit, dc bias with feec **Biasing stability** Stability factor analysis due to temperature variation (Effect of Ico, Vbe and Beta); Temperat compensation using diode biasing. **Small signal analysis,** Small signal equivalent circuit for CB, CE and CC configuration; Input/Output resistance; Calcul of current and voltage Gain in small signal amplifier; Graphical Analysis for voltage gain; Hybric parameters to analyze transistor circuits. **Field Effect Transistor (FET) and MOS transistor :** **FET biasing configurations, Depletion and Enhanced mode operation,** Introduction to the theory and operations of JFFT & MOSFET; FET Transistor configur Transistors transfer characteristics; Amplifier Circuit Biasing; transistor Equivalent circuit; signal analysis of FET transistor. **FREQUENCY RESPONSE:** Definition and Concepts; Gain in decibel; Bode plot for the gain; The effect of the Coupling capacitor; Low frequency analysis due to the R-C Coupled amplifier in BJTs; the Effect of emit bypass capacitor**;** Calculation of the Low cut-off frequency. Transistor amplifier at high frequen Hybrid PIE equivalent circuit at high frequency; High frequency behavior of CB & CE amplifi High cut-off frequency; Gain Band-Width products for the above circuits; FET at high frequenc CD and CS amplifier at high frequency; .

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	88	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	76	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	164		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Transistor construction and operation
Week 2	Bipolar transistor current flow mechanism
Week 3	Transistor configurations, current gain calculation, and input and output resistances
Week 4	Dc biasing circuits, operating point calculation
Week 5	Biasing stability, stability factor calculation
Week 6	Temperature compensation using diode biasing
Week 7	Small signal equivalent circuit for CB, CC, CE configurations
Week 8	Calculation of voltage and current gains
Week 9	Hybrid model ac analysis of transistor amplifier

Week 10	FET and MOS transistors operation
Week 11	FET biasing configurations
Week 12	Depletion and enhancement mode operation
Week 13	Definition and analysis of amplifier frequency response
Week 14	Low frequency and high frequency analysis
Week 15	Hybrid-Pie equivalent circuit at high frequency
Week 16	**Subject review**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor amplifiers to measure the current and voltage gains.** **To measure the input and output amplifier resistances** **To measure the amplifier frequency response.**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**Textbook1:INTEGRATEDELECTRONICS"MCGRAWHILL;9THREPRINT,1995**.ByMILLMAN&HALKIES **2: " ELECTRONICS DEVICES AND COMPONENTS", PITMAN,** 1995 By MOTTERSHED,. ,	yes
Recommended Texts	**3: " SOLID STATE DIVICES", PHI; 4TH EDITION**, 1995.By STREETMAN, **4" SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992**.By : M.S. TYAGI	Yes
Websites	Electronic circuits	

Grading Scheme

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**ELICTROSTATIC FIELDS**	**Module Delivery**	
Module Type	**Base**		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	NVEE215		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	SINAN KHALID SHANSHAL	**e-mail**	**sinan.mohammed@uoninevah.edu.iq**
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	02/07/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	To develop knowledge of the laws governing the behavior of electric fields, and to relate the laws governing the fields to applications in a range of electrical and electronic engineering application.
Module Learning Outcomes	On completion of the course the students should be able: • to have detailed knowledge of the physical background and terminology of the electrostatic field theory for electrical engineering problems • to understand the electrostatic field behavior • to select and use appropriate theoretical models for analysis, problem solving and finding solutions related to the electrostatic fields • to understand how laws of electrostatic can be applied to problems arising in engineering.
Indicative Contents	Electric charge and the electric field Electric flux density and Gauss's Law Electric potential Electric field in matter and boundary conditions Capacitance

Learning and Teaching Strategies	
Strategies	Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

Student Workload (SWL)			
Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	?	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	?		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	15% (10)	5,8,10,12	LO #1-5, 9 and 11
	Assignments	4	15% (10)	6,9,11,13	LO # 1-5, 6, 10 and 12
	Projects	0	0% (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-8
	Final Exam	3hr	50% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Review of Vector Calculus
Week 2	Review of Vector Calculus
Week 3	Experimental law of coulomb; Electric field intensity;
Week 4	Field of a continuous and volume charge distributions; line charge and sheet charge;
Week 5	Field of a continuous and volume charge distributions; line charge and sheet charge;
Week 6	Electric flux density; Gauss's law;
Week 7	Application of Gauss's law; some symmetrical charge distributions.
Week 8	Energy expended in moving a point charge in an electric field;
Week 9	Definition of potential difference and potential;
Week 10	Potential field of a point charge and system of charges; Potential gradient.
Week 11	Conductor Properties and boundary conditions;
Week 12	Nature of Dielectric Materials; Boundary Conditions for Perfect dielectric Materials;
Week 13	Capacitance; Several Capacitance Examples.
Week 14	Poisson and Laplace 's equations; Examples of the solution of Laplace equation
Week 15	Examples of the solution of Laplace equation; Examples of the solution of Poisson's equation.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered

Week 1-15	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1-ENGINEERING ELECTROSTATICES, Mc- Graw Hill, By WILLAIM H. HAYT. 2-Elements of engineering electrostatic, Prentice Hall, By Matthew N. O. SADIKU	No
Recommended Texts	1-Electrostatics (Schaum's Outlines), McGraw-Hill Education By Edminister, Joseph_ Nahvi, Mahmood.	No
Websites		

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Engineering analysis**		**Module Delivery**	
Module Type	**Base**		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NEEM2211**			
ECTS Credits				
SWL (hr/sem)				
Module Level	2	**Semester of Delivery**		1
Administering Department	Electronics dept	**College**	Electronics engineering college	
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date		**Version Number**		

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This course covers the following topics: Multiple Integrals, Vectors Functions, Numerical Analysis, Statistics and Probability. Those areas of mathematics which are most important in connection with practical problems for modeling different areas of science, computer can be easily utilized to find the properties of such systems.
Module Learning Outcomes	Upon successful completion, students will: 7. Improve their problem-solving skills. 8. Apply that knowledge toward practical problems in different areas of science. 9. Utilize the computer capabilities to solve such problems using proper methods. 10. Learn how to deal with geometry in 3D; find areas and volumes. 11. Solve ordinary and differential equations numerically. 12. Learn the importance of probability and statistics in everyday use.
Indicative Contents	Vectors Functions Multiple Integrals Numerical Analysis Statistics Probability

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Vectors: Vector in space, dot and cross product. Lines and planes in space. Vector valued functions and motion in space: position, velocity and acceleration, tangential vectors, curvature and normal vector.
Week 2	
Week 3	
Week 4	
Week 5	Multiple Integrals: Double Integral in rectangular coordinates, areas and volumes. Double Integral in Polar Coordinates, areas and volumes. Triple Integrals in rectangular, cylindrical, and spherical coordinates, volumes.
Week 6	
Week 7	
Week 8	
Week 9	Numerical Analysis: Solution of non-linear equations by iteration; bisection and Newton-Raphson. Numerical Integration; trapezoidal rule. Numerical solution of 1st order ordinary differential equations; Euler's method.
Week 10	
Week 11	
Week 12	
Week 13	Statistics and Probability: Definitions, mutually exclusive and conditional probability, permutations and combinations Probability distribution: binomial, normal and Poisson distributions.
Week 14	
Week 15	

Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Advanced Engineering Mathematics By KREYSIK	Yes
Recommended Texts	Calculus By Finney& Thomas	Yes
Websites		

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Human Physiology**	**Module Delivery**	
Module Type	**Base**	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEEELM 316**		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	1
Administering Department	Electronics dept	**College**	Electronics engineering college
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This subject introduces engineering students to human anatomy and physiology, with direct application of the knowledge to considerations for designing and manufacturing medical devices and equipment to assist in overcoming physical disabilities.
Module Learning Outcomes	Upon completion this unit, the student should be able to: 1. Demonstrate correct usage of the terminology used to describe anatomical structures. 2. Describe the organization of cells and tissues. 3. Describe the principles relating to the structure of connective tissues, skeletal muscle, bones and joints. 4. Describe the principles of excitable tissues. 5. Describe the structure and function of the human eye and ear and the mechanisms of vision and hearing. 6. Describe the principles of sensorimotor control. 7. Describe cardiac mechanics and cardiac biophysics. 8. Describe the application of technologies and techniques for investigating the structure and function of the body.
Indicative Contents	Anatomical terminology. The structure and appearance of cells and tissues.

	The appearance of bone and cartilage, the organization of dense connective tissues. Skeletal muscle structure and function. Principles of excitable tissues. The structure and function of sensory systems, including the eye and vision and the ear and hearing. Principles of sensory motor control. Cardiac mechanics and cardiac biophysics. Technologies, quantitative measurements and experimental techniques used to investigate the structure and function of different tissues, organs and organ systems.

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)			
Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	

Total SWL (h/sem)	

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Cells and their function
Week 2	Tissues, glands & membranes
Week 3	Muscle tissue
Week 4	The skeleton
Week 5	Nervous system
Week 6	Sensory
Week 7	Respiration
Week 8	The eye
Week 9	The joints
Week 10	The skin
Week 11	Digestive system
Week 12	The urinary system and body fluids
Week 13	The heart
Week 14	Blood
Week 15	Blood vessels Blood clotting
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Programming			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	NVEE215			☒ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	2	**Semester of Delivery**	2		
Administering Department	Dept. of Electronic Eng. (Med. Ele)	**College**	College of Electronic Engineering		
Module Leader	Qais Thanon	**e-mail**	Qais.najim@uoninevah.edu.iq		
Module Leader's Acad. Title	Porf.	**Module Leader's Qualification**	Ph. D.		
Module Tutor	Name (if available)	**e-mail**	E-mail		
Peer Reviewer Name	Name	**e-mail**	E-mail		
Scientific Committee Approval Date	20/06/2023	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Learning about the algorithms types and how building the algorithms. 2. Learning how to command computers to perform tasks using C++ language (Programming/coding). 3. Become acquainted with the designed programming including sequencing, condition and iteration. 4. Learn about the 1d and 2d arrays in C++ language. 5. Learn about the functions in C++ language. 6. Learn about the strings in C++ language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the meaning of the algorithms in programming languages. 2. Understanding the basics concepts of C language programming such as variables, data types, operators, control 3. Understanding the utilities of each one of sequencing, condition, and loops, and basic input/output operations. 4. Understanding how represent the data in 1d arrays and 2d arrays. 5. Learn about how the strings represented in C language. 6. Learn about divide any problem in sub-program and execute this problem by using function. 7. In advance practical experience by working on programming exercises and projects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Visualization via flowchart and Pseudocode [4 hrs] • Keyworks, identifier, format specifier, and naming variables and constants [8 hrs] • Use standard libraries to take input and display output [8 hrs] • Operators in C++ programming [10 hrs] • Priorities in C++ programming [4 hrs]

	• Math functions [4 hrs] • Conditional operations [8 hrs] • Iterations (Loop operators) [10 hrs] • Arrays [10 hrs] • Functions [8 hours] • Review classes and problem solving [8 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy being focused on is developing conceptual programming thinking, meanwhile refining and expanding their mathematical thinking skills. This will be achieved through classes, online lectures, interactive tutorials. Additionally, working on complex projects that challenge students' skills and require to apply advanced concepts. Such projects would help students exploring various aspects of C++ programming and gain hands-on experience in solving complex problems. some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	77	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	73	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

Formative assessment	**Assignments**	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to computer languages and the structure of C program
Week 2	Flowchart and Pseudo-code
Week 3	Introduction to C++ programming: Declare variables and constants
Week 4	Take input and print output
Week 5	Assignment and Increment ,Decrement, Arithmetic, Logical, and Bitwise operators
Week 6	Standard math functions in math header <math.h>
Week 7	Priorities of operators in C++ programming
Week 8	Relational and conditional operators
Week 9	Mid-term Exam
Week 10	If statement versus switch case statement
Week 11	Examples of structured programming (sequencing and condition)
Week 12	Loop operators (For, while, do-while)
Week 13	Arrays

Week 14	Functions
Week 15	String of characters
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Learn the C++ language program complier.
Week 3-4	Declare variables and constants and <iostream.h> including standard functions
Week 5-6	Arithmetic, logical, and bitwise operators
Week 7-8	Math header for math functions <math.h> and Assignment and increment & decrement operators
Week 9-10	Relational and conditional operators and Loop operators
Week 11-12	Examples about the Arrays
Week 13-14	Examples about Functions and string

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	C Programming Absolute Beginner's Guide, 3rd Edition 2014. BY: Greg Perry and Dean Miller.	Yes
Recommended Texts	C How to Program with an introduction to C++, 8th Edition 2016. *BY: Paul Deitel and Harvey Deitel.* Global Edition contribution by Piyali Sengupta	No
Websites	1- https://www.programiz.com/c-programming 2- https://www.coursera.org/specializations/c-programming	

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Signal Analysis**	**Module Delivery**	
Module Type	**Core**	**Theory** **☒ Lecture** **Lab** **☐ Tutorial** **☐X Practical** **☐ Seminar**	
Module Code	NVEEELM212		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	**Semester of Delivery**	3
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	25/06/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Student will be able to: 21. identify signals concepts . 22. understand the classification of signals . 23. understand the different operations on signals. 24. perform Fourier and Laplace transformations of signals.
Module Learning Outcomes	34. Definition of the signal concept. 35. Introduction of mathematical models. 36. Explain Continuous time signals. Discrete time signals. 37. Categorize the signals. 38. Achieve operations on signals. 39. Introduction of basic signals. 40. Define convolution operation between two signals. 41. Introduction of frequency domain and Fourier analysis. 42. Laplace Transformation.
Indicative Contents	Indicative content includes the following. Introduction to signals: - Definition and mathematical models. - Categorization of signals. - Operation on signals. - Basic types of signals. Convolution operation: - Introduction of convolution. - Convolution properties. Signal transformation: - Fourier series and transform. - Laplace Transform.

Learning and Teaching Strategies

Strategies	To make students interesting with both types of signals: continuous and discrete. Also with classifications of signals and operations on them. To make them familiar with time and frequency domain and analysis of a signal . Also to make them familiar with different types of transforms of signals. Also to make them have an experience with solving different problems and examples .

Student Workload (SWL)

Structured SWL (h/sem)ل	64	**Structured SWL (h/w)** ا	4
Unstructured SWL (h/sem)	86	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	**150**		

Module Evaluation

		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11

	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Basic definitions. Mathematical models.
Week 2	Continuous time signals
Week 3	Discrete time signals
Week 4	Signal classifications
Week 5	Energy and power of signals
Week 6	Basic operations on continuous signals.

Week 7	Basic operations on discrete signals.
Week 8	Time domain representation of continuous signals; sinusoidal and complex exponential signals
Week 9	singularity function signals
Week 10	Convolution definition and operation
Week 11	Convolution properties
Week 12	Frequency domain representation of continuous signals. Spectra and bandwidth of the signal
Week 13	Fourier series representations of periodic signals.
Week 14	Fourier transform representations of non periodic signals.
Week 15	Laplace Transform of continuous signals. Laplace properties.

Learning and Teaching Resources

	Text	Available in the Library?

Required Texts	**Signals and Systems. Simon S. Haykin**	Yes
Recommended Texts	**Signals and linear Systems. G. E. Carlson**	

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Signals and Systems**			**Module Delivery**	
Module Type	**Core**			**Theory** **☒ Lecture** **Lab** **☐ Tutorial** **☐X Practical** **☐ Seminar**	
Module Code	NEEM2321				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		1	**Semester of Delivery**		4
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		25/06/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Student will be able to: 25. identify systems concepts . 26. understand the properties of systems . 27. understand the mathematical relation between input and output of a system. 28. deal with Fourier and Laplace analysis of systems. 29. perform z-transform of discrete signals .
Module Learning Outcomes	43. Definition of the system concept. 44. Introduction of mathematical models. 45. Explain Continuous time systems. Discrete time systems. 46. Introduction of frequency response of systems. 47. Definition of filters. 48. Explain Ideal filters, Non ideal filters, and Butterworth filter design. 49. Define Z-transform of discrete signals. 50. Analyze of continuous system using Laplace Transform. System transfer function. 51. Definition of transfer function of a discrete system.
Indicative Contents	Indicative content includes the following. Introduction to systems: - Definition and mathematical models. - Properties of systems. Transformation used with continuous systems - Fourier transforms. - Filters. - Laplace transform. Z-transform: - Introduction of z- transform of discrete time signal. - Z-transform used with discrete systems. Convolution used for - Continuous systems. - Discrete systems

Learning and Teaching Strategies	
Strategies	To make students interesting with both types of systems: continuous and discrete. Also with properties of systems and operations . To make them familiar with time and frequency domain and analysis of a system. Also to make them familiar with different types of transforms of systems. Also to make them have an experience with solving different problems and examples.

Student Workload (SWL)			
Structured SWL (h/sem)ل	62	**Structured SWL (h/w)** ا	4
Unstructured SWL (h/sem)	88	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	**150**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Basic definitions. Mathematical models.
Week 2	Continuous time systems.

Week 3	Discrete time systems.
Week 4	System properties.
Weeks 5	Mathematical system representation in time domain: Convolution representation.
Week 6	Convolution properties.
Week 7	System description by linear constant coefficient differential equations.
Week 8	Frequency domain analysis of continuous system.
Week 9	Frequency response of a system.
Week 10	Frequency response of electrical circuits.
Week 11	Ffilters. Distortion less transmission.
Week 12	Ideal filters. Non ideal filters. Butterworth filter design.
Week 13	Analysis of continuous system using Laplace Transform.
Week 14	System transfer function.
Week 15	Analysis of discrete system using z-Transform. System transfer function.

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	**Signals and Systems. Simon S. Haykin**	Yes
Recommended Texts	**Signals and linear Systems. G. E. Carlson**	

Grading Scheme

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Technical English**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NV11				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	NV	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Noor Mothafar Hamid		**Module Leader's Qualification**	MS.D.	
Module Tutor	Name (if available)		**e-mail**	noorm.hame@duoninevah.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	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	35. To develop skills, reading, writing and understanding of English language through the application of teaching techniques. 36. To understand scientific subjects and technical terms through reading and comprehension. 37. This course deals with the basic concepts of scientific subjects. 38. This course handles how to write simple research and how to make a successful presentation. 39. To understand the scientific language in English.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	21. Recognize parts of speech and tenses in English language. 22. List the various terms associated with scientific texts. 23. Summarize what is meant by a basic electric circuit. 24. Discuss Electric currents, series and parallel circuits. 25. Describe electrical power, charge, and current. 26. Discuss computers, communication and the future of computers.. 27. Identify the basic circuit elements and their applications. 28. Explain energy types and forms. 29. Discuss the various properties of radio waves and vacuum tubes. 30. Explain modulation. 31. Discuss Electromagnetism.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1.parts of speech _verb _ noun _ pronoun 2.Tenses _Past _Present _future

	3.Electric currents and circuit _AC/DC _parallel, serious _Grounding, fuse, short circuit 4.Radio waves and vacuum tubes 5. Electromagnetism. 6. The future of computers, communication applications. _fiber optics. 7. Induction. _Electric generator _Electric transformer _self-induction _servomechanism 8. Incandescent lamp. 9. Energy. _types of energy _forms of energy 10. Introduction to electron and electricity. 11.Electricity and electronics.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation by reading, writing and comprehension in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, presentation, interactive tutorials, 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	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	4,6	LO #1, 2, 3,4 ,5and 6
	Assignments	2	10% (10)	9, 12	LO # 7,8,9,10,11and 12
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 13,14
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO #
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Parts of speech
Week 2	Tenses
Week 3	Electric currents and circuit
Week 4	Radio waves and vacuum tubes
Week 5	The future of computers, communication applications.
Week 6	Induction -Electric generator -Electric transformer
Week 7	Mid-term Exam
Week 8	Induction -Self-induction

	-Servomechanism
Week 9	Incandescent lamp.
Week 10	Energy. -types of energy -forms of energy
Week 11	Introduction to electron and electricity.
Week 12	Electricity and electronics
Week 13	The cathode ray tube
Week 14	Propagation
Week 15	Modulation
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	English in electrical engineering and electronics. The language of electrical and electronic engineering in English.	Yes

Recommended Texts	English for electrical engineering and computing.	No
Websites	https://www.askoxford.com/betterwriting/succesfulcv/application/?view=uk	

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	Communication principles			**Module Delivery**	
Module Type	Base			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE222				
ECTS Credits	٤				
SWL (hr/sem)	١٠٠				
Module Level		1	**Semester of Delivery**		7
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Dr. Ehab Isam Dawood Al-rawachy-		**e-mail**	**Ehab.dawood@uoninevah.edu.iq**	
Module Leader's Acad. Title		Lectural.	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		15/10/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	The aim of this module is to help students to understand principles of communications engineering. In this course, they can start to learn the fundamental of communication. This basis start with detailed knowledge of transmission lines and Analogue communications, the later include amplitude modulations and angle modulation. The module develops an analytical approach of a communication system design to give students a basis of understanding a communication's background and they can continue to an advance communications engineering of the next course .
Module Learning Outcomes	Students will be able to: 1. Explain the theory of Transmission line and their equivalent circuit's representation. 2. Realize the difference between matching and mismatching scenario in of Transmission line. 3. Understand the difference between the lossless and lossy transmission lines cases. Using zigzag diagram to show the incident and the reflected waves, plot the voltage and the current at the load. 4. Understand the input impedance and their calculations. 5. Use the smith chart to find and approximated values and compare it with the calculations. 6. Solve the mismatch case in a transmission line using stubs. 7. Understand the analogue modulations theory, the importance and their types. 8. Explain the AM transmitters, equations, plot the spectrum of the generated AM signal and the development of each AM type. 9. Learn the modulation index and it's effect on the Am signal. 10. Explain the AM receivers, equations and the development of each type. 11. Understand the importance of an Angle modulations and their types 12. Explain the FM transmitters, generation of the FM signal using direct and indirect methods. 13. explain the narrow band and wide band FM signal and plot their spectrum. 14. Learn the importance of FM modulation index and it's effect on the Fm signal. 15. Explain the FM receivers, equations and the development of each type.
Indicative Contents	**Indicative content includes the following:-** **Transmission lines:** Equivalent circuit, characteristic impedance, phase velocity, reflection coefficient, standing waves, quarter – wave transformer, smith chart calculation a matching. **Amplitude Modulation** ; Equation for AM, modulation index, spectrum of AM, DSB transmission with and without carriers, VSB transmission, DSB amplitude modulators, Envelope detectors, Balanced Modulator, SSB signal generation and Demodulation schemes. **Frequency modulation**: Equations for FM, modulation Index, spectrum calculation for sinu waveform and Bessels function table, phase modulation, relationship between FM and PM, frequency modulators (Armstrong method) Types of noise in AM and FM systems.

Learning and Teaching Strategies	
Strategies	To make students familiar with the principles of Communications, the effect of transmission line to the communication system. Students will be familiar with the theory of Analogue Communication systems. students can use their acquired knowledge in the class and apply it at the laboratory to do an experiment easier. Also, they can collect their reading and analyze it based on their theory behind.

Student Workload (SWL)			
Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction To a communications System, a detailed Introduction to transmission line.
Week 2	derivation of lossless transmission line, Study the zig-zag diagram.
Week 3	Study A Lossy Transmission Lines with NO Refection (Matching case), Study the Interference and Standing Waves Patterns
Week 4	Study the Transmission Lines with Reflection. Derive the Input Impedance of lossy Transmission Lines.
Week 5	Study The Complex Reflection coefficient ($\boldsymbol{KR}$) for Lossless TL, introduction Impedance Matching
Week 6	**Smith Chart**
Week 7	An introduction to Smith Chart Learn how to use it.
Week 8	Learn of a Quarter Wave Transformer for Complex Load, Parallel Matching Using Single Stub.
Week 9	**Amplitude Modulation:**
Week 10	introduction to a modulation, Explain the AM transmitters, equations, plot the spectrum of the generated AM signal and the development of each AM type. Learn the modulation index and it's effect on the Am signal. Explain the AM receivers, equations and the development of each type
Week 11	
Week 12	
Week 13	**Angle Modulation:**
Week 14	Understand the importance of an Angle modulations and their types, Explain the FM transmitters, generation of the FM signal using direct and indirect methods. explain the narrow band and wide band FM signal and plot their spectrum. Learn the importance of FM modulation index and it's effect on the Fm signal. Explain the FM receivers, equations and the development of each type.
Week 15	
Week 16	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Fundamental of applied electromagnetic b fawaz T. vilaby Arabic book "Communication Principles" by Dr. Sami AbdulMawjood, Dr.Khalil Hasan Said Mariyee, and Dr. Bayez Alslevani) Introduction to Communication System By Stremler Introduction to Analog and Digital Communication System By Haykin	
Recommended Texts	Communication Systems Engineering 2nd-5th Editions by Praokis	

Websites		

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**DIGITAL SIGNAL PROCESSINGI**			**Module Delivery**	
Module Type	**Core**			**Theory** **☒ Lecture** **Lab** **☐X Tutorial** **☐ Practical** **☐ Seminar**	
Module Code	NVEE204				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Signals and systems	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	30. To identify digital signal processing system. 31. To understand continuous, discrete, periodic and non-periodic signals. 32. To understand the transformation of signals and the different between them. 33. To perform spectrum of signals.
Module Learning Outcomes	52. Explain the function of each block in DSP system. 53. Covert the signals from continues to discrete form and then reconstruction. 54. Find impulse response, unit step response and difference equation 55. Define discrete Fourier series. 56. How can find the spectrum for periodic and non-periodic signals 57. Explain the different between transformation method. 58. Find and explain the equation of the transfer function in frequency domain 59. Define z-transform, region of convergence and the relationship between frequency and z-domain. 60. Find poles, zeros and the stability of transfer functions.
Indicative Contents	Indicative content includes the following. <u>Part A – block diagram of DSP system</u> Input signals, ADC, sampling, sampling frequency, maximum frequency, bit rate, number of bits, quantization, coding, SNR, reconstruction signals, anti-aliasing, output signals, Impulse and step responses, difference equations. [8 hrs] <u>Part B - transformations</u> Periodic and non-periodic signals, Fourier series, double side band spectrum. [4 hrs]

	Time-domain, frequency-domain, DTFT, IDTFT, magnitude and phase spectrum, DFT-N point and FFT, number of multiplication and addition, butterfly method, property of each transformation, transfer function. [24 hrs] z-transform, region of convergences, transfer function in z-domain, poles and zeros, stability, IZ-transform, long division, partial fraction, property of z-transform. [16 hrs]

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

Student Workload (SWL)			
Structured SWL (h/sem)ل	50	**Structured SWL (h/w)** ١	4
Unstructured SWL (h/sem)	75	**Unstructured SWL (h/w)**	1

Total SWL (h/sem)	**125**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Block diagram of DSP system
Week 2	Difference equations and impulse response
Week 3	Fourier Analysis
Week 4	Discrete-Time Fourier Transform
Week 5	DTFT Properties and IDTFT
Week 6	Transfer function in frequency domain
Week 7	Mid term
Week 8	DFT_N points transform and IDFT_N points
Week 9	Fast Fourier Transform and IFFT
Week 10	Fast Fourier Transform Properties and transfer function
Week 11	Z-transform and region of convergence
Week 12	Z-transform Properties
Week 13	Poles , zeros and stability of transfer function
Week 14	Inverse Z-transform
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Emmanuel and Barrie, "Digital Signal Processing practical Approach,"	Yes
Recommended Texts	1- 3.Li Tan and Jean Jiang, "Digital Signal Processing Fundamentals and Applications" 2- John G. Proakis, "Digital Signal Processing– Fourth Edition 2000	Yes

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**DIGITAL SIGNAL PROCESSINGI**			**Module Delivery**	
Module Type	**Core**			**Theory** **☒ Lecture** **Lab** **☐X Tutorial** **☐ Practical** **☐ Seminar**	
Module Code	NVEE204				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Signals and systems	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	34. To identify digital signal processing system. 35. To understand continuous, discrete, periodic and non-periodic signals. 36. To understand the transformation of signals and the different between them. 37. To perform spectrum of signals.
Module Learning Outcomes	61. Explain the function of each block in DSP system. 62. Covert the signals from continues to discrete form and then reconstruction. 63. Find impulse response, unit step response and difference equation 64. Define discrete Fourier series. 65. How can find the spectrum for periodic and non-periodic signals 66. Explain the different between transformation method. 67. Find and explain the equation of the transfer function in frequency domain 68. Define z-transform, region of convergence and the relationship between frequency and z-domain. 69. Find poles, zeros and the stability of transfer functions.
Indicative Contents	Indicative content includes the following. <u>Part A – block diagram of DSP system</u> Input signals, ADC, sampling, sampling frequency, maximum frequency, bit rate, number of bits, quantization, coding, SNR, reconstruction signals, anti-aliasing, output signals, Impulse and step responses, difference equations. [8 hrs] <u>Part B - transformations</u> Periodic and non-periodic signals, Fourier series, double side band spectrum. [4 hrs]

	Time-domain, frequency-domain, DTFT, IDTFT, magnitude and phase spectrum, DFT-N point and FFT, number of multiplication and addition, butterfly method, property of each transformation, transfer function. [24 hrs] z-transform, region of convergences, transfer function in z-domain, poles and zeros, stability, IZ-transform, long division, partial fraction, property of z-transform. [16 hrs]

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

Student Workload (SWL)			
Structured SWL (h/sem)ل	50	**Structured SWL (h/w)** ١	4
Unstructured SWL (h/sem)	75	**Unstructured SWL (h/w)**	1

Total SWL (h/sem)	**125**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Block diagram of DSP system
Week 2	Difference equations and impulse response
Week 3	Fourier Analysis
Week 4	Discrete-Time Fourier Transform
Week 5	DTFT Properties and IDTFT
Week 6	Transfer function in frequency domain
Week 7	Mid term
Week 8	DFT_N points transform and IDFT_N points
Week 9	Fast Fourier Transform and IFFT
Week 10	Fast Fourier Transform Properties and transfer function
Week 11	Z-transform and region of convergence
Week 12	Z-transform Properties
Week 13	Poles , zeros and stability of transfer function
Week 14	Inverse Z-transform
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Emmanuel and Barrie, "Digital Signal Processing practical Approach,"	Yes
Recommended Texts	3- 3.Li Tan and Jean Jiang, "Digital Signal Processing Fundamentals and Applications" 4- John G. Proakis, "Digital Signal Processing– Fourth Edition 2000	Yes

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	DIGITAL SIGNAL PROCESSING II			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐ **lab** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE205				
ECTS Credits	٥				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	38. To identify digital filters. 39. To understand the type of digital filters and different between them. 40. To identify the parameters of digital filters. 41. To explain the application of digital filters 42. To understand noise signals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	70. Design different type of digital filters. 71. Find coefficients and transfer function of filters. 72. Plot difference equations of digital filters 73. Understand the application of digital filters. 74. Understand the noise signals
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - digital filters</u> FIR, IIR, transfer function of digital filters, type of filters- LPF, HPF, BPF, BSF Ideal and practical filters, parameters of filters, cutoff frequency, attenuation stop band, ripple of pass band, transmission band, length of filters, Linear phase FIR filters, positive symmetric, negative symmetric, even and odd tap of filters. [8 hrs] <u>Part B – design FIR digital filters</u> Best functions of filters, Fourier transform method, Windowing method- Rectangle, Haming, Hanning and Blackman windows Frequency sampling method, Realization FIR filters. [16 hrs] <u>Part C – design IIR digital filters</u> Bilinear transformation method, Pole zero placement method, Realization FIR filters, adaptive filters, application of digital filters, noise calculation. [28 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	5 and 10	LO #1, #4
	Assignments	6	10% (10)	2 and 12	All
	Projects / Lab.	6	20% (20)	Continuous	LO #1 - #2-#3
	Report	0	0% (0)	13	All
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	7	LO #1 - #2-#3
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of digital filters
Week 2	Linear phase FIR filters
Week 3	Design FIR filters part1
Week 4	Design FIR filters part2
Week 5	Design FIR filters part3
Week 6	Realization FIR filters
Week 7	Mid term
Week 8	Design IIR filters part1
Week 9	Design IIR filters part2

Week 10	Design IIR filters part3
Week 11	Realization IIR filters
Week 12	Adaptive filters
Week 13	Application of filters in audio and image processing
Week 14	Noise calculation
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Emmanuel and Barrie, "Digital Signal Processing practical Approach,"	Yes
Recommended Texts	5- 3.Li Tan and Jean Jiang, "Digital Signal Processing Fundamentals and Applications" 6- John G. Proakis, "Digital Signal Processing– Fourth Edition 2000	No

Grading Scheme

مخطط الدرجات

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

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	DIGITAL SIGNAL PROCESSING II			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Tutorial** ☐ **lab** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE205				
ECTS Credits	٥				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	43. To identify digital filters. 44. To understand the type of digital filters and different between them. 45. To identify the parameters of digital filters. 46. To explain the application of digital filters 47. To understand noise signals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	75. Design different type of digital filters. 76. Find coefficients and transfer function of filters. 77. Plot difference equations of digital filters 78. Understand the application of digital filters. 79. Understand the noise signals
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - digital filters</u> FIR, IIR, transfer function of digital filters, type of filters- LPF, HPF, BPF, BSF Ideal and practical filters, parameters of filters, cutoff frequency, attenuation stop band, ripple of pass band, transmission band, length of filters, Linear phase FIR filters, positive symmetric, negative symmetric, even and odd tap of filters. [8 hrs] <u>Part B – design FIR digital filters</u> Best functions of filters, Fourier transform method, Windowing method- Rectangle, Haming, Hanning and Blackman windows Frequency sampling method, Realization FIR filters. [16 hrs] <u>Part C – design IIR digital filters</u> Bilinear transformation method, Pole zero placement method, Realization FIR filters, adaptive filters, application of digital filters, noise calculation. [28 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	5 and 10	LO #1, #4
	Assignments	6	10% (10)	2 and 12	All
	Projects / Lab.	6	20% (20)	Continuous	LO #1 - #2-#3
	Report	0	0% (0)	13	All
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	7	LO #1 - #2-#3
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of digital filters
Week 2	Linear phase FIR filters
Week 3	Design FIR filters part1
Week 4	Design FIR filters part2
Week 5	Design FIR filters part3
Week 6	Realization FIR filters
Week 7	Mid term
Week 8	Design IIR filters part1
Week 9	Design IIR filters part2

Week 10	Design IIR filters part3
Week 11	Realization IIR filters
Week 12	Adaptive filters
Week 13	Application of filters in audio and image processing
Week 14	Noise calculation
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Emmanuel and Barrie, "Digital Signal Processing practical Approach,"	Yes
Recommended Texts	7- 3.Li Tan and Jean Jiang, "Digital Signal Processing Fundamentals and Applications" 8- John G. Proakis, "Digital Signal Processing– Fourth Edition 2000	No

Grading Scheme

مخطط الدرجات

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

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electrical Machines**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEEELM321**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	SCE		**College**	EEC	
Module Leader	Mohammed Ibrahim Alwaise		**e-mail**	mohammed.Alwaise@uoninevah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	2٤/06/2023		**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	40. Understanding DC Machine Principles 41. Analyzing DC Machine Behavior 42. Control Strategies 43. System Integration 44. Practical Applications 45. Problem-Solving Skills 46. Laboratory Skills 47. Teamwork and Communication 48. Professional Development
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	32. Understand how voltage is induced in a rotating loop 33. Understand how curved pole faces contribute to a constant flux, and thus 34. more constant output voltages. 35. Understand how curved pole faces contribute to a constant flux, and thus more constant output voltages. 36. Understand the power flow diagram for de machines 37. Know the types of de motors in general use. 38. Understand the equivalent circuit of a de motor. 39. Understand how to derive the torque-speed characteristics of separately excited, shunt, series, and compounded de motors. 40. Understand how to control the speed of different types of de motors. 41. Understand the special characteristics of series de motors, and the applications. 42. Understand the methods of starting dc motors safely. 43. Understand the equivalent circuit of a dc generator. 44. Understand the purpose of a transformer in a power system. 45. Understand how real transformers approximate the operation of an ideal transformer. 46. Be able to explain how copper losses, leakage flux, hysteresis, and eddy currents are modeled in transformer equivalent circuits.
Indicative Contents المحتويات الإرشادية	Introduction - A Simple Rotating Loop between Curved Pole Faces. The Voltage Induced in a Rotating Loop / Getting DC Voltage Out of the Rotating Loop / The Induced Torque in the rotating loop.(12 hrs.).
	Commutation and Armature Construction in Real DC Machine. .(8 hrs.).

	Power Flow and Losses in DC Machines. .(6 hrs.).
	Introduction to DC Motors. The Equivalent Circuit of a DC Motor. The Magnetization Curve of a DC Machine. Separately Excited and Shunt DC Motors.(10 hrs.).
	Permanent-Magnet DC Motor. The Series DC Motor. The Compounded DC Motor. .(6 hrs.).
	Motor Starters. Solid-State Speed Controllers. .(12 hrs.).
	DC Motor Efficiency Calculations. .(4 hrs.).
	Mid-term Exam. .(3 hrs.).
	Introduction to DC Generators. The Separately Excited Generator. .(12 hrs.).
	The Shunt DC Generator. The Series DC Generator.(4 hrs.).
	The Cumulatively Compounded DC Generator. The Differentially Compounded DC Generator. .(4 hrs.).
	Types and Construction of Transformers. The Ideal Transformer. .(10 hrs.).
	Theory of Operation of Real Single-Phase Transformers. The Equivalent Circuit of a Transformer. .(18 hrs.).
	Transformer Voltage Regulation and Efficiency. .(12 hrs.).
	Instrument Transformers. .(4 hrs.).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Visual Aids Problem-Solving Exercises Real-World Applications Group Projects Simulations and Virtual Labs Multimedia Resources Real-Life Examples

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	65	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.64
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	
	Assignments	2	10% (10)	2, 12	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	
	Final Exam	2hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - A Simple Rotating Loop between Curved Pole Faces. The Voltage Induced in a Rotating Loop / Getting DC Voltage Out of the Rotating Loop / The Induced Torque in the rotating loop.
Week 2	Commutation and Armature Construction in Real DC Machine.
Week 3	Power Flow and Losses in DC Machines.
Week 4	Introduction to DC Motors. The Equivalent Circuit of a DC Motor. The Magnetization Curve of a DC Machine. Separately Excited and Shunt DC Motors
Week 5	Permanent-Magnet DC Motor. The Series DC Motor. The Compounded DC Motor.
Week 6	Motor Starters. Solid-State Speed Controllers.
Week 7	DC Motor Efficiency Calculations.
Week 8	Mid-term Exam.
Week 9	Introduction to DC Generators. The Separately Excited Generator.

Week 10	The Shunt DC Generator. The Series DC Generator
Week 11	The Cumulatively Compounded DC Generator. The Differentially Compounded DC Generator.
Week 12	Types and Construction of Transformers. The Ideal Transformer.
Week 13	Theory of Operation of Real Single-Phase Transformers. The Equivalent Circuit of a Transformer.
Week 14	Transformer Voltage Regulation and Efficiency.
Week 15	Instrument Transformers.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electrical Machinery Fundamentals" edited by Stephen J. Chapman.	Yes
Recommended Texts	TherajaBl, TherajaAk "ELECTRICAL TECHNOLOGY"	yes
Recommended Texts	electrical machines and transformer by: Ancieron and Macneiil	yes
Websites	https://www.coursera.org	yes

Grading Scheme

مخطط الدرجات

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	Electronics systems			**Module Delivery**	
Module Type	core			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	NVEEELM315				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Electronics		**College**	Electronic Engineering college	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	Ahmad.younis@uoninevah,edu,iq	
Scientific Committee Approval Date	12/06/2023		**Version Number**	1.0	

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	49. To understand the advanced applications of op-amps 50. To be familiar with the different op-amp based communication circuits 51. To understand the operation and analysis of active filters 52. To illustrate different active filter design methods 53. To understand the concept of oscillation and its conditions 54. To be able to design and analyze of RC and LC oscillators 55. To study the operation of 555 timer and crystal oscillator 56. To be familiar with design and analyze tuned amplifier 57. To understand the power amplifier basic principles 58. To study and analyze power amplifier classes A, B, AB, and class C 59. To be familiar with basic concept of multivibrator 60. To understand different operation of multivibrators 61. Design and analysis of Astable, monostable, and bistable MV 62. To understand the operation of A/D and D/A converters
Module Learning Outcomes	47. Understand and apply op-amp applications 48. Deign different op-amp circuits application 49. Deal with different active filter design and analysis 50. Understanding the principle operation of sinusoidal oscillator 51. Design and analyze RC , LC, and crystal oscillators 52. Ability to design tuned amplifiers 53. Understanding various power amplifier classes 54. Design and analyze class A,B, AB, power amplifiers 55. Understanding the operation and analysis of Astable, monostable, and bistable circuits 56. To be familiar with A/D and D/A convertors.

Indicative Contents	**OP-AMP APPLICATIONS:** inverting, non-inverting amplifier, buffer, summing amplifier, difference amplifier, integrator and differentiator , comparator, sample and hold, zero crossing detector, peak detector, precision diode and fast rectifier, analog computation. **Active Filters:** filter approximations, passive RLC design, active filter design methods (ladder, and cascaded design technique). **OSCILLATORS :** Oscillation conditions ; Satiability concept Three pole amplifier ; Nyquist criteria ; Stabilizing networks ; frequency compensation and sinusoidal oscillator ; phase shift , Wien bridge , Colpitts , Hartley , Crystal and Tuned circuit type oscillator (AF &RF Range). **TUNED AMPLIFIER**: Introduction to single tuned amplifier ; G.B. response calculations & design ; Cascade amplifier ; **POWER AMPLIFIERS:** Introduction to Class A, B, AB, and C operation , Class A – common –emitter power amplifier ; Transformer coupled amplifier ; Class push –pull power amplifier ; Amplifiers using complementary symmetry ; Class C amplifier . **MULTIVIBRATORS:** basic concept, Astable operation, monostable operation, 555 timer, and bistable.

	Converters: A/D and D/A converters design topologies and analysis

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	90	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	164		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Inverting and non inverting op-amp amplifier, buffer op-amp
Week 2	Summing, difference, integrator, comparator, and sample and hold
Week 3	Precision diode, precision rectifier, peak detector, and analog computation
Week 4	Active filter principles
Week 5	Design and analysis of different active filters
Week 6	Basic oscillation concept, conditions, and analysis
Week 7	Frequency compensation and sinusoidal oscillator
Week 8	RC phase shift oscillator
Week 9	LC and crystal oscillator
Week 10	Tuned amplifier aedign and analysis
Week 11	Power amplifier basic operation and principles
Week 12	Class A series fed and transformer coupled power amplifler
Week 13	Class B and AB

Week 14	Power amplifier distortion analysis
Week 15	Multivibrators Astable, monostable and bistable
Week 16	**A/D and D/A convertors.**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor op-amp applications** **To measure and to verify active filters and oscillators,** **To measure the performance of power amplifier classes**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Electronic Devices By Millmann Electronic Devices By Floyd	yes
Recommended Texts	Microelectronics by Millmann	Yes
Websites	Electronic circuits	

Grading Scheme

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Measurement instruments principles			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	NVEEELM313			☒ **Lecture**	
ECTS Credits	**6**			☐ **Lab**	
SWL (hr/sem)	**150**			☐**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	3		**Semester of Delivery**	1	
Administering Department	Dept. of Electronic Eng. (Med. Ele)		**College**	College of Electronic Engineering	
Module Leader	Amenah.E.Kanaan		**e-mail**	Amenah.kanaan@uoninevah.edu.iq	
Module Leader's Acad. Title	Assistance Lecturer		**Module Leader's Qualification**	MS.c	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	20/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• To educate the fundamental concepts and characteristics of measurement and errors. • To impart the knowledge on the functional aspects of measuring instruments. • To educate the fundamental working of sensors and transducers and their applications. • To infer the importance of various bridge circuits used with measuring instruments. • • To summarize the overall measurement and instrumentation with the knowledge on digital instrumentation principles..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Ability to understand the fundamental art of measurement in engineering. • Ability to understand the structural elements of various instruments. • Ability to understand about various transducers and their characteristics by experiments. • Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • CONCEPTS OF MEASUREMENTS. • MEASUREMENT OF PARAMETERS IN ELECTRICAL SYSTEMS. • TRANSDUCERS FOR MEASUREMENT OF NON- ELECTRICAL PARAMETERS. • AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS. • DIGITAL INSTRUMENTATION

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Electronic Measurements and Instrumentation involves with the measurement of various parameters related to the operation and use of electronic instruments. Measurements play a very important role in all engineering field. As a facilitator we have to strengthen the theoretical concepts by providing a platform for the students to analyze and design various instruments used for measurements. To improve the knowledge of measurements, analyzing and designing is the greatest challenge at the undergraduate level.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٤٩	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	١٠١	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of instruments
Week 2	Error of instrument
Week 3	Statistical evaluation of measurement data.
Week 4	Statistical evaluation of measurement data.
Week 5	Classification of instruments
Week 6	Classification of instruments
Week 7	AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS
Week 8	AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS
Week 9	Electronic instrument(ammeter, voltmeter)
Week 10	Electronic instrument(Ohmmeter)
Week 11	Digital voltmeter structure and design
Week 12	Digital voltmeter structure and design
Week 13	DIGITAL INSTRUMENTATION
Week 14	DIGITAL INSTRUMENTATION
Week 15	review
Week 16	First course exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	
Week 3-4	
Week 5-6	
Week 7-8	
Week 9-10	
Week 11-12	
Week 13-14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Electrical and Electronic Measurement By Ahmed A.Montaser and Karam A. sharshar**	Yes
Recommended Texts	**1-Electronic Instrumentation and Measurement Techniques" ByWillliam David Cooper and Albert D. Helfrick.** **2-Principles of Measurement systems By John P. Bentley**	No
Websites	1- 2-	

Grading Scheme

مخطط الدرجات

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

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Integrated Electronic**			**Module Delivery**	
Module Type	**core**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**NEEI3313**				
ECTS Credits	**5**				
SWL (hr/sem)	**165**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Electronics		**College**	Electronic Engineering college	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	Ahmad.younis@uoninevah,edu,iq	
Scientific Committee Approval Date	12/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	NEEI2322	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	63. To understand the advanced applications of op-amps 64. To be familiar with the different op-amp based communication circuits 65. To understand the operation and analysis of active filters 66. To illustrate different active filter design methods 67. To understand the concept of oscillation and its conditions 68. To be able to design and analyze of RC and LC oscillators 69. To study the operation of 555 timer and crystal oscillator 70. To be familiar with design and analyze tuned amplifier 71. To understand the power amplifier basic principles 72. To study and analyze power amplifier classes A, B, AB, and class C 73. To be familiar with basic concept of multivibrator 74. To understand different operation of multivibrators 75. Design and analysis of Astable, monostable, and bistable MV 76. To understand the operation of A/D and D/A converters
Module Learning Outcomes	57. Understand and apply op-amp applications 58. Deign different op-amp circuits application 59. Deal with different active filter design and analysis 60. Understanding the principle operation of sinusoidal oscillator 61. Design and analyze RC , LC, and crystal oscillators 62. Ability to design tuned amplifiers 63. Understanding various power amplifier classes 64. Design and analyze class A,B, AB, power amplifiers 65. Understanding the operation and analysis of Astable, monostable, and bistable circuits 66. To be familiar with A/D and D/A convertors.

Indicative Contents	**OP-AMP APPLICATIONS:** inverting, non-inverting amplifier, buffer, summing amplifier, difference amplifier, integrator and differentiator , comparator, sample and hold, zero crossing detector, peak detector, precision diode and fast rectifier, analog computation. **Active Filters:** filter approximations, passive RLC design, active filter design methods (ladder, and cascaded design technique). **OSCILLATORS :** Oscillation conditions ; Satiability concept Three pole amplifier ; Nyquist criteria ; Stabilizing networks ; frequency compensation and sinusoidal oscillator ; phase shift , Wien bridge , Colpitts , Hartley , Crystal and Tuned circuit type oscillator (AF &RF Range). **TUNED AMPLIFIER**: Introduction to single tuned amplifier ; G.B. response calculations & design ; Cascade amplifier ; **POWER AMPLIFIERS:** Introduction to Class A, B, AB, and C operation , Class A – common –emitter power amplifier ; Transformer coupled amplifier ; Class push –pull power amplifier ; Amplifiers using complementary symmetry ; Class C amplifier . **MULTIVIBRATORS:** basic concept, Astable operation, monostable operation, 555 timer, and bistable.

	Converters: A/D and D/A converters design topologies and analysis

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	90	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	164		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Inverting and non inverting op-amp amplifier, buffer op-amp
Week 2	Summing, difference, integrator, comparator, and sample and hold
Week 3	Precision diode, precision rectifier, peak detector, and analog computation
Week 4	Active filter principles
Week 5	Design and analysis of different active filters
Week 6	Basic oscillation concept, conditions, and analysis
Week 7	Frequency compensation and sinusoidal oscillator
Week 8	RC phase shift oscillator
Week 9	LC and crystal oscillator
Week 10	Tuned amplifier aedign and analysis
Week 11	Power amplifier basic operation and principles
Week 12	Class A series fed and transformer coupled power amplifler
Week 13	Class B and AB

Week 14	Power amplifier distortion analysis
Week 15	Multivibrators Astable, monostable and bistable
Week 16	**A/D and D/A convertors.**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor op-amp applications** **To measure and to verify active filters and oscillators,** **To measure the performance of power amplifier classes**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Electronic Devices By Millmann Electronic Devices By Floyd	yes
Recommended Texts	Microelectronics by Millmann	Yes
Websites	Electronic circuits	

Grading Scheme

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical sensors			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	NVEEELM323			☒ **Lecture**	
ECTS Credits	**4**			☐ **Lab**	
SWL (hr/sem)	**150**			☐**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	3		**Semester of Delivery**	1	
Administering Department	Dept. of Electronic Eng. (Med. Ele)		**College**	College of Electronic Engineering	
Module Leader	Amenah.E.Kanaan		**e-mail**	Amenah.kanaan@uoninevah.edu.iq	
Module Leader's Acad. Title	Assistance Lecturer		**Module Leader's Qualification**	MS.c	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	20/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introduction to biomedical sensors: definition, classification, calibration, requirem uncertainty, static and dynamic parameters, requirements and design aspects of sig circuits, temperature sensors: types, and signal processing circuits, Pressure sensor operating principle, calibration techniques, medical applications and conditioning Electrochemical sensors, Ion-selective sensors, Biosensors, Ion-sensitive field effe optical sensors, Ultrasound transducers, Intelligent biomedical sensors, manufactu sensors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.Recognize the requirements of biomedical sensors 2.Explain the Static and dynamic characteristics of biomedical sensors 3. Study the effect of environmental parameters 4. Identify the methods for characterization of biomedical sensors
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -Introduction to Biomedical Sensors -Resistive Sensors and their signal conditioning -Reactance Variation and Electromagnetic Sensors -Self-Generating Sensors and Signal Conditioning -Optical Sensors -Ultrasound Transducers -Intelligent Sensors -Biosensors

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active learning, where students should be active and involved in the learning process inside the classroom, will be emphasized in the delivery of this course. Different active learning methods/approaches such as: Engaged Learning, Project-Based Learning, Cooperative Learning, Problem-based Learning, Structured Problem-

	solving, will be used. The teaching method that will be used in this course will be composed of a series of mini lectures interrupted with frequent discussions and brainstorming exercises. PowerPoint presentations will be prepared for the course materials.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٤٩	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Biomedical Sensor**
Week 2	**Introduction to Biomedical Sensor**
Week 3	**Resistive Sensors and their signal conditioning**
Week 4	**Resistive Sensors and their signal conditioning**
Week 5	**Reactance Variation and Electromagnetic Sensors**
Week 6	**Reactance Variation and Electromagnetic Sensors**
Week 7	**Self-Generating Sensors and Signal Conditioning**
Week 8	**Self-Generating Sensors and Signal Conditioning**
Week 9	**Optical Sensors**
Week 10	**Optical Sensors**
Week 11	**Intelligent Sensors**
Week 12	**Intelligent Sensors**
Week 13	**Biosensors**
Week 14	**Biosensors**
Week 15	review
Week 16	second course exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	

Week 3-4	
Week 5-6	
Week 7-8	
Week 9-10	
Week 11-12	
Week 13-14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	1. Yang, V. C., and Ngo, T. T., (2000), Biosensors and their Applications, Kluwer Academic/Plenum Publisher, New York. 2. Harsanyi, G , (2000), Sensors in Biomedical Applications: Fundamentals, Technology and Applications, Technomic Publishing Company. 3. Hall, E. A., (1990), Biosensors, open University Press, Milton Keynes.	No
Websites	http://www.orionres.com http:// www.gl.iit.edu/subject/**biomedical**/ref.htm http:// www.vonl.com/chips/biomedtr.htm http:// www.ibmt.fraunhofer.de/Produktblaetter/SM_ms_fpwtransducer_en.p http:// www. depts.washington.edu/bioe/programs/bachelors/syllabus/BIOEN573.pdf	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors

	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION OF MICROPROCSSOR PROGRAMMING

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microprocessor Programming**			**Module Delivery**	
Module Type	**Base**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEE205**				
ECTS Credits	**٥**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	EEMB		**College**	College of Electronic Engineering	

Module Leader	Mohammed Muzahem Azeez	**e-mail**	mohammed.azeez@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MSc
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	1

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim is to study the software architecture of the 8086 microprocessor and how data are represented in computer memory. Study the instructions set of the microprocessor and write and run programs using assembly language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	67. To understand the architecture of 8086 microprocessors'. 68. To understand how data are represented in computer memory. 69. To describe the addressing modes of 8086. 70. To program using the transfer data instructions of the 8086 71. To program using logical instructions of the 8086 72. To program using arithmetic instructions of the 8086 73. To program using shift and rotate instructions of the 8086 74. To understand how String instruction is implemented in 8086. 75. To write assembly programs using macro-assembler. 76. Write programs using fixed point arithmetic and solving equations and sorting problems 77. understand the structured programming using subroutine in assembly langua ge. 78. Write programs to solve problems involve two dimension arrays and sorting al

	gorithms in assembly language.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Computer organization, data representation, the 8086 microprocessor architecture, and 8086 addressing modes. [16 hrs] Instructions set (data transfer, logical, shift and rotate, arithmetic and program control instructions). [20 hrs] 8086 assembly language programming, Implementing standard program structures in 8086 assembly language, Instruction timing and delay loops, strings; procedures and macros, 8086 interrupts and interrupt applications. [20 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be focus on developing a conceptual understanding of the principle of microprocessor programming while refining students critical thinking skills. This will be achieved through classes, interactive tutorials, and by considering the type of simple experiments involving some interesting sampling activities for the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.33
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	20% (20)	4,7, 11	LO #1-9
	Assignments	2	5% (5)	3, 10	LO # 1-8
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	5% (5)	13	LO # 1 -9

Summative assessment	**Midterm Exam**	2 hr	10% (10)	9	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to microprocessor
Week 2	Data Representations
Week 3	8086 Architecture and 8086 Addressing Modes
Week 4	Data Transfer instructions
Week 5	Logical Instructions
Week 6	Arithmetic instructions
Week 7	Shift and rotate instructions
Week 8	Program control instructions and Subroutine instructions
Week 9	Mid-term Exam + review
Week 10	String Instructions
Week 11	Assembly language program Tiny model , Small model and
Week 12	Two Dimensional Arrays
Week 13	Interrupt instructions
Week 14	Sorting Algorithms
Week 15	Preparatory week before the final Exam
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Debug program instructions 1
Week 3-4	Assembling and Executing Instruction with debug
Week 5-6	Addressing modes

Week 7-8	Transfer instructions
Week 9-10	Logical Instructions
Week 11-12	Shift and rotate instructions
Week 13-14	Arithmetic instructions

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The Intel Microprocessors By BARRY B. BREY	Yes
Recommended Texts	The 8088 & 8086 microprocessors programming , interfacing S/W, H/W & applications , Prentice Hall, 2003 By W. A. Triebel & A. Singh	
Websites		

Grading Scheme
مخطط الدرجات

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

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Power Electronic**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEEELM325**				
ECTS Credits	**٥**				
SWL (hr/sem)	**٥12**				
Module Level	1 3		**Semester of Delivery**	5	
Administering Department	Electronic Dept.		**College**	Electronics Collage	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	48. Introduce the undergraduate students to the principle of semiconductor switch-based conversion in power electronics. 49. The analysis of power components and important factors when dealing with nonsinusoidal quantities. 50. Focus on the features and benefits of power electronics circuits and apricate its importance in modern electrical engineering systems such as energy processing and conditioning. 51. To introduce the features and characteristics the common power switching devices. 52. To introduce the single-phase and three-phase phase-controlled power converter circuits. 53. To relate the steady state and transient analysis of phase-controlled power converter circuits to the converter performance and design.
Module Learning Outcomes	80. By the completion of the course, the students should be able to: 81. Define the scope, tools types and applications of power converters. 82. Calculate the assess the figures of merits used to describe the quality of non-ideal waveforms in power electronics converters. 83. Describe the behavioral characteristics and ratings of power switching semiconductor devices such as diodes, Thyristors, MOSFETs and IGBTs. 84. Analyze single-phase and three-phase power diode circuits, evaluate input-output performance parameters with idealized load models. 85. Analyze single-phase and three-phase power SCR controlled rectifier circuits with various load models. 86. Describe and Analyze the single-phase and three-phase SCR-AC controller circuits with R and RL loads.
Indicative Contents	Indicative content includes the following. <u>Part A – Introduction, definitions and tools</u> Power Electronics: definitions, approach and applications. Figures of Merits: Ripple factor, Total harmonic distortion, Form factor, Power factor (non-sinusoidal waveform), conversion efficiency. Review of circuit analysis tools.

	Quizzes Part B- Semiconductor Switching Devices Scope of power electronics, power converter specification. Power Semiconductor Devices: Thyristor families, V-I characteristics of SCR, Triac, GTO, Diac, Source of thyristor triggering, turn On \ turn Off characteristic and Gate triggering requirements, series/parallel operation, device ratings. Power transistor devices: Basic structure and V-I characteristics of power MOSFET, IGBT, SIT. Switching characteristic, Gate/Base drive circuits, Safe operating area, di/dt / dv/dt limitation, series/parallel operation, ratings. Part C- Phase-controlled AC-DC converters Phase Control Converters: Signal phase central taped transformer connection , half controlled and fully controlled Bridge configuration , three phase half controlled Bridge converters , Use of flywheeling diode operation with resistive , inductive and Back EMF load , line commutated inverter , effect of source inductance on converter performance , power factor , ripple factor calculation , firing scheme , linear alpha and cosine angle control , application of D.C motor speed control , regulated power supply , battery charger . Thyristor commutation techniques: Natural commutation, Force commutation, Voltage / Current commutation.

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering some activities through a simple project to guide the students to self-learning, report writing and scientific debate skills.

Student Workload (SWL)

Structured SWL (h/sem)	46	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	76	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	**122**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction: Definitions, Power and Energy, Types of Conversion, Power Electronics Approach. The role of switch in power converter, Energy recovery.
Week 2	Power Computations: Mean, RMS, Figures of Merits
Week 3	Power Diodes: Steady-state characteristics, basic parameters and ratings, transient characteristics, Special Diodes.
Week 4	SCRs: Steady-state characteristics, basic parameters and ratings, controlling SCR by gate pulses.

Week 5	Source of thyristor triggering, turn On\ turn Off characteristic and Gate triggering requirements.
Week 6	Power transistor devices: Basic structure and V-I characteristics of power IGBT. Switching characteristic, Gate/Base drive circuits, Safe operating area, di/dt / dv/dt limitation, series/parallel operation, ratings.
Week 7	Power transistor devices: Basic structure and V-I characteristics of power MOSFET.
Week 8	SCRs: Steady-state characteristics, basic parameters and ratings, controlling SCR by gate pulses.
Week 9	Half-wave diode rectifiers: R-load, RL-Load, freewheeling diode and capacitor filter.
Week 10	Full-Wave diode rectifier R, RL load and freewheeling diode.
Week 11	Controlled Full-Wave rectifier R, RL load and freewheeling diode.
Week 12	Three-phase three-pulse rectifier
Week 13	Six-pulse diode rectifier with R and highly inductive load
Week 14	Analysis of six-pulse diode rectifier with RLE load
Week 15	Preparatory week before the final Exam.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Power Electronics by Daniel W. Hart, ISBN 978-0-07-338067-4. McGraw Hill (2010)	No
Recommended Texts	-Power electronics Devices, circuits, and Applications (Fourth Edition) by Muhammad H. Rashid, ISBN 978-0-13-312590-0 , Pearson 2014 -Power Electronics Basics, by Yuriy Rozanov, Sergey Ryvkin, Evgeny Chaplygin and Pavel Voronin. ISBN 978-1-4822-9880-2, CRC Press 2016 -POWER CONVERTER CIRCUITS By Shepherd and Zhang ISBN: 0-8247-5054-3, Marcel Dekker 2004	No
Websites	https://classroom.google.com	

Grading Scheme				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	Biomedical Imaging		**Module Delivery**	
Module Type	Core		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEEELM431			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	4	**Semester of Delivery**	1	
Administering Department	Electronics dept	**College**	Electronics engineering college	
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date		**Version Number**		

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This course introduces the concepts of biomedical imaging. It provides the students the necessary knowledge to understand how modern biomedical imaging technologies generate data for analysis and diagnosis. including X-ray radiography, computed tomography (CT), nuclear medicine (SPECT and PET), magnetic resonance imaging (MRI), and ultrasound. Application of the biomedical images used to interpret biological process and diagnostics disease will also be discussed. Hands-on practical laboratory visits to cutting edge advanced bioimaging systems will be available to reinforce the lecture material, and quantitative imaging processing in the context of basic research and clinical settings will be covered.
Module Learning Outcomes	Upon successful completion, students will have the knowledge and skills to: 13. Evaluate the operation and function of different biomedical imaging instruments on molecules, cells and organs. 14. Describe and apply the principles of advanced biomedical imaging concepts and their application in health sciences. 15. Analyze the limitation of each biomedical imaging modalities and also how they complement each other for molecular, cellular and organ-level systems.
Indicative Contents	X-ray radiography. computed tomography (CT). nuclear medicine (SPECT and PET). magnetic resonance imaging (MRI). ultrasound.

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Imaging in medicine, structure of matter.
Week 2	Radioactive decay, and interactions of radiation
Week 3	Production of x rays, radiation quantity and quality, and interaction of x and γ rays in the body
Week 4	Radiation detectors for quantitative measurement
Week 5	Computers and image networking, probability and statistics
Week 6	Radiography Fluoroscopy Computed tomography (CT)
Week 7	
Week 8	
Week 9	
Week 10	Ultrasound waves, ultrasound transducers, and ultrasound instrumentation. Fundamentals of magnetic resonance
Week 11	
Week 12	
Week 13	Magnetic resonance imaging and spectroscopy.
Week 14	Magnetic resonance imaging: instrumentation, bioeffects, and site planning, Future developments in medical imaging
Week 15	
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	MEDICAL IMAGING PHYSICS, fourth edition William R. Hendee, Ph.D. E. Russell Ritenour, Ph.D.	No
Recommended Texts		
Websites		

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Computer Aided Design**	**Module Delivery**	
Module Type	**Core**	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEEELM125		
ECTS Credits	5		
SWL (hr/sem)	125		

Module Level	2	**Semester of Delivery**	2
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Harith H. Thannoon	**e-mail**	**Harith.thannoon@uoninevah.edu.iq**
Module Leader's Acad. Title	Asst. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	02/07/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Module Aims for a Computer-Aided Design (CAD) course generally revolve around providing students with a comprehensive understanding and theoretical knowledge of employing computers for circuit design
Module Learning Outcomes	Upon completion of the course, the students should be able: • Understanding the history and evolution of CAD: Familiarizing students with the historical development of CAD systems and their impact on various industries and design practices. • Exploring theoretical foundations of geometric modeling: Introducing students to the theoretical concepts and mathematical foundations behind circuit modeling. • Analyzing CAD algorithms and data structures: Providing an in-depth understanding of the algorithms and data structures used in CAD software for tasks. • Understanding CAD in the context of design theory: Analyzing the role of CAD in the broader context of design theory, including its relationship to design thinking, problem-solving methodologies, and the design process as a whole. • Exploring the theoretical implications of CAD in different industries: Investigating how CAD theory applies to specific industries such as architecture, engineering, manufacturing, and product design, and understanding the implications of CAD in shaping various design practices.
Indicative Contents	Study of electrical circuits using CAD tools. Analysis of circuit behavior and characteristics State variable analysis. Sensitivity analysis. Optimization. Genetic Algorithms in Circuit Design.

Learning and Teaching Strategies	
Strategies	Through the presentation of a theoretical explanation with the aid of a whiteboard and 'Data Show', to illustrate syllabus (examples and exercises) and using textbooks.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	15% (10)	5,8,10,12	LO #1-5,6-7, 9 and 11
	Assignments	4	15% (10)	6,9,11,13	LO # 1-5, 6, 10 and 12
	Projects	0	0% (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-8
	Final Exam	3hr	50% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Study of electrical circuits using CAD tools.
Week 2	Analysis of circuit behavior and characteristics.
Week 3	Numerical solution for non-linear network simple search algorithm convergence properties
Week 4	Examination of system dynamics using state variable techniques.
Week 5	Application of state equations in circuit analysis.
Week 6	Generation of state equation from topological data.
Week 7	Evaluation of circuit performance through sensitivity measures.
Week 8	Analysis of the impact of parameter variations on circuit behavior.
Week 9	sensitivity calculation tolerance analysis
Week 10	Utilization of CAD for optimizing circuit designs.
Week 11	numerical solution of gradient algorithm
Week 12	Implementation of gradient algorithms for circuit enhancement
Week 13	Incorporation of genetic algorithms for circuit optimization.
Week 14	Application of evolutionary strategies in circuit design improvement.
Week 15	Application of GA in electronics

Week 16	Preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Computer-assisted network and system analysis: by Mastacusa	No
Recommended Texts	Fundamentals of Computer Aided Design by: Ibrahim Zeid	No
Websites		

Grading Scheme

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Computer Networks**	**Module Delivery**	
Module Type	**Base**	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NEEM4222**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	1	**Semester of Delivery**	8
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Aws Zuheer Yonis	**e-mail**	**aws.yonis@uoninevah.edu.iq**
Module Leader's Acad. Title	Asst. Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	23/06/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This course provides an introduction to computer networks, with a special focus on the Internet architecture and protocols. Topics include layered network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, web and email protocols. Besides the theoretical foundations, students acquire practical experience by programming reduced versions of real Internet protocols.
Module Learning Outcomes	Students will be able to: 1. demonstrate an understanding of the physical properties and performance characteristics of communication media; specifically, copper cable, and wireless networks 2. demonstrate an understanding of the importance of communication standards, including an appreciation of protocol layer models and enhancements to those standards 3. demonstrate an appreciation of the theory and practice of common local area networks including virtual and wireless LANs 4. demonstrate an appreciation of the theory and practice of wide area networks and their interconnection 5. demonstrate an appreciation of the significance of network and inter-network protocols; specifically, IPv4, IPv6, TCP and UDP. 6. describe the importance of reliability and quality of service, including examples of error recovery strategies, traffic differentiation and prioritization.
Indicative Contents	**Indicative content includes the following:-** 1. Historical perspective. 2. Theoretical and practical models of network architecture, particularly the ISO OSI seven-layer model and the TCP/IP protocol stack. 3. Example networks and services, including LAN and WAN technologies, and their relevance to the OSI model.

Learning and Teaching Strategies	
Strategies	This is an introductory course to computer networks. The emphasis will be on the basic performance and engineering tradeoffs in the design and implementation of computer networks. To make the issues more concrete, the

	class includes several multi-week projects requiring significant design and implementation. The goal Strategies for students to learn not only what computer networks are and how they work today, but also why they are designed the way they are and how they are likely to evolve in the future. We will draw examples primarily from the Internet.

Student Workload (SWL)

Structured SWL (h/sem)	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	36	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**INTRODUCTION AND DEFINITIONS:-** Data Communication, Networks, Protocols, Standards, and Standard organizations.
Week 2	**BASIC CONCEPTS:-** Line configuration, Topology, Categories of networks.
Week 3	**TRANSMISSION MEDIA:-** Electromagnetic spectrum. Guided media: Unshielded Twisted Pair (UTP) Cable. Shielded Twisted Pair (STP) Cable. Coaxial Cable. Optical Fiber.
Week 4	Unguided media: Radio Transmission. Microwave Transmission. Satellite Microwave.
Week 5	**INTERFACES AND MODEMS:-** Data transmission: parallel, serial, synchronous and asynchronous. DTE-DCE interface and standards. Modems.
Week 6 **Week 7** **Week 8** **Week 9**	**THE OSI AND TCP/IP MODELS** - **NETWORKING AND INTERNETWORKING DEVICES:-** Networking devices: NICs, Hubs, Repeaters, Bridges and Switches.

	Internetworking devices: Router and Gateways.
Week 10 **Week 11** **Week 12**	- **DATA LINK CONTROL:-** Link Discipline, Flow control, Error control. - **DATA LINK PROTOCOLS:-** Asynchronous protocols, Synchronous protocols.
Week 13	**LOCAL AREA NETWORK (LAN):-** Ethernet Token Bus project 802 Token Ring FDDI.
Week 14 **Week 15**	**TCP/IP MODEL AND PROTOCOLS** - **WIRELESS LAN (WLAN):-** Introduction and history of (WLANs), Standardization and frequency bands, IEEE 802.11 standard. - **WIDE AREA NETWORK (WAN)** - **WIRELESS WAN**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Practical and subject specific skills (Transferable Skills) Use appropriate mathematical skills to 1) Illustrate the computer Networks topology. 2) Illustrate the.	No
Recommended Texts	➢ *Behrouz A. Forouzan* , "TCP/IP Protocol Suite", Fourth Edition, McGraw-Hill, 2010. ➢ *Andrew S. Tanenbaum*, " Computer Networks" 5th Edition, 2011.	No

	➢ CCNA Lecturers.	
Websites		

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

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MODULE DESCRIPTION FORM

Module Information

Module Title	**Computer Networks**	**Module Delivery**	
Module Type	**Base**	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEEELM422**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	1	**Semester of Delivery**	8
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Aws Zuheer Yonis	**e-mail**	**aws.yonis@uoninevah.edu.iq**
Module Leader's Acad. Title	Asst. Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	23/06/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This course provides an introduction to computer networks, with a special focus on the Internet architecture and protocols. Topics include layered network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, web and email protocols. Besides the theoretical foundations, students acquire practical experience by programming reduced versions of real Internet protocols.
Module Learning Outcomes	Students will be able to: 7. demonstrate an understanding of the physical properties and performance characteristics of communication media; specifically, copper cable, and wireless networks 8. demonstrate an understanding of the importance of communication standards, including an appreciation of protocol layer models and enhancements to those standards 9. demonstrate an appreciation of the theory and practice of common local area networks including virtual and wireless LANs 10. demonstrate an appreciation of the theory and practice of wide area networks and their interconnection 11. demonstrate an appreciation of the significance of network and inter-network protocols; specifically, IPv4, IPv6, TCP and UDP. 12. describe the importance of reliability and quality of service, including examples of error recovery strategies, traffic differentiation and prioritization.
Indicative Contents	**Indicative content includes the following:-** 1. Historical perspective. 2. Theoretical and practical models of network architecture, particularly the ISO OSI seven-layer model and the TCP/IP protocol stack. 3. Example networks and services, including LAN and WAN technologies, and their relevance to the OSI model.

Learning and Teaching Strategies	
Strategies	This is an introductory course to computer networks. The emphasis will be on the basic performance and engineering tradeoffs in the design and implementation of computer networks. To make the issues more concrete, the

	class includes several multi-week projects requiring significant design and implementation. The goal Strategies for students to learn not only what computer networks are and how they work today, but also why they are designed the way they are and how they are likely to evolve in the future. We will draw examples primarily from the Internet.

Student Workload (SWL)

Structured SWL (h/sem)	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	36	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**INTRODUCTION AND DEFINITIONS:-** Data Communication, Networks, Protocols, Standards, and Standard organizations.
Week 2	**BASIC CONCEPTS:-** Line configuration, Topology, Categories of networks.
Week 3	**TRANSMISSION MEDIA:-** Electromagnetic spectrum. Guided media: Unshielded Twisted Pair (UTP) Cable. Shielded Twisted Pair (STP) Cable. Coaxial Cable. Optical Fiber.
Week 4	Unguided media: Radio Transmission. Microwave Transmission. Satellite Microwave.
Week 5	**INTERFACES AND MODEMS:-** Data transmission: parallel, serial, synchronous and asynchronous. DTE-DCE interface and standards. Modems.
Week 6 **Week 7** **Week 8** **Week 9**	**THE OSI AND TCP/IP MODELS** - **NETWORKING AND INTERNETWORKING DEVICES:-** Networking devices: NICs, Hubs, Repeaters, Bridges and Switches.

	Internetworking devices: Router and Gateways.
Week 10 **Week 11** **Week 12**	- **DATA LINK CONTROL:-** Link Discipline, Flow control, Error control. - **DATA LINK PROTOCOLS:-** Asynchronous protocols, Synchronous protocols.
Week 13	**LOCAL AREA NETWORK (LAN):-** Ethernet Token Bus project 802 Token Ring FDDI.
Week 14 **Week 15**	**TCP/IP MODEL AND PROTOCOLS** - **WIRELESS LAN (WLAN):-** Introduction and history of (WLANs), Standardization and frequency bands, IEEE 802.11 standard. - **WIDE AREA NETWORK (WAN)** - **WIRELESS WAN**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Practical and subject specific skills (Transferable Skills) Use appropriate mathematical skills to 1) Illustrate the computer Networks topology. 2) Illustrate the.	No
Recommended Texts	➢ *Behrouz A. Forouzan* , "TCP/IP Protocol Suite", Fourth Edition, McGraw-Hill, 2010. ➢ *Andrew S. Tanenbaum*, " Computer Networks" 5th Edition, 2011.	No

	➢ CCNA Lecturers.	
Websites		

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	Digital Communication	**Module Delivery**	
Module Type	Base	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEEELM423		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	7
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Aws Zuheer Yonis	**e-mail**	**aws.yonis@uoninevah.edu.iq**
Module Leader's Acad. Title	Asst. Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	23/06/2023	**Version Number**	1.0

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	The aim of the module is to acquaint students with the principles and practice of digital communications - from the fundamental basis of communication to how signals are represented and processed. The module develops an analytical approach to problems in communication design and operation, grounded in elements of communication theory sufficient to give students an understanding of the problems that affect its reliability and efficiency. It introduces the theory and implementation of digital signal processing approaches, including the representation of signals in communication systems, filtering techniques and the applications of digital signal processing.
Module Learning Outcomes	Students will be able to: 1. Explain the sampling theory, PCM, and Principles of Data Transmission. 2. Illustrate the digital modulation and detection techniques, and compare and contrast between the various line codes. 3. Analyze the functionality of each block in simple digital communication system, explain the overall integration of the different blocks, explain the functionality of the whole system, and link its various blocks to the basic mathematical and signal operations. 4. Identify the effect of Gaussian noise on the performance of digital communication system, and calculate the bit error rate. 5. Analyze the performance of digital communication system in the presence of AWGN noise. 6. Categorize the block coding schemes / algorithms for bit error detection and correction. 7. Design a simple experimental setup in the form of a Digital Communication System to transmit an analog message.
Indicative Contents	**Indicative content includes the following:-** 1. Sampling theorem, concepts of TDM and quantization and determination of quantization error. 2. Analog to Digital Conversion techniques, PCM, and Delta Modulation. 3. Principles of digital communications, Digital Modulation Schemes, e.g., ASK, PSK, DPSK, and M-ARY communication. 4. Inter-symbol interference, line coding, pulse shaping, and matched filter receivers. 5. Effect of Gaussian noise on digital communications, optimum receivers for AWGN, optimum threshold detector, and calculation of bit error rate. 6. Signals vector representation. 7. Block codes for error detection and error corrections.

Learning and Teaching Strategies	
Strategies	To make students familiar with the principles of Digital Communications, and the effect of noise on systems performance. The students will experience design of Digital Communication Systems via laboratory experiments in teams using digital communication modules to build a communication system, and collect and analyze data.

Student Workload (SWL)			
Structured SWL (h/sem)	47	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	78	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	125		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10% (10)	٢, ٥, ٩,12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7
	Projects	6	20% (20)	٢, ٥, ٩,12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO # 1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Sampling Theory in Digital Communications
Week 2	Introduction and background knowledge review. System block diagram, advantages of digital communications.
Week 3	Introduction to communication systems and digital information,
Week 4	Review of Fourier transforms and linear systems, sampling
Week 5	Study the interpolation limits in digital transmission, Nyquist bandwidth, etc.
Week 6	**Probability** Optimal Detection Probability, optimal detection of binary signals, optimal transceiver, bit error rate analysis.
Week 7	
Week 8	
Week 9	
Week 10	**Baseband Transmission** Line coding, signaling analysis, inter symbol interference (ISI), pulse shaping equalization etc.
Week 11	
Week 12	
Week 13	Digital Modulation Signal space, signal space analysis of digital passband modulation,
Week 14	PSK/ASK/APK/QAM/FSK BER analysis, coherent and non-coherent detections and transceivers. (Lecture Notes)
Week 15	
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Practical and subject specific skills (Transferable Skills) Use appropriate mathematical skills to 1) Illustrate the modulation techniques. 2) Illustrate the signal-space analysis.	No
Recommended Texts	➢ J. G. Proakis, Digital Communications, 4th edition, McGrwa Hill, 2001. ➢ S. Haykin, Communication Systems, 4th edition, Wiley, 2001.	No

Websites	https://link.springer.com/book/10.1007/978-3-031-19588-4	

Grading Scheme				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information

Module Title	**Microelectronics**		**Module Delivery**	
Module Type	**Core**		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEEELM435**			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	4	**Semester of Delivery**	1	
Administering Department	Electronics dept	**College**	Electronics engineering college	
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date		**Version Number**		

Relation with other Modules

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	The microelectronics course covers the area of integrated circuit design. The physics of semiconductor materials and devices. The fabrication of electronic devices, design and analysis of analog and digital integrated circuits.
Module Learning Outcomes	Upon successful completion, students will: 16. Understand the physics of semiconductor materials and devices. 17. Apply that knowledge toward ICs. 18. Understand the fabrication processes needed in IC manufacturing. 19. Design and analysis the digital ICs. 20. Design and analysis the BJT-, and MOS-based ICs.
Indicative Contents	Semiconductor Fundamentals IC fabrication processes. LSI and VLSI Design and Application. Logic Families based on bipolar transistor MOS Transistor Fundamentals and MOS IC Technology.

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)			
Structured SWL (h/sem)		**Structured SWL (h/w)**	

Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Semiconductor Fundamentals: energy band model of solid, intrinsic and extrinsic semiconductor, free carrier density in semiconductor, carrier concentration and Fermi level. Carrier transport and recombination, carrier diffusion, the drift current, Hall effect. p-n junction, Schottky barriers, bipolar junction transistor.
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	IC fabrication processes: thermal oxidation, crystal growth, diffusion, evaporations, photolithography, chemical vapor deposition, etching, Ion implantation, sputtering, packaging.
Week 7	Logic Families based on bipolar junction transistor (RTL, DTL, TTL, STTL, ECL, I^2L).
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	MOS Transistor Fundamentals and MOS IC Technology: MOS capacitor, static characteristics of the MOS transistor, MOS device fabrication. Logic circuits based on MOSFET, PMOS, NMOS, CMOS. CMOS inverters, PDP calculation. Logic gate design. memory devices.
Week 13	
Week 14	
Week 15	
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Microelectronics: circuit analysis and design. Neamen	Yes
Recommended Texts	Solid state electronic devices Streetman And Banerjee	No
Websites		

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION OF MICROPROCSSOR APPLICATIONS

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microprocessor Applications**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEEELM422**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	EEMB		**College**	College of Electronic Engineering	
Module Leader	Mohammed Muzahem Azeez		**e-mail**	mohammed.azeez@uoninevah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Microprocessor programming**	**Semester**	6
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim is to learn how to implement 8086 microprocessor system, memory and input output, DAC and ADC interfacing. To know how to realize digital filter using microprocessor based system and control any system such stepper motor.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	79. To understand structure programming using subroutine in assembly language 80. To understand how delay subroutine 8086 microprocessor systems 81. To understand how Interrupt is implementing in 8086 microprocessor systems 82. To understand the control signals that are needed to implement the interface between the 8086 microprocessor and memory or input/output devices. 83. To implement Dos and Bios interrupts & software applications 84. To implement input-output interfacing with the 8086. 85. To implement memory interfacing with the 8086. 86. To implement DAC interfacing with the 8086. 87. To implement ADC interfacing with the 8086. 88. To implement PPI 8255 in 8086 microprocessor system. 89. To control Stepper motor using 8086 microprocessor system
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Review of 8086 microprocessors, 8086 hardware connections and input/output and memory interfacing. [30 hrs] Interfacing analog to digital converter, digital to analog converter, programmable peripheral interface and memory test. [25 hrs] Digital filter realization based microprocessor system, stepper motor control system and hardware and software applications. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be focus on developing a conceptual understanding of the principle of microprocessor applications while refining students critical thinking skills. This will be achieved through classes, interactive tutorials, and by considering the type of simple experiments involving some interesting sampling activities for the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.33
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	20% (20)	4,7, 11	LO #1-6
	Assignments	2	5% (5)	3, 10	LO # 1-6
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	5% (5)	13	LO # 1 -8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	9	LO # 1-5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Review of 8086
Week 2	Interrupt is implementing in 8086 microprocessor system
Week 3	Dos and Bios interrupts & software applications
Week 4	Input and output interface
Week 5	8086 Microprocessor Bus Buffering and Latching

Week 6	Memory interface 1
Week 7	Memory interface 2
Week 8	Analog To Digital Converter Interfacing
Week 9	Digital To Analog Converter Interfacing
Week 10	Mid-term Exam + review
Week 11	Programmable peripheral Interface (PPI)82C55
Week 12	Stepper Motor Interfacing
Week 13	Implementation of Digital filter
Week 14	Microprocessor System Design Applications
Week 15	Preparatory week before the final Exam
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Introduction to the MTS-86C microcomputer and File Transmission
Week 3-4	Simple input and output and 7-Segment display in MTS-86C
Week 5-6	Using String Instruction in MTS-86C
Week 7-8	Interrupts in MTS-86C
Week 9-10	Familiarity with Bios int 10h and Dos int 21h
Week 11-12	DAC
Week 13-14	ADC

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	The Intel Microprocessors By BARRY B. BREY	Yes
Recommended Texts	The 8088 & 8086 microprocessors programming , interfacing S/W, H/W & applications , Prentice Hall, 2003 By W. A. Triebel & A. Singh	
Websites		

Grading Scheme مخطط الدرجات				
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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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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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