MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Applications (IC3)**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**MIET1102**				
ECTS Credits	**6**				
SWL (hr/sem)	**180**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sarah amer Dawood		**e-mail**	Sarah.aldoori@mtu.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Aws Jabbar Ass.Prof.Dr. Ghaidaa Abdulrahman Khalid		**e-mail**	awss_alogaidi@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	16/06/2023		**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. To understand operating system, its types, and their characteristics. 2. To be familiar with the desktop. 3. To be familiar and manage files and folders. 4. To be familiar with the hardware components of the computer. 5. To be able to use the control panel. 6. To understand software and its types. 7. To be able to use essential applications (MS Office). 8. To be able to use MS Word program. 9. To be able to use MS Excel program. 10. To be able to use MS PowerPoint program. 11. To be able to use MS Outlook. 12. To be familiar with search engines and the World Wide Web. 13. To be able to use Google apps.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate understanding of operating systems, including their types and characteristics. 2. Navigate and utilize the desktop effectively. 3. Manage files and folders proficiently. 4. Identify and comprehend the hardware components of a computer system. 5. Utilize the control panel efficiently. 6. Differentiate software types and their applications. 7. Effectively utilize essential applications such as MS Office. 8. Demonstrate proficiency in using the MS Word program. 9. Demonstrate proficiency in using the MS Excel program. 10. Demonstrate proficiency in using the MS PowerPoint program. 11. Utilize MS Outlook for email and scheduling purposes. 12. Navigate search engines and utilize the World Wide Web effectively. 13. Utilize Google apps for various tasks.
Indicative Contents	Indicative content includes the following.

المحتويات الإرشادية	Introduction to Operating Systems: Definition, functions, and capabilities of an operating system. Types of operating systems (e.g., Windows, macOS, Linux) with examples. Differences between operating systems and software applications. Power options: computer power on/off and power settings. (5 hrs) Exploring the Desktop: Navigating the desktop environment. Using the start button and working with applications. Understanding the relationship between software and hardware, their differences, importance, and influence on each other. Introduction to software updates, security, and bug fixes. Exploring the taskbar. (10 hrs) Files and Folders: Understanding the typical window and file management. Introduction to the Recycle Bin. Concepts of drives, folders, and files, highlighting their differences and importance. Exploring directory and folder hierarchy. Understanding file names and common extensions. (10 hrs) Computer Hardware: Identifying various computer types (mainframe, supercomputers, desktops, laptops, tablets, etc.). Exploring components inside a computer, such as the microprocessor, system memory, and storage systems. Recognizing input/output devices and their interaction. (8 hrs) Main Screen Features: Common features found in word processing, spreadsheet, and presentation software. Understanding the ribbon, tabs, and status bar, and their specific functions in each application. (5 hrs) MS Office Basics: Definitions and key concepts in MS Office applications and Usage. (15 hrs) Google apps and gmil (4 hrs) Familiarity with the control panel and its categories and usage. (10 hrs) Software Overview: Understanding software requirements and their implications for hardware. Introduction to different types of application software, including integrated sheets, desktop publishing, spreadsheets, databases, presentations, art, engineering, mathematics, statistics, medical, management, content creation, multimedia, and entertainment. Overview of system protection. (3 hrs) Digital Citizenship: Identifying ethical issues in the digital realm, including intellectual property, copyright, and licensing. Protecting data and computers from software threats and understanding viruses. Ensuring online privacy and security. Guidelines for safe online purchasing and sharing personal information. (5 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Incorporate a mix of theoretical study, hands-on practice, experimentation, and real-world applications to reinforce understanding and proficiency in each of the desired learning outcomes. Seek feedback, engage in discussions, and actively participate in exercises to enhance learning and address any gaps in knowledge.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ **14** اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	88	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**180**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 13	LO #1, #2, #3 and #5, #7
	Assignments	4	10% (10)	8,9,10, and 11	LO #7, #8 and and #7 #9 and #7, #10 and #7, #11
	Projects / Lab.	5	15% (15)	Continuous	All
	Report	1	5% (5)	6	LO #4, #7 , #8 and #12
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered

Week 1	Operating systems what is an operating system and what it can do, types of operating systems (Examples) the differences between operating systems and software applications; computer power on/ off , power options.
Week 2	Looking at the desktop: navigation on desktop; using start button; working with application; understanding software and hardware (their differences, importance and relationships).
Week 3	explain why hardware can influence the operating system and software and vice versa; software updates, security and bugs; software ethics +Using taskbar
Week 4	Files and folders looking at typical window. understanding Recycle bin. concepts of drives, folders, and files (differences and importance); Directory and folder hierarchy and structure; understanding file name and common extensions.
Week 5	Computer hardware identifying computer (mainframe, super computers, mini computers, desktop, notebooks, laptop, tablet, PCs, servers, Hand held or mobile computers; Music on Media players and Electronic book readers).
Week 6	Looking inside a computer (microprocessor, system memory, storage systems)
Week 7	recognizing input/ output devices (using keyboard, pointing devices, microphones, monitor, printers, projector, and speakers) understanding how it works together.
Week 8	**Mid Term**
Week 9	looking at the main screen- common features (for word, excel, and PowerPoint) understanding ribbon; tabs; status bar- and what is specific for each
Week 10	Basic Definitions and concepts in MS Office
Week 11	Understanding control Panel and its categories
Week 12	Understanding user accounts and rights create new user account, change in controls; rights and access
Week 13	What is software (Checking system requirements, and hardware implications); application software; integrated sheets; desktop publishing; spreadsheet; database management; presentation; Art; Engineering; mathematics; statistics; medical; management; content creation; multimedia; entertainment; system protection)
Week 14	Digital citizenship identifying ethical issues (understanding intellectual property, copyright and licensing); protecting your data or computer (identifying software threats, understanding viruses), protecting yourself while online; buying online; how much information should I share? protecting your privacy)
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Getting to know computer hardware + turn on and shut down options +looking at the desktop + using mouse (pointing, selecting, dragging, scrolling and execution).
Week 2	Lab 2: Create a folder (and file) , Rename, Copy, Cut, shortcut +Recycle bin + using start button+ Hide Folder.
Week 3	Lab 3: looking at a typical window +control buttons + move, resize a window+ view options+ select files + file options +using taskbar .
Week 4	Lab 4: Creating Gmail+ basic e-mail functions+ using google class.
Week 5	Lab 5: Using internet (Google scholar + fining courses and materials, Khan academy and finding resources).
Week 6	Lab 6: MS Office (word, Excel, Power point, outlook) Starting each program and identify the main screen in details as title bar, main ribbons, etc.
Week 7	Lab 7: MS Word (Home Tab, Insert Tab, Layout Tab, References Tab, Review tab, View Tab + Watermark, Page boarder and Page color).
Week 8	Lab 8:MS Excel (Home Tab, Insert, Page layout, Formula, Data).
Week 9	Lab 9:MS Power Point (Home Tab, Insert, Design, Transition, Animation).
Week 10	Lab 10:MS outlook (Home Tab, send and receive) + **Google apps Vs MS office.**
Week 11	Lab 11: Install, open, close, and(control panel- Programs) uninstall applications(internet and other sources).
Week 12	Lab 12: Categories of Control Panel (System and security (power options)+Network and internet (Network and sharing center) personalization (background and color) + Hardware and sounds (add a device or printer)).
Week 13	Lab 13: Categories of Control Panel (User Account (create a standard account, change password , picture and name) + Clock and region (change date, time , and region) + Ease of Access (Narrator, Magnifier, on screen keyboard)).
Week 14	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Internet and Computing Core Certification	No
Recommended Texts		

Websites	https://alison.com/tag/microsoft Share and Discover Knowledge on SlideShare

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	Differential Mathematics			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐**Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET1103**				
ECTS Credits	**5**				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	1	
Administering Department	TENG-MIET		**College**	EETC	
Module Leader	Awss Jabbar Majeed		**e-mail**	awss_alogaidi@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Saleem Lateef Mohammed **Ass.Prof.Dr.** **Ghaidaa Abdulrahman Khalid**		**e-mail**	Saleem_lateef_mohammed@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	17/06/2023		**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. To develop problem solving skills and understanding of Differential calculus through a broad range of Differentiation techniques. 2. To understand limits and theory of derivative and apply it on various types of functions. 3. This is the basic subject for all engineering fields. 4. Demonstrate basic knowledge and understanding of a core of plane analytical geometry, algebra and applied mathematics. 5. Introduce student to Derivatives of trigonometric functions and their inverses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recall basic concepts of calculus: functions, variables, limits, and continuity 2. Understand transcendental functions and how a function and its inverse are related 3. Define Plane analytical geometry and identify how conic sections are formed in addition to define both in words and in algebraic formulae, a circle and its center and radius, and an ellipse and its foci. 4. Differentiate algebraic and transcendental functions 5.Discuss Chain rules and applications of the derivatives. 6. Learn how to solve Linear equations by Cramer's rule.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Limits and Transcendental functions; Trigonometric functions, and their inverses,Exponential function and logarithmic function. Plane analytical geometry, parabola, ellipse and hyperbola. [21 hrs] 2. Polar coordinates. theory of derivative - Derivative of trigonometric function, Chain rules, applications of the derivatives. Derivatives of the inverse trigonometric function, derivatives of trigonometric and inverse functions, derivatives of the exponential and natural logarithms functions. Hyperbolic and inverse hyperbolic functions with derivatives. [24 hrs] 3. Determinats, Properties of determinats, and solution of Linear equations by Cramer's rule.[10 hrs] 4. Revision problem classes [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. Classes and interactive lessons will be used to achieve this.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5
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 #3
	Assignments	2	10% (10)	2 and 12	LO #4, #5and #6
	Tutorial	1	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	20% (20)	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	Limits and Continuity
Week 2	Transcendental functions- trigonometric functions, and their inverses.
Week 3	Transcendental functions-Hyperbolic and inverse hyperbolic functions
Week 4	Transcendental functions-Exponential function and logarithmic function.
Week 5	Plane analytical geometry, parabola & ellipse, hyperbola.
Week 6	Polar coordinates.
Week 7	Mid-term Exam + Theory and rules of derivatives.
Week 8	Implicit Differentiation and Chain rules.
Week 9	Derivatives of trigonometric functions.
Week 10	Derivatives of inverse trigonometric functions.
Week 11	Derivatives of the exponential and natural logarithms functions.
Week 12	Derivatives of Hyperbolic and inverse hyperbolic functions.
Week 13	Applications of the derivatives.
Week 14	Determinants and properties of determinants.
Week 15	Solution of Linear equations by Cramer's rule.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mathematics I (**pdf**)	No
Recommended Texts	Thomas ' Calculus (**pdf**) Fouteenth edition Based on the original work by GEORGE B. THOMAS, JR.	No
Websites	https://elearningatria.files.wordpress.com/2013/10/differential-calculus-1-23.pdf http://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing**			**Module Delivery**	
Module Type	**Basic**			☐ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET1104**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	MIET		**College**	EETC	
Module Leader	Suha Sabeeh Ahmed		**e-mail**	suhasabeh@mtu.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Dr. Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	10/06/2023		**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	The module aims for the Basics of Engineering Drawing course are as follows: 1. To demonstrate proficiency in creating and interpreting engineering drawings: Develop the skills to create accurate and detailed engineering drawings using both manual drafting techniques and computer-aided drafting (CAD) software. Additionally, gain the ability to interpret and understand engineering drawings, including orthographic projections, sections, and assembly drawings. 2. To apply industry standards and practices: Understand and apply the relevant industry standards and practices for engineering drawing, such as dimensioning, tolerancing, and geometric dimensioning and tolerancing (GD&T). Ensure that drawings are compliant with applicable standards to facilitate effective communication and manufacturing processes. 3. To develop spatial visualization skills: Enhance your ability to visualize and mentally manipulate objects in three-dimensional space based on two-dimensional drawings. Strengthen your spatial awareness and improve your understanding of complex engineering designs. 4. To demonstrate effective communication of technical information: Acquire the skills to communicate technical information clearly and accurately through annotations, notes, and drawing presentations. Enhance your ability to convey design intent, dimensions, and specifications to other stakeholders, such as engineers, manufacturers, and clients. 5. To apply critical thinking and problem-solving skills in engineering drawing: Develop the ability to analyze and solve engineering drawing problems, such as identifying and resolving dimensional conflicts, addressing design issues, and ensuring proper fit and function of components. Apply critical thinking skills to evaluate and improve the quality and accuracy of engineering drawings.
Module Learning Outcomes	Upon completion of the course, students should be able to: 1. Develop Fundamental Skills: The aim is to develop fundamental skills in engineering drawing, including the ability to create accurate and precise technical drawings using appropriate drawing instruments and techniques. 2. Understand Drawing Standards and Conventions: The aim is to familiarize students with drawing standards and conventions used in engineering, enabling them to create drawings that adhere to industry guidelines and ensure clear communication of design intent. 3. Interpret and Create Orthographic Projections: The aim is to enable students to interpret and create orthographic projections of objects, including understanding the principles of multiview projection, selecting appropriate views, and accurately representing three-dimensional objects in two dimensions. 4. Apply Dimensioning and Tolerancing Principles: The aim is to develop students' ability to apply dimensioning and tolerancing principles to engineering drawings, including understanding different types of dimensions, tolerance symbols, and geometric dimensioning and tolerancing (GD&T) concepts.

	5. Familiarize with Computer-Aided Design (CAD): The aim is to introduce students to computer-aided design (CAD) software and develop their proficiency in using CAD tools to create and modify technical drawings, improving efficiency and accuracy in engineering design and documentation
Indicative Contents	**1. Introduction to engineering drawing: [12 hrs]** • Overview of the role and significance of engineering drawing in technical fields. • Introduction to different drawing tools and their uses. • Understanding the importance of accuracy and clarity in engineering drawings. **2. Orthographic projections and multiview drawings: [12 hrs]** • Principles and techniques of orthographic projection. • Creating and interpreting multiview drawings, including front, top, and side views. • Introduction to auxiliary views and sectional views. **3. Dimensioning and tolerancing: [12 hrs]** • Understanding dimensioning practices and techniques. • Introduction to geometric dimensioning and tolerancing (GD&T) symbols and concepts. • Applying tolerances to ensure proper fit and functionality of components. **4. Computer-aided drafting (CAD) software: [12 hrs]** • Introduction to CAD software and its applications in engineering drawing. • Learning basic commands and tools for creating and modifying drawings. • Hands-on practice with CAD software to create technical drawings. **5. Assembly drawings and exploded views: [11 hrs]** • Creation and interpretation of assembly drawings. • Understanding exploded views to visualize the relationship between parts. • Introduction to bill of materials (BOM) and part lists in assembly drawings.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to learning and teaching engineering drawing using AutoCAD, there are several strategies that can be effective. Here are some recommendations: 1. Familiarize with the Software: Before diving into engineering drawing concepts, it's important to become familiar with the AutoCAD software. This includes understanding the user interface, basic tools, and commands. Start with introductory tutorials or online resources that cover the basics of AutoCAD. 2. Start with Fundamentals: Begin by teaching the fundamental concepts of engineering drawing, such as orthographic projection, isometric projection, dimensioning, and tolerancing. Explain the principles and techniques used in creating accurate and clear technical drawings. 3. Hands-on Practice: Engineering drawing is a practical skill, so provide ample opportunities for hands-on practice. Assign exercises and projects that require students to create different types of drawings using AutoCAD. Encourage them to explore and experiment with various tools and commands. 4. Step-by-Step Instructions: Break down complex drawing tasks into smaller, manageable steps. Provide step-by-step instructions and demonstrations using

	AutoCAD, showing students how to execute each step effectively. This approach helps students understand the workflow and build their confidence. 5. Visual Aids and Examples: Utilize visual aids, such as slides, diagrams, and examples, to reinforce concepts. Show real-world engineering drawings and explain how they were created using AutoCAD. Visual representations can enhance understanding and make abstract concepts more tangible. 6. Group Activities and Collaboration: Promote collaboration among students by assigning group activities or projects. This allows them to work together, share knowledge, and learn from one another. Encourage students to discuss their approaches and problem-solving techniques related to engineering drawing in AutoCAD. 7. Provide Feedback: Regularly provide constructive feedback on students' drawings. Highlight areas for improvement, suggest alternative methods, and point out common mistakes. This feedback loop is crucial for students to refine their skills and develop a deeper understanding of engineering drawing principles. 8. Stay Updated with AutoCAD Features: AutoCAD is regularly updated with new features and enhancements. Stay up to date with these changes to ensure you're teaching the latest tools and workflows. Familiarize yourself with new capabilities that can improve efficiency and accuracy in engineering drawing. 9. Online Resources and Communities: Encourage students to explore online resources, tutorials, and communities dedicated to AutoCAD and engineering drawing. There are numerous websites, forums, and YouTube channels that offer valuable content and support for learning AutoCAD. 10. Project-Based Learning: Incorporate project-based learning into the curriculum, where students can apply their engineering drawing skills to real-world scenarios. Assign projects that simulate industry-related tasks, such as creating architectural plans, mechanical assemblies, or electrical schematics using AutoCAD.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل **15** اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعي	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعي	4.3
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	20% (20)	5, 10	LO #1, #2 and #3
	Assignments	2	10% (10)	2, 12	LO # 3 and # 4
	Report/project	14	10% (10)	14	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-3
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Engineering Drawing: • Importance and applications of engineering drawing. • Drawing instruments and materials. Drawing standards and conventions.
Week 2	Lines and Lettering • Types of lines used in engineering drawing. • Line weights and line quality. Techniques for freehand lettering and title block.
Week 3	Geometric Construction • Basic geometric shapes and their construction methods. • Construction of angles, triangles, and polygons. Division of lines and angles.
Week 4	Orthographic Projection • Introduction to orthographic projection. • Multiview projection and views of an object. Drawing orthographic views of simple objects.
Week 5	Sectional Views • Introduction to sectional views. • Types of sectional views (full, half, offset). Drawing sectional views of objects.

Week 6	Dimensioning and Tolerancing • Introduction to dimensioning and tolerancing. • Types of dimensions (linear, angular, radial). Geometric dimensioning and tolerancing (GD&T).
Week 7	Auxiliary Views: • Introduction to auxiliary views. • Drawing auxiliary views to show true shape and size of inclined surfaces. • Solving problems using auxiliary views.
Week 8	Pictorial Drawings • Introduction to pictorial drawings (isometric, oblique, perspective). • Drawing isometric and oblique pictorial views. Creating exploded views.
Week 9	Screw Threads and Fasteners • Introduction to screw threads. • Types of screw threads and thread representation. Drawing standard fasteners (bolts, nuts, screws).
Week 10	Assembly Drawings • Introduction to assembly drawings. • Drawing exploded views and assembly details. Bill of materials (BOM) and part numbering.
Week 11	Introduction to CAD (Computer-Aided Design) • Overview of CAD software and its benefits. • Introduction to basic CAD tools and commands. Creating simple drawings using CAD software.
Week 12	• Isometric Projection • Introduction to isometric projection. • Drawing isometric views of simple objects. Solving problems using isometric projection.
Week 13	Electrical and Electronic Symbols • Introduction to electrical and electronic symbols. • Drawing basic electrical and electronic circuits. Wiring diagrams and schematic symbols.
Week 14	Engineering Drawings for Manufacturing • Introduction to manufacturing drawings. • Drawing detailed views and dimensioning for manufacturing. Introduction to tolerances and fits.
Week 15	Review and Project Work

	• Review of course topics and concepts. • Project work involving the application of engineering drawing principles.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	D. A. Madsen, D. P. Madsen, and J. E. Briesacher, Engineering Drawing and Design, 5th ed., Clifton Park, NY: Delmar Cengage Learning, 2011.	Yes
Recommended Texts	F. E. Giesecke, A. Mitchell, H. C. Spencer, I. L. Hill, and J. T. Dygdon, Technical Drawing with Engineering Graphics, 15th ed., Upper Saddle River, NJ: Pearson, 2016.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering	

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	Engineering Workshops ورش هندسية			**Module Delivery**	
Module Type	Basic			☐ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET1205				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**		
Module Leader	Huda Farooq Jameel		**e-mail**	huda_baban@mtu.edu.iq	
Module Leader's Acad. Title	Asst. lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Mayss alreem nizar hammed **Ass.Prof.Dr. Ghaidaa Abdulrahman Khalid**		**e-mail**	Mayssalreem92@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	12-6-2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To explain the lathe workshop: various measuring devices and how to use them. How to operate the lathe and use different tools and cutting tools. 2. To explain the welding and gas welding processes and familiarize yourself with the devices and equipment used. Point welding, familiarization with the devices and equipment used, and carrying out a simple exercise. 3. To understand the electrical transformers and their types: magnetic circuits; electrical circuits; measuring the wire diameters of the transformer. 4. To understand the drawing of a circuit for establishing (the lamp ladder) two roads using a two-way switch—a practical application of the circuit. 5. To learn how to use the different measuring devices in the workshop (such as a multimeter, oscilloscope, etc.). 6. To learn how to use caustics, soldering irons, and various printed electronic circuits, identify how to install them, and install various electronic components on them. 7. To understand different types of coils and methods of checking them. Different types of capacitors differ in terms of the type of insulator used between the capacitor plates and the methods of checking them. The different types of resistors, in terms of the material they are made of and the capacity they can withstand, How to read the values of the resistors in different ways Variable and special resistors: how to check them. 8. To understand the different types of switches used in electronic devices and their examination methods. Different types of fuses There are different types of resistors in terms of the material they are made of. Types of semiconductor diodes and transistors and finding the equivalents Semiconductor check, diode check, and transistor check. 9. To understand how to read the electronic map and how to track faults on the electronic map How to install and solder electronic components on the printed board Implementation of a simple electronic circuit on the printed board integrated electronic circuits: identify the types of these circuits.
Module Learning	Upon completion of the course, students should be able to:

Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the methods of work on the lathe. 2. Cuts metals with a cutting and punching machine. 3. Install some simple structures. 4. Providing the student with manual experience and scientific proficiency in it. 5. Learn about electronic components. 6. Electronic components exchange is used to build and solder simple circuits. 7. Examine electronic circuits and their components. 8. Read the electronic map and learn how to track faults on the electronic map. 9. How to install and solder electronic components on the printed board. 10. Implementation of a simple electronic circuit on the printed board. 11. Removing solder from circuits for the purpose of lifting and replacing. 12. How to design electronic circuits on the printed board. 13. Methods of soldering integrated circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Lathe workshop, measuring devices, different tools, cutting tools, welding, gas welding, and point welding. [8 hrs.]. Electrical transformers, magnetic circuit, and electrical circuits. [6 hrs.]. Different measuring devices in the workshop (such as an ovometer, oscilloscope, power supply, etc.) [8 hrs.]. Soldering iron and printed electronic circuits [4 hrs.]. Coils, capacitors, and resistors [6 hrs.]. Switches and fuses [4 hrs.]. Semiconductor diode, and transistor [6 hrs.]. Electronic map, faults on the electronic map, and design electronic circuits on the printed board [8 hrs.]. Implemented a simple electronic circuit on the printed board [4 hrs.]. Integrated electronic circuits [4 hrs.].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Daily assessment - weekly assessment - quarterly assessment - objective questions - general questions - practical tests.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
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	**Daily assessment**	1	10% (10)	3, 8	LO # 1-2 and 4-6
	weekly assessment	1	10% (10)	9, 13	LO # 3 and #4
	Projects / Lab.	1	10% (10)	Continuous	
	practical test	1	10% (10)	2	LO # 7
Summative assessment	**Midterm Exam**	2 hr.	10% (10)	7	LO # 1-7
	Final Exam	3 hr.	50% (50)	14	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Lathe workshop: various measuring devices and how to use them. How to operate the lathe and use different tools and cutting tools
Week 2	Lab 2: Welding and gas welding, and familiarization with the devices and equipment used. Point welding, familiarization with the devices and equipment used, and carrying out a simple exercise.
Week 3	Lab 3: Electrical transformers: their types magnetic circuits; electrical circuits; opening transformers; taking information from the old transformer for primary and secondary coils measuring the wire diameters of the transformer; measuring the plastic coil template rewinding primary and secondary coils.
Week 4	Lab 4: Drawing a circuit for establishing two roads using a two-way switch is a practical application of the circuit. Identifying electrical collectors-their types, their use, thermal follow-ups, and time position.

Week 5	Lab 5: Training on making electrical installations (establishing inside tubes).Pipe cutting process: dental work, pipe bending, using drag springs.
Week 6	Lab 6: How to use the different measuring devices in the workshop (such as a multimeter, oscilloscope, etc.).
Week 7	Lab 7: How to use caustics: types of caustics used in the workshop; caustic welding training. Types of solder used: auxiliary materials for soldering; soldering some wires with each other and with some components. How to use a soldering iron and a soldering absorbent kit such as a solder sucker or solder remover, training on some electronic components, and lifting them from the printed plate. Various printed electronic circuits, identifying how to install them, and the installation of various electronic components on them.
Week 8	Lab 8: Coil types, methods of checking them, electrical transformers, types, checking, auto-transformer, the difference between an auto-transformer and an ordinary transformer. The different types of capacitors in terms of the type of insulator used between the capacitor plates, the effort that the capacitor bears, and reading the values of the capacitors using the different methods used in coding How to check the amplifiers and how to switch them. Making connections of the capacitors in parallel, series, and mixed on the printed board with the examination.
Week 9	Lab 9: The different types of switches used in electronic devices and their examination methods, the current that each switch bears, and the use of each type.Types of fuses used in electronic circuits, types and diameters of wires used and diameters of wires used in fuses, the current that each type bears, and how to repair fuses
Week 10	Lab 10: The different types of resistors, in terms of the material they are made of and the capacity they can withstand, How to read the values of the resistors in different ways Variable and special resistors (VDR-PYC-NTC) how to check them. Make a circuit to connect the resistors in series, make a circuit to connect the resistors in parallel, make a circuit to connect the resistors in series and parallel, and check the circuit.
Week 11	Lab 11: Types of semiconductor diodes and transistors and finding the equivalents. Semiconductor check, diode check, transistor check
Week 12	Lab 12: How to read the electronic map and track faults on the electronic map. Introduce the student to how to design electronic circuits on the printed board.
Week 13	Lab 13: How to install and solder electronic components on the printed board. Implementation of a simple electronic circuit on the printed board.
Week 14	Lab 14: Integrated electronic circuits: identify the types of these circuits. Cautery for soldering integrated circuits, the correct method of soldering integrated circuits, and

	removing solder from circuits for the purpose of lifting and replacing.
Week 15	**Preparatory week for the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Recommended Texts	1- Encyclopedia of Electronic Components Volume 1 (Charles Platt). 2- Encyclopedia of Electronic Components Volume 2 (Charles Platt). 3- Encyclopedia of Electronic Components Volume 3 (Charles Platt). 4- Encyclopedia of Electronic Components Volume 4 (Charles Platt). 5- Encyclopedia of Electronic Components Volume 5 (Charles Platt).	NO
Websites	https://www.electricaltechnology.org/2013/03/how-to-remember-direction-of-pnp-and.html	

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	**Fundamental of Electrical Engineering.**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET1101**				
ECTS Credits	**7**				
SWL (hr/sem)	**210**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Zainab Majid Nahi		**e-mail**	Zainab.majid@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSC	
Module Tutor			**e-mail**		
Peer Reviewer Name	**Prof.Dr.Jameel Kaduim Abed** **Ass.Prof.Dr. Ghaidaa Abdulrahman Khalid**		**e-mail**	Dr_ahmed.r@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	12/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis. 7. To perform Loop current method, Super position
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoids and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current. 12. Discuss the 3-Phase system, Wye connection and Delta connection. 13. Identify the power in balance phase circuit. 14. Describe the Magnetism and Magnetic Circuits
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – DC Circuit Theory I DC circuits – Current and voltage definitions, Passive sign convention, and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Conversion of delta – connected resistance into an equivalent Wye connection & Vic versa, Network reduction, Introduction to mesh and nodal analysis. [20 hrs]

	Part B – DC-Circuit Theory II Fundamentals of the Power sources connected in parallel, Thevenin and Norton equivalent circuits, current and voltage division, Loop current method, Super position method ,maximum power transfer, Non- linear direct current circuit [20 hrs] AC circuits I – Generation of alternating current, Sinusoidal current. The mean values of current and voltage. [15 hrs] AC Circuits II - The effective values of current and voltage. The vector diagram, [10 hrs] The instantaneous power and mean power of A.C , relative and apparent power . . [15 hrs] Revision problem classes [8 hrs] Magnetism and Magnetic Circuits [20 hrs] 3-Phase system, Wye connection, and Delta connection [15 hrs] The power in balance phase circuit. [10 hrs] Revision problem classes [6 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 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	210		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Symbols and abbreviations, Units, Electric circuits, and its elements.
Week 2	The direct–current network (Kirchhoff's law & their use in network).
Week 3	Conversion of delta–connected resistance into an equivalent Wye connection & Vic versa
Week 4	Power sources are connected in parallel,
Week 5	Circuit analysis methods: 1- Node voltage method.2-Loop current method.
Week 6	Circuit analysis Theorems: (Superposition and Thevinens Theorems)

Week 7	Circuit analysis Theorems: (Norton and Maximum power Theorems)
Week 8	Generation of alternating current, Sinusoidal current
Week 9	The mean values of current and voltage.
Week 10	The effective values of current and voltage.
Week 11	The vector diagram.
Week 12	The instantaneous power and mean power of A.C, relative and apparent power.
Week 13	RL transient circuit.
Week 14	RC transient circuit.
Week 15	3-Phase system ,The rotating magnetic field.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to electrical elements, sources, and measuring devices related to electrical circuits.
Week 2	Verification of Ohm's Law
Week 3	Verification of KVL and KCL
Week 4	Verification of Thevenin's and Norton's theorems
Week 5	Verification of the superposition theorem
Week 6	Verification of the maximum power transfer theorem
Week 7	Verification of the Nodal Voltage Theorem
Week 8	Verification of the Mesh Theorem
Week 9	Generating AC Voltages and Measurement Frequency, Period, Amplitude, and Peak Value.
Week 10	Calculations and Verification of the Impedance and Current of RL
Week 11	Calculations and Verification of Impedance and Current RC
Week 12	Calculations and verification of the impedance and current of RLC series circuits
Week 13	Calculations of Power in AC Circuits
Week 14	Calculations and verification of the impedance and current of RL, RC, and RLC parallel circuits
Week 15	Preparatory week before the final exam
Week 16	Preparatory week for the final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes

Recommended Texts	Electric Circuits Seventh Edition وSchaum's Outline Series	No
Websites	BASIC ELECTRICAL ENGINEERING FOURTH 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	**Human Rights and Democracy**			**Module Delivery**	
Module Type	**Support**			☒ **Theory**	
Module Code	**MIET1105**			☒ **Lecture**	
ECTS Credits	**5**			☐ **Lab**	
SWL (hr/sem)	**150**			☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Level	1		**Semester of Delivery**	2	
Administering Department	MITE		**College**	EETC	
Module Leader	Ahmed fadhel jassem		**e-mail**	dr.ahmedfadhel@yahoo.com	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Rasha Saheb Hadi Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	rashasaheb@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
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	The module aims to: 1. To provide students with a comprehensive understanding of the historical development of human rights and their significance in contemporary society. 2. To familiarize students with the concept and characteristics of human rights, enabling them to analyze and evaluate various human rights issues and challenges. 3. To explore the different generations of human rights, their evolution over time, and the implications for individuals and communities. 4. To examine the role of human rights in ancient civilizations and Abrahamic religions, highlighting the contributions and influences of these historical contexts. 5. To investigate the international and regional recognition of human rights through the study of key charters, conventions, and declarations, enabling students to comprehend the global framework for human rights protection and promotion.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a comprehensive understanding of the fundamental concepts and techniques of differential calculus, including limits, derivatives, and their applications in engineering contexts. 2. Apply differentiation techniques proficiently to solve a wide range of engineering problems, such as optimization, motion analysis, and cost and revenue optimization. 3. Utilize transcendental functions effectively in engineering applications, demonstrating competence in working with exponential, logarithmic, and inverse trigonometric functions. 4. Apply the principles of differential equations to model and analyze engineering systems, including growth and decay phenomena and electrical circuits. 5. Employ critical thinking and analytical skills to tackle real-world engineering scenarios, utilizing differential calculus concepts to develop innovative solutions.

Indicative Contents المحتويات الإرشادية	1. Historical Evolution of Human Rights: This content will focus on tracing the historical development of human rights, from ancient civilizations to the modern era. It will explore significant milestones and events that shaped the concept of human rights over time. [16 hrs.] 2. Conceptual Foundations of Human Rights: This section will delve into the theoretical underpinnings and key concepts of human rights. It will cover topics such as universality, indivisibility, and the inherent dignity of every individual as the basis for human rights. [16 hrs.] 3. Generations of Human Rights: This content will examine the different generations or categories of human rights, including civil and political rights, economic, social, and cultural rights, and solidarity rights. Students will explore the interdependence and interrelatedness of these rights. [16 hrs.] 4. Human Rights in Practice: This section will analyze real-world examples and case studies to illustrate the application of human rights principles. It may include topics such as human rights violations, human rights advocacy, and the role of international and regional human rights mechanisms. 5. Emerging Issues in Human Rights: This content will explore contemporary challenges and emerging issues in the field of human rights. It may cover topics such as technology and human rights, environmental rights, rights of vulnerable groups, and the intersectionality of human rights with other fields such as gender, race, and socio-economic factors. [16 hrs.]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will employ various learning and teaching strategies to enhance students' understanding and engagement. These strategies will include: 1. Lectures: Traditional lectures will be delivered by the instructor to provide foundational knowledge and concepts related to human rights. Lectures will offer comprehensive explanations, historical context, and theoretical frameworks. 2. Discussions and Debates: Interactive discussions and debates will be conducted to encourage critical thinking and active participation. Students will have the opportunity to express their opinions, engage in thoughtful debates, and analyze different perspectives on human rights issues. 3. Case Studies: Real-life case studies will be examined to illustrate the application of human rights principles in different contexts. Students will analyze and discuss these cases to develop problem-solving skills and gain a deeper understanding of the practical implications of human rights. 4. Group Projects: Collaborative group projects will be assigned to promote teamwork and research skills. Students will work together on specific human rights topics, conduct research, and present their findings to the class. This approach fosters teamwork, communication, and research

	abilities. 5. Guest Speakers: Inviting guest speakers, such as human rights activists, legal experts, or representatives from relevant organizations, will provide students with firsthand insights into the practical aspects of human rights work. Guest speakers can share their experiences, expertise, and engage in interactive discussions with students. 6. Multimedia Resources: Utilizing multimedia resources such as videos, documentaries, and online platforms will enhance students' understanding and engagement with human rights topics. These resources can present real-life examples, testimonies, and visual representations to complement the theoretical aspects of the module. 7. Critical Analysis and Reflection: Assignments and assessments will encourage students to critically analyze human rights issues, reflect on their personal perspectives, and evaluate the impact of human rights violations and advancements. This will develop their analytical skills and foster a deeper understanding of the complex nature of human rights. 8. Independent Study: Students will be encouraged to engage in independent study, including reading relevant textbooks, scholarly articles, and reports. This will enable them to deepen their understanding of specific human rights topics, broaden their knowledge base, and develop self-directed learning skills. 9. Overall, these learning and teaching strategies aim to create an interactive and engaging learning environment, fostering critical thinking, active participation, and a deeper understanding of human rights principles and their practical application.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**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/Nu	Weight (Marks)	Week Due	Relevant Learning

		mber			Outcome
Formative assessment	**Quizzes**	2	15% (15)	5, 10	LO #1, #2,and #3
	Assignments	2	15% (15)	2, 12	LO # 4 and #5
Summative assessment	**Midterm Exam**	2 hours	20% (20)	7	LO # 1-# 3
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1:	Introduction to Human Rights (1 week). • Historical Development of Human Rights. • Concept and Characteristics of Human Rights. Importance and Relevance of Human Rights.
Week 2:	Human Rights in Ancient Civilizations (1 week). • Examination of Human Rights in Ancient Societies. • Contributions of Ancient Civilizations to Human Rights Principles.
Week 3:	Human Rights in Abrahamic Religions (1 week). • Exploration of Human Rights in Judaism, Christianity, and Islam. • Emphasis on the Personality of Prophet Muhammad (PBUH) and his Contribution to Human Rights.
Week 4:	Human Rights in the Medieval and Modern Ages (1 week). • Evolution of Human Rights during the Middle Ages and Modern Era. • Impact of Enlightenment and Renaissance on Human Rights.
Week 5:	Contemporary International Recognition of Human Rights (1 week). • Analysis of International Human Rights Instruments and Treaties. • Focus on the Universal Declaration of Human Rights (1948).
Week 6:	Regional Recognition of Human Rights (1 week). • Examination of Regional Human Rights Systems and Mechanisms. • Exploration of Non-Governmental Organizations' Role in Promoting Human Rights.
Week 7:	Human Rights in International Charters (1 week). • Study of Key International Charters and Conventions. • In-depth Analysis of the Universal Declaration of Human Rights (1948).
Week 8:	Human Rights in National Constitutions (Iraqi Constitutions) (1 week). • Examination of Human Rights Provisions in Iraqi Constitutions. • Comparative Analysis of Constitutional Safeguards for Human Rights.
Week 9:	Human Rights in Iraq after 2003 (Iraqi Constitution 2005) (1 week). • Overview of Human Rights Developments in Iraq post-2003. • Analysis of the Iraqi Constitution of 2005 and its Impact on Human Rights.
Week 10:	Safeguards of Human Rights at Various Levels (1 week). • Exploration of International, Regional, and National Mechanisms for Protecting Human Rights. • Focus on Genocide as a Violation of Human Rights.

Week 11:	Financial and Administrative Corruption (1 week). • Understanding the Phenomenon of Financial and Administrative Corruption. • Causes and Consequences of Corruption and Efforts to Combat it.
Week 12:	Week 12: Right to Water and Sustainable Management (1 week). • Importance of the Right to Water as a Human Right. • Strategies for Sustainable Water Management and Ensuring Access to Clean Water.
Week 13:	Week 13: Terrorism and its Impact on State and Society (1 week). • Examination of Terrorism and its Threat to Human Rights. • Analysis of Counter-Terrorism Measures and Balancing Human Rights Considerations.
Week 14:	Human Rights in Contemporary Issues (1 week). • Exploration of Current Human Rights Challenges and Debates. • Discussion on Emerging Human Rights Issues in the Modern World.
Week 15:	Review and Conclusion (1 week). • Recap of Key Concepts and Themes Covered in the Module. Discussion on the Importance of Upholding and Promoting Human Rights in Today's Society.
Week 16	Preparatory week before the final Exam

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.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. "حقوق الإنسان في العالم العربي: القضايا والتحديات"، تأليف: علي حجازي وجمال شعت. الطبعة: الطبعة الثانية، العام: 2017. 2. "مبادئ حقوق الإنسان: المفاهيم والقضايا الحديثة"، تأليف: أحمد المجالي وغسان حمدان. الطبعة: الطبعة الأولى، العام: 2019.	Yes
Recommended Texts	1. "حقوق الإنسان والديمقراطية"، تأليف: مصطفى كامل محمود. الطبعة: الطبعة الأولى، العام: 2015. 2. "تاريخ حقوق الإنسان في العصور القديمة والوسطى"، تأليف: نبيل رزق. الطبعة: الطبعة الثالثة، العام: 2012. 3. "حقوق الإنسان في العراق: الواقع والتحديات"، تأليف: سعد الله عباس. الطبعة: الطبعة الأولى، العام: 2014. 4. "حقوق الإنسان في العراق: المفهوم والتطور"، تأليف: عبد الكريم السامرائي. الطبعة: الطبعة الأولى، العام: 2018. 5. "حقوق الإنسان في العراق: بين التحديات والآفاق"، تأليف: محمد السامرائي ولقاء الحربي. الطبعة: الطبعة الأولى، العام: 2020.	No
Websites	The Collage E-Library	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Integral Mathematics			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET1103				
ECTS Credits	**5**				
SWL (hr/sem)	**73**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	MITE		**College**	EETC	
Module Leader	Awss Jabbar Majeed		**e-mail**	awss_alogaidi@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Saleem Lateef Mohammed **Ass.Prof.Dr.** **Ghaidaa Abdulrahman Khalid**		**e-mail**	Saleem_lateef_mohammed@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	17/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Differential Mathematics	**Semester**	1
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 develop problem solving skills and understanding of Integral calculus through a broad range of Integration techniques. 2. To understand theory and methods of integrations and apply it on various types of functions. 3. This is the basic subject for all engineering fields 4. Demonstrate basic knowledge and understanding of a core of linear algebra and applied mathematics. 5. Introduce student to integration of trigonometric functions and their inverses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. learn the basic ideas, tools and techniques of integration and will use them to solve problems from real-life applications. 2. Understand the definite and indefinite integrals and their applications in life. 3. Learn approximation techniques for integration. 4. Recognize how to apply integration methods to find area and volumes 5. Learn how to find the length of a plane curve for a given function. 6. Discuss Matrices, Inverse of matrix and solution of homogeneous matrices. 7. List the various applications of Eigenvalues, Eigenvectors and Matrix diagonalization in Signals and systems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Theory of Integration,Basics of Definite and indefinite Integration, Integration of trigonometric and inverse functions, Integration of the exponential functions, and Integration of logarithmic functions. [21 hrs]

	Integration of Hyperbolic and inverse hyperbolic functions, methods of integration, numerical integration, applications of the definite integrals, and area of surface. [15 hrs] Volume of revolution, length of plane curve, and matrices with their Inverses. [15 hrs] Matrix Diagonalization, solution of homogeneous matrices, eigenvalues, and eigenvectors. [15 hrs] Revision problem classes [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. Classes and interactive lessons will be used to achieve this.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5
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	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #3

assessment	**Assignments**	2	10% (10)	2 and 12	LO #4, #5 , #6and #7
	Tutorial	1	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – Theory of Integration.
Week 2	Methods of integration and Basics of Definite and indefinite Integration.
Week 3	Integration of trigonometric and inverse functions.
Week 4	Integration of the exponential functions.
Week 5	Integration of logarithmic functions.
Week 6	Integration of Hyperbolic and inverse hyperbolic functions.
Week 7	Mid-term Exam + numerical integration and applications of the definite integrals.
Week 8	Area of surface.
Week 9	Volume of revolution.
Week 10	Length of plane curve.
Week 11	Matrices and Inverse of matrix.
Week 12	Matrix Diagonalization
Week 13	Solution of homogeneous systems
Week 14	Eigenvalues.
Week 15	Eigenvectors
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Notes on Calculus II Integral Calculus Miguel A. Lerma	No
Recommended Texts	Thomas ' Calculus (pdf) Fouteenth edition	No

	Based on the original work by GEORGE B. THOMAS, JR.	
Websites	https://sites.math.northwestern.edu/~mlerma/courses/math214-2-02f/notes/c2-all.pdf http://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Mechanics			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐**Lecture** **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET 1203				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	2	
Administering Department	ENG- MIET		**College**	EETC	
Module Leader	Abbas Sheyaa Alwan		**e-mail**	Abbas_sheyaa@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	**Ass.Prof.Dr. Ghaidaa Abdulrahman Khalid**		**e-mail**	**ghaidaakhalid@mtu.edu.iq**	
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	1. To understanding of mechanics theory through the application of motion. 2. To determine the forces, stress and strain under force effected. 3. To determine the reaction forces under load applied. 4. To understand the friction basic under mechanic applied 5. To understand a newton laws in motion. 6. To understand and solve problems in forces analysis. 7. To determine the materials properties and selective of materials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the basic of forces result in applications of structures. 2. Identify the basic of Equilibrium force system. 3. Recognize how phenomena motion in mechanics subject. 4. Summarize what is mean of forces reaction in beams. 5. Explain the analysis force in mechanics application. 6. Identify the basic of stress and strain in mechanics applications. 7. List the various parameters associated with mechanics theory. 8. Identify the basic of forces analysis and their applications. 9. Explain the Newton's laws used in mechanics application. 10. Identify the basic of friction forces in motion. 11. Identify the basic of welding and riveted joint in mechanics applications. 12. Explain the mechanical test to determine the mechanic properties. 13. Discuss the phenomena of moment of forces under different force moment.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A :</u> 1- Introduction of forces, Analysis of Forces, Result of forces, Moment of forces, Equilibrium force system. [18 hrs] 2- Stress, Strain, stress – strain curve, Simple strain, Variable stress. [18 hrs] 3- Beams and bending, Analysis of structure. [15 hrs]

	4- Friction, coefficient of friction, mechanism of friction. [18hrs] Part B: 1- Materials properties, material selective, stress- strain diagram. [18 hrs] 2- Mechanical tensile test, compression test, impact test, hardness test.[18 hrs] 3- Mechanical joint, Rivet joint, welding connection. [15 hrs] 4- Beams and bending, Analysis of structure, Centroid, Second moment of area. [18 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.
Unstructured USWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	105	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.5
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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of forces
Week 2	Result of forces
Week 3	Moment of forces
Week 4	Equilibrium force system
Week 5	Stress, Strain
Week 6	Simple strain
Week 7	Variable stress
Week 8	Friction
Week 9	Materials properties
Week 10	Rivet and weld connection
Week 11	Beams and bending
Week 12	Analysis of structure
Week 13	Centroid
Week 14	Second moment of area
Week 15	General Problems
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Engineering Mechanic's Statics, 12th Edition by R. C. Nibbler, 1995.	Yes
Recommended Texts	2- Engineering Mechanic's Statics, 7th Edition by James, L. Meriam, L. G Kraige, 1995.	No
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	MEDICAL CHEMISTRY			**Module Delivery**	
Module Type	BASIC			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET1202				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	1		**Semester of Delivery**	2	
Administering Department	MIET		**College**	EETC	
Module Leader	Suhair Mohammed Hassan Yaseen		**e-mail**	Suhair.yaseen@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	None		**e-mail**		
Peer Reviewer Name	**Ass.Prof.Dr.** **Ghaidaa Abdulrahman Khalid**		**e-mail**	**ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1- To write and balance chemical equation which many calculations depend on. 2- To convert chemical formula to components composition percent or to conclude empirical formula depending upon composition percent. 3-to predict about the economic pathway for specific reaction to happen depending upon stoichiometric calculations of balanced chemical equations. 4-to Know how to prepare buffers with different ranges of pH using acids with suitable dissociation constant of acid. 5- to understand effect of common ion on equilibrium of reversible reactions. 6-to focus on theoretical working principles of spectrophotometric instrumentations. 7- to discuss the importance of isotopes in diseases treatment and diagnosis.
	At ending of course, the student will: 1- Able to give chemical compounds their systematic names and to write their chemical formulae. 2- Know how to calculate concentrations of chemicals and to express them in various concentration terms. In addition to convert one term to another. 3- Calculate the compound composition percent according to chemical formula, or know empirical formula depending on compounds composition percent. 4- Write chemical equations of different reactions and balance them, and predict the limiting reactant in addition to the expected weight of products. 5-Eestimate the reaction direction according to calculation of equilibrium constant of reversible reactions. 6-Know how to prepare buffers and how buffer work? 7- Understand importance and wide application of slightly soluble salts. 8- Perform the statistical treatment of analytical results and source of errors. 9- Recognize the importance of galvanic cells in current generation and role of electrolytic cells in metallic electroplating. 9-Consider zero, 1st and 2nd laws of thermodynamic processes, and evaluate thermodynamic functions of work, enthalpy, heat, internal energy and giving judgment of spontaneous process or not by entropy and Gibbs free energy. 10-List the components of photometric determination techniques, in addition to

	principals of their works. 11- Identify the photometric instrumentations such as FIS, FT-IR spectrophotometer, and mass spectrophotometry. 12- Emphasize the vital role of isotopes in diagnosis and diseases treatment.
Indicative Contents المحتويات الإرشادية	Isotopes, Chemical formula, Units conversion Normality, Formality, Molarity, Molality, Mole fraction, Mill equivalent, ppm, ppb, mass percent, mass/vol percent. Stoichiometry Chemical equilibrium dissociation constant pH Buffers common ion Solubility product constant Statistical treatment, average, range, standard deviation, variance, Absolute error, relative error. Redox reactions, Electrochemistry, electrolytes, Nernst equation, cell potential. 1st law of thermodynamic, Reversible and irreversible process, Heat capacities, adiabatic process, Isothermal processes. 2nd law of thermodynamic, entropy, Gibbs free energy. Photochemistry, electromagnetic spectrum, Beer Lambert law. IR Spectrophotometer, mass spectroscopy, FIS, FES. Potentiometer, conductive meter, pH-meter.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	homework assignments, written exam, Quizzes, seminars, reports, practical tests and Online tests

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	120	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	15min/ 4 times	20%	3rd , 5th , 7th 12th	LO# 1st – 2nd LO# 1st – 5th LO# 5th – 7th LO# 10th – 12th
	Assignments	5min/ 4 times	10%	2nd , 6th , 8th ,13th	LO# 1st LO# 10th
	Projects / Lab.	10min/ One time	5%	6th	LO# 2nd – 5th
	Report	Each lab/ 5 times	5%	3rd , 4th , 5th , 6th , 7th	LO# 1st -2nd , LO# 3rd LO# 4th LO# 5th LO# 6th – 7th
Summative assessment	**Midterm Exam**	60min/ one time	10%	10th	LO# 1st – 10th
	Final Exam	180min/ one time	50%	16th	
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction, Units conversion, Isotopes, Chemical formula and chemical equation**
Week 2	**Methods of expressing analytical concentrations: Normality, Formality, Molarity, Molality, Mole fraction, Mill equivalent, ppm, ppb, wt. and vol. percent ratio.**
Week 3	**Stoichiometry**
Week 4	**Chemical equilibrium**
Week 5	**Acid-Base dissociation constant**
Week 6	**pH-scale, buffer solution**
Week 7	**Solubility of precipitations, common ion effect**
Week 8	**Errors & statistical treatment of analytical data sources of errors, types of errors, average mode, range, average derivation, standard deviation, relative standard deviation, variance, method of expressing accuracy, Absolute error, relative error.**
Week 9	**Redox reactions, balancing of redox equation**
Week 10	**Electrochemistry: electrochemical cells, types of electrodes, electrolytes, Nernst equation, cell potential**
Week 11	**Thermodynamic, Zero and first law of thermodynamic, Reversible and irreversible expansion, Heat capacities, adiabatic expansion, Isothermal processes.**
Week 12	**Second law of thermodynamic: spontaneous processes, entropy and Gibbs free energy.**
Week 13	**Photochemistry (spectrophotometer analysis), Regions of electromagnetic spectrum, Absorption and emission of electromagnetic spectrum, Beer Lambert law, instrumentations components of spectrophotometer.**
Week 14	**IR Spectrophotometer, mass spectroscopy, flame ionization spectrophotometry.**
Week 15	**Potentiometer, conductive meter, pH-meter and some other applications of chemical sensors**
Week 16	**Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Principals of qualitative analysis.
Week 2	Qualitative analysis of cations of 1st and 2nd groups.
Week 3	Qualitative analysis of cations of 3rd and fifth groups.
Week 4	Introduction to Quantitative (volumetric) analysis and types of standard substance in titration, principles and calculations of titration.
Week 5	How to prepare solution of primary standard materials and to standardize secondary standard substance of HCl, (acid-base titration)
Week 6	Standardization secondary standard substance of NaOH and its application by determination of vinegar acidity.
Week 7	Determination of residual chloride in tape water by titration against silver nitrate (precipitation titration).

Learning and Teaching Resources مصادر التعلم والتدريس		
Required Texts		
Recommended Texts	**1- ESSENTIALS OF GENERAL CHEMISTRY** **By EBBING GABBON RAGSDALE** **2- CHEMICAL PRINCIPLES** **By Steven S Zumdahl - 4th edition**	**No**
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical physics فيزياء طبية			**Module Delivery**	
Module Type	Basic			☒ **Theory** **Lecture** ☒ **Lab** **Tutorial** **Practical** **Seminar**	
Module Code	MIET1201				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	1		**Semester of Delivery**	2	
Administering Department	MITE		**College**	EETC	
Module Leader	Mayss alreem nizar hammed		**e-mail**	Mayssalreem92@mtu.edu.iq	
Module Leader's Acad. Title	Asst. lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof jinan fadhil Mahdi **Ass.Prof.Dr.Ghaidaa Abdulrahman Khalid**		**e-mail**	Jinan.f@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	15/6/2023		**Version Number**	1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- to recognize the influence of forces on the human body Identify how the skeleton works 2- to show how pressure affects the body's organs Recognize physical activity of the lungs and breathing 3- to demonstrate the physics of the cardiovascular system and the urinary system 4- to distinguishes the basic principles using the applications of electricity and magnetism in medicine 5- to shall be acquainted with respiratory, cardiovascular and cardiovascular equipment 6- to distinguishes the basic principles, using the sound waves in medicine and the use of x-rays in the diagnosis and identification of diseases
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1- Understand the difference between the Forces. 2- Know the bone has at least six functions. What are the main components of the bone, and to study the methods of Measurement the minerals quantity in the bone 3- know methods of diathermy 4- understand how Energy change in the body 5- know pressures inside the body parts and measure it 6- understand how to work the lungs and How the blood and lungs interact 7- know nervous system and the neuron 8- know the graphing devices of the body organs 9- know the applications of Electricity and Magnetism in Medicine 10- know the application of sound in medicine, know sonar devices 11- know the application of light and laser in medicine 12- know Major components of the cardiovascular system 13- know physics of nuclear medicine 14- know the x- ray device
Indicative Contents	1- Define the Forces , Frictional Forces , Dynamics (4hrs)

المحتويات الإرشادية	2- functions of the skeleton and Bone consists of quite different materials and how to measure mineral in the bones (5 hrs) 3- Types of thermometers , Heat therapy, Cryogenics (4hrs) 4- Sphygmomanometer, blood pressure, bladder pressure , tonometer(4hrs) 5- Function of Lungs & Breathing, breath rate, airways, Dalton's law of partial pressures(2hrs) 6- The nervous system and the neuron, Electrocardiogram, Electro retion gram (ERG), The magneto cardio gram (MCG)(4hrs) 7- Magnetic signals from the heart –magneto cardiogram(2hrs) 8- Macro shock, Micro shock (2hrs) 9- General Properties of Sound, Acoustic Impedance, Absorption, A-mode Display, Doppler Ultrasound(4hrs) 10- Endoscope, cytoscopes, Emissive IR photography.(4hrs) 11- Laser, population inversion, xray (4hrs) 12- Physics of the cardiovascular system (4 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Daily assessment - weekly assessment - quarterly assessment - objective questions - general questions - practical tests.

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	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	120	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation تقييم المادة الدراسية				
	Time/Numb	**Weight (Marks)**	**Week Due**	**Relevant**

		er			Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4, 11	LO # 1-3 and 8-10
	assessment	2	10% (10)	9, 13	LO # 8 and 11-12
	Reports	1	10% (10)	Continuous	
	practical test	2	10% (10)	7 , 12	LO # 1-6 and 7-11
Summative assessment	**Midterm Exam**	2 hr.	10% (10)	7	LO # 1-7
	Final Exam	3 hr.	50% (50)	14	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Forces on and in the body.
Week 2	Physics of the skeleton.
Week 3	Heat & cold in medicine
Week 4	Energy, work and power of the body.
Week 5	Pressure in body organs
Week 6	Physics of the lungs and breathing.
Week 7	**Mid Term Exam** + Physics of cardiovascular system
Week 8	Physics of urinary system.
Week 9	Electricity within the body.
Week 10	Sound in medicine and physics of hearing.
Week 11	Light in medicine and physics of vision.
Week 12	Diagnostic X-rays
Week 13	Physics of nuclear medicine (radioisotopes in medicine).
Week 14	Physics of radiation therapy
Week 15	Radiation protection
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Lab 1: Introduction to laboratory tools
Week 2	Lab 2: the simple pendulum
Week 3	Lab 3: hook's law
Week 4	Lab 4: the blood pressure
Week 5	Lab 5: the friction
Week 6	Lab 6: the speed of sound
Week 7	Lab 7: the laser
Week 8	Lab 8: viscosity of liquids
Week 9	Lab 9: The cylindrical body
Week 10	Lab 10: The convex lens
Week 11	Lab 11: the concave lens

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Recommended Texts	Introductory Physics I Elementary Mechanics by Robert G. Brown	NO
Websites	https://webhome.phy.duke.edu/~rgb/Class/intro_physics_1/intro_physics_1.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

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6/3/2023

English Language (Beginner)

ET1106

Nadirah Abdelrazzaq Ghzal

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language (Beginner)**			**Module Delivery**	
Module Type	**Support or related learning activity**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ET1106**				
ECTS Credits	**3**				
SWL (hr/sem)	**90**				
Module Level		1	**Semester of Delivery**		1
Administering Department		ENG – EET	**College**	EETC	
Module Leader	Nadirah Abdelrazzaq Ghzal		**e-mail**	nadra@mtu.edu.iq	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		M.A.
Module Tutor			**e-mail**		
Peer Reviewer Name		Rashid Ali Fayadh	**e-mail**	dr.rashidali@mtu.edu.iq	
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	The module aims of English Language (Beginner) are designed to help learners at the beginner level develop their English language skills and achieve specific learning objectives. While I don't have access to the specific module aims of this coursebook, I can provide you with a general outline of the typical aims for a beginner-level English course: 1. To introduce beginner-level learners to the English language, focusing on building vocabulary and acquiring essential language structures. 2. To develop listening and speaking skills through interactive activities and engaging in basic conversational practice. 3. To enhance reading comprehension abilities by introducing simple texts and emphasizing vocabulary and sentence structures. 4. To provide foundational writing skills, including sentence formation, paragraph writing, and completing basic forms. 5. To cultivate cultural awareness and equip learners with practical language skills for everyday situations, such as ordering food, shopping, and asking for directions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module learning outcomes for the English Language (Beginner) module are as follows: 1. Develop basic proficiency in listening and understanding spoken English at a beginner level. 2. Demonstrate improved speaking skills by participating in simple conversations and expressing basic ideas and opinions. 3. Comprehend and interpret basic written texts, including short passages and simple dialogues. 4. Produce written texts using basic grammatical structures and vocabulary appropriate for beginner-level communication. 5. Increase vocabulary knowledge and usage to effectively communicate in everyday situations. 6. Develop an awareness of cultural aspects related to English-speaking countries and demonstrate cross-cultural understanding in language use. 7. Apply basic language skills in practical situations, such as greetings, introductions, making requests, and asking for and giving simple directions.
Indicative Contents المحتويات الإرشادية	Unit 1: Hello! [3 hrs.] Unit 2: Your world. [3 hrs.] Unit 3: All about you. [3 hrs.] Unit 4: Family and friends. [3 hrs.] Unit 5: The way I live. [3 hrs.] Unit 6: Every day[3 hrs.] Unit 7: My favourites. [3 hrs.] Unit 8: Where I live, Times past. [3 hrs.] Unit 9: We had a great time!, I can do that! [3 hrs.] Unit 10: Please and thank you, Here and now. [3 hrs.] Unit 11: It's time to go!, Getting to know you. [3 hrs.] Unit 12: The way we live, It all went wrong. [3 hrs.] Unit 13: Let's go shopping! [3 hrs.] Unit 14: What do you want to do? [3 hrs.] Unit 15: Tell me! What's it like? [3 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The learning and teaching strategies for the English Language (Beginner) module may include: 1. Interactive Language Practice: Engage learners in communicative activities that promote active participation and language practice. This can include pair work, group discussions, role-plays, and language games. 2. Authentic Materials: Incorporate authentic materials such as videos, audio recordings, and reading texts that reflect real-life language use. This helps learners develop their listening, speaking, reading, and writing skills in authentic contexts. 3. Task-Based Learning: Design tasks and projects that require learners to use the target language to accomplish specific goals or solve problems. This promotes meaningful language use and encourages critical thinking and problem-solving skills. 4. Visual Aids and Multimedia: Utilize visual aids, charts, diagrams, and multimedia resources to support language learning and comprehension. Visuals can enhance understanding, aid in vocabulary acquisition, and provide context for language use. 5. Error Correction and Feedback: Provide timely and constructive feedback on learners' language production to help them identify and correct errors. Encourage self-correction and peer correction to foster a supportive learning environment.

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	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	90		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	• Hello!
Week 2	• Your world.
Week 3	• All about you.
Week 4	• Family and friends.
Week 5	• The way I live.
Week 6	• Every day
Week 7	• My favourites.
Week 8	• Where I live. • Times past.
Week 9	• We had a great time! • I can do that!
Week 10	• Please and thank you. • Here and now.
Week 11	• It's time to go! • Getting to know you.
Week 12	• The way we live. • It all went wrong.
Week 13	• Let's go shopping!
Week 14	• What do you want to do?
Week 15	• Tell me! What's it like?
Week 16	• Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Soars, J., Soars, L. (2014). New Headway Plus: Beginner Student's Book. United Kingdom: Oxford University Press. • Soars, J., Soars, L. (2006). New Headway Plus: Pre-intermediate. United Kingdom: Oxford University Press.	Yes
Recommended Texts	Audio CDs or Online Audio: Recordings of listening exercises, dialogues, and pronunciation practice.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
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6/3/2023

Arabic Language

ET1203

Ahmed Fadhil Jassem

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	**Support or related learning activity**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ET1203**				
ECTS Credits	**3**				
SWL (hr/sem)	**90**				
Module Level		1	**Semester of Delivery**		2
Administering Department		ENG - EET	**College**	EETC	
Module Leader	Ahmed Fadhil Jassem		**e-mail**	dr.ahmedfadhel@mtu.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Rashid Ali Fayadh	**e-mail**	dr.rashidali@mtu.edu.iq	
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	أهداف المادة الدراسية هي اني يكون الطالب قادراً على أن : 1. يتعرف على أنواع الأخطاء اللغوية المشتركة وتوضيح أسبابها وكيفية تجنبها. 2. يتعلم القواعد المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة وكيفية كتابتها بشكل صحيح. 3. يتعلم قواعد كتابة الألف الممدودة والمقصورة واستخدام الحروف الشمسية والقمرية بشكل صحيح. 4. التعرف على الضاد والظاء ومعرفة كيفية التمييز بينهما في الكتابة. 5. يتعلم طرق كتابة الهمزة بشكل صحيح وفقًا للقواعد اللغوية. 6. التعرف على علامات الترقيم واستخدامها بشكل صحيح في النصوص. 7. يفهم الفروق بين الاسم والفعل والتمييز بينهما في الجمل. 8. يفهم المفاعيل و كيفية استخدامها بشكل صحيح في النصوص. 9. يتعلم الأرقام والعدد واستخدامها في التعبير عن الكميات. 10. يتجنب الأخطاء اللغوية الشائعة في سياقات عملية لتعزيز فهم القواعد وتحسين المهارات اللغوية. 11. يدرس النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل. 12. يركز على الجوانب الشكلية للخطاب الإداري وكيفية كتابته بأسلوب صحيح ومناسب. 13. التعرف على لغة الخطاب الإداري وفهم استخدامها في التواصل الإداري. 14. يفهم نماذج من المراسلات الإدارية لتطبيق المفاهيم والمهارات المكتسبة في الخطاب الإداري.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	مخرجات التعلم للمادة الدراسية هي: 1. قدرة الطلاب على تحليل وتعريف الأخطاء اللغوية المشتركة وتطبيق القواعد الصحيحة لتجنبها. 2. القدرة على استخدام القواعد اللغوية المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة بشكل صحيح. 3. قدرة الطلاب على استخدام الألف الممدودة والمقصورة بشكل صحيح واستخدام الحروف الشمسية والقمرية بطريقة صحيحة. 4. تمكين الطلاب من التمييز بين الضاد والظاء وتطبيق القواعد الصحيحة في الكتابة. 5. القدرة على كتابة الهمزة بشكل صحيح وفقًا للقواعد اللغوية. 6. استخدام علامات الترقيم بشكل صحيح في النصوص المكتوبة. 7. فهم الطلاب للفروق بين الاسم والفعل وتمكينهم من استخدامهما بشكل صحيح في الجمل. 8. القدرة على استخدام المفاعيل بشكل صحيح في النصوص المكتوبة. 9. استخدام الأرقام والعدد بطريقة صحيحة للتعبير عن الكميات. 10. التمكن من تطبيق الأخطاء اللغوية الشائعة في سياقات عملية وتصحيحها بشكل مناسب. 11. فهم استخدام النون والتنوين ومعاني حروف الجر واستخدامها بشكل صحيح في الجمل. 12. القدرة على كتابة الخطاب الإداري بأسلوب صحيح ومناسب وفهم لغة الخطاب الإداري. 13. تطبيق المفاهيم والمهارات المكتسبة في كتابة المراسلات الإدارية بشكل صحيح وفعال.
Indicative Contents المحتويات الإرشادية	المحتويات الإرشادية في مادة اللغة تشمل مجموعة من المفاهيم والمواضيع التي يتم تغطيتها خلال عملية التعلم. ومن بين المحتويات الإرشادية المهمة: 1. مقدمة عن الأخطاء اللغوية والتعريف بالتاء المربوطة والتاء المطوَّلة والتاء المفتوحة. (4 ساعات) 2. قواعد كتابة الألف الممدودة والمقصورة والتعرف على الحروف الشمسية والقمرية. (4 ساعات) 3. دراسة الضاد والظاء وتعلم طرق كتابتهما بشكل صحيح. (4 ساعات) 4. تعلم كتابة الهمزة بشكل صحيح وفقًا للقواعد اللغوية. (4 ساعات) 5. دراسة علامات الترقيم وتعلم استخدامها بشكل صحيح في النصوص اللغوية. (4 ساعات) 6. التعرف على الاسم والفعل والتفريق بينهما وفهم القواعد المتعلقة بهما. (4 ساعات) 7. دراسة المفاعيل وتعلم استخدامها في الجمل اللغوية. (4 ساعات) 8. التعرف على الأعداد واستخدامها بشكل صحيح في العبارات والجمل. (4 ساعات) 9. دراسة الأخطاء اللغوية الشائعة وتطبيقاتها في النصوص اللغوية. (4 ساعات) 10. تعلم استخدام النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل. (3 ساعات) 11. التعرف على الجوانب الشكلية للخطاب الإداري وفهم لغته وقواعده. (3 ساعات) 12. دراسة نماذج من المراسلات الإدارية وتطبيقها في الكتابة. (3 ساعات) توفر هذه المحتويات الإرشادية للطلاب فهمًا شاملاً للمفاهيم اللغوية وتعلم القواعد والتطبيقات العملية التي تساعدهم في تطوير مهاراتهم اللغوية.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	استراتيجيات التعلم والتعليم المستخدمة في مادة اللغة تشمل مجموعة متنوعة من النهج والتقنيات التي تعزز عملية التعلم للطلاب. من بين هذه الاستراتيجيات: 1. التفاعل النشط: يتم تشجيع الطلاب على المشاركة والمشاركة الفعالة في الدروس من خلال المناقشات الجماعية والأنشطة التفاعلية. 2. التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خلال العمل الجماعي والمشاريع الجماعية، حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة. 3. التطبيق العملي: يتم توفير فرص للطلاب لتطبيق المفاهيم والمهارات المكتسبة في سياقات عملية وواقعية، مما يعزز التفاعل الفعال مع المادة. 4. استخدام التقنيات الحديثة: يستفيد الطلاب من استخدام التكنولوجيا في عملية التعلم، مثل استخدام الحواسيب والإنترنت للبحث والتعلم الذاتي. 5. توفير ردود فعل فورية: يتم توفير ردود فعل فورية وتقييم مستمر للطلاب، سواء عن طريق التقييمات الشفهية أو الكتابية، مما يساعدهم على تحسين أدائهم وتطوير مهاراتهم. 6. التنويع في وسائل التواصل: يتم استخدام مجموعة متنوعة من وسائل التواصل والتعليم، مثل المحاضرات التوضيحية، والمناقشات الجماعية، والأنشطة العملية، والعروض التقديمية، لتلبية احتياجات وأساليب التعلم المختلفة للطلاب. 7. باستخدام هذه الاستراتيجيات، يتم تعزيز التفاعل والتعلم الفعال للطلاب، و 8. تحفيزهم على المشاركة واكتساب المعرفة والمهارات بشكل شامل وشيق.

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	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	90		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
الأسبوع الأول	مقدمة عن الأخطاء اللغوية –التاء المربوطة والطويلة والتاء المفتوحة	8-1
الأسبوع الثـــاني	قواعد كتابة الالف الممدودة والمقصورة – الحروف الشمسية والقمرية	14-9
الاسبوع الثـــالث	الضاد والظاء	19-15
الأسبوع الـــرابـع	كتابة الهمزة	30-20
الأسبوع الخـــامس	علامات الترقيم	36-31
الأسبوع الســـادس	الاسم والفعل والتفريق بينهما	44-37
الأسبوع الســـابع	المفاعيل	50-45
الأسبوع الثـــامن	العـــدد	61-51
الأسبوع التاسع والعاشر	تطبيقات الأخطاء اللغوية الشائعة	69-62
الاسبوع الحادي عشر	النون والتنوين ـ معاني حروف الجر	75-70
الاسبوع الثاني عشر	الجوانب الشكلية للخطاب الإداري	80-76
الأسبوع الثالث عشر والرابـــع عشر	لغة الخطاب الإداري	86-81
الأسبوع الخامس عشر	نماذج من المراسلات الإدارية	
الأسبوع السادس عشر	الاستعداد للأمتحان النهائي	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• ملزمة اللغة العربية (المعممة من وزارة التعليم العالي والبحث العلمي)	Yes
Recommended Texts		No
Websites	The Collage E-Library	

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	Anatomy & Physiology			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	MIET2105				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	MIET		**College**	EETC	
Module Leader	Dr. Abbas Fadhal Humadi		**e-mail**	Drabbas@mtu.edu.com	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	PhD.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Asst. Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-Anatomy and Physiology are important medical discipline to understand structures and functions of human body cells, tissues, organs, organ systems, and as a whole system, how it works and the relationships between body parts. 2- This mode unit consists of main elements of anatomy and physiology, the terminology used, and how our body control itself. 3- Students will be unable to understand how medical device work with the human body and what the benefit from it. 4- To understand the level of organization of the human organism and the homeostatic system. 5- To understand the chemical structure, chemical reactions and their control with acid-base balance in human body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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. Develop quantitative descriptions of physiological properties and systems. 9. Describe the application of technologies and techniques for investigating the structure and function of the body. 10. Demonstrate communication skills (oral and written) to describe the structure and function of the human body. 11. Describe basic structural and functional features of the major organ systems within the human body. 12. Define basic biological processes essential for maintenance of homeostasis.

	13. Correlate specific structural features of human cells, tissues, organs and systems of the human body with their normal functions, and identify the changes that occur during human development, ageing and disease.
Indicative Contents المحتويات الإرشادية	Topics include: • Anatomical terminology (5 hrs). • The structure and appearance of cells and tissues (5 hrs). • The appearance of bone and cartilage, the organization of dense connective tissues (5 hrs). • Skeletal muscle structure and function. Principles of excitable tissues. [15 hr] • 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.[10 hr] • Multiscale modelling of physiological systems (5 hrs). • Technologies, quantitative measurements and experimental techniques used to investigate the structure and function of different tissues, organs and organ systems. [15 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies employed in this module can vary depending on the specific course. However, here are some common strategies that may be used with this course: **<u>Teaching methods include:</u>** • lectures • seminars • tutorials • lab experiments • design assignments • industrial visits • professional training • a variety of projects **<u>Assessment :</u>** methods of assessment include a combination of:

	• coursework • group project reports • lab reports • written exams.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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**	4	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	All
	Report	15	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4 hr	50 % (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Anatomy and Physiology.
Week 2	The Chemical level of Organization.
Week 3	The Cell level of Organization
Week 4	The Tissue level of organization
Week 5	The Integumentary system
Week 6	The Muscular system
Week 7	Mid Exam
Week 8	The Skeletal System
Week 9	The Central Nervous System
Week 10	The Peripheral Nervous System and Autonomic Nervous System.
Week 11	The Sense and Sensory System.
Week 12	The Endocrine System.
Week 13	The Cardiovascular System: The Heart, Blood Vessels And Blood.
Week 14	The Respiratory System.
Week 15	The Urinary System.
Week 16	Preparatory week before final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1 measurement of body temperature
Week 2	Lab 2 Coagulation
Week 3	Lab 3 The blood
Week 4	Lab 4 Membrane transport
Week 5	Lab 5 Complete blood count
Week 6	Lab 6 Hemoglobin (Hb) Determination
Week 7	Lab 7 Erythrocyte Sedimentation Rate ESR
Week 8	Lab 8 Total leucocyte count
Week 9	Lab 9 Total Red Blood Cell R B C count

Week 10	Lab 10 Platelets count
Week 11	Lab 11 Blood film
Week 12	Lab 12 Blood group
Week 13	Lab 13 Blood sugar
Week 14	Lab 14 Blood urea & Blood pressure

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Frederic H Martini, Edwin F Bartholomew, William C. Ober, Claire W. Garrison, Kathleen Welch, & Ralf T Hutchings (2007), *Essentials of Anatomy and Physiology*, 14th edn, Pearson Education, San Francesco, USA.	No
Recommended Texts	1- **Human Physiology Study Guide** 2- **Human Anatomy & Physiology: Help and Review**	
Websites	Interactive physiology, Copyright © 2005 Pearson Education, Inc. publishing as Benjamin	

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Biomedical Transducers and Sensors			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET2205				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	MIET		**College**	EETC	
Module Leader	Dr. Mohammed Saeed Mohammed		**e-mail**	mohammedsaeed@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Asst . Lect Suha Sabeeh Ahmed		**e-mail**	suhasabeh@mtu.edu.iq	
Peer Reviewer Name	Prof. Dr. Sadik Kamel Gharghan Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	sadik.gharghan@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamental of Electrical Engineering	**Semester**	UGI-S1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Analyze errors and uncertainty of experimental results obtained from biomedical sensors. 2. Understand requirements, calibration, characteristics, and parameters of biomedical sensors. 3. Design with confidence signal conditioning systems required for processing the sensors responses. 4. Understand the operating principle, types, parameters, signal conditioning, and applications of resistive, reactance variation and self-generating sensors. 5. Understand the operating principle of different types of optical sensors and their features. 6. Understand the operation, models, and parameters of ultrasound transducers. 7. Understand the design, main building blocks, features, and calibration of intelligent sensors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define biomedical sensors, biosensors, and biomedical transducers. 2. Classify the biomedical sensors. Acquire knowledge about sensor data processing and feature extraction. 3. Recognize the requirements of biomedical sensors. 4. Explain the Static and dynamic characteristics of biomedical sensors. 5. Explain the requirements of signal conditioning circuits suitable for biomedical sensors. 6. Identify design principles of conditioning circuits. 7. Identify the different types of resistive, reactance variation and self- 8. generating sensors. 9. Explain the operating principle, parameters, calibration and applications. of resistive, reactance variation and self-generating sensors. 10. Identify the different types of optical sensors. 11. Reveal the advantages of optical sensors. 12. Classify ultrasound transducers. 13. Recognize the main parts of ultrasound transducers.

	14. List the main features of intelligent sensors.
Indicative Contents المحتويات الإرشادية	Indicative Contents including the following: General concept and terminology, Sensor classification and calibration, static and dynamic characteristics, errors [10 hrs] Resistive Temperature Detectors (RTD), Thermistors, light-dependent resistors, signal conditioning for resistive sensors [5 hrs] Capacitive sensors, Inductive sensors, Electromagnetic sensors, signal conditioning for reactance variation sensors [5 hrs] Thermoelectric sensors, Piezoelectric sensors, Electrochemical sensors, Signal conditioning for self-generating sensors.[7 hrs] Optical techniques, General principles of optical sensing, Fiber-optic basics, Fiber-optic sensor technologies and applications[7 hrs] Fundamentals of ultrasonic-based sensors, Ultrasonic-based sensing methods and applications.[8 hrs] Definition, parameters, features, operating principle , main building blocks and applications.[5 hrs]

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. ➢ Use software packages for design and simulation of signal conditioning circuits implemented using these sensors.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	5% (5)	6, 9	LO # 1-4, and 5-8
	Assignments	2	5% (5)	5, 12	LO # 1-4, and 5-10
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 5-14
Summative assessment	**Midterm Exam**	2 hr	20% (20)	12	LO # 1-9
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1,2	**Introduction to Biomedical Sensors** General concept and terminology, Sensor classification and calibration, static and dynamic characteristics, errors and uncertainty.
Week 3,4	**Resistive Sensors and their signal conditioning** Potentiometers, Strain gages, Resistive Temperature Detectors (RTD), Thermistors, light-dependent resistors, signal conditioning for resistive sensors

Week 5,6	**Reactance Variation and Electromagnetic Sensors** Capacitive sensors, Inductive sensors, Electromagnetic sensors, signal conditioning for reactance variation sensors,
Week 7	**Mid- Exam**
Week 8,9	**Self-Generating Sensors and Signal Conditioning** Thermoelectric sensors, Piezoelectric sensors, Electrochemical sensors, Signal conditioning for self-generating sensors.
Week 10,11	**Optical Sensors** Optical techniques, General principles of optical sensing, Fiber-optic basics, Fiber-optic sensor technologies and applications.
Week 12,13	**Ultrasound Transducers** Fundamentals of ultrasonic-based sensors, Ultrasonic-based sensing methods and applications.
Week 14,15	**Intelligent Sensors** Definition, parameters, features, operating principle , main building blocks and applications.
Week 16	Preparatory week before final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1,2	Characteristics of various Biomedical sensors(Pulse sensor, Galvanic skin Response, Glucose sensor, EMG sensor).
Week 3,4	Measurement of Resistance, Inductance and Capacitance using bridge circuits.
Week 5	Measurement of temperature using thermistor and RTD.
Week 6	Design of preamplifiers to acquire bio-signals along with impedance matching circuit using suitable ICs.
Week 7,8	Design of EEG, ECG amplifiers and Measurement of heart rate.
Week 9,10	Acquire and display electrical and biological biosignals on a computer using the appropriate hardware and software tools.
Week 11	e-Health Sensor Platform V2.0 using Arduino and Raspberry Pi.
Week 12	Measurement of respiration rate.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Sensors and Signal Conditioning, Ramon Pallas-Areny and John G. Webster, John Wiley & Sons, 2001,2nd Edition	No
Recommended Texts	Biosensors: An Introduction , Eggins, Brian, John Wiley & Sons, 1996,1st Edition	No
Websites	https://www.multisim.com/	

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	Clinical Chemistry instrumentation		**Module Delivery**	
Module Type	Core		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET2204			
ECTS Credits	5			
SWL (hr/sem)	150			
Module Level	UGII	**Semester of Delivery**		4
Administering Department	MIET	**College**	EETC	
Module Leader	Dina Raheem Rzaij	**e-mail**	dina.rr@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor		**e-mail**		
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid	**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1.To introduce the clinical chemistry and biochemical mechanism in the human body 2.To describe the types of laboratory medical instruments. 3. To describe the types of clinical chemistry analysis or (tests). 4. To explain the principal work of the laboratory medical devices techniques. 5. To describe the most important compositions in human body. 6. To understanding the maintenance of laboratory medical devices and its electrical and mechanical faults.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1.Define the clinical chemistry and recognize what is the laboratory security system and determine the quality control results in medical laboratory. 2. List the principal work of spectrophotometer instruments and derive Beer's-Lambert Law. 3.Desribe the measurement instruments of ions and salts in human body. 4. Identify all the clinical chemistry analysis and their measurement techniques. 5. Discus the importance of minerals in human body and their measurement. 6. Describe the principal work of Elisa technique and list their methods. 7. Explain the electrical conduction concept and their examples in human body. 8. Explain the osmotic conduction concept and their examples in human body. 9. List the types and function of enzyme in human body and their measurements techniques. 10. Discus the importance of proteins in human body and describe their measurements. 11. Explain the importance of fats in human body and explain their measurement techniques. 12. Define the hemoglobin and explain the hemoglobin diseases with its clinical significant. 13. List all types of minerals in human body and describe their daily requirements. 14. Define the immune system and recognize the foreign material and explain the disorders of immune system.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Clinical chemistry definition, analysis lists, work security rules, best laboratory uses guidelines. [3hr]. Spectrophotometer instruments criteria, theory, types, components, advantage and disadvantage, physical and medical application and Beer-Lambert law derivative .[6hr] Electrolyte analyzer definition, features, theory, components, configuration advantages, disadvantages and application. [5hr] Autoanalyzer concept, Blood Gas Analyzer (BGA) criteria, types, theory, components, figuration, advantages and disadvantages. [5hr] ELISA Technique concept, theory ,methods:(direct and indirect), components ,figuration, advantages ,disadvantages and applications [4hr]. Minerals definition, classifications, sources, function, nutrition(mg/day) and diagnostic procedure[5hr]. Electrical conduction concept , examples ,performing tests. Osmotic conduction concept, examples ,performing tests [5hr]. Enzyme definition, classification, function, performing test and clinical significant. [5hr] Proteins definition, classification ,function, clinical significant, Electrophoresis Technique :diagnostic procedure, theory and principle work [5hr]. Fats concept, classification, sources, importance, clinical signification and measurements: Hydro densitometry Weighing (Underwater Weighing, Near – infrared interaction (NIR), Skin Fold Caliper, Dual energy X-ray absorptiometry (DEXA), BMI (Body mass impedance) [6hr] . Hemoglobin definition, structure, analysis, hemoglobin diseases, clinical significant and diagnostic procedure: complete blood count (CBC) [5hr]. Concept of immunology, structure, material and disease diagnostic [3hr].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures - scientific laboratory- data show - summer training- workshops- seminars, written exam, Quizzes and online testing .

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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**	4	20%	3, 5,8,11	LO:1,2,3……14
	Assignments	2	10%	7,10	LO: 6, 13
	Projects / Lab.	-	-	-	-
	Report	1	10%	11	LO: 10,12
Summative assessment	**Midterm Exam**	2 hr	10%	7	LO: 1-7
	Final Exam	3 hr	50%	14	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction ,Best laboratory uses and quality control.
Week 2	Spectrum instruments and uses.
Week 3	Ion and salt measurement instruments
Week 4	Auto-analysis instruments
Week 5	Mineral measurement instrument
Week 6	Elisa instrument and its uses
Week 7	**Mid-term Exam**

Week 8	Electrical conduction
Week 9	Osmotic conduction
Week 10	Enzyme and their measurement
Week 11	Protein and its importance
Week 12	Fats and its importance
Week 13	Hemoglobin
Week 14	Minerals and nutrition
Week 15	Immunological chemistry
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Clinical Chemistry instrumentation
Week 2	Lab1: spectrophotometer and colorimeter, theory, principle of work, operation, component's function, maintenance and the faults.
Week 3	Lab2: Flame photometer, types, theory, principle of work, operation, component's function, maintenance and the faults.
Week 4	Lab3: Blood gas analyzer and PH meter, theory, principle of work, operation, components function, normal results, maintenance and the faults.
Week 5	Lab4: Auto-analysis, types, theory, principle of work, operation, component's function, maintenance and the faults.
Week 6	Lab5: Elisa, types, theory, principle of work, operation, components function, maintenance and the faults.
Week 7	Lab6: Hemodialysis and peritoneal technique, theory, principle of work, operation, maintenance and faults.
Week 8	Lab7: Electrophoresis, theory, principle of work, operation, component's function, normal results, maintenance and the faults.
Week 9	Lab 8: Body fat analyzer, theory, principle of work, operation, component's function, normal results, maintenance and the faults.
Week 10	Lab 9: review for the clinical chemistry instrumentation.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Clinical Chemistry Hand book: workbook of principles ,techniques and correlation by N.T.Coleman	yes
Recommended Texts	LABORATORY INSTRUMENTATION AND TECHNIQUES, Book by Dr.Mathew Folaranmi OLANIYAN,Associate Professor,Department of Medical Laboratory Science,Achievers University, Owo-Nigeria,2017.	No
Websites	1.https://byjus.com/chemistry/spectrophotometer-principle/ 2.3.https://www.bosterbio.com/media/pdf/ELISA_Handbook.pdf3.	

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	Computer programming and applications MATLAB-beginner			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET2106				
ECTS Credits	3				
SWL (hr/sem)	90				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	MIET		**College**		
Module Leader	Luban Hamdy Hameed		**e-mail**	Luban_alqudsi@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer Assistant		**Module Leader's Qualification**	M.Sc	
Module Tutor			**e-mail**		
Peer Reviewer Name	Dr.Aws Alazawi Asst.Prof.Dr Ghaidaa Abdulrahman Khalid		**e-mail**	aws_basil@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understanding the fundamental concepts of MATLAB programming language environment. 2. The students will understand and learn how to use MATLAB as an effective programming language. 3. The students will be able to solve different mathematical and engineering problems as well as using plotting functions and design projects using codes or GUI. 4. Students will acquire the knowledge of basic MATLAB syntax such as: variables, input, output, vectors, matrices, functions, plotting, and GUI, 5. The students will gain the necessary skills to design and implements appropriate algorithms that solve problems dealing with different mathematical and engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the MATLAB environments and windows (Command Window, Workspace Window, Command History window, Help Window, Editor Window). 2. The students learn how to write first program and learn Expressions, Constants, Entering Matrices, Useful Matrix Generators, Subscripting, End as a subscript, Colon Operator, Transpose Deleting Rows or Columns. 3. Explain how to use variables and assignment statement, logical operator. 4. Practice on using Arrays, Built in functions, Basic Matrix Functions(sum, max, min, mean, magic, diag, length, size, median, prod, sort). 5. Learn how to perform basic Plotting (Multiple Data Sets in One Graph, Specifying Line Styles and Colors, Multiple Plots in One Figure, Setting Axis Limits). 6. Understand arguments and return values, M-file, input-output statement. 7. Train on using control Statements (Conditional statements: If, Else, Elseif, switch case) 8. Identify the repetition statements: (While statement, For statement). 9. Learn how to use combination of conditional and repetition statements. 10. Understand the procedures and functions (a custom-made MATLAB function, define the name of the function, the input and the output variables, Calling Functions). 11. Learn how to handle graphics and user interface. 1.pre-defined dialogs 2. Handle graphics a) Graphics objects b) Properties of objects c) Modifying properties of graphics objects. 12. Train of GUI Interface (Attaching buttons to actions, Getting Input, Setting

	Output).
Indicative Contents المحتويات الإرشادية	1. Window, Workspace Window, Command History window, Help Window, Editor Window. (2 H) 2. Constants, Entering Matrices, Useful Matrix Generators, Subscripting, End as a subscript, Colon Operator, Transpose Deleting Rows or Columns. (4) 3. variables and assignment statement, logical operator. (4) 4. sum, max, min, mean, magic, diag, length, size, median, prod, sort. (2) 5. Multiple Data Sets in One Graph, Specifying Line Styles and Colors, Multiple Plots in One Figure, Setting Axis Limits. (2) 6. M-file, input-output statement. (2) 7. Conditional statements: If, Else, Elseif, switch case. (2) 8. While statement, For statement. (4) 9. conditional and repetition statements. (4) 10. accustom-made MATLAB function. (4) 11. GUI. (4) 12. GUI attaching buttons to actions, Getting Input, Setting Output. (4)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. Moreover, motivate the creative side by posing various problems to students and urging them to find appropriate solutions. Also forming work teams to assess the results of their work and change their structure periodically to develop the spirit of cooperation and development and motivate students to make intensive efforts to work different roles.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	46	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	44	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	90		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, MATLAB Environment, MATLAB Windows(Command Window, Workspace Window, Command History window, Help Window, Editor Window).
Week 2	A First Program, Expressions, Constants, Entering Matrices, Useful Matrix Generators, Subscripting, End as a subscript, Colon Operator, Transpose Deleting Rows or Columns.
Week 3	Variables and assignment statement, logical operator.
Week 4	Arrays, Built in functions, Basic Matrix Functions (sum, max, min, mean, magic, diag, length, size, median, prod, sort).
Week 5	Basic Plotting (Multiple Data Sets in One Graph, Specifying Line Styles and Colors, Multiple

	Plots in One Figure, Setting Axis Limits).
Week 6	Arguments and return values, M-file, input-output statement
Week 7	Mid-Exam + Control Statements (Conditional statements: If, Else, Elseif, switch case)
Week 8	Repetition statements: (While statement, For statement)
Week 9	Combination of conditional and repetition statements I
Week 10	Combination of conditional and repetition statements II
Week 11	Procedures and Functions (a custom-made MATLAB function, define the name of the function, the input and the output variables, Calling Functions)
Week 12	Handle graphics and user interface. 1.pre-defined dialogs 2. Handle graphics a) Graphics objects b) Properties of objects c) Modifying properties of graphics objects
Week 13	GUI Interface (Attaching buttons to actions, Getting Input, Setting Output) I
Week 14	GUI Interface (Attaching buttons to actions, Getting Input, Setting Output) II
Week 15	GUI Interface (Attaching buttons to actions, Getting Input, Setting Output) II
Week 16	**Preparing for final exm**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction, MATLAB Environment, MATLAB Windows (Command Window, Workspace Window, Command History window, Help Window, Editor Window).
Week 2	A First Program, Expressions, Constants, Entering Matrices, Useful Matrix Generators, Subscripting, End as a subscript, Colon Operator, Transpose Deleting Rows or Columns.
Week 3	Variables and assignment statement, logical operator.
Week 4	Arrays, Built in functions, Basic Matrix Functions (sum, max, min, mean, magic, diag, length, size, median, prod, sort).
Week 5	Basic Plotting (Multiple Data Sets in One Graph, Specifying Line Styles and Colors, Multiple Plots in One Figure, Setting Axis Limits).
Week 6	Arguments and return values, M-file, input-output statement
Week 7	Control Statements (Conditional statements: If, Else, Elseif, switch case)
Week 8	Repetition statements: (While statement, For statement)

Week 9	Combination of conditional and repetition statements I
Week 10	Combination of conditional and repetition statements II
Week 11	Procedures and Functions(a custom-made Matlab function, define the name of the function, the input and the output variables, Calling Functions)
Week 12	Handle graphics and user interface. 1.Pre-defined dialogs 2. Handle graphics a) Graphics objects b) Properties of objects c) Modifying properties of graphics objects
Week 13	GUI Interface (Attaching buttons to actions, Getting Input, Setting Output) I
Week 14	GUI Interface (Attaching buttons to actions, Getting Input, Setting Output) II

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to MATLAB for Engineers William J. Palm III	yes
Recommended Texts	INTRODUCTION TO MATLAB FOR ENGINEERING STUDENTS ,David Houcque	
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Digital Electronics			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET2203				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	MIET		**College**	EETC	
Module Leader	Saleem Lateef Mohammed		**e-mail**	saleem_lateef_mohammed@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr. Sadik Kamel Gharghan Asst. Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	sadik.gharghan@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronics Circuits I	**Semester**	UGII-S3
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To learn the basics of logical circuits which are used in computers. 2. To understand how the logical medical instrumentations to work 3. To program the logical medical instrumentations 4. To design the logical medical instrumentations 5. To learn how to use logical tables to perform the logical medical instrumentations 6. TO maintain the logical medical instrumentations 7. To suggest how to build modern the logical medical instrumentations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At ending of course, student will: 1-know the numbers systems, and conversion between them. 2-know binary codes. 3-design binary gates, and use Boolean algebra. 4-design and simplify the arithmetic circuits. 5- define Karnaugh maps. 6- know how flip-flops works. 7-define the work principles of counters and its types. 8-know the shift registers and types. 9-principles of decoders. 10-identify the Multiplexers and De-Multiplexers. 11-conversion of analog to digital circuits.
Indicative Contents المحتويات الإرشادية	Numbers systems, Binary, Octal, Hexadecimal. (4 hrs) Codes numbers . (8 hrs). Arithmetic circuits . (6 hrs). De Margan's theorems . (6 hrs). Karnaugh map . (6 hrs) Flip – Flop: RS, RST, JK, D, FF . (4 hrs) Asynchronous counter and synchronous . (6 hrs) Shift registers . (6 hrs) Multiplexer, De multiplexer . (8 hrs) Decoder . (8 hrs) Analog conversion (6 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 skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	5% (5)	3, 9	LO #1, 2, 4,11 and 12
	Assignments	2	5% (5)	3, 13	LO # 4, 5, 7 and 8
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 6, 8 and11
Summative assessment	**Midterm Exam**	2 hr	20% (20)	8	LO # 1-8
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Number system: Binary numbers, Octal numbers, Hexadecimal numbers,**
Week 2	**Binary codes**
Week 3	**Logic gates, De Margan's theorems, Laws and theorem of Boolean algebra**
Week 4	**Arithmetic circuit, Simplifying logic circuits:**
Week 5	**fundamentals products, sum of products, algebraic simplification**
Week 6	**Truth table to Karnaugh map**
Week 7	**Mid-term Exam**
Week 8	**Flip – Flop: RS, RST, JK, D, FF**
Week 9	**Counters: Asynchronous counter**
Week 10	**Counters: synchronous counter**
Week 11	**Shift registers: Serial in -Serial out shift register** **Serial in -Parallel out shift register**
Week 12	**Shift registers: Bidirectional Shift Register**
Week 13	**Multiplexer and De multiplexer**
Week 14	**Decoder**
Week 15	**Digital to Analog converter**
Week 16	**Preparatory week before final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Logic Gates (NOT, AND)
Week 2	Lab 2: Logic Gates (OR, NAND, NOR)
Week 3	Lab 3: Logic Gates (XOR, XNOR)
Week 4	Lab 4: Exercises
Week 5	Lab 5: Universal Gates (NAND, NOR)
Week 6	Lab 6: Flip-Flop
Week 7	Lab 7: Adder (Half and Full Adder)

Week 8	Lab 8: Subtractor (Half and Full Subtractor)
Week 9	Lab 9: Comparator
Week 10	Lab 10: Asynchronous Binary Counter Up
Week 11	Lab 11: Asynchronous Binary Down Counter
Week 12	Lab 12: Asynchronous Binary Decade Counter
Week 13	Lab 13: Asynchronous MOD Counter
Week 14	Lab 14: Asynchronous Binary Counter (count from number to another)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	DIGITAL FUNDAMENTALS / FLOYD	
Recommended Texts		
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

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	MIET2103				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		MIET	**College**	EETC	
Module Leader	Mohammed sameer mohsen		**e-mail**	Mohammed.sh.c@mtu.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Jameel Kaduim Abed Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_jameel57@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamental of Electrical Engineering	**Semester**	UGI-S1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Study engineering concepts and their applications for electrical machines and transformers. 2- How electrical transformers work, how to connect them, and solve mathematical problems related to them and their types. 3- What are electrical machines and what are their classifications. 4- Knowledge and understanding of the basics of laws related to electrical technology materials. 5- Solve issues and issues and apply the rules of application related to electrical engineering. 6- Giving students confidence and ability to use mathematical foundations in applications on generators, electric motors. 7- Building interactive skills that help classify information and make engineering decisions. 8- Develop proposals and alternatives for electrical parts for medical devices
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn how transformers work in electrical circuits. 2. List the various terms associated with electrical circuits and machines. 3. Summarize what is meant by electrical transformers and basic electrical machines of all kinds. 4. Discuss the interaction and participation of the number of windings, wire diameter and size of electrical transformers. 5. Description of electrical transformers, motors and generators with direct current and alternating current. 6. Determine the laws related to electrical transformers and their derivations. 7. Identify the equivalent circuits of electrical transformers and methods of calculating their efficiency. 8. Discuss the processes that lead to losses in transformers and electrical machines, and ways to reduce them and increase their efficiency. 9. Discuss the different characteristics of engines and generators, their main components, and the functioning of each. 10. Explain the two laws of machines and determine their efficiency, capacity and torque, and the laws of their formation. 11. Identify the relationship of transformers and electrical machines to medical

	devices. 12. Discuss the systems of connecting machines, ways of wrapping coils inside them, and the benefits of each. 13. Determining how to increase the efficiency of motors used in medical devices and methods of maintaining and repairing them. 14. Describe the types of motors included in the formation of medical devices and their classification
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Single-phase electrical transformers Types of electrical transformers, their parts and components, their equivalent circuit, types of losses, how to calculate them, and how to calculate transformer efficiency through mathematical operations and efficiency laws. [10 hours] Part B - Three-phase electrical transformers Types of three-phase electrical transformers, calculating their cost, types of connections in their files, calculating their equivalent circuits, and deriving special laws for each connection [13 hours] Part C- Electromagnetic and electromechanical induction and the relationship between them and linear motion using those concepts and applications on linear motion and how to generate it. [10 hours] Part D- The electromotive force of single-phase machines, methods of generating them, their laws, and their calculation through mathematical issues and calculating currents, voltages, losses, and capacity. [10 hours] Part E- The electromotive force of the three-phase machines, methods of generating them, their laws, and their calculation through mathematical problems, types of coil connections, testing those machines, and calculating currents, voltages, losses, and real and apparent power. [15 hours] Instantaneous power and average power of alternating current, relative and apparent power. Types of electric motors and how they work [5 hours] Review problem categories [6 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some of the electrical wiring activities in the laboratory curriculum that develop students' skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Transformers : single phase transformer and construction
Week 2	Transformers : single phase transformer and construction
Week 3	Theory of operation, no load and short circuit test.
Week 4	Equivalent circuit, auto–transformers, instrument transformers
Week 5	Equivalent circuit, auto–transformers, instrument transformers
Week 6	Three phase transformers, constructions methods of connection.
Week 7	Mid exam + Three phase transformers, constructions methods of connection.
Week 8	Electromechanical energy conversion principles relay operation.
Week 9	Electromechanical energy conversion principles relay operation.
Week 10	Motor characteristics, testing, calculation of losses and efficiency.
Week 11	Induction machines: equivalent circuit, basic equation, simple analysis testing.
Week 12	Single phase induction motor, methods of starting, siplitphase, capacitor short, capacitor run and shaded pole motors.
Week 13	Single phase induction motor, methods of starting, siplitphase, capacitor short, capacitor run and shaded pole motors.
Week 14	Synchronous machines, generators and motors, equivalent circuit, basic equation.
Week 15	Special machines: Reluctance motor , hysteresis motor , linear motor , stepper motor , dray cup type motor , servo motor , etc ……..
Week 16	Preparatory week before final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to measuring devices and identifying wattmeter
Week 2	Characteristics of single phase electric transformers
Week 3	Open circuit test of transformers
Week 4	Load circuit for single phase transformers
Week 5	Three phase transfer theorem delta- delta
Week 6	Three phase transfer theorem delta- star
Week 7	Three phase transfer theorem star- delta
Week 8	Three phase transfer theorem star- star
Week 9	Characteristics of DC machine
Week 10	load test of three phases (I.M)
Week 11	open circuit test of three phases (I.M)
Week 12	short circuit test of three phases (I.M)
Week 13	Speed control of DC motor
Week 14	load test of DC generator
Week 15	Series & Shunt DC machine connection
Week 16	Compound connection of DC machine

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Electrical Machines and Drives Fundamentals and Advanced Modelling by Jan A. Melkebeek	Yes
Recommended Texts	Electrical Machines Drives and Power Systems 5th Edition By Theodore Wildi	No
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.

Electronic Circuits I

Module Information معلومات المادة الدراسية					
Module Title	**Electronic Circuits I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET2102**				
ECTS Credits	**6**				
SWL (hr/sem)	**180**				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	MIET		**College**	EETC	
Module Leader	Ali Ghazi		**e-mail**	Ali7new@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr. Ahmed R. Ajel Asst. Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_ahmed.r@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	06/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamental of electrical engineering	**Semester**	UGI_S1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The graduate get scientific and applied skills of electronic circuits 2. The graduated students will gain the ability of knowledge of different parts of electronic circuits. 3. Development and training the engineering technical staffs on the electronic circuits 4. Preparation the research and studies to improve and develop the action of electronic circuits. 5. Prepare application engineers in technical and electronic engineers. 6. Put the proposals and alternatives for the electronic devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Become aware of the general characteristics of electronic devices. 2. Be able to describe the difference types of electronic categories. 3. Develop a clear understanding of the basic operation and characteristics of electronic devices. 4. Become familiar with the use of equivalent circuits to analyze series, parallel, and series-parallel electronic networks. 5. Be able to predict the output response of an electronic networks. 6. Become familiar with the analysis of and the range of applications for electronic devices 7. Become familiar with the basic construction and operation of the various types of electronic categories. 8. Be able to test a various type of electronic terminals. 9. Be able to determine the dc levels for the variety of important electronic circuits. 10. Understand how to measure the important voltage levels of electronic circuits. 11. Begin to understand the troubleshooting process as applied to electronic configurations. 12. Develop a sense for the stability factors of an electronic circuits. 13. Learn to use the equivalent model to find the important ac parameters for an amplifier. 14. Develop some skill in troubleshooting ac amplifier networks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A Electronic Theory</u> Semiconductor Materials: Ge, Si, and GaAs 2, Covalent Bonding and Intrinsic Materials , n -Type and p -Type Materials , Semiconductor Diode , Transistor Construction ,Transistor Operation , Construction and Characteristics of JFETs ,Transfer Characteristics, Important Relationships ,Depletion-Type MOSFET Enhancement-Type MOSFET [10 hrs]

	Diode Applications -Load-Line Analysis ,Series Diode Configurations ,Parallel and Series–Parallel Configurations ,Sinusoidal Inputs; Half-Wave Rectification Full-Wave Rectification , Clippers , Clampers Networks with a dc and ac Source, Zener Diodes , Voltage-Multiplier Circuits [12 hrs] Revision problem classes [6 hrs] <u>Part B - DC Electronic Circuits</u> BJT Transistor - Operating Point, dc bias configurations of a BJT transistor, Miscellaneous Bias Configurations of a BJT transistor 4.11 Design Operations of a BJT transistor, Multiple BJT Networks, Current Mirrors. [13 hrs] FET Transistor - biasing arrangements for the n and p channel JFET, 7.7 Depletion-Type MOSFETs, Enhancement-Type MOSFETs, Combination Networks, Universal JFET Bias, Practical Applications. [10 hrs] <u>Part C - AC Electronic Circuits</u> BJT Transistor - Amplification in the AC Domain, BJT Transistor Modeling, The r_e Transistor Model, Effect of RL and Rs, Determining the Current Gain, Cascaded Systems, Darlington Connection, Feedback Pair, The Hybrid Equivalent Model. [17 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be encourage active participation and engagement of students through activities such as group discussions, hands-on experiments, problem-solving tasks, and case studies. This approach promotes critical thinking, collaboration, and knowledge application and encourages students to explore and discover knowledge through inquiry and investigation. Pose open-ended questions or problem scenarios that require learners to research, analyze, and draw conclusions independently.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction -
Week 2	Semiconductors materials
Week 3	Diode Configurations
Week 4	Diode Networks with a dc and ac Source
Week 5	Zener Diodes
Week 6	Bipolar junctions transistor

Week 7	Mid-Exam
Week 8	DC biasing BJTs
Week 9	Multiple BJT Networks
Week 10	Field effect transistor and MOSFET
Week 11	Depletion-Type MOSFET
Week 12	Enhancement type MOSFET
Week 13	BJT AC Analysis
Week 14	BJT Transistor Modeling
Week 15	Effect of RL and Rs
Week 16	Preparatory week before final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Diode characteristics
Week 2	Lab 2: Half – wave Rectifier
Week 3	Lab 3: full wave Rectifier
Week 4	Lab 4: Filter for Halve – wave and full wave Rectifiers
Week 5	Lab 5: Voltage Doubler
Week 6	Lab 6: Voltage Tripler
Week 7	Lab 7: Positive Series Clipper
Week 8	Lab 8: Negative Series Clipper
Week 9	Lab 9: positive parallel Clipper
Week 10	Lab 10: Negative parallel Clipper
Week 11	Lab 11: Clamper
Week 12	Lab12: Zener Diode
Week 13	Lab13: Fixed Vi , Variable RL Zener Diode
Week 14	Lab14: Fixed RL , Variable Vi Zener Diode

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	electronic devices and circuit theory 11th edition, Robert L. Boylestad , Louis Nashelsky	Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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.

Electronic Circuits Ⅱ

Module Information معلومات المادة الدراسية					
Module Title	**Electronic Circuits II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET2201**				
ECTS Credits	**6**				
SWL (hr/sem)	**180**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	MIET		**College**	EETC	
Module Leader	Ali Ghazi		**e-mail**	Ali7new@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr. Ahmed R. Ajel Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_ahmed.r@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	06/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronics Circuits I	**Semester**	UGII-S3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The graduate get scientific and applied skills of electronic circuits 2. The graduated students will gain the ability of knowledge of different parts of electronic circuits. 3. Development and training the engineering technical staffs on the electronic circuits. 4. Preparation the research and studies to improve and develop the action of electronic circuits. 5. Prepare application engineers in technical and electronic engineers. 6. Put the proposals and alternatives for the electronic devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Become aware of the general characteristics of electronic devices. 2. Be able to describe the difference types of electronic categories. 3. Develop a clear understanding of the basic operation and characteristics of electronic devices. 4. Become familiar with the use of equivalent circuits to analyze series, parallel, and series-parallel electronic networks. 5. Be able to predict the output response of an electronic networks. 6. Become familiar with the analysis of and the range of applications for electronic devices. 7. Become familiar with the basic construction and operation of the various types of electronic categories! 8. Be able to test a various type of electronic terminals. 9. Be able to determine the dc levels for the variety of important electronic circuits. 10. Understand how to measure the important voltage levels of electronic circuits. 11. Begin to understand the troubleshooting process as applied to electronic configurations. 12. Develop a sense for the stability factors of an electronic circuits. 13. Learn to use the equivalent model to find the important ac parameters for an amplifier. 14. Develop some skill in troubleshooting ac amplifier networks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A Electronic Theory JFETs: n -channel, p -channel, TRANSFER CHARACTERISTICS, Shockley's Equation , Shorthand Method [10 hrs] FET Biasing -Fixed-bias configuration, self-bias configuration, voltage-divider bias

	arrangement; common gate configuration , depletion-type MOSFETs , enhancement-type MOSFET [10 hrs] Revision problem classes [5 hrs] <u>Part B – Frequency response</u> Decibels- General Frequency Considerations, Low-Frequency Analysis—Bode Plot, Low-Frequency Response—BJT Amplifier with RL, Low-Frequency Response—FET Amplifier, High-Frequency Response—BJT Amplifier, High-Frequency Response—FET Amplifier [10 hrs] Operational Amplifiers - Differential Amplifier Circuit, BiFET, BiMOS, and CMOS Differential Amplifier Circuits, Op-Amp Basics, Practical Op-Amp Circuits, Op-Amp Specifications—DC Offset Parameters. [10 hrs] <u>Part C - Power Amplifiers</u> Series-Fed Class A Amplifier- Transformer-Coupled Class A Amplifier, Class B Amplifier Operation, Class B Amplifier Circuits, Amplifier Distortion.[10 hrs] Power Supplies (Voltage Regulators) [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be encourage active participation and engagement of students through activities such as group discussions, hands-on experiments, problem-solving tasks, and case studies. This approach promotes critical thinking, collaboration, and knowledge application and encourage students to explore and discover knowledge through inquiry and investigation. Pose open-ended questions or problem scenarios that require learners to research, analyze, and draw conclusions independently.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	FET Amplifiers.
Week 2	JFET Small-Signal Model
Week 3	General Frequency Considerations
Week 4	BJT frequency response
Week 5	JFET frequency response
Week 6	Power amplifier.
Week 7	Mid- Exam
Week 8	Series-Fed Class A Amplifier

Week 9	Class B,C and D amplifiers
Week 10	Feedback and Oscillator Circuits
Week 11	PNPN and Other Devices
Week 12	Operational amplifier
Week 13	Operational amplifier applications
Week 14	Power Supplies
Week 15	Voltage Regulators
Week 16	Preparatory week before final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Common emitter transistor characteristics
Week 2	Lab 2: Common collector transistor
Week 3	Lab 3: Common emitter amplifier
Week 4	Lab 4: Transistor biasing (part 1)
Week 5	Lab 5: Transistor biasing (part 2)
Week 6	Lab 6: common collector amplifier
Week 7	Lab 7: Common base amplifier
Week 8	Lab 8: Collector feedback amplifier circuit
Week 9	Lab 9: Voltage divider biasing circuit
Week 10	Lab 10: Emitter follower
Week 11	Lab 11: JFET characteristics
Week 12	Lab12: JFET amplifier
Week 13	Lab13: operational amplifier (part1)
Week 14	Lab14: operational amplifier (part 2)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	electronic devices and circuit theory 11th edition, Robert L. Boylestad , Louis Nashelsky	Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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	Engineering Mathematics			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET2104				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	MIET		**College**	EETC	
Module Leader	Awss Jabbar Majeed		**e-mail**	awss_alogaidi@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Proff. Saleem Lateef Mohammed Asst.Proff. Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Saleem_lateef_mohammed@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Integral Mathematics	**Semester**	UGI-S2
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. The goal of this module is to give students the necessary mathematical skills and tools to solve a range of design engineering issues. 2. Demonstrate basic knowledge and understanding of a core of vector analysis, linear algebra and applied mathematics. 3. Introduce student to Infinite and power series. 4. Understand how to solve Differential equations of the 1st and nth order. 5. Introduce student to Integral Transforms: Fourier series and Laplace transform and their applications in signal and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Manipulate algebraic expressions of real numbers and vectors. 2. Define a vector, represent a vector by a directed straight line, add vectors, write a vector in terms of component vectors, write a vector in terms of component unit vectors, set up a coordinate system for representing vectors, and obtain the direction cosines of a vector. 3. Solve systems of linear equations using Gauss-Jordan elimination to reduce to echelon form, and solve systems of linear equations using the inverse of the coefficient matrix when possible. 4. Calculate the scalar product of two vectors, calculate the vector product of two vectors, and determine the angle between two vectors. 5. know what is meant by infinite series & its convergence, 6. Learn formation of Differential Equations - solutions of first order Differential Equations: Homogeneous-Non-homogeneous - Exact – Non-exact and solutions of nth order Differential Equations as well. 7. Definition of Laplace and Fourier transforms, Condition for existence, Laplace transform of standard functions, Properties of Laplace transform, Application of Laplace and Fourier transforms to ordinary differential equations. 8. Solve initial value problem and boundary value problem using Laplace transform and derive Fourier series representation of periodic functions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Vector analysis, Vector fields, Linear algebra: The basics, and vector calculus. [19 hrs] Scalars and vectors-unit, Orthogonal vectors, Dot Product, Cross Product, Infinite series, and power series. [19 hrs] Convergence and divergence series, and Differential equations: Differential equations of the first order. [15 hrs]

	Solutions of Differential equation of nth order and their applications.[11 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. Classes and interactive lessons will be used to achieve this.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 #2, #3, and #4
	Assignments	2	10% (10)	2 and 12	LO #5, #6, #7 and #8
	Tutorial	1	10% (10)	Continuous	All
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	Vector analysis.
Week 2	Vector fields.
Week 3	Linear algebra: The basics.
Week 4	Vector calculus.
Week 5	Scalars and vectors-unit.
Week 6	Orthogonal vectors.
Week 7	Mid-term Exam + Dot Product.
Week 8	Cross Product
Week 9	Infinite series.
Week 10	Power series.
Week 11	Convergence and divergence series.
Week 12	Differential equations.
Week 13	Differential equation of the first order.
Week 14	Differential equation of *nth* order.
Week 15	Integral Transforms: Fourier series and Laplace transform.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	https://dokumen.tips/download/link/engineering-mathematics-5th-ed-by-k-a-stroud.html (**pdf**)	No
Recommended Texts		

Websites	https://dokumen.tips/download/link/engineering-mathematics-5th-ed-by-k-a-stroud.html

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	Laboratory Medical Instrumentation I			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	MITE2101				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	MIET		**College**	EETC	
Module Leader	Zainab Majid Nahi		**e-mail**	Zainab.majid@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	None		**e-mail**		
Peer Reviewer Name	Amal Ibrahim Mahmood Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Aml.alzubedy@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The graduate get scientific and applied skills to diagnose the medical instruments faults. 2. The graduated students will gain the ability of knowledge of different parts of medical instruments. 3. Development and training the engineering technical staff on medical device maintenance. 4. Preparation of the research and studies to improve and develop the action of medical devices. 5. Prepare application engineers in technical and electronic engineering. 6. Put the proposals and alternatives for the medical devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1. Define the Medical instrumentation and recognize what is the laboratory security system and determine the quality control results in the medical laboratory. 2. Classify the medical instrumentation. 3. Describe the hospital design. 4. Design and Describe the operating room. 5. Understand patient safety laws and rules. 6. Define and understand the medical Laboratory Instruments and Tools. 7. Calibration of Medical Laboratory Instruments. 8. Define, explain, and describe Balances and understand the electrical and electronic parts. 9. Explain the types of balances and their medical application. 10. Define, explain, and describe water bath and understand the electrical and electronic parts. 11. Define, explain, and describe wax bath and understand the electrical and electronic parts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Medical instrumentation classification , analysis lists, work security rules, and best laboratory use guidelines [12 hr]. Calibration of instruments criteria, types, components, advantages and disadvantage, physical and medical applications.[13hr] Medical instrumentation faults and maintenance , analysis lists, work security rules, and best laboratory use guidelines [13hr].

	Patient safety and hospital design rules [14h]. Classification of different types medical laboratories like medical, biological histological and chemical[13].

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 design, while at the same time refining and expanding their medical instrumentations 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition to medical instruments.
Week 2	Introduction to medical instruments.
Week 3	Classification of medical instrumentation.
Week 4	Design of hospitals.
Week 5	Design of operating room.
Week 6	Patient Safety.
Week 7	Mid term
Week 8	Medical Laboratory Instruments and Tools-1
Week 9	Medical Laboratory Instruments and Tools- 2
Week 10	Classification of different medical laboratories
Week 11	Calibration of Medical Laboratory Instruments.
Week 12	Introduction to Balance.
Week 13	Balance and their types.
Week 14	Wax bath.
Week 15	Water bath.
Week 16	The preparatory week before the final exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to medical instruments.
Week 2	Classification of medical instrumentation.

Week 3	Medical Laboratory Instruments and Tools.
Week 4	Patient Safety.
Week 5	Calibration of Medical Laboratory Instruments.
Week 6	Classification of different medical lab.
Week 7	Introduction to Balance.
Week 8	Balance and their types.
Week 9	Wax bath.
Week 10	Water bath.
Week 11	Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Biomedical device technology ,by ANTHONY Y. K. CHAN, MSc, MEng, PEng, CCE	
Recommended Texts	Ananthi ,2005,"A text book of medical instruments	
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.

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بغداد
الكلية التقنية
الهندسية الكهربائية
Electrical Engineering Technical College

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Laboratory Medical Instrumentation II			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	MIET2202				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	MIET		**College**	EETC	
Module Leader	Zainab Majid Nahi		**e-mail**	Zainab.majid@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	None		**e-mail**		
Peer Reviewer Name	Amal Ibrahim Mahmood Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Aml.alzubedy@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/6/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Laboratory Medical Instrumentation I	**Semester**	**UGII-S3**
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The graduate get scientific and applied skills to diagnosis the medical instruments faults. 2. The graduated students will gain the ability of knowledge of different parts of medical instruments. 3. Development and training the engineering technical staffs on the medical device maintenance. 4. Preparation of the research and studies to improve and develop the action of medical devices. 5. Put the proposals and alternatives for the medical devices. 6. To describe the types of laboratory medical instruments. 7. To explain the principal work of the laboratory medical devices techniques. 8. To understand the maintenance of laboratory medical devices and their electrical and mechanical faults.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1. Introduction about the laboratory Design, Rules and limitations. 2. Define, explain, and describe the centrifuge and understand the electrical and electronic parts. 3. Define, explain, and describe Microscope and understand the electrical and electronic parts. 4. List and recognize the types of microscopes. 5. Define, explain, and describe Polymerase chain reaction (PCR). and understand the electrical and electronic parts. 6. Definition of Laboratory incubators and explain their applications. 7. List and understand the types of Laboratory Incubators. 8. Define and explain Oven and its medical application. 9. Define and explain Autoclave and its medical application. 10. Describe and understand water distillation and its application with the medical field. 11. Definition and understanding of the CBC System. 12. Define the principle of CBC Medical system. 13. Faults and maintenance of medical instrumentations
Indicative Contents	Indicative content includes the following: Medical instrumentation definition, analysis lists, work security rules, and

المحتويات الإرشادية	best laboratory use guidelines [12hr]. Laboratory instruments criteria, types, components, advantages and disadvantages, physical and medical application. [10hr]. Medical instrumentation faults and maintenance, analysis lists, work security rules, and best laboratory use guidelines [12hr]. Explain Polymerase chain reaction (pcr)and definition of Laboratory incubators[12 hr]. Types of Laboratory Incubators and oven and its medical application[12hr]. Autoclave medical application and water distillation[12hr].

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 design, while at the same time refining and expanding their medical instrumentations 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction about the laboratory Design.
Week2	Definition of Centrifuge
Week 3	Applications of Centrifuge
Week 4	Definition of Microscopes.
Week 5	Types of Microscopes.
Week 6	Water distillation
Week7	Mid Term
Week 8	Oven and its medical application.
Week 9	Autoclave and its medical application.
Week 10	Definition of Laboratory incubators.
Week 11	Types of Laboratory Incubators.
Week 12	Polymerase chain reaction (PCR).
Week 13	Applications of (PCR)
Week 14	Definition of Complete Blood Counter (CBC)
Week 15	Principle of (CBC)
Week 16	A preparatory week before final exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction about the laboratory Design
Week 2	Centrifuge
Week 3	Microscopes.
Week 4	Types of Microscopes.
Week 5	Water distillation
Week6	Oven and its medical application.
Week7	Autoclave and its medical application.
Week 8	Laboratory Incubators.
Week 9	Polymerase chain reaction (PCR).
Week10	Complete Blood Counter (CBC)
Week11	Faults and maintenance of medical lab. instruments

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Biomedical device technology ,by ANTHONY Y. K. CHAN, MSc, MEng, PEng, CCE	
Recommended Texts	Ananthi ,2005,"A text book of medical instruments	
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.

6/3/2023

English Language (Intermediate)

EET2206

Nadirah Abdelrazzaq Ghzal

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language (Intermediate)**			**Module Delivery**	
Module Type	**Support or related learning activity**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**EET2206**				
ECTS Credits	**3**				
SWL (hr/sem)	**90**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	ENG – EET		**College**	EETC	
Module Leader	Nadirah Abdelrazzaq Ghzal		**e-mail**	nadra@mtu.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	M.A.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Rashid Ali Fayadh		**e-mail**	dr.rashidali@mtu.edu.iq	
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	The module aims of English Language (Intermediate) are designed to help learners at the beginner level develop their English language skills and achieve specific learning objectives. While I don't have access to the specific module aims of this coursebook, I can provide you with a general outline of the typical aims for a beginner-level English course: 1. To introduce beginner-level learners to the English language, focusing on building vocabulary and acquiring essential language structures. 2. To develop listening and speaking skills through interactive activities and engaging in basic conversational practice. 3. To enhance reading comprehension abilities by introducing simple texts and emphasizing vocabulary and sentence structures. 4. To provide foundational writing skills, including sentence formation, paragraph writing, and completing basic forms. 5. To cultivate cultural awareness and equip learners with practical language skills for everyday situations, such as ordering food, shopping, and asking for directions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module learning outcomes for the English Language (Beginner) module are as follows: 1. Develop basic proficiency in listening and understanding spoken English at a beginner level. 2. Demonstrate improved speaking skills by participating in simple conversations and expressing basic ideas and opinions. 3. Comprehend and interpret basic written texts, including short passages and simple dialogues. 4. Produce written texts using basic grammatical structures and vocabulary appropriate for beginner-level communication. 5. Increase vocabulary knowledge and usage to effectively communicate in everyday situations. 6. Develop an awareness of cultural aspects related to English-speaking countries and demonstrate cross-cultural understanding in language use. 7. Apply basic language skills in practical situations, such as greetings, introductions, making requests, and asking for and giving simple directions.
Indicative Contents المحتويات الإرشادية	1. There is no place like home. [3 hrs.] 2. Reading and speaking. [3 hrs.] 3. Writing and speaking. [3 hrs.] 4. Been there, done that.[3 hrs.] 5. Reading. [3 hrs.] 6. What happened, was there. [3 hrs.] 7. Reading & listening. [3 hrs.] 8. Speaking. [3 hrs.] 9. whatever will be, will be. [3 hrs.] 10. Reading & speaking. [3 hrs.] 11. people places and things. [3 hrs.] 12. Reading &speaking. [3 hrs.] 13. How to write resume applying for a job. [3 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The learning and teaching strategies for the English Language (Beginner) module may include: 1. Interactive Language Practice: Engage learners in communicative activities that promote active participation and language practice. This can include pair work, group discussions, role-plays, and language games. 2. Authentic Materials: Incorporate authentic materials such as videos, audio recordings, and reading texts that reflect real-life language use. This helps learners develop their listening, speaking, reading, and writing skills in authentic contexts. 3. Task-Based Learning: Design tasks and projects that require learners to use the target language to accomplish specific goals or solve problems. This promotes meaningful language use and encourages critical thinking and problem-solving skills. 4. Visual Aids and Multimedia: Utilize visual aids, charts, diagrams, and multimedia resources to support language learning and comprehension. Visuals can enhance understanding, aid in vocabulary acquisition, and provide context for language use. 5. Error Correction and Feedback: Provide timely and constructive feedback on learners' language production to help them identify and correct errors. Encourage self-correction and peer correction to foster a supportive learning environment.

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	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	90		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	• Famous couples.
Week 2	• Do's and Don'ts.
Week 3	• Going places.
Week 4	• Scared to death.
Week 5	• Things that changed the world.
Week 6	• Dreams and reality.
Week 7	• Earning a living.
Week 8	• Love you and leave you.
Week 9	• it's a wonderful world!
Week 10	• Get happy.
Week 11	• Telling tales.
Week 12	• Doing the right thing.
Week 13	• on the move.
Week 14	• l just love.
Week 15	• The world of work.
Week 16	• Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Soars, J., Soars, L. (2006). New Headway Plus: Pre-intermediate. United Kingdom: Oxford University Press. • L. Soars and J. Soars, New Headway Plus - Intermediate, 4th ed. Oxford: Oxford University Press, 2019.	Yes
Recommended Texts	• Audio CDs or Online Audio: Recordings of listening exercises, dialogues, and pronunciation practice.	No
Websites	Collage E- Library	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	**FX –** Fail	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	Computer Programming and Applications (C++ programming)			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	MIET3105				
ECTS Credits	**4**				
SWL (hr/sem)	**120**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	MIET		**College**	EETC	
Module Leader	Zina Ahmad		**e-mail**	zena@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSC	
Module Tutor	Awss Jabbar Majeed		**e-mail**	awss_alogaidi@mtu.edu.iq	
Peer Reviewer Name	Dr.Aws Alazawi Ghaidaa Abdulrahman Khalid		**e-mail**	aws_basil@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
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	1. Understanding the fundamental concepts of C++ programming language environment. 2. The students will understand and learn how to use C++ as an effective programming language. 3. The students will be able to solve different mathematical and engineering problems as well as design projects using code. 4. Students will acquire the knowledge of basic C++ syntax such as: variables, input, output, vectors, matrices, functions. 5. The students will gain the necessary skills to design and implement appropriate algorithms that solve problems dealing with different mathematical and engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introducing the history and philosophy of C and C++, how C++ adds generic programming concepts to the C language, programming language standards, the mechanics of creating a program. 2. The students learn how to create a C++ program and the general format for a C++ program 3. The "# include directive", the main() function, How to use the cout object for output, how to place comments in a C++ Program, how and when to use endl, how to declare and use variables, how to use the "cin" object for input, how to define and use simple functions. 4. Learn rules for naming C++ variables, C++ built-in integer types, numeric constants of various integer types, using the const qualifier to create symbolic constants, C++'s built-in floating-point types, C++'s arithmetic operators, automatic type conversions, forced type conversions (type casts). 5. How to create and use arrays, how to create and use C-style strings. 6. How to create and use string class strings, how to use the "getline()". 7. Learn how to create and use structures, how to create and use pointers, how to create dynamic arrays, how to create dynamic structures, automatic, static, and dynamic storage. 8. Understand the for loop, expressions and statements, the increment and decrement operators: ++ and --, combination assignment operators, compound statements (blocks). 9. The if statement, the if else statement, logical operators: "&&" ," ||" , and "!", the "cctype" library of character functions, the conditional operator, the switch statement, the continue and break statements, number-reading loops, basic file

	input/output. 10. The C++ view of input and output, the “iostream” family of classes redirection, ostream class methods, formatting output, “istream” class methods, stream states, file I/O, using the “ifstream” class for input from files, using the “ofstream” class for output to files, using the “fstream” class file input and output, command-line processing, binary files.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introducing to the history and philosophy of C and of C++, How C++ adds object-oriented, concepts to the C language, How C++ adds generic programming concepts to the C language, programming language standards, and the mechanics of creating a program. How to create a C++ program, the general format for a C++ program the #include directive, the “main()” function, how to use the cout object for output, how to place comments in a C++ program, how and when to use “endl”, how to declare and use variables, how to use the “cin” object for input, and how to define and use simple functions. Rules for naming C++ variables, C++’s built-in integer types, Numeric constants of various integer types, Using the “const” qualifier to create symbolic constants, C++’s built-in floating-point types, C++’s arithmetic operators, automatic type conversions, and forced type conversions (type casts). [15 hrs] How to create and use arrays, how to create and use C-style strings ,how to create and use string class strings, How to use the “getline()” and how to create and use arrays, how to create and use C-style strings, how to create and use string class strings, How to use the “getline(): and “get()” methods for reading strings, How to mix string and numeric input, how to create and use structures, how to create and use pointers, how to create dynamic arrays, and how to create dynamic structures, automatic, static, and dynamic storage. The for loop, Expressions and statements, The increment and decrement operators: ++ and --, Combination assignment operators, Compound statements (blocks), The comma operator, Relational operators: > , >= , == , <= ,< , and !=, The while loop, The do while loop, The get() character input method, The end-of-file condition, Nested loops and two-dimensional arrays.[15 hrs] The if statement, The if else statement, Logical operators: && , || , and !, The cctype library of character functions, The conditional operator: ?:. The switch statement, the continue and break statements, number-reading loops, and basic File input/output [10 hrs] The C++ view of input and output, the “iostream” family of classes Redirection, “ostream” class methods, formatting output, “istream” class methods, stream states, file I/O, using the “ifstream” class for input from files, using the “ofstream” class for output to files, using the “fstream” class file input and output, command-line processing, binary files, and random file access. [15 hrs]

	Revision problem classes [6 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 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	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	15% (15)	5 and 10	LO #1, #2 and #10,
	Assignments	2	15% (15)	2 and 12	LO #3, #4 and #6, #7
Summative assessment	**Midterm Exam**	2hr	20% (20)	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	Introducing history and philosophy of C and C++, How C++ adds object-oriented, concepts to the C language, How C++ adds generic programming concepts to the C language, Programming language standards, and the mechanics of creating a program.
Week 2	How to create a C++ program, general format for a C++ program, "#include" directive, The main() function, how to use the "cout" object for output, how to place comments in a C++ program, how and when to use "endl", how to declare and use variables, how to use the "cin" object for input, and how to define and use simple functions.
Week 3 &4	Rules for naming C++ variables, C++'s built-in integer types, numeric constants of various integer types, using the "const" qualifier to create symbolic constants, C++'s built-in floating-point types, C++'s arithmetic operators, automatic type conversions, and forced type conversions (type casts).
Week 5	How to create and use arrays, how to create and use C-style strings, how to create and use string class strings, how to use the "getline()" and "get()" methods for reading strings,
Week 6	How to mix string and numeric input, how to create and use structures, how to create and use pointers, and how to create dynamic arrays.
Week 7	**Mid-term Exam** + How to create dynamic structures, automatic, static, and dynamic storage.
Week 8	The for loop, Expressions and statements, increment and decrement operators: ++ and --, combination assignment operators, compound statements (blocks), comma operator, and relational operators: > , >= , == , <= ,< , and !=.
Week 9	While loop, do "while" loop, and "get()" character input method.
Week 10	The end-of-file condition, nested loops and two-dimensional arrays.
Week 11	if statement, if else statement, logical operators: && , || , and !", "cctype" library of character functions, and conditional operator: ?.
Week 12	"Switch" statement, "continue" and "break" statements, number-reading loops, and basic File input/output.
Week 13 &14	C++ view of input and output, the "io-stream" family of classes redirection, "io-stream" class methods, formatting output, "io-stream" class methods, stream states, file I/O, using the "ifstream" class for input from files, and using the "ofstream" class for output to files.
Week 15	Command-line processing, binary files, random file access, and "Incore" formatting
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction, C++ Environment.
Week 2	The general format for a C++ program, the #include directive, The main() function, how to use the cout object for output, How to place comments in a C++ Program, how and when to use endl, how to declare and use variables, how to use the cin object for input, and how to define and use simple functions.
Week 3	
Week 4	Variables and assignment statement, logical operator.
Week 5	
Week 6	Using the const qualifier to create symbolic constants, C++'s built-in floating-point types, and C++'s arithmetic operators.
Week 7	
Week 8	Arrays, Built in functions, Basic Matrix Functions
Week 9	
Week 10	Control Statements(Conditional statements: If, Else, Elseif, switch case)
Week 11	
Week 12	How to create dynamic structures, automatic, static, and dynamic storage.
Week 13	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	P.B. Mahapatra "C++"	yes
Recommended Texts	A Complete Guide to Programming in C++ Ulla Kirch-Prinz Peter Prinz	
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineeringhttp://www.lmpt.univ-tours.fr/~volkov/C++.pdf	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Programming and Applications (C++ programming)			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	MIET3105				
ECTS Credits	**4**				
SWL (hr/sem)	**120**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	MIET		**College**	EETC	
Module Leader	Zina Ahmad		**e-mail**	zena@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSC	
Module Tutor	Awss Jabbar Majeed		**e-mail**	awss_alogaidi@mtu.edu.iq	
Peer Reviewer Name	Dr.Aws Alazawi Ghaidaa Abdulrahman Khalid		**e-mail**	aws_basil@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
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	1. Understanding the fundamental concepts of C++ programming language environment. 2. The students will understand and learn how to use C++ as an effective programming language. 3. The students will be able to solve different mathematical and engineering problems as well as design projects using code. 4. Students will acquire the knowledge of basic C++ syntax such as: variables, input, output, vectors, matrices, functions. 5. The students will gain the necessary skills to design and implement appropriate algorithms that solve problems dealing with different mathematical and engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introducing the history and philosophy of C and C++, how C++ adds generic programming concepts to the C language, programming language standards, the mechanics of creating a program. 2. The students learn how to create a C++ program and the general format for a C++ program 3. The "# include directive", the main() function, How to use the cout object for output, how to place comments in a C++ Program, how and when to use endl, how to declare and use variables, how to use the "cin" object for input, how to define and use simple functions. 4. Learn rules for naming C++ variables, C++ built-in integer types, numeric constants of various integer types, using the const qualifier to create symbolic constants, C++'s built-in floating-point types, C++'s arithmetic operators, automatic type conversions, forced type conversions (type casts). 5. How to create and use arrays, how to create and use C-style strings. 6. How to create and use string class strings, how to use the "getline()". 7. Learn how to create and use structures, how to create and use pointers, how to create dynamic arrays, how to create dynamic structures, automatic, static, and dynamic storage. 8. Understand the for loop, expressions and statements, the increment and decrement operators: ++ and --, combination assignment operators, compound statements (blocks). 9. The if statement, the if else statement, logical operators: "&&" ," ||" , and "!", the "cctype" library of character functions, the conditional operator, the switch statement, the continue and break statements, number-reading loops, basic file

	input/output. 10. The C++ view of input and output, the “iostream” family of classes redirection, ostream class methods, formatting output, “istream” class methods, stream states, file I/O, using the “ifstream” class for input from files, using the “ofstream” class for output to files, using the “fstream” class file input and output, command-line processing, binary files.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introducing to the history and philosophy of C and of C++, How C++ adds object-oriented, concepts to the C language, How C++ adds generic programming concepts to the C language, programming language standards, and the mechanics of creating a program. How to create a C++ program, the general format for a C++ program the #include directive, the “main()” function, how to use the cout object for output, how to place comments in a C++ program, how and when to use “endl”, how to declare and use variables, how to use the “cin” object for input, and how to define and use simple functions. Rules for naming C++ variables, C++’s built-in integer types, Numeric constants of various integer types, Using the “const” qualifier to create symbolic constants, C++’s built-in floating-point types, C++’s arithmetic operators, automatic type conversions, and forced type conversions (type casts). [15 hrs] How to create and use arrays, how to create and use C-style strings ,how to create and use string class strings, How to use the “getline()” and how to create and use arrays, how to create and use C-style strings, how to create and use string class strings, How to use the “getline(): and “get()” methods for reading strings, How to mix string and numeric input, how to create and use structures, how to create and use pointers, how to create dynamic arrays, and how to create dynamic structures, automatic, static, and dynamic storage. The for loop, Expressions and statements, The increment and decrement operators: ++ and --, Combination assignment operators, Compound statements (blocks), The comma operator, Relational operators: > , >= , == , <= ,< , and !=, The while loop, The do while loop, The get() character input method, The end-of-file condition, Nested loops and two-dimensional arrays.[15 hrs] The if statement, The if else statement, Logical operators: && , || , and !, The cctype library of character functions, The conditional operator: ?:. The switch statement, the continue and break statements, number-reading loops, and basic File input/output [10 hrs] The C++ view of input and output, the “iostream” family of classes Redirection, “ostream” class methods, formatting output, “istream” class methods, stream states, file I/O, using the “ifstream” class for input from files, using the “ofstream” class for output to files, using the “fstream” class file input and output, command-line processing, binary files, and random file access. [15 hrs]

	Revision problem classes [6 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 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	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	15% (15)	5 and 10	LO #1, #2 and #10,
	Assignments	2	15% (15)	2 and 12	LO #3, #4 and #6, #7
Summative assessment	**Midterm Exam**	2hr	20% (20)	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	Introducing history and philosophy of C and C++, How C++ adds object-oriented, concepts to the C language, How C++ adds generic programming concepts to the C language, Programming language standards, and the mechanics of creating a program.
Week 2	How to create a C++ program, general format for a C++ program, "#include" directive, The main() function, how to use the "cout" object for output, how to place comments in a C++ program, how and when to use "endl", how to declare and use variables, how to use the "cin" object for input, and how to define and use simple functions.
Week 3 &4	Rules for naming C++ variables, C++'s built-in integer types, numeric constants of various integer types, using the "const" qualifier to create symbolic constants, C++'s built-in floating-point types, C++'s arithmetic operators, automatic type conversions, and forced type conversions (type casts).
Week 5	How to create and use arrays, how to create and use C-style strings, how to create and use string class strings, how to use the "getline()" and "get()" methods for reading strings,
Week 6	How to mix string and numeric input, how to create and use structures, how to create and use pointers, and how to create dynamic arrays.
Week 7	**Mid-term Exam** + How to create dynamic structures, automatic, static, and dynamic storage.
Week 8	The for loop, Expressions and statements, increment and decrement operators: ++ and --, combination assignment operators, compound statements (blocks), comma operator, and relational operators: > , >= , == , <= ,< , and !=.
Week 9	While loop, do "while" loop, and "get()" character input method.
Week 10	The end-of-file condition, nested loops and two-dimensional arrays.
Week 11	if statement, if else statement, logical operators: && , || , and !", "cctype" library of character functions, and conditional operator: ?.
Week 12	"Switch" statement, "continue" and "break" statements, number-reading loops, and basic File input/output.
Week 13 &14	C++ view of input and output, the "io-stream" family of classes redirection, "io-stream" class methods, formatting output, "io-stream" class methods, stream states, file I/O, using the "ifstream" class for input from files, and using the "ofstream" class for output to files.
Week 15	Command-line processing, binary files, random file access, and "Incore" formatting
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction, C++ Environment.
Week 2	The general format for a C++ program, the #include directive, The main() function, how to use the cout object for output, How to place comments in a C++ Program, how and when to use endl, how to declare and use variables, how to use the cin object for input, and how to define and use simple functions.
Week 3	
Week 4	Variables and assignment statement, logical operator.
Week 5	
Week 6	Using the const qualifier to create symbolic constants, C++'s built-in floating-point types, and C++'s arithmetic operators.
Week 7	
Week 8	Arrays, Built in functions, Basic Matrix Functions
Week 9	
Week 10	Control Statements(Conditional statements: If, Else, Elseif, switch case)
Week 11	
Week 12	How to create dynamic structures, automatic, static, and dynamic storage.
Week 13	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	P.B. Mahapatra "C++"	yes
Recommended Texts	A Complete Guide to Programming in C++ Ulla Kirch-Prinz Peter Prinz	
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineeringhttp://www.lmpt.univ-tours.fr/~volkov/C++.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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electromagnetic Fields**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET 3103				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Asst. Lec. Mustafa F. Mahmood		**e-mail**	mustafa.falah@mtu.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr. Sadik Kamel Gharghan Ghaidaa Abdulrahman Khalid		e-mail	sadik.gharghan@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/6/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mathematics	**Semester**	UGII-S3
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To learn about electromagnetic transmission 2. To learn about Maxwell's equations 3. To know the types of electromagnetic wave transmission media. 4. To recognize the types of signals and systems. 5. To recognize the Guided Waves 6. To recognize transmission lines 7. To recognize Electromagnetic Radiation and Antennas
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn about General review in electrostatic. 2. Learn about Gauss's law. 3. Learn about Steady magnetic field. 4. Learn about Time varying magnetic field. 5. Learn about Maxwell's equations in electric fields. 6. Learn about Maxwell's equations in magnetic fields. 7. Recognize types of electromagnetic wave transmission media. 8. Recognize the types of signals and systems for electromagnetic waves. 9. Recognize the introduction Guided Waves. 10. Recognize the applications Guided Waves in medical device. 11. Recognize transmission lines. 12. Recognize Electromagnetic Radiation and Antennas.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1- Electrostatic, Electric charge, Coulomb's law, Electrical field intensity, and examples **[4 H].** 2- Electric Flux Density and Gauss's Law with examples **[4 H].** 3- Steady Magnetic Field, Magnetic Field in life's human with examples **[4 H].** 4- Time varying - magnetic field and Maxwell's equations, FARADAY'S LAW, Moving Conductor in a Magnetic Field, Displacement Current and Conduction Current (Ampere's Law), Maxwell's equations in pointing form, Wave equations with examples **[12 H].** 5- Uniform plane wave, Wave velocity, Characteristic impedance, Wave propagation in media, Skin effect, The pointing vector and power consideration with examples **[8 H].** 6- Guided Waves with examples **[12 H].** 7- Transmission lines with examples **[8 H].** 8- Electromagnetic Radiation and Antennas with examples **[12 H].**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Lectures - means of clarification - intellectual questions - scientific exhibitions - scientific competitions

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General review in electrostatic
Week 2	Gauss's law

Week 3	Steady magnetic field
Week 4	Time varying magnetic field
Week 5-6	Maxwell's equations
Week 7-8	Plane Wave Propagation and Reflection
Week 8-10	Guided Waves
Week 11-12	Transmission lines
Week 13-14	Electromagnetic Radiation and Antennas
Week 15	
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	General review in electrostatic
Week 2	Gauss's law
Week 3	Steady magnetic field
Week 4	Time varying magnetic field
Week 5-6	Maxwell's equations
Week 7-8	Plane Wave Propagation and Reflection
Week 8-10	Guided Waves
Week 11-12	Transmission lines
Week 13-14	Electromagnetic Radiation and Antennas
Week 15	
Week 16	

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

Required Texts	Engineering Electromagnetic (fifth edition – by William H. Hayt. JR)	NO
Recommended Texts	Introduction to Communication Systems (second edition- by Ferrel. G. Stremler)	YES
Websites	1. https://www.coursera.org/search?query=Electromagnetic%20Fields&=null&index=prod_all_launched_products_term_optimization. 2. www.tallguide.com 3. www.ainfoinc.com 4. www.millitech.com 5. www.rfcafe.com 6. www.globalspec.com	

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	**Medical Communication systems**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET 3203				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Asst. Lec. Mustafa F. Mahmood		**e-mail**	mustafa.falah@mtu.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr. Sadik Kamel Gharghan Ghaidaa Abdulrahman Khalid		**e-mail**	sadik.gharghan@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/6/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Signals and systems	**Semester**	UGIII-S5
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To learn the types of digital and analog modulation 2. To distinguishes the difference between digital and analogue modulation 3. To learn the types of impulse modulation. 4. To learn spread spectrum systems 5. To learn the biomedical sensor network 6. To learn mobile communications (3G / 4G) 7. To learn telemedicine and healthcare systems 8. To learn the Internet of Things in medical applications
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student learns the types of digital and analog modulation 2. The student distinguishes the difference between digital and analogue modulation 3. The student learns the types of impulse modulation. 4. The student learns spread spectrum systems 5. The student learns the biomedical sensor network 6. The student learns mobile communications (3G / 4G) 7. The student learns telemedicine and healthcare systems 8. The student learns the Internet of Things in medical applications
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Communication System and types **[4 H].** 2. AM and Fm modulation system and types and examples **[4 H].** 3. Sampling, PAM, PWM, PPM, and PCM and examples **[10 H].** 4. Digital Modulation Techniques, ASK, FSK, and PSK examples **[8 H].** 5. Spread Spectrum Systems, Wireless Sensor Network, Biomedical Sensor Network, and Mobile Communication (3G/4G) and examples **[20 H].** 6. Telemedicine and Health care Systems, IoT in Medical Applications and examples **[8 H].**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures - means of clarification - intellectual questions - scientific exhibitions - scientific competitions

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	60	**Structured SWL (h/w)**	4

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	120	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Noise in Communication Systems
Week 2-3	Sampling, PAM, PWM, PPM, and PCM
Week 4-5	Digital Modulation Techniques
Week 6	Spread Spectrum Systems
Week 7-8	Mid-Exam + Wireless Sensor Network
Week 9-10	Biomedical Sensor Network
Week 11-12	Mobile Communication (3G/4G)
Week 13	Telemedicine and Health care Systems

Week 14	IoT in Medical Applications
Week 15	
Week 16	**Preparing for final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Amplitude Modulation large carrier and Amplitude Modulation suppressed carrier
Week 3	Frequency Modulation
Week 4	Amplitude Demodulation
Week 5	PAM
Week 6	PWM
Week 7	PPM
Week 8	ASK
Week 9	FSK
Week 10	PWM
Week 11	BPSK
Week 12	Biomedical Sensor Network
Week 13	Telemedicine and Health care Systems
Week 14	IoT in Medical Applications
Week 15	
Week 16	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to Communication Systems	NO

Recommended Texts	Introduction to Communication Systems (second edition- by Ferrel. G. Stremler)	YES
Websites	1. https://www.coursera.org/search?query=Electromagnetic%20Fields&=null&index=prod_all_launched_products_term_optimization. 2. www.tallguide.com 3. www.ainfoinc.com 4. www.millitech.com 5. www.rfcafe.com 6. www.globalspec.com	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	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
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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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical Diagnostic Instrumentation I أجهزة التشخيص الطبية I			**Module Delivery**	
Module Type	Core			☒ **Theory** **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	MIET3101				
ECTS Credits	7				
SWL (hr/sem)	210				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	ENG- MIET		**College**	EETC	
Module Leader	Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Ali Abdulelah Al-Naji Ghaidaa Abdulrahman Khalid		**e-mail**	ali_al_naji@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	14/06/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Anatomy & Physiology	**Semester**	UGII - S3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims: 1. To generate a grounding knowledge base for the students which allows them understanding the technology and principles applied in a medical environment. 2. To understand the nature of physiological signals and how they can be acquired, analysed and visualised. 3. To provide a grounding in the theory of biomedical measurement systems, including sensors, signal conditioning methods, measurement techniques, patient interfacing and instrumentation used in biomedicine. 4. To introduce students to design strategies of biomedical devices. 5. To develop prototypes of medical instruments in an accompanying laboratory session. 6. To demonstrate how modern biomedical instruments combine traditional instrumentation techniques and technological innovation, including software presentation and analysis of data. 7. To be able to enter a wide range of medical related industries, clinical environments or professional biomedical research programmes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1. (a). Understanding the principles of operation of important sensors used in biomedical instrumentation and measurement. (b). Understanding the technical specifications of commercially produced sensors used for this purposes. 2. (a). Being able to specify and design instrumentation and measurement systems that employ these sensors and which, as appropriate, enable safe interface with the human body.(b). Recognised and understand the characteristics of the physiological signals being measured; 3. (a). Being able to offer realistic solutions to clinical measurement problems and to justify the choices. (b). Having a sufficient knowledge in the subject to be able to investigate and evaluate new designs of biomedical sensors and instruments. (c) Explain the operating principles of biomedical transducers for the measurement of biopotentials (ECG, EMG, EEG, EOG) and other critical physiological variables such as blood pressure, flow, and temperature. 4. (a) Design and build analog signal conditioning circuits that provide

Comment [R_0011]: مكررة
to

	reliable biopotentialmeasurements, e.g.ECG .(b) Explain the physical principles underlying the function of biopotential electrodes; (c) Demonstrate knowledge of electrical safety considerations in the medical environment. 5. (a) A respirometer is a device used to measure the rate of respiration of a living organism by measuring its rate of exchange of oxygen and/or carbon dioxide. They allow investigation into how factors such as age, or chemicals affect the rate of respiration. (b).The patient monitoring systems in healthcare are collections of machines or equipment used to constantly monitor patients through various vital signs and warning systems to detect and record changes in patient wellbeing. 6. Ambulatory monitors are devices that record the electrical activity in your heart. These are used to detect heart rhythm problems over a longer period of time, and you can take them home with you. They're an invaluable tool when it comes to diagnosing problems that happen unpredictably and outside of a medical setting. 7. Electronic fetal monitoring is a procedure in which instruments are used to continuously record the heartbeat of the fetus and the contractions of the woman's uterus during labor. 8. An endoscope is an inspection instrument composed of image sensor, optical lens, light source and mechanical device, which is used to look deep into the body by way of openings such as the mouth or anus. 9. There are many direct and indirect (noninvasive) methods of measuring cardiac output. Several instruments can measure blood pressure quickly and with little discomfort. A sphygmomanometer is commonly used. 10. There are three different types of eye exams, including a comprehensive eye exam, a routine eye exam, and a contact lens exam. 11. Pulmonary function tests (PFTs) are noninvasive tests that show how well the lungs are working. The tests measure lung volume, capacity, rates of flow, and gas exchange. 12. Patients who have a tumor in or around the ear may undergo audiometry testing to determine whether hearing loss has occurred or to monitor their hearing before and after surgery. 13. (a). An arterial blood gas (ABG) test measures the levels of oxygen and carbon dioxide in your blood as well as the pH balance in your blood. (b). The blood cell counter measure of the number of red blood cells, white blood cells, and platelets in the blood. 14. (a). Hospitals can ensure patient safety and prevent untoward harm to patients who seek treatment with these steps. (b). Apply safety standards and select disposal method and procedures for electrical diagnostic equipment

Indicative Contents المحتويات الإرشادية	The indicative contents of module include: Biopotential amplifiers: Physiological quantities, basic concepts and principles of medical instrumentation Bio-potentials, electrodes and amplifiers, static and dynamic characteristics of measurement systems, noise and noise reduction, sensor characterization. [5 hr.] Instrumentation amplifier: Signal conditioning. Digital/analog conversion Electodes (Oxidation/reduction, electrolytes, electrode electrical models) Advanced conditioning circuits (noise, interference, shielding, active shielding, driven right leg active ground). Sensing displacement (strain gauges, LVDTs, piezocrystals, MEMS accelerometers and gyroscopes, optical sensors) * Bridges (no bridge; 1/4, 1/2, full bridge) * Electrical safety [10 hrs] Introduction to sensors and signal processing: transducers, sensors and instruments; calibration; accuracy and error; amplifiers; filters; software and hardware signal processing. Nature of biomedical signals: physical signals (force, torque, flow, pressure as well as thermal, geometric and kinematic quantities); biopotentials; chemical signals. [10 hr.] Medical measurement systems: (EEG, ECG, EMG, EOG,...) Measurement constraints in the clinical environment, invasive and non-invasive measurements, Biomedical and chemical biosensors, Measurement of blood pressure, flow and volume, pulse oximetry and respiratory performance; Clinical laboratory instrumentation, and applications in patient monitoring. [15 hrs] Protection and safety: medical ethics; mechanical safety; electrical safety; biological hazards; chemical safety; radiation protection. [5 hrs] Introduction to sensors and signal processing: transducers, sensors and instruments; calibration; accuracy and error; amplifiers; filters; software and hardware signal processing. (b). Nature of biomedical signals: physical signals (force, torque, flow, pressure as well as

	thermal, geometric and kinematic quantities); biopotentials; chemical signals. Transducers of biomedical signals and their application: biopotential electrodes and amplifiers; pressure sensors; flow sensors; optical sensors; electrochemical sensors. [15 hr.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies employed in this module can vary depending on the specific course. However, here are some common strategies that may be used with this course: **Teaching methods include:** • lectures • seminars • tutorials • lab experiments • design assignments • industrial visits • professional training • a variety of projects **Assessment :** methods of assessment include a combination of: • coursework • group project reports • lab reports • written exams.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	136	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	9.7

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	210

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**4**	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	**2**	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	
	Report	15	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	**3** hr	**50**% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fundamentals of Medical Instrumentation.
Week 2	Bioelectric Signals and Electrodes, Physiological Transducers, Recording System.
Week 3	Biomedical Recorders.(ECG, EMG,EEG,EOG,VCG,PCG,…….etc.).
Week 4	Respiratory System Measurments, Respiration Monitoring and Apnea Detection, Oximeters.
Week 5	Patient Monitoring Systems, Coronary Care Unit (CCU).
Week 6	Arrhythmia and Ambulatory Monitoring Instruments.
Week 7	Foetal Monitoring Instruments/Systems.
Week 8	Blood Flow and Cardiac Output Measurements and Devices.
Week 9	Endoscopy.
Week 10	Advanced Vision and Eye Testing Instruments
Week 11	Pulmonary Function System.
Week 12	Pulmonary Function System.
Week 13	Equipments for Diagnostic Audiology and Hearing Tests.
Week 14	Patient Safety, Regulations and Safety Measures.

Comment [R_0012]: مكرر ام تعطى خلال اسبوعين؟

Week 15	Recap and Final Assessments: Review of the Entire Syllabus, Revision Sessions, and Final Exams or Project Presentations.
Week 16	Final test

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to the Medical diagnostic instrumentation lab.
Week2	Biomedical signals recorders (ECG)
Week3	Biomedical signals recorders (ECG)
Week 4	Biomedical signals recorders (EMG, EEG , ERG, EOG).
Week 5	Equipments for patient monitoring systems, (CCU), and ambulatory monitoring instruments.
Week 6	Equipments for foetal monitoring system.
Week 7	Equipments for cardiac output measurements..
Week 8	Equipments for blood flow measurement.
Week 9	Endoscopy.
Week 10	Advanced vision and eye testing instruments (Ophthalmoscopy, Retinoscopy, Ocular tonometry, Slit lamp, Optical coherence tomography,.....etc).
Week 11	Advanced vision and eye testing instruments (Ophthalmoscopy, Retinoscopy, Ocular tonometry, Slit lamp, Optical coherence tomography,.....etc).
Week 12	Pulmonary function testing equipments and machines (Spirometer, Body plethysmograph., Pulmonary gas analyzer, Gas-conditioning device, Blood gas analyzer, Silverman pneumotachometer, Pulse oximeter,.....etc).
Week 13	Equipments for diagnostic audiology (ABR, AOE, Audiometers, Tympanometer, Hearing aid fitting systems, Balance testing equipment..... etc).
Week 14	Equipments for diagnostic audiology (ABR, AOE, Audiometers, Tympanometer, Hearing aid fitting systems, Balance testing equipment..... etc).
Week 15	Preparatory week before the final exam.
Week 16	Final test.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Khandpur , R. S. (1990) . Handbook of Biomedical Instrumentation , Tata McGraw Hill Publishing Co. 2. Joseph D. Bronzino (2006). The Biomedical Engineering Handbook, 3rd. Edition. Germany: Taylor & Francis.	**Yes**
Recommended Texts	1. Press.Joseph D. Bronzino (2006). Medical Devices and Human Engineering. (2017). United Kingdom: CRC Press. 2. Khandpur, R. S. (2004). Biomedical Instrumentation: Technology and Applications. India: McGraw Hill LLC. ***3.*** Brown, J. M., Carr, J. J. (2001). Introduction to Biomedical Equipment Technology. India: Prentice Hall.	**No**
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical Diagnostic Instrumentation II **أجهزة التشخيص الطبية II**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	MIET3201				
ECTS Credits	7				
SWL (hr/sem)	210				
Module Level	UG-III		**Semester of Delivery**	6	
Administering Department	ENG- MIET		**College**	EETC	
Module Leader	Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Ali Abdulelah Al-Naji Ghaidaa Abdulrahman Khalid		**e-mail**	ali_al_naji@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	14/06/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Medical Diagnostic Instrumentation I	**Semester**	UG-III - S5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims: 1. To provide a grounding in the theory of relevant biomedical measurement systems including sensors, signal acquisition and conditioning principles, measurement techniques and instrumentation and detectors; 2. To impart the basic theory and physiological interactions of medical imaging modalities (including microscopy, endoscopy, x-ray, ultrasound, CT, MRI, PET and IR) and review applications and image-guided interventions; 3. To teach the basic physiological and anatomical principles of surgical interventions, interventional radiology and how the imaging objectives relate to disease and treatment 4. To review the working principles of existing surgical technology including robotics and how this addresses the surgical intent, including current minimal access techniques and understand the implications for image guidance. 5. To provide a basic understanding of the process of invention and its management; an introduction to entrepreneurship and its interface with invention; product development and its relationship to invention, resultant intellectual property and entrepreneurship
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1. Understand the principles of operation of relevant sensors and detectors used in biomedical measurement for imaging and their technical specifications. 2. Be able to apply a range of signal analysis and signal processing methods. 3. Understand how medical imaging systems work, how they interact with the tissue, how their images can be interpreted and the limitations of their application. 4. Be familiar with a range of medical imaging applications for different pathologies, including cellular, molecular imaging and interventions. 5. Know how image guidance interacts and operates with instruments and equipment in surgical intervention including robotics. Understand the equipment and instruments required and how it is use. 6. Understand the requirements in quality spatial, contrast and time resolution of imaging modalities used for different outcomes. 7. have knowledge of the research and engineering methods applied in the

	development of medical imaging. 8. Basic knowledge and understanding of the inventive process and its management, the entrepreneurial basis of business development; exploitation and value of Intellectual Property. 9. This gives you a solid understanding of how engineering improves patient care. 10. Having the opportunity to gain valuable experience within a clinical environment – learning about the anatomy and functions of the human biology. 11. Develop research and business management skills within the biomedical industry. 12. the application of engineering principles and design concepts to human biology and medicine, to solve challenges in the healthcare industry. 13. Gain an all-rounded understanding of where and how the technologies you develop will be used.
Indicative Contents المحتويات الإرشادية	The indicative contents of module include: **Part A:** • Physiologic quantities, basic concepts and principles of medical imaging instrumentation. • Signal types, measurement and sensor system properties, transfer functions, Fourier analysis, spectral analysis and filtering theory. [8 hrs.] **Part B:** • Characteristics of detection systems, amplification, noise/noise reduction and biomedical sensor and detector types. • Measurement constraints in the physical environment. [8 hrs.] **Part C:** • Principles and exemplar applications of x-ray and CT imaging. • Principles and exemplar applications of Nuclear and PET imaging. • Principles of MRI imaging, MRI applications and MRI-guided interventions, MRI safety. • Current and future developments of medical optical and photonics imaging, fluorescence, confocal, single/multiphoton, Raman, NIR. [8 hrs.] **Part D:** • Overview of diagnostic and interventional ultrasound and review of likely future developments. • Introduction to the objectives and practice of clinical diagnostic imaging. [12 hrs.]

	Part E: • Introduction to interventional principles, overview of instrumentation and devices, open, minimally invasive and image guided surgery. [12 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies employed in this module can vary depending on the specific course. However, here are some common strategies that may be used with this course: **Teaching methods include:** • lectures • seminars • tutorials • lab experiments • design assignments • industrial visits • professional training • a variety of projects **Assessment :** methods of assessment include a combination of: • coursework • group project reports • lab reports • written exams.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	136	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	9.7
Total SWL (h/sem)	210		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	
	Report	15	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Modern Imaging Systems.
Week 2	X-ray Machines and Digital Radiography.
Week 3	X-ray Machines and Digital Radiography.
Week 4	X-ray Computed Tomography.
Week 5	X-ray Computed Tomography, Electrical Impedance Tomography.
Week 6	Magnetic Resonance Imaging System.
Week 6	Magnetic Resonance Imaging System.
Week 7	Mid-Exam + Nuclear Medical Imaging Systems, Single- Photon – Emission Computed Tomography (SPECT).
Week 8	Nuclear Medical Imaging Systems, Gamma Camera, Positron Emission Tomography (PET) Scanner.
Week 9	Ultrasonic Imaging Systems, Three – Dimensional Ultrasound Imaging Systems, Portable Ultrasound Systems.
Week 10	Modern Ultrasound Imaging Systems.
Week 11	Thermal Imaging Systems.
Week 12	Magnetic Resonance Microscopy, Medical Applications of Virtual Reality Technology.
Week 13	Biomedical Telemetry.
Week 14	Telemedicine Technology.

Week 15	Recap and Final Assessments: Review of the Entire Syllabus, Revision Sessions, Project Presentations.
Week 16	**Preparing for final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	X-ray Machines and Digital Radiography.
Week2	X-ray Machines and Digital Radiography.
Week 2	X-ray Computed Tomography.
Week 3	X-ray Computed Tomography.
Week 4	Magnetic Resonance Imaging System.
Week 5	Magnetic Resonance Imaging System.
Week 6	Nuclear Medical Imaging Systems.
Week 7	Nuclear Medical Imaging Systems.
Week 8	Ultrasonic Imaging Systems.
Week 9	Ultrasonic Imaging Systems.
Week 10	Modern Ultrasound Imaging Systems.
Week 11	Thermal Imaging Systems.
Week 12	Biomedical Telemetry.
Week 13	Telemedicine Technology.
Week 14	Medical Applications of Virtual Reality Technology.
Week 15	Preparatory Week Before the Final Exam.,
Week 16	Final Term

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Khandpur , R. S. (1990) . Handbook of Biomedical Instrumentation , Tata McGraw Hill Publishing Co. 2. Joseph D. Bronzino (2006). The Biomedical Engineering Handbook, 3rd. Edition. Germany: Taylor & Francis.	**Yes**
Recommended Texts	1. Press.Joseph D. Bronzino (2006). Medical Devices and Human Engineering. (2017). United Kingdom: CRC Press. 2. Khandpur, R. S. (2004). Biomedical Instrumentation: Technology and Applications. India: McGraw Hill LLC. 3. Brown, J. M., Carr, J. J. (2001). Introduction to Biomedical Equipment Technology. India: Prentice Hall.	**No**
Websites	https://www.intuitive.com/en-us/products-and-services/da-vinci/learning.	

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	**Medical Electronic Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET3202				
ECTS Credits	**6**				
SWL (hr/sem)	**180**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	MIET		**College**	EECT	
Module Leader	Ali Abdulelah Al-Naji		**e-mail**	ali_al_naji@mtu.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Jameel Kaduim Abed Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_jameel57@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	10/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronic circuit II	**Semester**	UGII-S4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To provide students with an understanding of electronic systems and their applications in the medical field. 2. To develop students' knowledge and skills in designing, analyzing, and troubleshooting electronic circuits used in medical devices. 3. To familiarize students with the principles and operation of regulated power supplies, switching regulators, clippers, clampers, voltage multiplier circuits, and their practical applications in medical electronic systems. 4. To enhance students' ability to apply theoretical knowledge to practical scenarios and develop critical thinking skills in the context of medical electronics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a comprehensive understanding of electronic systems and their relevance in the medical field. 2. Design and analyze regulated power supplies, switching regulators, clippers, clampers, and voltage multiplier circuits used in medical electronic systems. 3. Explain the principles and operation of regulated power supplies, switching regulators, clippers, clampers, and voltage multiplier circuits. 4. Apply theoretical knowledge to solve problems and troubleshoot electronic circuits used in medical devices. 5. Evaluate the suitability of different electronic circuits for specific medical applications. 6. Critically analyze and interpret data obtained from electronic measurements in medical electronic systems. 7. Communicate effectively and professionally about medical electronic systems, both orally and in writing.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A: Regulated power supplies (Rectification) (20)</u> • Introduction to medical electronic systems • Half-wave and full-wave rectification • Understanding diodes and their characteristics • Rectifier circuits and waveforms • Capacitor filtering and its role in power supplies • Ripple factor and its significance in regulated power supplies

	• Calculation of filter capacitance • Design considerations for capacitor filters in medical devices • Linear voltage regulators and their operation • Zener diode regulators • IC regulators Part B: Clippers & Clampers (20) • Introduction to clippers and their role in signal conditioning • Diode clippers and their characteristics • Design considerations for clipping circuits • Applications of clippers in medical electronic systems • Positive and negative clampers • Design and analysis of clamping circuits • Use cases and limitations of clampers in medical devices. Part C: Operational Amplifiers (Op-Amps) (20) • Introduction to operational amplifiers and their applications in medical electronic systems • Op-Amp characteristics and ideal behavior • Practical applications Part D: Filters (LPF, HPF, PBF and PSF) (10)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Active Learning: Engage students through hands-on experiments, discussions, and problem-solving activities. • Practical Applications: Connect theoretical knowledge to real-world medical devices and systems. • Hands-on Experiments: Provide laboratory experiences to reinforce theoretical knowledge and develop practical skills. • Technology Integration: Utilize simulation software and virtual labs for circuit analysis and design. • Continuous Feedback: Provide regular feedback to support student progress and understanding.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to medical electronic systems
Week 2	Regulated power supplies (Rectification)
Week 3	Regulated power supplies (Filtration)
Week 4	Regulated power supplies (Regulation)
Week 5	Clippers
Week 6	Clampers
Week 7	Mid-Exam + Operations amplifiers OP-AMP applications
Week 8	OP-AMP applications

Week 9	Active filters (LPF and HPF)
Week 10	Active filters (BPF and BSF)
Week 11	Passive filters (LPF and HPF)
Week 12	Passive filters (BPF and BSF)
Week 13	Analog to digital conversion (ADC)
Week 14	Digital to analog conversion (DAC)
Week 15	Practical applications
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Multism
Week 2	Half-wave rectifier circuits
Week 3	full-wave rectifier circuits
Week 4	Designing capacitor filters for power supplies
Week 5	Building and testing voltage regulation circuits (Zener stages)
Week 6	Building and testing voltage regulation circuits (IC Regulators)
Week 7	Implementing and testing diode clipping circuits (negative and positive clippers)
Week 8	Implementing and testing diode clipping circuits (Full-wave Clippers)
Week 9	Designing and evaluating clamping circuits
Week 10	Constructing and testing operational amplifier circuits (Inverting and non-Inverting Op-Amp)
Week 11	Constructing and testing operational amplifier circuits (Comparator Op-Amp)
Week 12	Constructing and testing operational amplifier circuits (Integrator and Differentiator)
Week 13	Filters (LPF and HPF)
Week 14	Filters (PBF and PSF)

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

Required Texts	Electronic Devices and Circuits Theory (Eleventh Edition) by Robert L. Boylestad and Louis Nashelsky	Yes
Recommended Texts		No
Websites	https://www.youtube.com/@aliabdulelahal-naji3192	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	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	Microprocessor **المعالج الدقيق**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** **Tutorial** **Practical** **Seminar**	
Module Code	MIET3102				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Mayss alreem nizar hammed		**e-mail**	Mayssalreem92@mtu.edu.iq	
Module Leader's Acad. Title	Asst. lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof.Dr.Ahmed R Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_ahmed.r@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	14/6/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Digital electronics	**Semester**	UGII-4
Co-requisites module	none	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- The student knows the definition of Microprocessor 8085 . 2- How to engage colleagues and stakeholders in managing information, knowledge and communication systems. 3. Design and implementation of 8085 microprocessors. 4- Principles, methods, tools and techniques for keeping information, knowledge and communication secure and how to establish appropriate security levels and approaches. 5- How to evaluate current information, knowledge and communication systems and their capability and capacity to meet future needs. 6- Information, knowledge and communication technologies, their features and benefits for your needs. 7- Suppliers of information, knowledge and 8085MP and their capabilities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1- Understand the difference between microprocessor and microcontroller 2- Understand application of microprocessor in medical devices 3- Know characteristics of 8085 microprocessor 4- Know the architecture of 8085 microprocessor 5- Know the pins of 8085 microprocessor IC 6- Know the op-code of instructions 7- Know how to transfer data between memory and processor programmatically 8- Know how to build program to execute any arithmetic operation 9- Know how to build program to execute any logical operation 10- Know how to build program by using branching instruction for multitask 11- Know how to calculate time delay of any program code 12- Know how to dram time diagram of any instruction 13- Know the types of memories
Indicative Contents المحتويات الإرشادية	1. Microprocessor , microcontroller (6hrs) 2. Microprocessor architecture, registers, accumulator, flag (8hrs) 3. Carry, axillary carry, parity(4 hrs) 4. Stack pointer, decoder, arithmetic/logic unit(6hrs) 5. Interrupt, serial I/O, address buffer, bus organization (6hrs) 6. Direct memory access, hold acknowledge (4 hrs) 7. Instructions, data transfer instructions (8hrs) 8. Arithmetic, logical, branching, control instructions (15hrs)

	9. Time diagram, time delay, opcode (6hrs)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Daily assessment - weekly assessment - quarterly assessment - objective questions - general questions - practical tests.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	88	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (10)	3, 6, 8, 11	LO # 1-2 ,4-5, 6-7, 8-10
	assessment	2	10% (10)	9, 13	LO # 8 and 11-12
	practical test	2	10% (10)	7 ,12	LO # 1-6 and 7-11
Summative assessment	**Midterm Exam**	2 hr.	10% (10)	7	LO # 1-7
	Final Exam	4hr.	50% (50)	14	All
Total assessment			100% (100)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to microprocessor and microcomputer
Week 2	MP architecture
Week 3	MP IC pins
Week 4	bus signal
Week 5	Introduction to Instruction set MP and addressing mode

Week 6	Data transfer instructions
Week 7	Mid-term Exam + Arithmetic instructions
Week 8	Logical instructions
Week 9	Branching instructions
Week 10	Review instructions and Tutorial
Week 11	Op-code and machine cycle
Week 12	Timing diagram of instructions
Week 13	Time delay of code
Week 14	Types and architecture for memory
Week 15	
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: introduction to 8085 simulator
Week 2	Lab 2: move data
Week 3	Lab 3: ADD two data
Week 4	Lab 4: SUB two data
Week 5	Lab 5: multiplication of two 8-bit data
Week 6	Lab 6: division of two 8-bit data
Week 7	Lab 7: OR , AND two data
Week 8	Lab 8: largest number
Week 9	Lab 9: smallest number
Week 10	Lab 10: copy memory locations array
Week 11	Lab 11: count blank memory locations
Week 12	Lab 12: exchange two memory locations array
Week 13	Lab 13: find first and second complement
Week 14	Lab 14: rotate 8-bit data

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Recommended Texts	Microprocessor Architecture, Programming and Applications with the 8085 (6th Edition)	NO
Websites	https://www.mediafire.com/file/xnu0xhfknbp9bml/sim8085_win_7.rar/file	

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	**English Language (Advanced Level)**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**MIET3106**				
ECTS Credits	**3**				
SWL (hr/sem)	**90**				
Module Level		UGIII	**Semester of Delivery**		5
Administering Department		ENG_MIET	**College**	EETC	
Module Leader	Sarah Amer Dawood		**e-mail**	Sarah.aldoori@mtu.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Dina Raheem Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	English Language (Intermediate Level)	**Semester**	UGII-S4
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. Learn the common terms that are suitable for the upper-intermediate level of the language. 2. Understand the tense system: simple, continuous, perfect (active and passive) 3. Learn spoken English informal language. 4. Master the present perfect tense (simple and continuous) 5. The ability to discuss public issues and express opinions. 6. Understand negatives in spoken English and prefixes. 7. Explore the topic of today's teenagers. 8. The ability to formulate affirmative and negative questions and answers, as well as to use indirect speech. 9. Understanding the language and the appropriate use of tenses, auxiliary verbs, and adverbs in a manner suitable for the upper-intermediate level. 10. Master future forms and hot words.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand and apply the tense system: simple, continuous, perfect (active and passive). 2. Develop proficiency in spoken English and informal language usage. 3. Gain insights into different experiences of living abroad through personal narratives. 4. Master the usage of the present perfect tense (simple and continuous). 5. Explore the literary work "Paradise Lost." 6. Learn narrative tenses: past simple, past continuous, past perfect (active and passive). 7. Study spoken English usage in storytelling. 8. Acquire skills in forming questions. 9. Understand the usage of negatives, prefixes, and spoken English expressions. 10. Explore popular conspiracy theories. 11. Develop competence in future forms and hot verbs. 12. Gain knowledge about contemporary teenagers and their characteristics. 13. Learn informal expressions of quantity in spoken English. 14. Explore the profiles of two famous brands: Starbucks and Apple Macintosh.
Indicative Contents المحتويات الإرشادية	Introduction and Sounds [2 hrs]. No place like home, been there, done that [5 hrs]. What a story, nothing but the truth [6 hrs]. An eye to the future, making it big [5 hrs]. Getting on together [4 hrs]. Going to extremes [4 hrs]. Things ain't what they used to be, Risking life and limb [6 hrs]. In your dreams [4 hrs]. It's never too late [5 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major strategy for presenting this module will be to encourage students to participate in the tasks while also polishing and improving their critical thinking skills. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of small experiments incorporating sample activities that are of interest to the students

Student Workload (SWL) الحمل الدراسي للطالب			
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	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**90**		

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 and Sounds
Week 2	**CH 1 No place like home:** The tense system: (Simple, continuous, perfect Active and

	passive), Spoken English Informal language), A home from home two people describe their experiences of living abroad
Week 3	**CH 2 Been there, done that!** :Present Perfect- Simple and continuous- Spoken English, Paradise Lost
Week 4	**CH 3 What a story!!** Narrative tenses Past Simple, Past Continuous, Past Perfect active and passive- Spoken English, Jane Austen - one of the world's most downloaded authors
Week 5	**CH 4 Nothing but the truth :** Questions, Negatives - Spoken English- Prefixes
Week 6	**CH 4 Nothing but the truth :** Diana and Elvis shot JFK!' - three of the world's most popular conspiracy theories
Week 7	**CH 5 An eye to the future:** Future forms - Hot verbs , Today's teenagers are just fine Mid-Exam
Week 8	**CH 6 Making it big:** Expressions of quantity- Spoken English (Informal expressions of quantity), A profile of two famous brands- Starbucks and Apple Macintosh
Week 9	**CH 7 Getting on together:** Modals and related verbs I, Spoken English (Declarative questions - Questions expressing surprise), Meet the Kippers
Week 10	**CH 8 Going to extremes :** Relative clauses- Participles, Adverb collocations - Adverbs and adjectives, Chukotka, the coldest place on earth
Week 11	**CH 9 Things ain't what they used to be!:** Expressing habit- be used to doing, People and their money
Week 12	**CH 10 Risking life and limb :** Modal auxiliary verbs 2, How the West was won
Week 13	**CH 10 Risking life and limb :** Homonyms, Synonyms, Hot words
Week 14	**CH 11 In your dreams:** Hypothesizing- Spoken English (Expressions with if), Have you ever wondered?
Week 15	**CH 12 It's never too late :** Articles (a/an, the, one, zero article)- Determiners, Articles (a/an, the, one, zero article)- Determiners,
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. New Headway Plus - Upper Intermediate Students Book, 3rd Edition 2. New Headway Plus - Upper Intermediate Work Book with Key, 3rd Edition	Yes
Recommended Texts		
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.

6/3/2023

English Language (Advanced)

EET3205

Nadirah Abdelrazzaq Ghzal

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language (Advanced)**			**Module Delivery**	
Module Type	**Support or related learning activity**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**EET3205**				
ECTS Credits	**3**				
SWL (hr/sem)	**90**				
Module Level		3	**Semester of Delivery**		6
Administering Department		ENG – EET	**College**	EETC	
Module Leader	Nadirah Abdelrazzaq Ghzal		**e-mail**	nadra@mtu.edu.iq	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		M.A.
Module Tutor			**e-mail**		
Peer Reviewer Name		Rashid Ali Fayadh	**e-mail**	dr.rashidali@mtu.edu.iq	
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	The module aims of English Language (Intermediate) are designed to help learners at the beginner level develop their English language skills and achieve specific learning objectives. While I don't have access to the specific module aims of this coursebook, I can provide you with a general outline of the typical aims for a beginner-level English course: 1. To introduce beginner-level learners to the English language, focusing on building vocabulary and acquiring essential language structures. 2. To develop listening and speaking skills through interactive activities and engaging in basic conversational practice. 3. To enhance reading comprehension abilities by introducing simple texts and emphasizing vocabulary and sentence structures. 4. To provide foundational writing skills, including sentence formation, paragraph writing, and completing basic forms. 5. To cultivate cultural awareness and equip learners with practical language skills for everyday situations, such as ordering food, shopping, and asking for directions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module learning outcomes for the English Language (Beginner) module are as follows: 1. Develop basic proficiency in listening and understanding spoken English at a beginner level. 2. Demonstrate improved speaking skills by participating in simple conversations and expressing basic ideas and opinions. 3. Comprehend and interpret basic written texts, including short passages and simple dialogues. 4. Produce written texts using basic grammatical structures and vocabulary appropriate for beginner-level communication. 5. Increase vocabulary knowledge and usage to effectively communicate in everyday situations. 6. Develop an awareness of cultural aspects related to English-speaking countries and demonstrate cross-cultural understanding in language use. 7. Apply basic language skills in practical situations, such as greetings, introductions, making requests, and asking for and giving simple directions.
Indicative Contents المحتويات الإرشادية	1. There is no place like home. [3 hrs.] 2. Reading and speaking. [3 hrs.] 3. Writing and speaking. [3 hrs.] 4. Been there, done that. [3 hrs.] 5. Reading. [3 hrs.] 6. What happened, was there. [3 hrs.] 7. Reading & listening. [3 hrs.] 8. Speaking. [3 hrs.] 9. whatever will be, will be. [3 hrs.] 10. Reading & speaking. [3 hrs.] 11. people places and things. [3 hrs.] 12. Reading &speaking. [3 hrs.] 13. How to write resume applying for a job. [3 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1. The learning and teaching strategies for the English Language (Beginner) module may include: 2. Interactive Language Practice: Engage learners in communicative activities that promote active participation and language practice. This can include pair work, group discussions, role-plays, and language games. 3. Authentic Materials: Incorporate authentic materials such as videos, audio recordings, and reading texts that reflect real-life language use. This helps learners develop their listening, speaking, reading, and writing skills in authentic contexts. 4. Task-Based Learning: Design tasks and projects that require learners to use the target language to accomplish specific goals or solve problems. This promotes meaningful language use and encourages critical thinking and problem-solving skills. 5. Visual Aids and Multimedia: Utilize visual aids, charts, diagrams, and multimedia resources to support language learning and comprehension. Visuals can enhance understanding, aid in vocabulary acquisition, and provide context for language use. 6. Error Correction and Feedback: Provide timely and constructive feedback on learners' language production to help them identify and correct errors. Encourage self-correction and peer correction to foster a supportive learning environment.

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	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	90		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	• There is no place like home
Week 2	• Reading and speaking
Week 3	• Writing and speaking
Week 4	• Been there, done that
Week 5	• Reading
Week 6	• What happened, was there
Week 7	• Reading & listening
Week 8	• Speaking
Week 9	• Whatever will be, will be
Week 10	• Reading & speaking
Week 11	• people places and things
Week 12	• Reading &speaking
Week 13	• How to write resume applying for a iob
Week 14	• Final module assignment.
Week 15	• Seminar.
Week 16	• Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Soars, J., Soars, L. (2006). New Headway Plus: Pre-intermediate. United Kingdom: Oxford University Press. • L. Soars and J. Soars, New Headway Plus - Intermediate, 4th ed. Oxford: Oxford University Press, 2019.	Yes
Recommended Texts	Audio CDs or Online Audio: Recordings of listening exercises, dialogues, and pronunciation practice.	No
Websites	Collage E- Library	

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	**Power Electronics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET3204				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	MIET		**College**	EECT	
Module Leader	Jameel Kaduim Abed		**e-mail**	Dr_jameel57@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr.Ahmed R.Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_ahmed.r@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronic circuit I	**Semester**	UGII-S3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of power electronic theory through the application of techniques. 2. To understand thyristor ,transistor as switching from a given circuit. 3. This course deals with the basic concept of rectifier . 4. This is the basic subject chopper. 5. To understand ac-ac converter, inverter. 6. Application of power electronics especially in medical instrument.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how power electronic works in electrical circuits. 2. List the various terms associated with power electronic. 3. Summarize what is meant by a basic with power electronic. 4. Discuss the reaction and involvement of in rectifier circuit. 5. Describe thyristor ,transistor diode . 6. Dc- dc converter. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of ac-ac converter. 9. Discuss the various properties inverter. 10. Explain the applications of power electronics in industry especially in medical equipment .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> [Diode and Transistor Thyristor as switch its characteristic ,protection, triggering circuit. [15 hrs.] AC circuits I –Single phase half wave and full wave Rectifier . [15 hrs] Revision problem classes [6 hrs]

	Part B Applications dc-dc converter ,stepdown and step up chopper. [15 hrs] Single phase and three phase inverters. [15 hrs] Applications oof power Electronics UPS.SMPS and Health car application. [15 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to power electronics. Lect.1and 1a
Week 2	Switching devices, power & control device
Week 3	Types and characteristic, rating (diode, transistor …).
Week 4	Methods of turning – on & turning – off.
Week 5	Protection of power devices.
Week 6	Triggering & base drive circuits.
Week 7	Mid-Exam + Controlled rectifiers, 1 – phase
Week 8	Controlled Rectifier 3 – phase circuits
Week 9	Half – wave & full – wave circuits3 phase Rectifiers.
Week 10	D.C choppers; step – up & step – down choppers
Week 11	A.C phase controllers.
Week 12	Invertors, 1 – phase & 3 – phase bridges
Week 13	Some applications: a – uninterruptible power supply UPS).
Week 14	switching mode power supply (SMPS)
Week 15	**Application of power Electronics in medical instruments**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered

Week 1	Uncontrolled Resistive Half Wave Rectifier with Load.
Week 2	Controlled Half Wave Rectifier with Resistive Load.
Week 3	Controlled Half Wave Rectifier with Inductive Load.
Week 4	Single Phase Full Wave Rectifier (Bridge) /Part I.
Week 5	Single Phase Full Wave Rectifier (Bridge) /Part II.
Week 6	Three Phase Half Wave Rectifier.
Week 7	Three Phase Full Wave Rectifier.
Week 8	Single Phase Half Bridge Inverter/ Part 1.
Week 9	Single Phase Half Bridge Inverter/ Part 2.
Week 10	Single Phase Full Bridge Inverter.
Week 11	Single-Phase Half Wave AC Voltage Controller.
Week 12	Single-Phase Full wave AC Voltage Controller.
Week 13	Step-Down DC Chopper.
Week 14	Step-Down DC Chopper.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Power Electronics By Lander	Yes
Recommended Texts	Power Electronics and drive By Mohmmed T.Lazim	No
Websites	M.T.Lazim	

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	**Project Management**			**Module Delivery**	
Module Type	Support learning activity			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	MIET3206				
ECTS Credits	3				
SWL (hr/sem)	90				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	ENG-MIET		**College**	EECT	
Module Leader	Mohammed sameer mohsen		**e-mail**	Mohammed.sh.c@mtu.edu.iq	
Module Leader's Acad. Title	assistant teacher		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name	Ali Abdulelah Al-Naji Ghaidaa Abdulrahman Khalid		**e-mail**	ali_al_naji@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	13/06/2023		**Version Number**	1	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce the fundamental concepts and principles of project management. 2. Develop an understanding of project planning, scheduling, and controlling techniques. 3. Explore cost accounting methods and their application in project management. 4. Gain knowledge of machine replacement, materials handling, and inventory control in projects 5. Learn about time management techniques and their significance in project management.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define and explain the key elements, objectives, and phases of project management. 2. Apply project planning, scheduling, and controlling techniques effectively. 3. Utilize project planning techniques such as Gantt charts, Critical Path Method (CPM), and Project Evaluation and Review Technique (PERT). 4. Understand the concept of crashing project networks to expedite project completion. 5. Apply cost accounting methods, including unit cost calculations and break-even analysis. 6. Demonstrate knowledge of depreciation accounting methods: straight-line, sum-of-years digits, reducing balance, and double-declining balance. 7. Evaluate machine replacement decisions in project management. 8. Analyze materials handling strategies in project environments. 9. Apply Material Requirements Planning (MRP) concepts in project settings. 10. Understand inventory control techniques and their relevance to project management. 11. Implement time management strategies to optimize project efficiency.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Project Management: Elements, Objectives, and Phases(5) 2. Planning and Controlling in Projects(5) • Planning • Scheduling

	• Controlling 3. Project Planning Techniques(5) • Gantt chart • Critical Path Method (CPM) • Project Evaluation and Review Technique (PERT) 4. Crashing of Project Network(5) 5. Cost Account Methods(5) • Unit Cost Calculations • Break-Even Analysis Method 6. Depreciation Accounting Methods(5) • Straight-line Method • Sum-of-Years Digits (SOYD) Method • Reducing Balance (RB) Method • Double-Declining Balance (DDB) Method 7. Machine Replacement(2) 8. Materials Handling(2) 9. Material Requirements Planning (MRP) (2) 10. Inventory Control(2) 11. Time Management(2)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures to introduce key concepts and theories. • Case studies and practical examples to illustrate application in real-world scenarios. • Group discussions and activities to promote active learning and collaboration. • Assignments and projects to apply learned techniques and tools. • Continuous Feedback: Provide regular feedback to support student progress and understanding.

Student Workload (SWL) الحمل الدراسي للطالب

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	45	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	90		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Project Management: Introduction, Elements, Objectives and Phases
Week 2	Planning and Controlling in Projects: Planning, Scheduling and Controlling
Week 3	Project Planning Techniques - Gantt chart
Week 4	Project Planning Techniques - Critical Path Method (CPM)
Week 5	Project Planning Techniques - Project Evaluation and Review Technique (PERT)
Week 6	Crashing of project network
Week 7	Mid-Exam + Cost Account Methods (Unit Cost Calculations)
Week 8	Cost Account Methods (Break Even Analysis Method)
Week 9	Depreciation Accounting Methods: (1) Straight-line Method (2) Sum-of- Years Digits (SOYD) Method
Week 10	Depreciation Accounting Methods: (3) Reducing Balance (RB) Method

	(4) Double-Declining Balance (DDB) Method
Week 11	Machine Replacement
Week 12	Materials Handling
Week 13	Material Requirements Planning (MRP)
Week 14	Inventory Control
Week 15	Time Management
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Project Management: Introduction, Elements, Objectives and Phases
Week 2	Planning and Controlling in Projects: Planning Scheduling Controlling
Week 3	Project Planning Techniques Gantt chart
Week 4	Project Planning Techniques Critical Path Method (CPM)
Week 5	Project Planning Techniques Project Evaluation and Review Technique (PERT)
Week 6	Crashing of project network
Week 7	Cost Account Methods Unit Cost Calculations
Week 8	Cost Account Methods Break Even Analysis Method
Week 9	Depreciation Accounting Methods: (1) Straight-line Method (2) Sum-of- Years Digits (SOYD) Method (3) Reducing Balance (RB) Method Double-Declining Balance (DDB) Method

Week 10	Machine Replacement
Week 11	Materials Handling
Week 12	Material Requirements Planning (MRP)
Week 13	Inventory Control
Week 14	Time Management

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Project Management: A Systems Approach to Planning, Scheduling, and Controlling" by Harold Kerzner	Yes
Recommended Texts	"Project Management: The Managerial Process" by Clifford Gray and Erik Larson	No
Websites	Lecture Slides: Prepared lecture slides covering the key concepts, frameworks, and techniques of project management will be provided to students.	

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	Signals and Systems			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET3104				
ECTS Credits	4				
SWL (hr/sem)	120				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Aws Alazawi		**e-mail**	aws_basil@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	e-mail	
Peer Reviewer Name	Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mathematics	**Semester**	UGII-S3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	✓ Understand and classify signals based on their characteristics and properties. ✓ Study basic continuous-time and discrete-time signals to establish a foundation for signal analysis. ✓ Analyze systems and classify them according to their characteristics and behavior. ✓ Investigate the response of continuous-time LTI systems using convolution integral and understand its implications for signal processing. ✓ Explore the properties and behaviors of LTI systems described by differential equations or difference equations to model and analyze real-world systems. ✓ Learn the Laplace Transform and its applications in analyzing continuous-time signals and systems. ✓ Understand the concept of the system function in the Laplace domain and its role in analyzing continuous-time LTI systems. ✓ Study the Z-Transform and its applications in analyzing discrete-time signals and systems. ✓ Understand and represent periodic signals using Fourier series. ✓ Analyze continuous-time signals using the Fourier transform. ✓ Explore properties of the continuous-time Fourier transform. ✓ Study the frequency response of continuous-time LTI systems, including filtering and bandwidth. ✓ Investigate Fourier analysis of discrete-time signals and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: ✓ Demonstrate a systematic knowledge of the classification of signals. ✓ Demonstrate an understanding of the principles of LTI system. ✓ Demonstrate an understanding of time analysis of signals and systems. ✓ Demonstrate an understanding of frequency analysis of signals and systems. ✓ Critically evaluate the LTI system response.
Indicative Contents المحتويات الإرشادية	Signals and classification of signals, basic continuous-time signals, basic discrete-time signals [7 hrs] Systems and classification of systems, response of a continuous-time LTI system and the convolution integral, properties of continuous-time LTI systems, eigenfunctions of continuous-time LTI systems, systems described by differential equations , response of a discrete-time LTI system and convolution sum, properties and eigenfunctions of discrete-time LTI systems [10 hrs] The Laplace transforms, Laplace transform of some common signals, properties of the Laplace transform, the inverse Laplace transform, the system function, the unilateral Laplace transform. The z-transform, z-transform of some common sequences, properties of the z-transform, the inverse z-transform, the system function of discrete-time LTI systems, the unilateral z-transform [14 hrs]. Fourier Analysis of Continuous-Time Signals and Systems, Fourier series representation of periodic signals the Fourier transform, properties of the continuous-time Fourier transform. The frequency response of continuous-time LTI systems. Fourier Analysis of Discrete-Time Signals and Systems, discrete Fourier series, the Fourier transform and its properties. System response to sampled continuous-time sinusoids [17 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major strategy for presenting this module will be to encourage students to participate in the tasks while also polishing and improving their critical thinking skills. This will be accomplished through courses, interactive lectures, and the consideration of small experiments involving various sample tasks that are engaging to the students and help them learn more about the module.

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
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	15%(15)	5 and 10	LO #1 and #3
	Assignments	2	10%(10)	2 and 12	LO #2 and #4
	Projects / Lab.	1	10%(10)	Continuous	All
	Report	1	5%(5)	13	LO #5
Summative assessment	**Midterm Exam**	2hr	10%(10)	7	LO #1 - #3
	Final Exam	4hr	50%(50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	✓ SIGNALS AND CLASSIFICATION OF SIGNALS ✓ BASIC CONTINUOUS-TIME SIGNALS ✓ BASIC DISCRETE-TIME SIGNALS
Week 2	
Week 3	✓ SYSTEMS AND CLASSIFICATION OF SYSTEMS ✓ RESPONSE OF A CONTINUOUS-TIME LTI SYSTEM AND THE CONVOLUTION INTEGRAL ✓ PROPERTIES OF CONTINUOUS-TIME LTI SYSTEMS ✓ EIGENFUNCTIONS OF CONTINUOUS-TIME LTI SYSTEMS ✓ SYSTEMS DESCRIBED BY DIFFERENTIAL EQUATIONS ✓ RESPONSE OF A DISCRETE-TIME LTI SYSTEM AND CONVOLUTION SUM ✓ PROPERTIES OF DISCRETE-TIME LTI SYSTEMS ✓ EIGENFUNCTIONS OF DISCRETE-TIME LTI SYSTEMS ✓ SYSTEMS DESCRIBED BY DIFFERENCE EQUATIONS
Week 4	
Week 5	
Week 6	✓ THE LAPLACE TRANSFORM ✓ LAPLACE TRANSFORM OF SOME COMMON SIGNALS ✓ PROPERTIES OF THE LAPLACE TRANSFORM ✓ THE INVERSE LAPLACE TRANSFORM ✓ THE SYSTEM FUNCTION ✓ THE UNILATERAL LAPLACE TRANSFORM Mid Exam
Week 7	
Week 8	
Week 9	✓ THE Z-TRANSFORM ✓ Z-TRANSFORM OF SOME COMMON SEQUENCES ✓ PROPERTIES OF THE Z-TRANSFORM ✓ THE INVERSE Z-TRANSFORM ✓ THE SYSTEM FUNCTION OF DISCRETE-TIME LTI SYSTEMS ✓ THE UNILATERAL Z-TRANSFORM
Week 10	
Week 11	**Fourier Analysis of Continuous-Time Signals and Systems** ✓ FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS ✓ THE FOURIER TRANSFORM ✓ PROPERTIES OF THE CONTINUOUS-TIME FOURIER TRANSFORM ✓ THE FREQUENCY RESPONSE OF CONTINUOUS-TIME LTI SYSTEMS ✓ FILTERING ✓ BANDWIDTH
Week 12	
Week 13	**Fourier Analysis of Discrete-Time Signals and Systems** ✓ DISCRETE FOURIER SERIES ✓ THE FOURIER TRANSFORM ✓ PROPERTIES OF THE FOURIER TRANSFORM ✓ THE FREQUENCY RESPONSE OF DISCRETE-TIME LTI SYSTEMS ✓ SYSTEM RESPONSE TO SAMPLED CONTINUOUS-TIME SINUSOIDS ✓ DIGITAL SIMULATION OF ANALOG SYSTEMS
Week 14	
Week 15	
Week 16	**Preparing for final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	SIGNAL REPRESENTATIONS
Week 2	RESPONSE OF A DISCRETE-TIME LTI SYSTEM AND CONVOLUTION SUM
Week 3	
Week 4	SYSTEMS DESCRIBED BY DIFFERENCE EQUATIONS
Week 5	
Week 6	PROPERTIES OF THE Z-TRANSFORM
Week 7	
Week 8	FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS
Week 9	
Week 10	DISCRETE FOURIER TRANSFORM
Week 11	
Week 12	THE FREQUENCY RESPONSE OF DISCRETE-TIME LTI SYSTEMS
Week 13	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	S. Palani, SIGNALS AND SYSTEMS, Springer International Publishing, 2021	
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Artificial Limbs and Robotics** الأطراف الأصطناعية والروبوتات			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET4203				
ECTS Credits	6				
SWL (hr/sem)	180				
Module Level	4		**Semester of Delivery**	8	
Administering Department	ENG- MIET		**College**	EETC	
Module Leader	Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Prof. Dr. Sadik Kamel Gharghan. Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	sadik.gharghan@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	14/06/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Control Systems	**Semester**	L3- S7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims : 1. To introduce students to the fundamentals of robotic systems including kinematics and dynamics as applied to manipulators and mobile robots. 2. To support many application sensors are required, the module will discuss tactile and vision sensing as applied to both fixed and mobile robots. 3. To understand on how biological systems have influenced the development of current and future robotic systems, including swarms and humanoid robotic systems. 4. To educate students about the artificial limbs which is an artificial extension that replaces a missing body part such as an arm or leg and replace the form and/or function of the absent limb. 5. To make use of artificial l Intelligance to improve artificial limbs usability. 6. To overcome the limitations with current artificial limbs by offering improved signal decoding, functionality and more intuitive control. 7. To provide students with a solid understanding of robotics fundamentals, the module aims to cover their designs and the workspace of robot. 8. To introduce students to the common types of robots and the applications of robot according to their design. 9. To recognize state-of-the-art systems and methods for robotic and computer-assisted surgeries.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1. Understand the robotics fundamentals, and cover robot designs and the workspace of robot. 2. Explain the basic concepts of the common types of robots and the applications of robot according to their design. 3. Outline that a robot is mechanically constructed from links that are connected by various types of joint. The links are usually modeled as rigid bodies. An end-effector such as a gripper may be attached to some link of the robot. Actuators deliver forces and torques to the joints, thereby causing motion of the robot. 4. Understand the algebric tools for mapping between frames of robot joints using rotation matrix. Analyze homogeneous transformation matrix used in robot kinematics to find position and orientation of end effector of manipulator. 5. Recognize between forward and inverse kinematics of robot using the suitable mathematical procedure of each type. 6. Apply basic difinitions and mathematical tools needed for forwarde kinematics of robot using geometric approch of DH convention. 7. (1). Analysis the inverse kinematic of planar robot for certain position and orientation of end effector of robot. (2). The controller samples the sensors and updates its control signals to the actuators at a rate of hundreds to a few thousands of Hz. In most robotic applications control update rates higher than this are of limited benefitt, given the time constants associated with the dynamics of the robot and environment.

	8. (a).Having an overview of robotic sensors where two main sensor types are discussed: contact and noncontact. Descriptions of the physical measurements. How they are measured, and operating principles of specific devices are provided for both types of sensors. The contact, or tactile, sensors comprise three groups: touch, proximity, and slip sensors. (b).The noncontacting sensors comprise six groups, according to principles of operation: optical, magnetic, capacitive, resistive, ultrasound, and air pressure, each of which can measure numerous physical properties. 9. Describe the biomechanical contributions to common injuries of the upper extremitis. 10. Describe the biomechanical contributions to common injuries of the lower extremitis.. 11. Understanding the key difference between bionic limbs and artificial limbs is that bionic limbs are artificial limbs that work using signals from an individual's muscles to move seamlessly, while artificial limbs require an individual's body power to move. 12. Take advantage of Artificial Intelligeance to improve artifical limbs usability and serviceability. 13. came up with a better way to teach deep-learning systems how to evaluate and quantify uncertainty in a way that allows the system to incorporate uncertainty into its decision making. 14. providing a digitized interface between the surgeon and the patient designed to increase surgeon control and reduce surgical variability.
Indicative Contents المحتويات الإرشادية	The indicative contents of (Artificial Limbs and Robotics) module include: Part A: Introduction • Definition of robotic systems. • Including an overview of manufacturing systems, Biologically inspired robotics, medicalapplications, and space applications. [8 hrs.] Part B: Manipulator • Classification of types of robot. • Identification of manipulator components and terminology. • Joints classification. • Mobile robot platforms. [8 hrs.] Part C: Kinematics • Axis transformations as applied to robotics. • Application and definition of the DH matrix. • Forward and reverse kinematics. • Introduction to Jacobian anddynamic performance. • Path generation. • Definition of workspace. [8 hrs.] Part D: Teleoperation • Master-slave systems. • Supervisory control. • Latency problems. [8 hrs.]

	Part E: Robotic end effectors. • Characteristic of the human hand. • Underactuated systems. • Stable grip. • Constraints. • Types of contact. • Mathematical representation ofstable grip • Use of screw twist, and wrenchgripper design. [8 hrs.] Part F: Tactile Sensors • Construction of tactile and touchsensors. • Interpretation of sensory information. • Use of sensory data to determinekinematic information. • Peg into hole problem. • Contacts. • RCC and IRCC systems. [8 hrs.] Part G : Artificial limbs. • Amputation. • Rehabilitation. • Adaptive technology. • Prosthetics. • Limb loss. • Myoelectric prostheses. • Esper Hand . • myoelectric sensors. • Osseointegration. • augmented reality. • targeted muscle reinnervation (TMR) [15 hr] Part k : Types of Artificial limbs; transradial,transfemoral, transtibial, and transhumeral. Part M : Technology used for prosthetic limbs: 3D printing, device implants, digital design tools, AI-powered prosthetic leg. Part G: Vision Systems • Computer vision. • Sobal operator. • Perception. • Optical flow. • Road car. • Quad-copter navigation. [16 hrs.]

	Part H :Biologically inspired robotics • Bio-inspired morphologies. • Sensors and actuators. • What is intelligence. • Reactive and deliberative control. • Learning. • SLAM. • Behaviours. • Multi-robot and swarm systems. [12 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies employed in (Artificial Limbs and Robotics) module can vary depending on the specific course. However, here are some common strategies that may be used with this course: 1. Lectures: Lectures are often used to deliver theoretical concepts and foundational knowledge of (Artificial Limbs and Robotics). In lectures, instructors may explain key concepts, theories, and techniques, supported by visual aids such as slides, diagrams, and demonstrations. 2. Practical Sessions: Practical sessions provide hands-on experience and reinforce theoretical concepts. Students may work with software tools like MATLAB, Python, or specialized robot software to simulate robot kinematics. Practical sessions may involve robot kinematics, allowing students to apply their knowledge and solve problems. 3. Laboratory Experiments: Laboratory experiments provide an opportunity for students to apply robot concepts in a controlled environment. They may work with hardware such as manipulator, and parallel robot to design, implement, and test forward kinematic algorithms. Through these experiments, students can gain practical skills and validate theoretical concepts. 4. Problem-Solving Exercises: Problem-solving exercises, both in-class and as homework assignments, allow students to apply their knowledge and analytical skills to solve robot problems. These exercises may involve deriving mathematical expressions, analyzing robot motion, or implementing algorithms. Instructors may provide feedback and guidance to help students improve their problem-solving abilities. 5. Case Studies and Applications: Case studies and real-world applications of robot help students understand the relevance and practical implications of the concepts they learn. Instructors may present examples from fields. This approach enhances students' ability to apply robot analysis techniques in various domains. 6. Group Discussions and Peer Learning: Group discussions and collaborative activities promote active learning and peer-to-peer interaction. Students can exchange ideas, discuss concepts, and solve problems together. This approach

	encourages critical thinking, enhances understanding through different perspectives, and fosters teamwork skills. 7. Online Resources and Multimedia: In addition to traditional teaching methods, instructors may utilize online resources, multimedia content, and interactive tools to supplement learning. These resources can include video tutorials, simulations, online quizzes, and discussion forums. They provide flexibility, enable self-paced learning, and facilitate deeper exploration of robot concepts. 8. Assessments: Assessments, such as quizzes, exams, projects, and presentations, evaluate students' understanding and application of robot concepts. These assessments may include theoretical questions, problem-solving tasks, and practical demonstrations. They help measure learning outcomes and provide feedback to students on their progress.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	88	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.28
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.57
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	15	10% (10)	Continuous	
	Report	15	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Robotics , Overview of Robot Subsystems
Week 2	Configurations Space, Rigid-Body Motions.
Week 3	Spatial Descriptions, Transformations.
Week 4	Forward Kinematics, Inverse Kinematics.
Week 5	Actuation, Gearing, Friction and Trajectory Generation.
Week 6	Motion Planning, Robot Control.
Week 7	Mid Term Test +Grasping and Manipulation, Wheeled Mobile Robots.
Week 8	Robotic Sensors: Touch and Forcing Sensing, Proximity or Displacement Sensing, Slip Sensing, Visual sensing, Position, Velocity and Acceleration Sensors, Optical and Light Sensors, Temperature sensors, Gyroscopes Sensors, Magnetic Sensors and Inductive Sensors, Magnetic Fiber Optic, Capacitive Sensors, Resistive Sensors, Ultrasound and Sonar Sensors and Air Pressure Sensors, Ranging –Laser-Acoustic Sensors, ……. etc.
Week 9	The Biomechanics of The Human Upper Extremitis.
Week 10	The Biomechanics of The Human Lower Extremitis.
Week 11	The Artificial Limbs Management.
Week 12	Application of Artificial Intelligence in Prosthetic and Orthotic Rehabilitation.
Week 13	Safety of Robotic Prosthetics Based on Artificial Intelligence and Computer Vision.
Week 14	Robotics in Medicine: Digital Laparoscopy for Abdominal, Pelvic, and Thoracoscopic Procedures, PCI, CABG, Stereotactic Neurosurgery, arthroplasty, VTA Surgical device, The Intellijoint HIP system, Colorectal Surgery, Radical Prostatectomy, Liver Surgery, Retinal Surgery, Knee and Orthopedic Surgery, General Surgery, Breast Biopsy, The Sina Robotic, MIS Robotic, STRAS Robotic, S-Surge Robotic, Robossis Robotic. …… etc.
Week 15	Recap and Final Assessments: Review of the Entire Syllabus, Revision Sessions, and Final Exams or Project Presentations.
Week 16	Final Term Test.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Robot Lab and MATLAB: Introduction to The Robot Lab Environment, Matlab Basics, and Introductory Exercises to Apply Matlab Command used in Robot Simulation.
Week 2	Lab 2: Learn the basics of Robotics System Toolbox. (Build a Robot Step by Step, 2-D Path Tracing with Inverse Kinematics)
Week 3	Lab 3: Learn the basics of Robotics System Toolbox. (Path Following for a Differential Drive Robot, Trajectory Control Modeling with Inverse Kinematics)
Week 4	Lab 4: Learn the basics of Robotics System Toolbox. (Trajectory Control Modeling with Inverse Kinematics)
Week 5	Lab 5: Manipulator Algorithm Design. (Robot Models , Inverse Kinematics, Manipulator Motion Planning)
Week 6	Lab 6: Manipulator Algorithm Design. (Trajectory Generation and Following , Collision Detection)
Week 7	MidTerm Test+ Lab 7: Mobile Robot Algorithm Design (Mapping and Path Planning)
Week 8	Lab 8: Mobile Robot Algorithm Design (Motion Modeling)
Week 9	Lab 9: Mobile Robot Algorithm Design (Robot Control, State Estimation)
Week 10	Lab 10: Robot Modeling and Simulation (Kinematic and motion models, Gazebo simulation and co-simulation for Robotics System Toolbox)
Week 11	Lab 11: Coordinate Transformations and Trajectories (Quaternions, rotation matrices, transformations, trajectory generation)
Week 12	Lab 12: Code Generation (Generate C/C++ code and MEX functions for algorithm acceleration)
Week 13	Lab 13: Robotics System Toolbox Supported Hardware (Support for third-party hardware)

Week 14	Lab 14: Graphical Programming Tutorial: Blinking the On-board LED, DO Use the Push-Button as a Switch, Ultrasonic Sensor HC-SR04, IR sensor, Human sensor, 2 channel relay DC motor, servo , Relay control, Car Robot 1 and Car Robot 2.
Week 15	Lab 15: Preparatory Week Before the Final Exam.
Week 16	Final Term Test.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Kevin M. Lynch and Frank C. Park (2017), "Modern Robotics: Mechanics, Planning, and Control". Cambridge University Press. 2. McKerrow P J (1993). "Introduction to Robotics". Addison Wesley. 3. Craig J J (1993). "Introduction to Robotics, Mechanics and Control". Addison Wesley. 4. Schilling R J (1990)."Fundimantales of Robotics- Analysis and Control". Prentice Hall. 5. Mark W. Spong, S. Hutchinson, and M. Vidyasagar, "Robot Dynamics and Control", 2nd Edition, , 2004.	**Yes**
Recommended Texts	1. Kevin M. Lynch and Frank C. Park (2017), "Modern Robotics: Mechanics, Planning, and Control". Cambridge University Press. 2. Fu K, Gonzalez R and Lee C.," Robotics (Control Sensing Vision and Intelligence)". McGraw Hill. 3. Mohammad Hossein Abedin Nasab, (2019)."Handbook of Robotic and Image-Guided Surgery". 4. *Li, Guanglin; Kuiken, Todd A (2008). "Modeling of Prosthetic Limb Rotation Control by Sensing Rotation of Residual Arm Bone". IEEE Transactions on Biomedical Engineering. **55** (9): 2134–2142. doi:10.1109/tbme.2008.923914. PMC 3038244. PMID 18713682.* 5. *Contreras-Vidal José L.; et al. (2012). "Restoration of Whole Body Movement: Toward a Noninvasive Brain-Machine Interface System". IEEE Pulse. **3** (1): 34 37. doi:10.1109/mpul.2011.2175635. PMC 3357625. PMID 22344949.* 6. *"Rehabilitation Institute of Chicago First to Develop Thought Controlled Robotic Leg". Medgadget.com. September 2013. Retrieved 2016-12-28.* 7. Is This the Future of Robotic Legs? 8. *"Transtibial Powered Prostheses". Biomechatronics. MIT Media Lab.* 9. *"Brain-Controlled Bionic Legs Are Finally Here". Popular Science. Retrieved 2018-12-01.* 10. *Liacouras, Peter C.; Sahajwalla, Divya; Beachler, Mark D.; Sleeman, Todd; Ho, Vincent B.; Lichtenberger, John P. (2017). "Using computed tomography and 3D printing to construct custom prosthetics attachments and devices". 3D Printing in Medicine. **3** (1):*	**No**

	doi:10.1186/s41205-017-0016-1. ISSN 2365-6271. PMC 5954798. PMID 29782612. 11. "Home – BionX Medical Technologies". www.bionxmed.com. Retrieved 2018-01-08. 12. Össur. "PROPRIO FOOT". www.ossur.com. Retrieved 2018-01-08. 13. "Elan – Carbon, Feet, Hydraulic – Endolite USA – Lower Limb Prosthetics". Endolite USA – Lower Limb Prosthetics. Retrieved 2018-01-08. 14. ^ Windrich, Michael; Grimmer, Martin; Christ, Oliver; Rinderknecht, Stephan; Beckerle, Philipp (19 December 2016). "Active lower limb prosthetics: a systematic review of design issues and solutions". BioMedical Engineering OnLine. **15** (S3): 140. doi:10.1186/s12938-016-0284-9. PMC 5249019. PMID 28105948. 15.	
Websites	https://www.intuitive.com/en-us/products-and-services/da-vinci/learning.	

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	Artificial Neural Engineering			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET4107				
ECTS Credits	**4**				
SWL (hr/sem)	**120**				
Module Level	UGIV		**Semester of Delivery**	7	
Administering Department	MIET		**College**	EETC	
Module Leader	Jameel Kaduim Abed		**e-mail**	Dr_jameel57@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Prof. Dr. Sadik Kamel Gharghan Asst. Prof. Dr. Ghaidaa Abdulrahman Khalid		**e-mail**	sadik.gharghan@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	17/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MATLAB for Beginner _ MIET2106 Microcontroller_ MIET4106	**Semester**	UG II- S3 UG IV – S7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce the biological inspiration of artificial neural network. 2. List some of applications of artificial neural networks 3. Introduce the simplified mathematical model of the neuron. 4. Explain how these artificial neurons can be interconnected to form a variety of network architectures. 5. Show how the architectures of artificial neural networks can be used to solve a practical problems. 6. Show how to classify the learning rules as supervised, unsupervised and reinforcement learning rules. 7. Introduce some of learning rules for classification, regression, clustering and prediction problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student will be able to design an artificial neural networks for linear Regression by using backpropagation algorithm. 2. The student will be able to design an artificial neural network for pattern Classification problems. 3. The student will be able to design an artificial neural networks for clustering Problems using competitive learning rules. 4. The student will be able to design an artificial neural networks for prediction Problems using dynamic networks. 5. In general the student will be able to read the problem requirements and how to design the neural network for this problem. 6. Using genetic algorithm for solution optimization. 7. Design a control system using fuzzy logic. 8. apply the A.I in medical system 9. the concept of Biological inspiration 10. How simulate the human brain behavior. 11. Apply of fuzzy logic in diagnosis of medical. 12. Using Expert system in medical
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Introduction: History , Applications , Biological Inspiration (3hrs) - Neuron Model and Network Architecture: Single – Multiple Input Neuron, Transfer Functions, Single – Multiple Layers of Neurons, Recurrent Networks (2hrs). - Pattern Recognition Example: Perceptron, Hamming and Hopfield network (3hrs). - Perceptron network: Perceptron Architecture, Perceptron Learning Rule (2hrs). - Signal and Weight Vector Spaces: linear vector space, inner product , orthogonality , Norm , Gram-Schmidt Orthogonalization (3hrs). - Linear Transformations for Neural Networks: Linear Transformations, Matrix Representations, Change of Basis, Eigenvalues and Eigenvectors, Diagonalization (3hrs). - Supervised Hebbian Learning: Linear Associator, The Hebb Rule, Pseudoinverse Rule, Application (2hrs).

	- Performance Surfaces and Optimum Points: Taylor Series, Directional Derivatives, Minima, Necessary Conditions for Optimality, Quadratic Functions (3hrs). - Performance Optimization: Steepest Descent, Newton's Method, Conjugate Gradient (2hrs). - Widrow-Hoff Learning: ADALINE Network, Mean Square Error, LMS Algorithm, Analysis of Convergence, Adaptive Filtering (2hrs). - Backpropagation: Multilayer Perceptrons, The Backpropagation Algorithm, Batch vs. Incremental Training (3hrs). - Variations on Backpropagation: Heuristic Modifications of Backpropagation, Numerical Optimization Techniques (2hrs). - Generalization: Early Stopping, Regularization, Bayesian Regularization (3hrs). - Dynamic Networks: Real Time Recurrent Learning, Backpropagation-Through-Time (3hrs). - Associative Learning: Unsupervised Hebb Rule, Instar Rule, Outstar Rule (2hrs). - Competitive Networks: Self-Organizing Feature Maps, Learning Vector Quantization (3hrs). - Radial Basis Networks: Radial Basis Network, Training RBF Networks, Linear Least Squares, Orthogonal Least Squares (2hrs). - Genetic Algorithm : Mathematical equation solving using genetic algorithm , Neural network learning using genetic algorithm (3hrs). - Fuzzy Logic : examples of control system design based fuzzy logic algorithm (3hrs).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Assessment is based on hand-in assignments, written exam, Case study, Quizzes, report presentation, Practical testing

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
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	4	20% (10)	3,6,9,12	All
	Assignments	2	5% (10)	6,12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (10)	14	All
Summative assessment	Midterm Exam	2 hr	10% (10)	8	All
	Final Exam	4 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	- Introduction to the artificial intelligence - Machine learining
Week 2	- Perceptron learning rule
Week 3	- Supervised Hebb learning rule
Week 4	- Widrow – Hoff learning rule - Adaptive noise cancellation design using neural network
Week 5	- Multi- layer perceptron - Backpropagation learning rule
Week 6	- Variations of Backpropagation Algorithm
Week 7	- Associative learning/ Kohenen self organization
Week 8	**Mid Term**
Week 9	- Competitive networks + Deep learning (Deep Recurrent Neural Network & Deep convolution Neural Network)
Week 10	- Expert system
Week 11	- Hopfield networks
Week 12	- Introduction to the Genetic algorithm

Week 13	- Fuzzy logic
Week 14	- *Machine Learning Classification/ Machine Learning Linear Regression*
Week 15	- Applications of A.I in medical Engineering
Week 16	**Preparing for the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	- Review of MATLAB programing.
Week 2	- Perceptron learning rule MATLAB programming .
Week 3	- Supervised Hebb learning rule MATLAB programming.
Week 4	- Widrow – Hoff learning rule MATLAB programming. - Adaptive noise cancellation design using neural network with MATLAB programming.
Week 5	- Incremental Backpropagation learning rule MATLAB programming. - Batch Backpropagation learning rule MATLAB programming.
Week 6	- Levenberge – Marquartd algorithm MATLAB programming.
Week 7	- Golden Section Search algorithm MATLAB programming.
Week 8	- Instar , Outstar , Hebbian Supervised learning rules MATLAB programming.
Week 9	- Learning Vector Quantization learning rule MATLAB programming.
Week 10	- Linear Least Square Error learning rule MATLAB programming.
Week 11	- MATLAB program for mathematical equation solution optimization using genetic algorithm
Week 12	- Fuzzy logic implementation using MATLAB program
Week 13	- Introduction to the KNIME program
Week 14	- Machine Learning classification using KNIME program
Week 15	- Machine Learning Linear Regression using KNIME program

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Neural Network Design By HAGAN	Yes
Recommended Texts	Fundamental of Neural Network By Luerene	No
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Biomedical Image Processing**			**Module Delivery**	
Module Type	Elective			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET4207				
ECTS Credits	4				
SWL (hr/sem)	120				
Module Level	UGIV		**Semester of Delivery**		8
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Aws Alazawi		**e-mail**	aws_basil@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	e-mail	
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrah man Khalid		**e-mail**	ghaidaakhalid@mtu.edu	
Scientific Committee Approval Date	15/06/2023		**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Biomedical Signal Processing	**Semester**	L4-S7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	✓ Understanding image processing techniques, their application in biomedical contexts, and the enhancement of medical images for improved analysis and diagnosis. ✓ Equip learners with the necessary knowledge and skills to effectively visualize image data using algorithms like marching cubes, surface rendering, and volume rendering. ✓ Focuses on feature extraction techniques at various levels to extract valuable information from images for analysis and interpretation. ✓ Provide learners with an understanding of segmentation techniques to divide images into meaningful regions and classification methods to assign labels or classes to these regions based on extracted features. ✓ Equips learners with the skills necessary for image analysis, object recognition, and decision-making based on image content.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: ✓ Demonstrate a knowledge of medical image formation. ✓ Demonstrate an understanding of the principles of image processing. ✓ Demonstrate an understanding of time analysis of image. ✓ Demonstrate an understanding of frequency analysis of image. ✓ Critically evaluate image features.
Indicative Contents المحتويات الإرشادية	✓ Introduction involves steps of image processing, remarks on terminology, biomedical image processing. Medical image formation, basic physics, imaging modalities, digitalization [7 hrs]. ✓ Image enhancement, histogram transforms, convolution, mathematical morphology, calibration, registration. Image Data Visualization, marching cube algorithm, surface rendering, volume Rendering [14 hrs]. ✓ Visual Feature Extraction, Segmentation [14 hrs]. ✓ Classification, statistic classifiers, syntactic classifiers, computational intelligence-based classifiers [13 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	✓ The major method for delivering this module is to encourage active student participation in exercises, thereby nurturing and widening their critical thinking abilities. This will be accomplished through interactive lectures, classroom discussions, and the inclusion of enthralling sampling activities that will stimulate students' attention and increase their grasp of the module subject.

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
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	15%(15)	5 and 10	LO #1 and #3
	Assignments	2	10%(10)	2 and 12	LO #2 and #4
	Projects / Lab.	1	10%(10)	Continuous	All
	Report	1	5%(5)	13	LO #5
Summative assessment	**Midterm Exam**	2hr	10%(10)	7	LO #1 - #3
	Final Exam	3hr	50%(50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction ✓ Steps of Image Processing ✓ Remarks on Terminology ✓ Biomedical Image Processing
Week 2	Medical Image Formation ✓ Basic Physics ✓ Imaging Modalities ✓ Digitalization
Week 3	Image Enhancement ✓ Histogram Transforms ✓ Convolution ✓ Mathematical Morphology ✓ Calibration ✓ Registration
Week 4	

Week 5	Image Data Visualization ✓ Marching Cube Algorithm ✓ Surface Rendering ✓ Volume Rendering
Week 6	
Week 7	Visual Feature Extraction ✓ Data Level ✓ Pixel Level ✓ Edge Level ✓ Texture Level ✓ Region Level
Week 8	
Week 9	Segmentation ✓ Pixel-Based Segmentation ✓ Edge-Based Segmentation ✓ Region-Based Segmentation ✓ Over- and Under-Segmentation ✓ Model-Based Segmentation
Week 10	
Week 11	Classification ✓ Statistic Classifiers ✓ Syntactic Classifiers ✓ Computational Intelligence-Based Classifiers
Week 12	
Week 13	
Week 14	
Week 15	FINAL EXAM OF SIGNALS AND SYSTEMS LAB
Week 16	FINAL EXAM OF SIGNALS AND SYSTEMS

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Image acquisition
Week 2	
Week 3	Intensity transformation
Week 4	
Week 5	Histogram Processing and Function Plotting
Week 6	
Week 7	Spatial Filtering
Week 8	
Week 9	Filtering in frequency domain
Week 10	
Week 11	Image restoration and reconstruction
Week 12	
Week 13	Geometric transformation and image registration

Week 14	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, Digital Image Processing Using MATLAB, 2nd Edition, 2012, TataMcGraw-Hill.	Yes
Recommended Texts	Thomas M. Deserno, Biomedical Image Processing, 2011, Springer.	
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Biomedical Sensors Networks**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET4206**				
ECTS Credits	**4**				
SWL (hr/sem)	**120**				
Module Level	4		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Sadik Kamel Gharghan		**e-mail**	sadik.gharghan@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Prof. Dr. Ahmed Rashid Ajel Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	dr_ahmed.R@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Medical communication Systems	**Semester**	Six MIET3203
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To recognize biomedical sensors and signal acquisition. 2. To acquire knowledge about sensor data processing and feature extraction. 3. To identify suitable wireless communication in the biomedical sensor network and their applications. 4. To comprehend how to manage the power resources of the biomedical sensor network. 5. To merge and integrate the collected data of the biomedical sensors. 6. To learn how to track and localize the patients in different environments. 7. To explore the importance of wearable biomedical sensors for continuous vital sign monitoring in biomedical applications. 8. To identify the suitable wireless power transfer for implanted biomedical sensors networks. 9. To explore the importance of wearable and implantable sensor networks in biomedical applications. 10. To realize the importance Internet of Things (IoT) and cloud computing in biomedical sensor networks. 11. To learn the use of machine learning in biomedical sensor networks. 12. To gain proficiency in disease monitoring and management based on biomedical sensor networks. 13. To realize data privacy in medical applications. 14. To explore the emerging trends and future directions in biomedical sensor networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize biomedical sensors and signal acquisition. 2. Acquire knowledge about sensor data processing and feature extraction. 3. Identify suitable wireless communication in the biomedical sensor network and its applications. 4. Comprehend power resource management in the biomedical sensor network. 5. Merge and integrate collected data from biomedical sensors. 6. Learn how to track and localize patients in different environments. 7. Explore the importance of wearable biomedical sensors for continuous vital sign monitoring in biomedical applications. 8. Identify suitable wireless power transfer for implanted biomedical sensor networks. 9. Explore the importance of wearable and implantable sensor networks in biomedical applications. 10. Realize the importance of the Internet of Things (IoT) and cloud computing in biomedical sensor networks. 11. Learn the use of machine learning in biomedical sensor networks. 12. Gain proficiency in disease monitoring and management based on biomedical sensor networks. 13. Understand data privacy in medical applications. 14. Explore emerging trends and future directions in biomedical sensor networks.
Indicative Contents المحتويات الإرشادية	<u>Indicative Contents including the following:</u> <u>Introduction to Biomedical Sensor Networks</u> (2 hrs) • Overview of biomedical sensor networks

	• Applications and importance in healthcare • Challenges and design considerations Biomedical Sensors and Signal Acquisition, Sensor Data Processing and Feature Extraction (4 hrs) • Types of biomedical sensors: physiological, biochemical, and imaging • Signal acquisition techniques and challenges • Preprocessing techniques for sensor data • Feature extraction methods for biomedical signals • Signal denoising and filtering techniques Wireless Communication (Bluetooth, Wi-Fi, Zigbee, etc.) in Biomedical Sensor (2 hrs) Networks • Wireless communication protocols for biomedical sensor networks • Energy-efficient communication protocols • Routing algorithms and protocols Energy Management and Power Optimization, Data Fusion and Integration (4 hrs) • Energy consumption models in biomedical sensor networks • Energy harvesting techniques • Power optimization algorithms and strategies • Data fusion techniques in biomedical sensor networks • Sensor data integration and interoperability • Data aggregation and compression Localization and Tracking in Biomedical Sensor Networks, Wearable biomedical sensors for continuous vital sign monitoring (4 hrs) • Localization techniques for sensor nodes • Tracking and monitoring algorithms • Indoor and outdoor localization methods • Introduction to wearable sensor networks • Design Considerations and Challenges • Applications in healthcare monitoring and diagnosis Wireless power transfer for implanted biomedical sensors Networks (2 hrs) • Introduction to implanted biomedical sensors networks • Design considerations and challenges of wireless power transfer • Applications in healthcare monitoring and diagnosis Internet of Things (IoT) and Cloud Computing in Biomedical Sensor Networks (2 hrs) • Integration of biomedical sensor networks with IoT • Cloud-based solutions for sensor data storage and analysis • Edge computing and fog computing in healthcare Data Analytics and Machine Learning in Biomedical Sensor Networks (2 hrs) • Introduction to data analytics and machine learning in healthcare • Feature selection and dimensionality reduction

	• Classification and prediction algorithms Biomedical Sensor Networks for Disease Monitoring and Management (2 hrs) • Case studies on the use of sensor networks in disease monitoring • Chronic disease management using sensor networks • Remote patient monitoring and telemedicine • Security and Privacy in Biomedical Sensor Networks, Emerging Trends and Future Directions (4 hrs) • Security challenges in biomedical sensor networks • Authentication and access control • Privacy-preserving techniques for sensor data • Emerging technologies and trends in biomedical sensor networks • Advances in sensor technology

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach employed for delivering this module aims to foster active engagement of students in recognition of sensors network and their related topics in biomedical applications. Simultaneously, it aims to enhance their design skills and deepen their understanding of biomedical sensors in biomedical applications. The module will incorporate classroom sessions, lectures, and hands-on laboratory experiments to accomplish this. The laboratory exercises will include the utilization of some components used in biomedical applications, ensuring an intriguing learning experience for the students.

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
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	5% (5)	6, 9	LO # 1-4, and 5-8
	Assignments	2	5% (5)	5, 12	LO # 1-4, and 5-10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 5-14
Summative assessment	Midterm Exam	2 hr	20% (20)	12	LO # 1-11
	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 Networks
Week 2	Biomedical Sensors and Signal Acquisition
Week 3	Sensor Data Processing and Feature Extraction
Week 4	Wireless Communication (Bluetooth, Wi-Fi, Zigbee, etc.) in Biomedical Sensor Networks
Week 5	Energy Management and Power Optimization
Week 6	Data Fusion and Integration
Week 7	Localization and Tracking in Biomedical Sensor Networks
Week 8	Wearable biomedical sensors for continuous vital sign monitoring
Week 9	Wireless power transfer for implanted biomedical sensors Networks
Week 10	Internet of Things (IoT) and Cloud Computing in Biomedical Sensor Networks
Week 11	Data Analytics and Machine Learning in Biomedical Sensor Networks
Week 12	Biomedical Sensor Networks for Disease Monitoring and Management
Week 13	Security and Privacy in Biomedical Sensor Networks
Week 14	Emerging Trends and Future Directions
Week 15	**Final Exam (Practical)**
Week 16	**Final Exam (Theoretical)**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Characteristics of some biomedical sensors and wireless protocols.
Week 2	Lab 2: How to use the PLX-DAQ-V2 program for signal acquisition.
Week 3	Lab 3: How to use the Matlab program for signal acquisition.
Week 4	Lab 4: Data acquisition of temperature sensor (LM35).
Week 5	Lab 5: Data acquisition of motion sensor.
Week 6	Lab 6: Data acquisition of 3D acceleration sensor (ADXL335).
Week 7	Lab 7: Sensor data transmission using point-to-point communication (Bluetooth or Wi-Fi or Zigbee or nRF24L01).
Week 8	Lab 8: Reduce the power consumption of the biomedical sensor node based on sleep/wake up. Strategy.
Week 9	Lab 9: Data Fusion of biomedical sensors.
Week 10	Lab 10: Patient's localization using a wireless communication protocol such as WIFI or ZigBee.
Week 11	Lab 11: patient tracking using GPS and GSM.
Week 12	Lab 12: Wearable biomedical sensors for continuous vital sign monitoring.
Week 13	Lab 13: Wireless power transfer for implanted biomedical sensors Networks.
Week 14	Lab 14: Internet of Things (IoT) and Cloud Computing in Biomedical Sensor Networks.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Body Sensor Networks, Second Edition, by Guang-Zhong Yang, Springer 2014 • Handbook of sensor networks: compact wireless and wired sensing systems, by Mohammad Ilyas and Imad Mahgoub, CRC PRESS, 2004	No
Recommended Texts		No
Websites	https://www.labcenter.com/ https://www.multisim.com/	

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	Biomedical Signal Processing			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET4105				
ECTS Credits	4				
SWL (hr/sem)	120				
Module Level	4		**Semester of Delivery**		7
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Aws Alazawi		**e-mail**	aws_basil@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	e-mail	
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/06/2023		**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Signals and systems	**Semester**	L3-S5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	✓ Provide knowledge on the characteristics of medical data and the analysis of physiological signals. ✓ Equips learners with skills for efficient data management and signal analysis, contributing to improved healthcare delivery and patient outcomes. ✓ Understanding random physiological signals and their analysis as stochastic processes. ✓ Focuses on applying averaging techniques, utilizing the sampling theorem, implementing windowing, efficient computation of discrete Fourier transform, and implementing discrete-time systems. ✓ Understanding and implementing digital filters that involve FIR and IIR filters, analyzing filter characteristics, designing filters, and applying filters for signal processing and noise reduction.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: ✓ Demonstrate a systematic knowledge of the complex physical and physiological principles that underpin biomedical signals. ✓ Demonstrate an understanding of the principles of digital signal processing. ✓ Systematically apply methods to extract relevant information from biomedical signal measurements. ✓ Critically assess the appropriateness of biomedical signal processing techniques for various challenges in the field. ✓ Evaluate the effectiveness of techniques applied to biomedical signals against specific benchmarks.
Indicative Contents المحتويات الإرشادية	✓ Characteristics of medical data, physiological signals analyzer, medical care system, nature of biomedical signals, signal acquisition [7 hrs]. ✓ Random physiological signals, signal as stochastic process, averaging techniques [10 hrs]. ✓ Sampling theorem, windowing, Efficient computation of discrete Fourier transform [11 hrs]. ✓ Implementation of discrete time systems, digital filters (FIR, IIR) [17 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary method for delivering this module will be to encourage students to participate in the tasks while improving and expanding their critical thinking skills. This will be accomplished through class lectures and seminars and the consideration of basic experiments incorporating various sample activities that are attractive to the students and improve module knowledge.

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
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	15%(15)	5 and 10	LO #1 and #3
	Assignments	2	10%(10)	2 and 12	LO #2 and #4
	Projects / Lab.	1	10%(10)	Continuous	All
	Report	1	5%(5)	13	LO #5
Summative assessment	Midterm Exam	2hr	10%(10)	7	LO #1 - #3
	Final Exam	3hr	50%(50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	✓ CHARACTERISTICS OF MEDICAL DATA ✓ PHYSIOLOGICAL SIGNALS ANALYZER ✓ MEDICAL CARE SYSTEM
Week 2	✓ NATURE OF BIOMEDICAL SIGNALS ✓ SIGNAL ACQUISITION
Week 3	RANDOM PHYSIOLOGICAL SIGNALS ✓ SIGNAL AS STOCHASTIC PROCESS ✓ AVERAGING TECHNIQUES
Week 4	
Week 5	
Week 6	SAMPLING THEOREM
Week 7	WINDOWING

Week 8	EFFICIENT COMPUTATION OF DISCRETE FOURIER TRANSFORM
Week 9	
Week 10	IMPLEMENTATION OF DISCRETE TIME SYSTEMS
Week 11	
Week 12	DIGITAL FILTERS ✓ FIR ✓ IIR
Week 13	
Week 14	
Week 15	FINAL EXAM OF SIGNALS AND SYSTEMS LAB
Week 16	FINAL EXAM OF SIGNALS AND SYSTEMS

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	SIGNAL ACQUISITION
Week 2	
Week 3	AVERAGING TECHNIQUES
Week 4	
Week 5	SAMPLING
Week 6	
Week 7	WINDOWING
Week 8	
Week 9	EFFICIENT COMPUTATION OF DISCRETE FOURIER TRANSFORM
Week 10	
Week 11	IMPLEMENTATION OF DISCRETE TIME SYSTEMS
Week 12	
Week 13	DIGITAL FILTERS
Week 14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	John G. Proakis & Dimitris G. Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, 2007, 4th Edition, Pearson Prentice Hall.	621.382 1920
Recommended Texts	Eugene N. Bruce, Biomedical Signal Processing and Signal Modeling, 2000, John Wiley & Sons. A V Oppenheim & R W Schafer, Discrete-time Digital Signal Processing, 2009, Edition: 3rd, Prentice-Hall: Englewood Cliffs, NJ	
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
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	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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Control System**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET4103**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**		6
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Prof. Dr. Ahmed R. Ajel		**e-mail**	Dr_ahmed.r@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Prof. Dr. jameel K. Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	Dr_jameel57@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Power electronics	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims to: 1. calculate system sensitivity and disturbance rejection and the effect of feedback on these 2. analyses and design for steady-state error requirements 3. analyses system stability and performance using analytical techniques 4. analyses system stability and performance using graphical frequency response techniques 5. design, simulate and evaluate compensator-based control schemes 6. design, simulate and evaluate PID-based control schemes 7. use appropriate software tools to present, analyses, design and simulate systems 8. effectively present and discuss the analysis and/or design of systems by written means 9. enable students to comprehend the characteristics of digital controller and apply appropriate design methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this lecture, the student will be able to: **1.** Define a control system and describe some applications. **2.** Describe historical developments leading to modern day control theory **3.** Describe the basic features and configurations of control systems **4.** Describe control systems analysis and design objectives **5.** Describe a control system's design process **6.** Describe the benefit from studying control systems
Indicative Contents المحتويات الإرشادية	The indicative contents of control system module include: 1. Introduction to linear control engineering. [15 hrs.] 2. Transfer function, block diagram representation and reduction, signal flow diagram, State space representation and analysis. [15 hrs.] 3. Mathematical background; laplace transform, complex variable, matrices. [10 hrs.] 4. Time domain analysis, steady – state transient analysis. Stability analysis; Routh, Nyquist. [9 hrs.] 5. Root locus technique. [10 hrs.] 6. Frequency domain analysis, gain margin, phase margin and bode plot. 7. Frequency domain synthesis, phase lead. [10 hrs.] 8. Compensation, phase – lag compensation lag – lead compensation - PID controllers design. [9 hrs.]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies employed in a Control system engineering module can vary depending on the specific course or institution. However, here are some common strategies that may be used: 1. 1. Lectures: Theoretical ideas and the basics of control system knowledge are frequently presented in lectures. Using visual aids like slides, diagrams, and demonstrations, lecturers may go through important theories, concepts, and methods.

	2. 2. Practical Sessions: Practical sessions strengthen theoretical ideas while also provide practical experience. Implementing and analyzing signal processing methods can be done by students using software tools like MATLAB, Python, or specialist software. Students can apply their knowledge and work in groups or individually during practical sessions to address difficulties in real-world processing. 3. 3. Laboratory Experiments: In a controlled setting, laboratory experiments give students the chance to apply CONTROL SYSTEM ENGINEERING ideas. To design and implement, they might use hardware like signal generators, oscilloscopes, and CONTROL SYSTEM ENGINEERING boards. 4. 4. Problem-Solving activities: In class and as homework assignments, problem-solving activities let students use their understanding and analytical abilities to tackle CONTROL SYSTEM ENGINEERING issues. These exercises could entail creating mathematical models, interpreting signals, generating mathematical expressions, or putting algorithms into practice. To assist students in developing their problem-solving skills, instructors may offer comments and direction. 5. Case Studies and Applications: CONTROL SYSTEM ENGINEERING case studies and real-world applications assist students in comprehending the relevance and application of the ideas they are taught. This method improves students' ability to use CONTROL SYSTEM ENGINEERING principles in a variety of contexts. 6. Group talks and Peer Learning: Group talks and cooperative exercises encourage peer-to-peer engagement and active learning. Together, students may solve issues, discuss ideas, and exchange ideas. This strategy promotes critical thinking, understanding through many views, and teamwork abilities. Online Resources, In addition to traditional teaching methods, instructors may utilize online resources, multimedia content, and interactive tools to supplement learning. These resources can include video tutorials, simulations, online quizzes, and discussion forums. They provide flexibility, enable self-paced learning, and facilitate deeper exploration of CONTROL SYSTEM ENGINEERING concepts. 7. Assessments: Students' comprehension and application of CONTROL SYSTEM ENGINEERING principles are assessed by assessments such as quizzes, examinations, projects, and presentations. Theoretical inquiries, problem-solving exercises, and practical demonstrations could all be a part of these evaluations. They aid in measuring learning outcomes and give students feedback on their development.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	80	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.7
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	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Introduction to CONTROL SYSTEM ENGINEERING: Overview, applications, and advantages of control system. • Test signal : Introduction to continuous-time, unit-step, ramp and system representations.
Week 2	• Mathematical background; modelling , application of mathematical modelling.
Week 3	• Laplace transformation and inverse Laplace transform, partial fraction
Week 4	• Block diagram representation for 1st and 2nd type
Week 5	• Block diagram representation reduction, rules of minimizing block diagram.
Week 6	• signal flow diagram.
Week 7	• Time domain analysis, for 1st , 2nd and higher order system
Week 8	• Stability analysis; Routh, Nyquist
Week 9	• Root locus technique
Week 10	• Root locus technique design
Week 11	• Frequency domain analysis, Gain margin, phase margin and bode plot.
Week 12	• Frequency domain synthesis, phase lead
Week 13	• Compensation, phase – lag compensation lag – lead compensation.
Week 14	• PID controllers design.
Week 15	• State space representation and analysis and analogue computer
Week 16	• Preparatory week before the final Exam

Delivery Plan (Weekly Workshop Syllabus) المنهاج الاسبوعي للورشة	
	Material Covered
Week 1	Lab Safety & Lab Equipment Use Tutorial.
Week 2	Introduction to Computer Simulation
Week 3	Transfer Function Simplification and Solution
Week 4	State Space Method
Week 5	Zeros, Poles and Stability
Week 6	Time Response characteristics for 1st ,2nd order system
Week 7	Root-Locus drawing
Week 8	Root-Locus design controller
Week 9	Frequency response characteristics
Week 10	Bode and Nyquist diagram
Week 11	Check the stability by PM and GM
Week 12	PID Controller
Week 13	QNET DC Motor Position Control
Week 14	Lead-Lag Compensation
Week 15	Presentation & Demonstration of Final Project
Week 16	Preparatory week before the final Exam

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
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	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

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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Modern Control Engineering, Ogata Katsuhiko, 5th Edition, Prentice-Hall, 2010.	Yes
Recommended Texts	Nise, N. S., 'Control Systems Engineering', 5th Edition, John Wiley, International Student Version. 2008. ISBN 978-0-470-16997-1	No
Websites	The Collage E-Library	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**ENGINEERING OF RADIATION INSTRUMENATS**			**Module Delivery**	
Module Type	**CORE**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET4202**				
ECTS Credits	**6**				
SWL (hr/sem)	**180**				
Module Level	4		**Semester of Delivery**		8
Administering Department	**ENG- MIET**		**College**	**EETC**	
Module Leader	Prof. Dr.jinan fadhil Mahdi		**e-mail**	Jinan.f@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name	Asst.Prof.Dr. Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	11/06/2023		**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	• To provide the students with an understanding of the fundamental principles of physics and mathematics used in radiation protection, including radioactive processes. • To provide the students with an understanding of the basics of ionizing and non-ionizing radiation; radiation safety and protection; and an overview of the variety of health physics applications, especially as it pertains to the medical field and to radioactive materials research in academia. • To provide foundation training in radiation protection and the safety of radiation sources • Students will be aware of sources of radiation and understand the interactions of radiation with matter, known effects of the human body • The focus of the standard syllabus is on the radiation safety framework necessary for regulatory and operational controls for protection against ionizing radiation and the safe use of radiation sources in all their applications • To introduce the trainee to a range of equipment and techniques used in Nuclear Medicine and Diagnostic Radiology and understand the effects of image acquisition parameters and post processing. • Using laboratory or field equipment, becoming familiar with radiation protection software • Use physics laboratories with equipment and procedures to conduct basic experiments on radioactivity and interaction of radiation with matter.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this module students will be able to: 1. Critically evaluate the science behind and the differences between ionizing and nonionizing radiation. 2. Critically evaluate radiation protection principles, practices and protocols including safety requirements, radiation scatter and leakage. 3. Critically evaluate the effects of different types of radiation on the human. 4. Demonstrate an understanding of the principles that underpin the operation of radiation imaging and treatment equipment. 5. Critically evaluate new technology and applications of existing technologies to be used in the imaging or treatment of the human body Demonstrate safe practice when working with sources of ionizing radiation, including X-ray equipment. 6. Make and collate patient dose measurements.

	7. Describe the legislation that applies to safe working within the radiation. 8. Explain the physical principles behind the interaction of radiation with matter. 9. Describe the basis of clinical measurement. 10. Discuss and evaluate the role of Medical Physics in innovation and service development.
Indicative Contents المحتويات الإرشادية	• Nuclear medicine [20 hrs] • Ionizing radiation – interactions, quantities. [15 hrs] • Biological effect of ionizing radiation. [10 hrs] • Radiation safety regulations and Radiation risk. [20 hrs] • Revision problem classes [8 hrs] • Basis of x-ray imaging and technology, including computed tomography. [15 hrs] • Basis of nuclear medicine imaging and technology. [15 hrs] • Revision problem classes [6 hrs] • Basis of radiotherapy. [20 hrs] • The basis of clinical measurement. [20 hrs] • Revision problem classes [6 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy on successful completion of this module the student will be able to: 1. Apply critical understanding to the use of physical techniques in radiation detection and measurement. 2. Work with their knowledge of the principal techniques and their application to solve problems in any of the topic areas. 3. Demonstrate a specialist understanding of the current areas of interest in nuclear medicine research. 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. A practical exercise can be characterized as being a hands-on experience by the students working individually or in small groups under the supervision of a

	trainer, for example, using laboratory or field equipment, becoming familiar with radiation protection software, applying a laboratory procedure, or solving a case study or carrying out a desk-top exercise. On completion of each practical exercise, it is important to ensure that students submit individual written reports (even if they were working in groups) and that those reports are assessed.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Atomic structure and atomic radiation: Radiation history to the present.
Week 2	The nuclear and nuclear radiation: nuclear mass, nuclear structure, binding energy, radioactive decay, Activity, exponential decay, half-life.

Week 3	Interaction of radiation with matter: Radioactive decay: Alpha, beta, and gamma decay; decay schemes, internal conversion, electron capture, shielding, energy loss through matter.
Week 4	Radiation detection & engineering of radiation detectors. Ion chambers; proportional counters; scintillation detectors and photomultiplier tubes; semiconductor diode detectors; x-ray detection; gamma-ray detection; detection of light and heavy charged particles; neutron detection.
Week 5	Radiation protection: Effective shielding and detection, Principles of dose limitation.
Week 6	Radiation dose, detection, and dosimetry
Week 7	Engineering of body scanners
Week 8	Production of X – rays: Types of X-ray tube and design features, X-ray generators, Bremsstrahlung (ion radiation losses)
Week 9	Nuclear Medicine Imaging Devices: Gamma Camera system, Gamma (photon) scattering and absorption, mass attenuation.
Week 10	Clinical radiation generators: cyclotron , electrostatic accelerators, such as the Cockcroft–Walton accelerator and Van de Graaff generator.
Week 11	Dose distribution and scatter analysis.
Week 12	Treatment Planning systems and Process.
Week 13	Engineering of electron beam therapy.
Week 14	Active Source Therapy: Brachytherapy, Cobalt Therapy.
Week 15	
Week 16	

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Photo electric effect device
Week 2	Lab 2: Parts & accessories of Photo electric effect device
Week 3	Lab 3: Photo electric effect tube
Week 4	Lab 4: The photo – electric effect
Week 5	Lab 5: Relationship between Illumination & Current
Week 6	Lab 6: The energy in photon depends on the frequency of the light
Week 7	Lab 7: Analyze data to determine PLANCK'S Constant
Week 8	Lab 8: PLANCK'S Constant (sample graphs)

Week 9	Lab 9: Energy distribution.
Week 10	Lab 10: Characteristic curve of the photo – tube
Week 11	Lab 11: Geiger Counter device
Week 12	Lab 12: Geiger Counter / pate meter - digital
Week 13	Lab 13: Geiger Counter tube
Week 14	Lab 14: IR devise and Lux meter device
Week 15	
Week 16	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Khan F.M. and Gibbons J.P. (2014) "The Physics of Radiation Therapy "(EDITION 5) https://dl.icdst.org/pdfs/files3/da276c4dbff4eaca387bdfb0ddbbdcf9.pdf	No
Recommended Texts	• Ahmed S.N. (2007) "Physics and Engineering of Radiation Detection" http://www.gammaexplorer.com/wp-content/uploads/2014/03/Physics-and-Engineering-of-Radiation-Detection.pdf • World Health Organization 2021." Technical specifications of radiotherapy equipment for cancer treatment" https://apps.who.int/iris/bitstream/handle/10665/339912/9789240019980-eng.pdf	No
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical Laser System			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET 4102				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	UG IV		**Semester of Delivery**		7
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Dalya Hussein Abbas		**e-mail**	dalya@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		Master
Module Tutor			**e-mail**		
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/06/2023		**Version Number**		1

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Anatomy and Physiology	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Learning of laser generation. 2. Studying optical fiber and optical fiber splicers. 3. To understanding suitable detectors for each laser type. 4. Laser tissue interaction phenomena and determination suitable medical laser application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student listed laser types. 2. The student Distinguish between laser and light. 3. Recognize laser application in Medicine. 4. The student learn laser properties. 5. Recognize the optical fiber (laser transportation) 6. Recognize laser dangers and laser safety. 7. The student uses laser systems. 8. The student uses laser sensors. 9. The student acquires skills in understanding of laser properties and its applications. 10. The student writes the results and phenomena of laser lab. Experiments.
Indicative Contents المحتويات الإرشادية	The Einstein Relations, Gain Coefficient Solid state laser (Ruby laser, Nd:YAG) Gas laser (He-Ne laser, CO_2 laser, Argon Ion laser) Optical Fiber: Snell's Law Laser Detectors (Quantum Detectors, Vacuum Photodiode and photomultiplier). Laser therapy (Photochemical Interaction, Photothermal Interactions, Photoablation Interaction, Plasma-induced Photoablation and Photodisruption.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Assessment is based on seminars, Quizzes, Report submitting, Practical testing and scientific visits.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.4
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**	2	10%	5,9	LO # 3,4,5,8, 9
	Assignments	2	10%	4,10	LO # 5,6, 7
	Report / Lab.	5	10%	Continuous	
	Seminar	1	10%	12	All
Summative assessment	**Midterm Exam**	2hr	10%	13	LO # 1.....12
	Final Exam	2hr	50%		All
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Light Nature and Laser Generation
Week 2	Laser Generation
Week 3	Einstein Relations, Gain Coefficient
Week 4	Laser System Types
Week 5	Laser Types properties

Week 6	Optical Fibers
Week 7	Photonic Crystal Fiber
Week 8	Lasers Detectors (Quantum Detectors), Vacuum Photodiode and photomultiplier
Week 9	Lasers Detectors (Vacuum Photodiode and photomultiplier)
Week 10	Medical Laser Application
Week 11	Mechanisms of Laser-Tissue Interactions
Week 12	Laser in Medical Surgery
Week 13	Mid Examination
Week 14	Laser Hazards
Week 15	The Standard level for Safe Working Environments, Lab safety.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab safety - Tools
Week 2	Reflection, Refraction and total internal reflection
Week 3	Divergence
Week 4	Semiconductor manufacturing
Week 5	Emission cct design
Week 6	Detection cct design
Week 7	Optical fiber types
Week 8	Connrecterization
Week 9	Optical fiber characterization
Week 10	Splicing (Mechanical)
Week 11	Splicing (automated)
Week 12	Optical fiber losses

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	An introduction to the Laser theory and applications By M. N. Avadhanulu and Dr. P. S. Hemne. Optical Fiber Communications By Gerd Keiser,second edition. Laser Principles and Applications By J.Wilson.	No Yes No
Recommended Texts	Photonics Linear and non Linear Interactions of Laser and Matter	No
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical Therapeutic Instrumentation I			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	MIET4101				
ECTS Credits	7				
SWL (hr/sem)	210				
Module Level	4		**Semester of Delivery**	7	
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Luban Hamdy Hameed		**e-mail**	Luban_alqudsi@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer Assistant		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Amal Ibrahim Mahmood		**e-mail**	Aml.alzubedy@mtu.edu.iq	
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	15/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Anatomy & Physiology	**Semester**	L2 -S3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The graduated students will acquire the theoretical concepts behind medical therapeutic instruments. 2. The graduates get the scientific and applied skills to diagnosis the medical therapeutic instruments faults. 3. The graduated students will gain the necessary knowledge about different parts of medical therapeutic instruments. 4. Development and training the engineering technical staff on the medical therapeutic instruments maintenance. 5. Preparation of the research and studies to improve and develop the medical therapeutic instruments 6. Put the proposals and alternatives for the medical therapeutic instruments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the importance of surgeries in human medical therapy. 2. Get the basic knowledge about the medical instruments used in operating room. 3. Understand the concept behind the surgical diathermy. 4. Identify the parts of the surgical diathermy instrument and recognize its faults and the methods of maintenance. 5. Understand the working principle of Dental chair. 6. Identify the parts of the Dental chair and recognize its faults and the methods of maintenance. 7. Understand the concept behind the ophthalmic microsurgical instruments. 8. Identify the parts of the ophthalmic microsurgical instrument and recognize its faults and the methods of maintenance. 9. Understand the working principle of heart-lung machine. 10. Identify the parts of the heart-lung machine and recognize its faults and the methods of maintenance. 11. Understand the concept behind the Hemodialysis machine. 12. Identify the parts of the hemodialysis machine and recognize its faults and the methods of maintenance. 13. Understand the working principle of Therapeutic diathermy instruments. 14. Identify the parts of the therapeutic diathermy instruments and recognize its faults and the methods of maintenance.
Indicative Contents المحتويات الإرشادية	General systems and specialized tools in general surgery [7 hrs]. Surgical diathermy, cautery [7 hrs]. Dental chair [7 hrs]. Ophthalmic microsurgical Inst. [7 hrs]. Heart – lung machine [7 hrs]. Hemodialysis machine [7 hrs]. Therapeutic Diathermy [11 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 skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. Moreover, motivate the creative side by posing various problems to students and urging them to find appropriate solutions. Also forming work teams to assess the results of their work and change their structure periodically to develop the spirit of cooperation and development and motivate students to make intensive efforts to work different roles.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفص	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	136	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	210		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	15% (20)	5, 10	LO #1, 2, 3, 4,7,8,9 and 10
	Assignments	1	5%	8	LO #5, 8
	Projects / Lab.	1	10%	Continuous	All
	Report	2	10% (10)	13	LO # 3,5, 7,9 and 11
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	General systems and specialized tools in general surgery I
Week 2	General systems and specialized tools in general surgery II
Week 3	Surgical diathermy, cautery I
Week 4	Surgical diathermy, cautery II
Week 5	Dental chair I
Week 6	Dental chair II
Week 7	Ophthalmic microsurgical Inst. I
Week 8	Ophthalmic microsurgical Inst. II
Week 9	Heart – lung machine I
Week 10	Heart – lung machine II
Week 11	Hemodialysis machine I
Week 12	Hemodialysis machine II
Week 13	Therapeutic Diathermy I
Week 14	Therapeutic Diathermy II
Week 15	Practical exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	General systems and specialized tools in general surgery I
Week 2	General systems and specialized tools in general surgery II
Week 3	Surgical diathermy, cautery I
Week 4	Surgical diathermy, cautery II
Week 5	Dental chair I
Week 6	Dental chair II

Week 7	Ophthalmic microsurgical Inst. I
Week 8	Ophthalmic microsurgical Inst. II
Week 9	Heart – lung machine I
Week 10	Heart – lung machine II
Week 11	Hemodialysis machine I
Week 12	Hemodialysis machine II
Week 13	Therapeutic Diathermy I
Week 14	Therapeutic Diathermy II

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Webster, John G., ed. *medical instrumentation: application and design*. John Wiley & Sons, 2009.	yes
Recommended Texts	J.D.Bronzino ,Biomedical Engineering Handbook	
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical Therapeutic Instrumentation II			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	MIET4201				
ECTS Credits	7				
SWL (hr/sem)	210				
Module Level	4	**Semester of Delivery**	8		
Administering Department	ENG-MIET	**College**	EETC		
Module Leader	Luban Hamdy Hameed	**e-mail**	Luban_alqudsi@mtu.edu.iq		
Module Leader's Acad. Title	Lecturer Assistant	**Module Leader's Qualification**	M.Sc.		
Module Tutor	Amal Ibrahim Mahmood	**e-mail**	Aml.alzubedy@mtu.edu.iq		
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid	**e-mail**	ghaidaakhalid@mtu.edu.iq		
Scientific Committee Approval Date	15/06/2023	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Medical Therapeutic Instrumentation I	**Semester**	L4 -S7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. The graduated students will acquire theoretical concepts about artificial organs. 2. Understanding the aim of the mechanical ventilator that assists patients with respiratory difficulties, improve oxygenation, support surgeries and emergencies, and maintain lung function to prevent respiratory failure. 3. Understanding the administer anesthetics for surgery, ensure patient safety and comfort during anesthesia, regulate anesthetic delivery, and facilitate smooth induction, maintenance, and recovery from anesthesia. 4. Obtain the knowledge about restoring normal heart rhythm by delivering controlled electric shocks represented by defibrillators. 5. Understanding the modern lithotripters systems that considering the non-invasively break down kidney or gallstones using shock waves or lasers. 6. Study the precise radiation therapy to treat cancer by destroying cancer cells while minimizing harm to healthy tissue by understanding the linear accelerator system. 7. Knowing Stereotactic radiosurgery systems that involve Gamma knife and CyperKnife.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the principles and techniques of many artificial organs. 2. Identify artificial organs parts and faults and their maintenance. 3. Explain how ventilators work. 4. Show the parts and faults of ventilator and learn how to fix it. 5. Identify and describe the concept behind anesthesia machine. 6. Learn their basic modules and how to maintain the machine. 7. Understand the indications and techniques for working and using defibrillators. 8. Show their different parts and faults and how to restore the instruments. 9. Understand the principles and applications of lithotripters. 10. Describe the components and functions of lithotripters and the modern methods of their maintenance. 11. Study the precise radiation therapy to treat cancer by destroying cancer cells while minimizing harm to healthy tissue by understanding the linear accelerator system. 12. Identify linear accelerator system parts and faults and their maintenance. 13. Demonstrate the concept of stereotactic radiosurgery systems. 14. Learn the differences between Gamma knife and CyperKnife.
Indicative Contents المحتويات الإرشادية	Pacemaker, cochlear prosthesis [7 hrs]. Manditory and spontainous mode ventilation [7 hrs]. AC and DC defibrillators [7 hrs].

	Gas inhaling anesthesia machine, vaporizers. [7 hrs]. Lithotripters, Ultrasound shock wave generation [7 hrs]. Linear accelerators, Cancer therapy planning [11 hrs]. Stereotactic radiosurgery systems [7 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 skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. Moreover, motivate the creative side by posing various problems to students and urging them to find appropriate solutions. Also forming work teams to assess the results of their work and change their structure periodically to develop the spirit of cooperation and development and motivate students to make intensive efforts to work different roles.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفص	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	136	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	210		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	15% (20)	5, 10	LO #1, 2, 3, 4,7,8,9 and 10
	Assignments	1	5%	8	LO #5, 8
	Projects / Lab.	1	10%	Continuous	All

	Report	2	10% (10)	13	LO # 3,5, 7,9 and 11
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Artificial organs – internal & external. I
Week 2	Artificial organs – internal & external. II
Week 3	Mechanical ventilator I
Week 4	Mechanical ventilator II
Week 5	Anesthesia machine I
Week 6	Anesthesia machine II
Week 7	Defibrillators I
Week 8	Defibrillators II
Week 9	Lithotripters I
Week 10	Lithotripters II
Week 11	Linear accelerator I
Week 12	Linear accelerator II
Week 13	Stereotactic radiosurgery systems
Week 14	Stereotactic radiosurgery systems
Week 15	**Practical exam**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Artificial organs – internal & external. I
Week 2	Artificial organs – internal & external. II

Week 3	Mechanical ventilator I
Week 4	Mechanical ventilator II
Week 5	Anesthesia machine I
Week 6	Anesthesia machine II
Week 7	Defibrillators I
Week 8	Defibrillators II
Week 9	Lithotripters I
Week 10	Lithotripters II
Week 11	Linear accelerator I
Week 12	Linear accelerator II
Week 13	Stereotactic radiosurgery systems
Week 14	Stereotactic radiosurgery systems

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Webster, John G., ed. *medical instrumentation: application and design*. John Wiley & Sons, 2009.	yes
Recommended Texts	J.D.Bronzino ,Biomedical Engineering Handbook	
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.

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Programmable Logic Devices**			**Module Delivery**	
Module Type	**Elective II**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET4205**				
ECTS Credits	**4**				
SWL (hr/sem)	**120**				
Module Level	4		**Semester of Delivery**		2
Administering Department	MIET		**College**	EECT	
Module Leader	Dr. Sadik Kamel Gharghan		**e-mail**	sadik.gharghan@mtu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Prof. Saleem Latteef Mohammed Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	saleem_lateef_mohammed@mtu.edu.iq ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Digital Electronics	**Semester**	L4-S7 MIET2203
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To acquaint oneself with programmable logic devices. 2. To acquire knowledge about the various types of RAMs. 3. To identify different types of ROMs and design ROMs based on diode matrix ROM. 4. To comprehend the internal structure of PROM and Flash memories. 5. To distinguish between FIFOs and LIFOs. 6. To develop various types of PN codes. 7. To create both Combinational and Sequential Circuits. 8. To enhance students' comprehension of Programmable Logic Array (PLA). 9. To improve students' understanding of Programmable Array Logic (PAL). 10. To guide students in utilizing Complex Programmable Logic Devices (CPLD). 11. To examine the features of Field Programmable Gate Array (FPGA). 12. To gain proficiency in programming FPGA-based VHDL. 13. To proficiently program logic gates using VHDL.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Acquire proficiency in working with programmable logic devices. 2. Gain knowledge about various types of RAMs. 3. Identify different types of ROMs and develop diode matrix ROM designs. 4. Understand the internal structure of PROM and Flash memories. 5. Distinguish between FIFOs and LIFOs. 6. Create various PN codes through design. 7. Design both combinational and sequential circuits. 8. Strengthen students' comprehension of Programmable Logic Array (PLA). 9. Enhance students' understanding of Programmable Array Logic (PAL). 10. Guide students in utilizing Complex Programmable Logic Devices (CPLD). 11. Investigate the features of Field Programmable Gate Array (FPGA). 12. Learn the programming of FPGA-based VHDL. 13. Proficiently implement logic gates using VHDL programming.
Indicative Contents المحتويات الإرشادية	Indicative Contents including the following: - Random Access Memories (RAMs), Static RAMs, Dynamics RAMs (2 hrs) - ROM, Mask ROM, Diode matrix ROM, EEPROM, PROM, Flash memories (4 hrs) - Special types of memories FIFO and LIFO (2 hrs). - Maximal code generation, Gold code, barker codes, non-linear codes (2 hrs) - Combinational of logic gates, Binary Adder/Subtractor, decoder, multiplexer and Sequential Circuits (4 hrs) - PLA and PAL (4 hrs) - CPLD and FPGA (4 hrs) - Programming gates (AND, NAND, OR, NOR, XOR, and XNOR) using VHDL language (6 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach employed for delivering this module aims to foster the active engagement of students in designing various types of programmable logic devices (PLDs) based on different logic combinations. Simultaneously, it aims to enhance their design skills and deepen their understanding of PLDs in medical applications. The module will incorporate classroom sessions, lectures, and hands-on laboratory experiments to accomplish this. The laboratory exercises will include the utilization of some components used in medical applications, ensuring an intriguing learning experience for the students.

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
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	5% (5)	5, 8	LO # 1-4, and 5-7
	Assignments	2	5% (5)	5, 12	LO # 1-4, and 5-10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	2 hr	20% (20)	12	LO # 1-11
	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 PLDs
Week 2	Random Access Memories (RAMs), Static RAMs, Dynamics RAMs
Week 3	Read only memories (ROMs), Diode matrix ROM.
Week 4	Programmable read only memories (PROMs), Flash memories
Week 5	First in –First out serial memories (FIFOs), Last in - First out memories (LIFOs)
Week 6	PN codes generation
Week 7	Combinational and Sequential Circuits
Week 8	Programmable Logic Array (PLA)
Week 9	Programmable Array Logic (PAL)
Week 10	Complex Programmable Logic Devices (CPLD)
Week 11	Field Programmable Gate Array (FPGA)
Week 12 and 13	Hardware Description Language (VHDL)
Week 14 and 15	Programming logic gates using VHDL
Week 16	**Preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Overview of the simulation software used with this module
Week 2	Lab 2: One cell of Static RAM
Week 3	Lab 3: Flash memories
Week 4	Lab 4: FIFOs memories
Week 5	Lab 5: Five PN codes generation
Week 6	Lab 6: Seven PN codes generation
Week 7	Lab 7: Five Gold codes generation
Week 8	Lab 8: Seven Gold codes generation
Week 9	Lab 9: Combinational Logic Circuits
Week 10	Lab 10: Sequential Logic Circuits
Week 11	Lab 11: Programmable Logic Array (PLA)

Week 12	Lab 12: Programmable Array Logic (PAL)
Week 13	Lab 13: Programming AND, OR logic gates using VHDL
Week 14	Lab 14: Programming NAND, NOR logic gates using VHDL
Week 15	Lab 15: Programming XOR, XNOR logic gates using VHDL

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Digital fundamentals, ninth edition, by Thomas L. Floyd 2006. • Circuit Design with VHDL, By Volnei A. Pedroni 2004, MIT Press, Cambridge, Massachusetts, London, England.	No
Recommended Texts		No
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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**STATISTICS FOR BIOMEDICAL ENGINEERING**			**Module Delivery**	
Module Type	Elective			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MIET4208				
ECTS Credits	4				
SWL (hr/sem)	120				
Module Level	UGIV		**Semester of Delivery**		8
Administering Department	ENG-MIET		**College**	EETC	
Module Leader	Aws Alazawi		**e-mail**	aws_basil@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	e-mail	
Peer Reviewer Name	Asst.Prof.Dr.Ghaidaa Abdulrahman Khalid		**e-mail**	ghaidaakhalid@mtu.edu.iq	
Scientific Committee Approval Date	14/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mathematics	**Semester**	L1-S3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	✓ Equip students with the necessary knowledge and skills in sampling, descriptive statistics, probability theory, and error propagation. ✓ Provides a foundation for statistical analysis, data interpretation, and decision-making based on sample data and probability distributions. ✓ Provide learners with a solid understanding of commonly used probability distributions, confidence intervals, and hypothesis testing. ✓ Prepares student with the skills necessary to analyze and interpret data, make statistical inferences, and draw meaningful conclusions based on sample data and hypothesis testing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: ✓ Demonstrate a knowledge of statistics. ✓ Demonstrate an understanding of the principles of random variables. ✓ Demonstrate an understanding of hypothesis testing. ✓ Demonstrate an understanding of the principles of confidence intervals ✓ Critically evaluate error measurements.
Indicative Contents المحتويات الإرشادية	✓ Sampling and descriptive statistics, probability, propagation of error [20 hrs]. ✓ Commonly Used Distributions [19 hrs]. ✓ Confidence intervals, hypothesis testing [17 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	✓ The primary strategy for delivering this module is to encourage active student engagement in exercises, which fosters and broadens their critical thinking ability. This will be accomplished through interactive lectures, classroom discussions, and the inclusion of engaging sampling activities that will pique students' interest and deepen their understanding of the module subject.

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	4.2
Unstructured SWL (h/sem)	60	**Unstructured SWL (h/w)**	4.2

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	15%(15)	5 and 10	LO #1 and #3
	Assignments	2	10%(10)	2 and 12	LO #2 and #4
	Projects / Lab.	1	10%(10)	Continuous	All
	Report	1	5%(5)	13	LO #5
Summative assessment	Midterm Exam	2hr	10%(10)	7	LO #1 - #3
	Final Exam	3hr	50%(50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Sampling and Descriptive Statistics
Week 2	Probability
Week 3	
Week 4	
Week 5	Propagation of Error
Week 6	
Week 7	Commonly Used Distributions
Week 8	
Week 9	
Week 10	Confidence Intervals
Week 11	
Week 12	Hypothesis Testing
Week 13	

Week 14	
Week 15	FINAL EXAM OF SIGNALS AND SYSTEMS LAB
Week 16	FINAL EXAM OF SIGNALS AND SYSTEMS

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Random number generation
Week 2	
Week 3	Probability distributions
Week 4	
Week 5	Distribution fitting
Week 6	
Week 7	Descriptive Statistics
Week 8	
Week 9	Linear Models
Week 10	
Week 11	Regressions
Week 12	
Week 13	Hypothesis Tests
Week 14	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	William Navidi, Statistics for Engineers and Scientists, 2011, 3rd Edition, McGraw-Hill. Watkins, Joseph. "An introduction to the science of statistics: From theory to implementation, 2016 Preliminary Edition, Joseph C. Watkins.	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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