	Ministry of Higher Education and Scientific Research - Iraq University of Warithe Al_Anbiyaa Engineering College Biomedical Engineering Department	

Module Information
معلومات المادة الدراسية

Module Title	**Cell Biology**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BME-212**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	engineering
Module Leader	Aref alsayad	**e-mail**	aref.alsayad@uowa.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	1. To know the cell number, size, shape, and properties of cells and distinguish their characteristics. 2. To understand Chromosomes and Genes, Structure of a Chromosome 3. This course deals with the basic concept of Muscle tissue. 4. This is the basic subject for all body tissues. 5. To develop skills Dealing Structure of the Cell and Cell Organelles. 6. To Know the types of microscopes used in diagnosis.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion. 2. An ability to communicate effectively with a range of audiences. 3. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Cell Division (Mitosis and Miosis) , Prophase, Metaphase, Anaphase, Telophase , Reduction or Maturation Division (Meiosis) [12 hrs] cartilage, hyaline, elastic and fibrocatilage, histogensis of cartilage ,Bone- cells, matrix, types of bones, bone histogenesis ,blood, cells, formed elements, hematopoiesis, stem cells, bone marrow, maturation of erythrocytes, maturation of granyolocytes, maturation of lymphocytes and monocytes, origin of platelets [12 hrs] Genetics (The Science of Heredity) Genes, Chromosomes, and the Genome , The Allele , Dominance, Recessiveness, and Codominance , Phenotype and Genotype , The Mendelian Rules , Autosomal Dominant Hereditary Transmission , Sex-linked Inheritance. [12 hrs] Exchange of Materials between the Cell and Its Environment Composition of the , Extracellular Fluid , Composition of the Intracellular Fluid , Membrane or Resting Potential of a Cel , Solid and Fluid TransportRenal system , reproductive systems. [20 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' Structure of the Cell and Cell Organelles and laboratory technique, 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 محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	48	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	4
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	52	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of cell Number, Size, Shape, and Properties of Cells , Metabolism and the Generation of Energy , Reproduction and Life Expectancy , Sensitivity to Stimulation and Response to Stimulation
Week 2	Structure of the Cell and Cell Organelles , Cell Membrane , Cytoplasm and Cell Organelles, Endoplasmic Reticulum (ER) , Ribosomes, Golgi Apparatus
Week 3	Lysosomes , Centrioles , Mitochondria , The Cell Nucleus
Week 4	Chromosomes and Genes, Structure of a Chromosome , The Genetic Code , Protein Synthesis , Duplication of Genetic Material (Replication)
Week 5	Cell Division (Mitosis and Miosis) , Prophase, Metaphase, Anaphase, Telophase , Reduction or Maturation Division (Meiosis)
Week 6	First maturation division , Second maturation division , The result of the two maturation divisions = mature sex cells , Prophase II , Metaphase II , Anaphase II , Telophase II
Week 7	Mid-term Exam
Week 8	Exchange of Materials between the Cell and Its Environment Composition of the , Extracellular Fluid , Composition of the Intracellular Fluid , Membrane or Resting Potential of a Cel , Solid and Fluid Transport
Week 9	Diffusion , Osmosis and Osmotic Pressure , Filtration , Active Transport , Endocytosis and Exocytosis
Week 10	Genetics (The Science of Heredity) Genes, Chromosomes, and the Genome , The Allele , Dominance, Recessiveness, and Codominance , Phenotype and Genotype , The Mendelian Rules , Autosomal Dominant Hereditary Transmission , Sex-linked Inheritance
Week 11	X Chromosome-linked Dominant Inheritance , X Chromosome-linked Recessive Inheritance , Mutations , Gene Mutations , Chromosome Mutations , Genome Mutations
Week 12	Epithelial Tissue and connective tissue , Surface Epithelia , Cell Junctions , Glandular and Sensory Epithelia , Simple epithelial tissue , Stratified tissue , Shape of epithelial tissue , Connective tissue Function , Connective Tissue Cells
Week 13	Intercellular Matrix (Ground Substance) , Loose Areolar (Interstitial) Tissue , Dense Fibrous White Connective Tissue , Adipose (Fatty) Tissue , Cartilaginous Tissue , Bone Tissue
Week 14	Nervous and Muscles tissue , Smooth Muscle Tissue , Striated Muscle Tissue , Cardiac Muscle Tissue
Week 15	The Neuron , The Nerve Impulse (Action Potential) , The Synapse , The Glia Cells (Neuroglia)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Cytology (7th editions) by Silva Anderus A L (ed.).	Yes
Recommended Texts	Human Biology (6 th editions), by John Recharged	yes
Websites	https://libgen.me/book/ed0b6954e2617c88bdd0e1a8d335eaf7	

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	**Materials Science**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BME-214**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	BME		**College**	ENG	
Module Leader	Ahmed Hadi Abdulameer AlYasari		**e-mail**	a.alyasari@uokerbala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	13/12/2025		**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. Identify engineering materials, especially biological materials, that are in contact with the body of a living organism. 2. Identify the types of bonding between atoms of matter 3. Identify space lattice of metals 4. Calculations related with space lattice of metals 5. Mechanical properties of materials 6. Polymers: its types, properties and applications 7. Ceramics: its types, properties and applications 8. Composite materials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Training the student on the purposeful engineering mindset 2. Make the student able to distinguish between engineering materials and their uses. 3. Applying theoretical concepts through conducting practical experiments on the properties of matter. 4. Recognize and understand how to choose the right material in the right place. 5. The ability to analyze and discover the problem or error and the ability to find a solution to the error.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. -**Introduction into materials science** Materials Science and Engineering. Why Study Materials Science? Classification of Materials Primary and secondary bonds. Atomic Structure Number of atoms Atomic Bonding in Solids Types of bonds in materials Types of atomic and molecular bonds Metal-crystal network. Atomic or Ionic Arrangements Crystal Structures of metals The Face-Centered Cubic (FCC) Crystal Structure

	The Body-Centered Cubic Crystal Structure (B.C.C). The Hexagonal Close-Packed Crystal Structure (HCP). Density Computations—metals Single Crystals Polycrystalline Materials Nanocrystalline Solids (Amorphous) (16hrs) - **Introduction into Mechanical behavior** Tensile testing Engineering Stress-Strain Curve Shear testing Hardness Fatigue test Some problems (8hrs) - **Introduction into Polymer** Fundamentals of Polymer Science and Technology Importance of polymers Polymerization Degree of Polymerization and Molecular Weight Linear, Branched, and Cross-Linked Polymers Network Polymers Copolymers Arrangements of polymer unite (mers) Crystallinity Polymer Crystals Plastics (12hrs) - **Introduction into Ceramics** Classification of ceramic materials Properties of ceramics: Structures of Crystalline Ceramics Types of ceramics A-Traditional Ceramics B-New Ceramics Glass Methods of producing ceramics: Bio ceramics

	Examples for Bio ceramics (12hrs) - **Introduction into Composites materials** Technology and Classification of Composite Materials Metal Matrix Composites Ceramic Matrix Composites Polymer Matrix Composites (8hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1.Giving lectures and solving mathematical problems, if any, on the board. 2. Use of modern technologies and display videos and practical means of electronic display (Data Show) to illustrate the shapes and drawings and diagrams and vocabulary lecture. 3. Focusing on students' participation in the lecture by asking questions, eliciting new ideas and finding other ways to solve mathematical problems. 4- Adopting the homework method to solve the exercises by the students and evaluating their solutions in the classroom.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction into materials science Materials Science and Engineering. Why Study Materials Science? Classification of Materials
Week 2	Primary and secondary bonds. Atomic Structure Number of atoms Atomic Bonding in Solids Types of bonds in materials Types of atomic and molecular bonds
Week 3	Metal-crystal network. Atomic or Ionic Arrangements Crystal Structures of metals The Face-Centered Cubic (FCC) Crystal Structure The Body-Centered Cubic Crystal Structure (B.C.C).
Week 4	The Hexagonal Close-Packed Crystal Structure (HCP). Density Computations—metals Single Crystals Polycrystalline Materials

	Nanocrystalline Solids (Amorphous)
Week 5	Introduction into Mechanical behavior Tensile testing Engineering Stress-Strain Curve Shear testing
Week 6	Hardness Fatigue test Some problems
Week 7	Mid-term Exam
Week 8	Introduction into Polymer Fundamentals of Polymer Science and Technology Importance of polymers Polymerization
Week 9	Degree of Polymerization and Molecular Weight Linear, Branched, and Cross-Linked Polymers Network Polymers Copolymers
Week 10	Arrangements of polymer unite (mers) Crystallinity Polymer Crystals Plastics
Week 11	Introduction into Ceramics Classification of ceramic materials Properties of ceramics:
Week 12	Structures of Crystalline Ceramics Types of ceramics A-Traditional Ceramics B-New Ceramics
Week 13	Glass Methods of producing ceramics: Bio ceramics Examples for Bio ceramics

Week 14	Introduction into Composites materials Technology and Classification of Composite Materials
Week 15	Metal Matrix Composites Ceramic Matrix Composites Polymer Matrix Composites
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Sample Preparation for Microscopic Inspection
Week 2	Lab 2: Microscopic Inspection for specimen
Week 3	Lab 3: Tensile Test
Week 4	Lab 4: Hardness Test
Week 5	Lab 5: Fatigue test
Week 6	Lab 6: Impact Test
Week 7	Lab 7: Properties of Engineering Materials with Regular Shapes -Bulk density - Specific weight: - The porosity

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- (Engineering metallurgy, part 1) Higgins, Raymond A.- Engineering Metallurgy - Applied Physical Metallurgy- Elsevier (1993). 2- (Engineering metallurgy, part 2) Higgins, Raymond A.- Engineering Metallurgy - Applied Physical Metallurgy- Elsevier (1993).	No

Recommended Texts	1-The Science and Engineering of Materials, Seventh Edition, Donald R. Askeland, University of Missouri—Rolla, Emeritus, Wendelin J. Wright, Bucknell Univers, 2016. 2-Materials Science and Engineering An Introduction, William D. Callister, Jr. and David G. Rethwisch, 2010	No
Websites	/https://www.sanfoundry.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.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of Biomedicine

Unit Information Course Information					
Unit Title	**Mathematics III**			**Unit delivery**	
Unit Type	**Basic**			**نظريه** ☒ **حاضر** ☒ **المختبر** ☐ **تعليمي** ☐ **عملي** ☐ ☐ **Seminar**	
Unit Code	ENG201				
ECTS Credits	6				
SWL (ساعة / SEM)	150				
Unit level	2		**Delivery Semester**	1	
Administrative Management	**Biomedical Engineering**		**College**	**Faculty of Engineering**	
Unit Commander	**Salwan Ali Habeeb**		**E-mail Address**	Salwan.ali@uowa.edu.iq	
Title of Unit Commander	teacher		**Unit Commander Qualifications**	Doctor	
Unit Teacher			**E-mail Address**		
Peer Reviewer Name			**E-mail Address**		
Date of accreditation of the Scientific Committee	26/9/2024		**Version number**	1.0	

Relationship with other units Relationship with other subjects			
Prerequisites Unit	Mathematics II	**Semester**	2
Common Requirements Unit	No	**Semester**	

Unit objectives, learning outcomes and how-to contents Course objectives, learning outcomes and instructional contents	
Objectives of the Unit Course Objectives	The objectives of the Mathematics Unit aim to develop a deep understanding of basic mathematical concepts and their practical applications. Emphasis is placed on enhancing students' analytical and logical thinking skills through problem solving and the use of appropriate mathematical methods. The module also aims to teach students how to represent and analyze data using mathematical tools such as graphs and equations. The unit also seeks to develop the ability to apply mathematical concepts in multiple fields such as engineering, physics, and economics, helping to connect mathematics to everyday life and other sciences. In addition, students are encouraged to use modern technologies such as mathematical software to facilitate mathematical calculations and modeling, enhancing their academic and professional competence.

Unit Learning Outcomes Learning outcomes of the course	1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to apply engineering design process to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline. 3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion.
Indicative Contents Indicative Contents	The instructional contents of the Mathematics module include a set of basic topics aimed at building a solid base of mathematical concepts. The module begins by reviewing basic principles of algebra, such as arithmetic, equations, and inequities, with a focus on solving linear and quadratic equations. The module also includes the study of basic geometry, including geometric shapes, measurements, and geometric theories such as the Pythagorean theorem, as well as the applications of geometry in solving practical problems. The basics of calculus, including derivatives and integrals and their applications in the study of variations and their rates, are discussed. Contents include the study of statistics and probability, where students are taught how to collect, analyze, and represent data using graphs and tables. Emphasis is also placed on solving problems using mathematical models and digital technologies such as custom software. The module concludes with practical applications that link mathematical concepts to everyday life and specialized fields such as physics, economics, and engineering, enhancing students' understanding of the role of mathematics in explaining phenomena and solving real-world challenges.

Learning and Teaching Strategies
Learning and Teaching Strategies

Strategies	The teaching strategy in the Mathematics module is based on combining theoretical explanation with practical application to ensure a deep understanding of the concepts. Real-life examples are used and linked to life problems to illustrate the importance of mathematics and its applications. It also encourages interactive activities such as teamwork and problem solving, as well as the use of technology such as digital tools and mathematical software to enhance learning. Lessons conclude with periodic reviews and tests to assess students' comprehension of content.

Student Workload (SWL)
The student's academic load is calculated for 15 weeks

Structured SWL (h / sem) Regular academic load of the student during the semester	78	**SWL regulator (h / w)** Regular student load per week	6
Unstructured SWL (h / sem) Irregular academic load of the student during the semester	72	**Unregulated SWL (h/w)** Irregular student academic load per week	4
Total SWL (h / sem) The student's total academic load during the semester	150		

Unit Evaluation
Course Evaluation

As		Time/Number	Weight (tags)	Week due	Related learning outcomes
Formative Assessment	**Quizes**	2	10% (10)	5, 10	LO #1 , 2 , 10 and 11
	Assignments	2	10% (10)	2, 12	LO #3 , 4 , 6 and 7
	Projects /Laboratory.				

	Attendends	1	10% (10)	13	LO #5 , 8 and 10
Final Assessment	**Midterm Exam**	2 hr	20% (10)	5,12	LO #1-5,#6-11
	Final Exam	3 hours	50% (50)	16	All
Overall Rating			100% (100 degree)		

Delivery Plan (Weekly Syllabus) Theoretical Weekly Curriculum	
week	**Covered Material**
Week 1 **Week 2** **Week 3** **Week 4**	**Ordinary Differential Equations:** First order(variables separable,homogeneous, linear). Second order(Homogeneous and non-homogeneous). Higher order differential equations.
Week 5 **Week 6** **Week 7**	**Partial Differentiation:** Function of two or more variables, Partial Derivative.
Week 8 **Week 9** **Week 10**	**Laplace Transform:** Unit step function, Definition of L.T. and properties. Inverse Laplace Transform, Partial Fractions,solution of differential equations using Laplace transform.
Week 11 **Week 12**	**Sequences and Series**: Sequences, Series, Geometric series, etc.
Week 13 **Week 14** **Week 15**	**Fourier Series:** Periodic Function, Fourier series, Even and Odd Function, Complex notation for Fourier series.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

Learning and Teaching Resources

	text	Available in the library?
Required texts	Erwin Kreyszig,"Advanced Engineering Mathmatics", 10 Ed.	Yes
Recommended texts	1. George B. Thomas Jr.," CALCULAS",14 th Ed. 2. Schaum's Outline of College Mathematics, 4 th Ed. 3. Mary Attenborough, "Mathematics for Elicteical Engineering and Computing", 1 st Ed.	Yes
Websites	Topics in Calculus - Wolfarm Mathworld.	

Grading chart

Grading chart

group	degree	Appreciation	Tags (%)	definition
Success Group (50 - 100)	**A** - Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Proper work with noticeable errors
	D - Satisfactory	medium	60 - 69	Fair but with significant shortcomings
	E - sufficient	Acceptable	50 - 59	The work meets the minimum standards
Group failure (0 – 49)	**FX** - Failed	Deposit (in processing)	(45-49)	More work required but credit granted
	F - Failed	Failure	(0-44)	Large amount of work required

Note: Signs that are more than 0.5 decimal places greater than or below the full mark will be rounded higher or lower (for example, a score of 54.5 will be rounded to 55, while a mark of 54.4 will be rounded to 54. The university has a policy of not tolerating "imminent traffic failure", so the only modification to the marks granted by the original mark(s) will be the automatic rounding described above.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa Engineering College Biomedical Engineering Department	

MODULE DESCRIPTION FORM

Module Information					
Module Title	Medical Informatics			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	BME-213				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	Two		**Semester of Delivery**	3	
Administering Department	BME		**College**	ENG	
Module Leader	Alaa Akram Jawad		**e-mail**	alaa.ak@uowa.edu.iq	
Module Leader's Acad. Title	Assistant Lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	1/6/2025		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Computer Science 1	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	The goal of this one-semester course is to provide the students with a broad overview on "Health Informatics" with focus on electronic health services provided by different kinds of software application. This improves the ability to managing electronic health systems, such as the HER, PACS, HIS, ...etc.
Module Learning Outcomes	1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion. 3. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments which must consider the impact of engineering solutions in global, economic, environment, and social context.
Indicative Contents	Indicative content includes the following. **Part A - Theory** This semester constitutes the lecture notes to provide undergraduate students of biomedical engineering, the background knowledge of the structure of different health care systems. **Part B - Laboratory** In this part, we will investigate a sample system of cach of the given systems in the theoretical part. We recommend to select an open source health care systems to be demonstrated in the lab.

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

Student Workload (SWL)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	12	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	75		

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

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to the Health information technology (HIT) and health care systems,
Week 2	PHI (protected or personal health information)
Week 3	Electronic health records (EHRs) systems
Week 4	Personal health records (PHRs) systems
Week 5	Electronic prescribing (E-prescribing) system
Week 6	Clinical decision support system (CDSS)
Week 7	Clinical decision support system (CDSS)
Week 8	Hospital information systems (HIS)
Week 9	Hospital information systems (HIS)
Week 10	picture archiving systems (PACS)
Week 11	picture archiving systems (PACS)
Week 12	Computer Aided Diagnosis (CAD)
Week 13	Medical image processing
Week 14	Molecular bioinformatics
Week 15	Molecular bioinformatics
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Electronic health records (EHRs) system demonstration.
Week 2	Lab 1: Electronic health records (EHRs) system demonstration.
Week 3	Lab 2: Personal health records (PHRs) system demonstration.
Week 4	Lah 2: Personal health records (PHRs) system demonstration.
Week 5	Lab3: Electronic prescribing (E-prescribing) system demonstration.
Week 6	Lab3: Electronic prescribing (E-prescribing) system demonstration.
Week 7	Lab 4: Hospital information systems (HIS) system demonstration.
Week 8	Lab 4: Hospital information systems (HIS) system demonstration.
Week 9	Lab 5: picture archiving systems (PACS) system demonstration.
Week 10	Lab 5: picture archiving systems (PACS) system demonstration.
Week 11	Lah 6: Computer Aided Diagnosis (CAD) system demonstration.
Week 12	Lab 6: Computer Aided Diagnosis (CAD) system demonstration.
Week 13	Lab 7: Medical image processing system demonstration.
Week 14	Lab 7: Medical image processing system demonstration.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Biomedical Information Technology, by David Dagan Feng	Yes
Websites	Health IT and EHR (https://www.techtarget.com/)	

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

course description

College of Engineering

Department of Biomedical engineering

Course Information

Article Title	**Engineering Mechanics**		**Module Delivery**	
Material Type	**basic**		☒ **Theoretical** ☒ **Lecture** ☐ **Laboratory** ☒ **Discussion** ☐ **practical** ☐ **Seminar**	
Article Code	BME-213			
Number of Credit Hours according to ECTS	**4**			
SWL (Hours/Semester)	**60**			
Material Level	3	**Semester**	3	
Department	BME	**College**	Engineering	
Subject Professor	Hussein Amir Muhammad Ali	**Email**	hussein.aljawad@uowa.edu.iq	
Academic Title of the Subject Professor	Assistant Lecturer	**Academic achievement**	MSc	
Name of the unit instructor (if applicable)		Email		
Name of peer references		Email		
Date of approval of the Scientific Committee		Issue Number		

Relationship with other subjects

Course Requirements	without	**Chapter**	
Common Material Requirements	without	**Chapter**	

Course Objectives, Learning Outcomes, and Instructional Contents	
Course Objectives	Building and psychologically preparing the student to carry out his role as an engineer
Learning Outcomes for the Course	1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to apply engineering design processes to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline. 3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion.
How-to Contents	

Learning and Teaching Strategies	
Strategies	The main strategy that will be followed in the presentation of this module is to encourage students to participate in exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classrooms, interactive lessons and by looking at some kind of simple experiments involving some sampling activities that are of interest to students.

The student's academic load is calculated for 15 weeks			
Student's regular academic load during the semester	60	**Regular Academic Load of the Student Weekly**	4
Student's irregular academic load during class		**Student's irregular academic load per week**	
The student's total academic load during the semester	60		

Assessment of the course

		Time/Count	Weight (Grade)	The week	Relevant Learning Outcomes
Formative Assessment	Tests	2	10% (10)	5, 10	1&2
	Tasks	2	10% (10)	2, 12	1&2
	Projects .	1	10% (10)	Continuous	
	The Report	1	10% (10)	13	LO # 5, 8 and 10
Final Evaluation	Mid-Term Exam	2	10% (10)	7	LO # 1-7
	Final Exam	2	50% (50)	16	All
Kidney			100% (100 °)		

Theoretical Weekly Curriculum

	Covered Material
Week 1	Introduction to Dynamics
Week 2	Straight Motion
Week 3	Flat curved motion
Week 4	Vertical and tangential coordinates (n-t)
Week 5	Polar coordinates (r-θ)
Week 6	Relative Motion
Week 7	MID Exam 1
Week 8	Restricted movement of connected particles
Week 9	Labour and Energy
Week 10	Potential Energy
Week 11	Impact
Week 12	Pulsed momentum
Week 13	Energy and Momentum Conservation
Week 14	Static Mass Flow
Week 15	MID 2 Exam
Week 16	A preparatory week before the final exam

Learning and Teaching Resources

	Source	Library Availability
Required Source	Engineering Mechanics: Dynamics, (14th edition, by R. C. Hibbeler	Yes

Recommended Source	ENGINEERING MECHANICS: DYNAMICS, (5th editions), by J. L. MERIAM and L. G. KRAIGE.	Yes
Website	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

Grading Chart

Collection	**Recognition**	Recognition	**Grade (%)**	**Definition**
Success (50 - 100)	**A -** Excellent	**Privilege**	90 - 100	Outstanding performance
	B - Very Good	**Very good**	80 - 89	Above average with some errors
	C - Good	**Good**	70 - 79	Good work with noticeable errors
	D - Satisfactory	**Medium**	60 - 69	Acceptable but with major flaws
	E - Sufficient	**Acceptable**	50 - 59	Work meets minimum standards
Failure (0 – 49)	**FX –** Fail	**Deposit (in processing)**	(45-49)	More work is required but recognition has been awarded
	F – Fail	**Failure**	(0-44)	A great deal of work is required

Note: Decimal scores above or below 0.5 will be rounded to the highest or lowest full score (e.g., 54.5 will be rounded to 55, while 54.4 will be rounded to 54. The University has a zero-tolerance policy for "near-success failures", so the only adjustment to the marks awarded by the original proofreaders will be the automatic rounding described above.

	Ministry of Higher Education and Scientific Research - Iraq University of Warithe Al_Anbiyaa Engineering College Biomedical Engineering	

MODULE DESCRIPTION FORM

Module Information					
Module Title	Ba'ath Party Crimes			**Module Delivery**	
Module Type	Secondary			☒ **Theory** ☒ **Lecture** ☐ **Lab** **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	BME-112				
ECTS Credits	2				
SWL (hr/sem)	30				
Module Level			**Semester of Delivery**	1	
Administering Department	BME		**College**	ENG	
Module Leader	Zahraa sahib mohammed		**e-mail**	Zahraa.sahib@uowa.edu.iq	
Module Leader's Acad. Title	Assistant teacher		**Module Leader's Qualification**	Master's	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. 1. Introducing students to the historical and legal background of the Ba'ath Party era in Iraq. 2. 2. Analyzing the nature of the crimes and violations committed by the party in light of national laws and international human rights standards. 3. 3. Enabling students to understand the legal framework of criminal accountability for those crimes under Iraqi legislation and the competent courts. 4. 4. Enhancing students' ability to distinguish between political crimes and crimes against humanity according to contemporary legal concepts. 5. 5. Equipping students with the skills to analyze legal texts and historical documents related to the crimes of the former regime. 6. 6. Developing students' legal and human rights awareness regarding the importance of transitional justice and reparations for the victims of that period.
Module Learning Outcomes	1. An ability to communicate effectively with a range of audiences. 2. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments which must consider the impact of engineering solutions in global, economic, environment, and social context.
Indicative Contents	The instructional content includes the following: 1. A historical overview of the emergence and development of the Ba'ath Party in Iraq. 2. Ba'athist ideology and its impact on the structure of the state and society. 3. Political executions and physical liquidations. 4. Crimes of torture and arbitrary detention within security and intelligence agencies. 5. Forced displacement of families (Feyli Kurds, sectarian displacement). 6. Genocidal crimes (Anfal campaign, mass graves). 7. The use of chemical weapons (Halabja as a case study).

Learning and Teaching Strategies	
Strategies	The student's workload is distributed over fifteen weeks through attending theoretical lectures and participating in classroom discussions aimed at reinforcing the legal and historical understanding of the course subject. The student is expected to complete readings and homework assignments that enhance the knowledge acquired in class, in addition to preparing a short report or research paper that develops analytical and research skills. The workload also includes group work that contributes to improving communication and teamwork abilities. At the end of the semester, the student prepares for the examinations by reviewing lectures and sources and by comprehending the core concepts of the course.

Student Workload (SWL)			
Structured SWL (h/sem)	93	**Structured SWL (h/w)**	6
Unstructured SWL (h/sem)	57	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	150		

Module Evaluation					
		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
	attendance	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	3 hrs.	10% (10)	7	LO # 1-7
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Violations of rights and freedoms.
Week 2	Descriptive overview of political regimes in Iraq (1921–2003).
Week 3	Violations of public rights and freedoms by the Ba'athist regime.
Week 4	Impact of Ba'athist regime behaviors on society and its domination over the state.
Week 5	Effect of the transitional period in combating authoritarian politics.
Week 6	The psychological domain, the social domain.
Week 7	Midterm examination.
Week 8	Religion and the state.
Week 9	Culture, media, and militarization of society.
Week 10	Impact of repression and wars on the environment and population.
Week 11	Use of internationally prohibited weapons and environmental pollution.
Week 12	Scorched earth policy.
Week 13	Draining of marshlands and forced migration.
Week 14	Destruction of agricultural and animal environments and radioactive contamination.
Week 15	Preparatory week before the final exam.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Curriculum on the Crimes of the Former Banned Ba'ath Party	Yes
Recommended Texts		No
Websites		

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

	Ministry of Higher Education and Scientific Research - Iraq University of Warithe Al_Anbiyaa Engineering College Biomedical Engineering Department	

MODULE DESCRIPTION FORM

Module Information					
Module Title	Electronic Circuits I			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	BME-211				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level			**Semester of Delivery**	1	
Administering Department	BME		**College**	ENG	
Module Leader	Ali mohammed abdulsadaa		**e-mail**	Ali.mohammed@uowa.edu.iq	
Module Leader's Acad. Title	Assistant lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. Develop problem-solving skills and an understanding of electronic circuits through practical application. 2. Understand the analysis and application of diode circuits. 3. Understand scissor, clamp, and Zener circuits. 4. This course covers the fundamental concepts of electronic circuits. 5. Understand and analyze the main types of transistors. 6. Perform series-connection analysis of transistors.
Module Learning Outcomes	1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to apply engineering design process to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline. 3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion.
Indicative Contents	Indicative content includes the following. Semiconductors: N-type, P-type, P-N junction, V-I characteristics, diode applications, half-wave rectifier, full-wave rectifier, power supply with filters and regulators, clippers, clamps, Zener diode: construction, characteristics and circuitry, applications, other types of diodes: variable diodes, current-regulating diode, tunneling diode, shock diode, PIN diode, bipolar junction transistor (BJT): transistor structure, BJT connection configuration, bias, characteristics, amplification parameters, DC load line, waveform distortion and Q-point, BJT switching operation, BJT amplifier operation, H parameters, equivalent circuits for CC, CB, and C.E. with their circuit applications.

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

Student Workload (SWL)			
Structured SWL (h/sem)	93	**Structured SWL (h/w)**	6
Unstructured SWL (h/sem)	57	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	150		

Module Evaluation					
		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**	3 hrs.	10% (10)	7	LO # 1-7
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Semiconductors: N-type, P-type, P-N junction, V-I characteristics
Week 2	Diode applications, half-wave rectifier, full-wave rectifier
Week 3	Parameters, DC load line, Q-point and waveform distortion
Week 4	Power supplies with filters and regulators, clippers, clampers
Week 5	Zener diode: construction, characteristics, circuitry and applications
Week 6	Bipolar junction transistor (BJT): transistor structure
Week 7	Midterm exam
Week 8	BJT connection configuration, bias, characteristics, and amplification
Week 9	BJT switching operation
Week 10	BJT amplifier operation
Week 11	H parameters, equivalent circuits
Week 12	H parameters, equivalent circuits for C.C.
Week 13	H parameters, equivalent circuits for C.B.
Week 14	H parameters, equivalent circuits for CE with their circuit applications
Week 15	Darlington amplifier
Week 16	Preparation week before the final exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Diode characteristics
Week 2	Types of diode
Week 3	Rectifiers and filters
Week 4	Clippers, clippers, and voltage amplifiers
Week 5	Zener diode as a voltage regulator
Week 6	BJT characteristics and DC bias
Week 7	Common-emitter amplifier

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Boylestad, R.L., and Nashelsky, L., Electronic Devices and circuit Theory, 9th Ed., Pearson Education, Inc., 2013.	Yes
Recommended Texts	Floyd, Thomas L., Electronic devices: Electron Flow Version, 11th Ed., Pearson Education, Inc., 2012.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa Engineering College Biomedical Engineering Department	

MODULE DESCRIPTION FORM

Module Information					
Module Title	Mechanics of Material			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	WBM-31-02				
ECTS Credits	3				
SWL (hr/sem)	150				
Module Level			**Semester of Delivery**	1	
Administering Department	BME		**College**	ENG	
Module Leader	Natiq Aziz Omran		**e-mail**	Nataq.az@uowa.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. To develop problem solving skills and understanding of the behavior of engineering materials under different loading conditions. 2. To understand stress, strain, and deformation in structural members. 3. This course deals with the basic concepts of strength of materials. 4. This is a fundamental subject for mechanical and biomedical engineering applications. 5. To understand axial, torsional, and bending stress problems. 6. To perform stress and deformation analysis in beams, shafts, and structural elements. 7. To apply basic failure theories and material properties in engineering analysis.
Module Learning Outcomes	After successfully completing this module, students will be able to: 1. Explain the fundamental concepts of stress, strain, and deformation in engineering materials. 2. Identify and classify different types of loads and their effects on structural members. 3. Analyze axial stress and strain in bars subjected to tensile and compressive forces. 4. Evaluate torsional stresses and angles of twist in circular shafts. 5. Determine bending stresses and normal stresses in beams subjected to transverse loading. 6. Analyze shear stresses in beams and thin-walled members. 7. Apply the concepts of elastic behavior, Hooke's law, and material properties such as Young's modulus, shear modulus, and Poisson's ratio. 8. Calculate thermal stresses and strains resulting from temperature changes. 9. Assess combined stresses and determine principal stresses and maximum shear stresses. 10. Use appropriate failure theories to predict material behavior under different loading conditions. 11. Solve engineering problems related to strength and deformation of materials using analytical methods. 12. Demonstrate problem-solving skills relevant to mechanical and biomedical engineering applications.
Indicative Contents	Indicative content includes the following: Strength of Materials Theory Stress and strain concepts, types of stress and strain, mechanical properties of materials. Axial loading of members, elastic deformation and Hooke's law. Torsion of circular shafts, angle of twist and shear stress. Bending of beams, bending stress and flexural formula. Shear stress in beams. Combined stresses, principal stresses and failure theories. Thermal stresses and strains.

Learning and Teaching Strategies	
Strategies	The main strategy adopted in delivering this module is to enhance students' understanding of the fundamental principles of strength of materials through lectures and problem-solving activities. Emphasis is placed on developing analytical skills by applying theoretical concepts to practical engineering problems. Lectures are used to explain key topics such as stress, strain, torsion, bending, and material behavior under different loading conditions. Problem-solving exercises are integrated into the teaching process to improve students' ability to analyze and solve numerical problems. Continuous assessment methods, including quizzes, assignments, and examinations, are used to evaluate students' progress and reinforce learning outcomes. This approach encourages active student participation and supports the development of critical thinking and independent learning skills.

Student Workload (SWL)			
Structured SWL (h/sem)	123	**Structured SWL (h/w)**	6
Unstructured SWL (h/sem)	27	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	150		

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

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Units and common principles and Analysis of Internal Forces and Stresses
Week 2	Normal stress and Shear stress and safety Factor
Week 3	Torsion of Circular Shaft and Torsion of non- circular section
Week 4	
Week 5	Current divider rule, open and short circuits.
Week 6	Series-Parallel Networks, series-parallel DC networks.
Week 7	Mid-term Exam
Week 8	Thin walled pressure vessels
Week 9	Simple Strain and Deformations of Axially Loaded Members
Week 10	Deformation of axially loaded members
Week 11	Displacement Diagram
Week 12	Statically indeterminate problems
Week 13	Thermal stresses and strains
Week 14	The Columns, Definition, The Critical load of column, Radius of Gyration.
Week 15	Combined Stresses, Combined axial and bending loading, Combined axial and torsional loading, Combined bending and torsional loading
Week 16	Preparatory week before the final Exam
Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Introduction to mechanics of materials
Week 2	Lab 2: loading effects on material
Week 3	Lab 3: stress
Week 4	Lab 4: strain
Week 5	Lab 5: bending
Week 6	Lab 6: relation between stress and strain
Week 7	Lab 7: torsion

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Strength of Materials, Third and Fourth Edition. Ferdinand and L.Singer Andrew Pytel	Yes
Recommended Texts	An Introduction to the Mechanics of Elastic and Plastic Deformation of Solids and Structural Materials THIRD EDITION E. J. HEARN Ph.D., B.Sc. (Eng.) Hons., C.Eng., F.I.Mech.E., F.I.Prod.E., F.1.Diag.E.	Yes
Websites	http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IITROORKEE	

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

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Histology**	**Unit delivery**	
Unit Type	**Core**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-316		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**125**		
Unit level	3	**Delivery Semester**	1
Department of Administration	Biomedical Engineering	**College**	College of Engineering
Unit Commander	Kawthar Ali Hasan	**E-mail Address**	Kawthar.ali@uowa.edu.iq
Title of Unit Commander	Assist-Lecture	**Unit Commander Qualifications**	Doctor
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	Name	**E-mail Address**	
Date of accreditation of the Scientific Committee	26/9/2024	**Version number**	1.0

Relationship with other units

Relationship with other subjects

Prerequisites Unit	No	**Semester**	
Common Requirements Unit	No	**Semester**	

Unit objectives, learning outcomes and how-to contents Course objectives, learning outcomes and instructional contents	
Objectives of the Unit Course Objectives	The course aims to enable students to acquire the following skills: • Identify the different types of tissues in the body, such as epithelial, muscular, nervous, and connective tissues. • Enable students to gain general knowledge about tissues. • Understand the characteristics of tissues and the damage that may occur in them. • Learn about specialized types of tissues. • Recognize histological stains and their use in preparations and early detection of some diseases. • Understand the relationship between histology and physiology.
Unit Learning Outcomes Learning outcomes of the course	1. Training the student on the purposeful engineering mindset 2. Make the student able to distinguish between engineering materials and their uses. 3. Applying theoretical concepts through conducting practical experiments on the properties of matter. 4. Recognize and understand how to choose the right material in the right place. The ability to analyze and discover the problem or error and the ability to find a solution to the error.
Indicative Contents Indicative Contents	Introduction to Tissues: Defining the types of tissues and their basic functions. • Epithelial Tissues: Study of tissues that cover the internal and external surfaces of the body, such as the skin and intestines. • Muscle Tissues: Study of tissues responsible for movement, including skeletal, cardiac, and smooth muscles. • Nervous Tissues: Study of tissues that handle nerve signals, such as nerves and the brain. • Connective Tissues: Study of tissues that support and connect other tissues, such as tendons and cartilage. • Specialized Tissues: Such as blood, bone, and glandular tissues. • Pathological Changes in Tissues: Study of how tissues change due to diseases or injuries.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	1. Using the Smart Board and Illustrative Images Whenever Possible. 2. Using the Light Microscope at Different Magnifications with Objective and Eyepiece Lenses.

Student Workload (SWL) The student's academic load is calculated for 15 weeks			
SWL منظم (h / sem) Regular academic load of the student during the semester	64	**SWL regulator(h/s)** Regular student load per week	4
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	61	**Unregulated SWL (h/s)** Irregular student academic load per week	4
SWL إجمالى (h / sem) The student's total academic load during the semester	125		

Unit Evaluation Course Evaluation					
As		Time/Number	Weight (tags)	Week due	Related learning outcomes
Formative Assessment	Contests	2	10% (10)	5, 10	2&1
	Assignments	2	10% (10)	2, 12	2&1
	Projects /Laboratory.	1	10% (10)	continuous	2&1
	report	1	10% (10)	13	
Final Assessment	Midterm Exam	2 hr	10% (10)	7	2&1
	Final Exam	2 hours	50% (50)	16	every
Overall Rating			100% (100 degree)		

Delivery Plan (Weekly Curriculum) Theoretical Weekly Curriculum	
week	Covered Material
Week 2+1	General Introduction: History of histology, review of cell components, and the concept of tissue.
Week 3	Epithelial Tissue: Characteristics of epithelial tissues, their functions, classification, and information about pseudostratified and transitional epithelium.
Week 4	Connective Tissue: Introduction to connective tissue, its functions, components, and ground substance
Week 5	Connective Tissue: Collagen fibers, elastic fibers, and reticular fibers.
Week 6	Bone Tissue: Components of bone, its functions, bone cells, types of bone tissue, and bone diseases
Week 7	Blood: Components and functions of blood, blood cells and plasma, and common blood disorders.
Week8	Cartilage: Histological structure of cartilage, cartilage cells, and functions of cartilage
Week 9	Types of Cartilage: Hyaline, elastic, and fibrocartilage.
Week 10	Nervous Tissue: Its types and characteristics, distribution in the body, and functions
Week 11	Muscle Tissue: Its types, characteristics, distribution in the body, and functions.
Week 12	Heart and Smooth Muscles

Week 13	Lymphatic System: Histological structure of some organs and its adaptation to function.
Week 14	Study of the Compound Light Microscope: Learning about the types of light microscopes and the cameras used for tissue imaging
Week 15	Exams

Learning and Teaching Resources

Learning and Teaching Resources

	text	Available in the library?
Required texts	Junqueiras- basic – histology and cell biology Text book of veterinary histology by samuelson 2010	Yes
Recommended texts	General Histology Books	Yes
Websites	http://www.iasj.net الاكاديميه العلمية المجلات	

Grading chart

Grading chart

group	degree	Appreciation	Tags (%)	definition
An-Najah Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Proper work with noticeable errors
	D - Satisfactory	medium	60 - 69	Fair but with significant shortcomings
	E - sufficient	Acceptable	50 - 59	The work meets the minimum standards
Group failure (0 – 49)	**FX -** Failed	Deposit (in (processing	(45-49)	More work required but credit granted
	F - Failed	Failure	(0-44)	Large amount of work required

Note: Signs that are more than 0.5 decimal places greater than or below the full mark will be rounded higher or lower (for example, a score of 54.5 will be rounded to 55, while a mark of 54.4 will be rounded to 54. The university has a policy of not tolerating "imminent traffic failure", so the only modification to the marks granted by the original mark(s) will be the automatic rounding described above.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of Biomedicine

Unit Information				
Course Information				
Unit Type	**Electromagnetics**			نظريه ☒ حاضر ☒ المختبر ☒ تعليمي ☐ عملي ☐ ☐ **Seminar**
Unit Code	**BME-312**			
ECTS Credits	**3**			
SWL (ساعة / SEM)	**150**			
Unit level	3	**Delivery Semester**	1	
	Biomedical Engineering	**College**	College of Engineering	
Unit Commander	Saad M. Sarhan	**E-mail Address**	saad.mah@uowa.edu.iq	
Title of Unit Commander	Assistant Doctor	**Unit Commander Qualifications**	Doctor	
Unit Teacher		**E-mail Address**		
Peer Reviewer Name		**E-mail Address**		
Date of accreditation of the Scientific Committee	26/9/2025	**Version number**	1.0	

Unit objectives, learning outcomes and how-to contents	
Course objectives, learning outcomes and instructional contents	
Objectives of the Unit	

Course Objectives	□ Understand the fundamental concepts of scalars, vectors, vector algebra, and different coordinate systems. □ Apply Coulomb's Law and compute electric field intensity for different charge distributions (line, surface, and volume). □ Understand electric flux density, Gauss's Law, and the concept of divergence. □ Use the **Del operator** and apply the Divergence Theorem in field analysis. □ Analyze the relationship between electric potential and energy in electrostatic fields.
Unit Learning Outcomes Learning outcomes of the course	By the end of this unit, students will be able to: 1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to apply engineering design process to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline. 3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion. 4. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge

Indicative Contents
Indicative Contents
	1. Overview of Scalars, Vectors, Vector Algebra, and Coordinate Systems
	• Definitions of scalar and vector quantities.
	• Vector operations: addition, subtraction, dot product, and cross product.
	• Coordinate systems:
	  ○ Cartesian
	  ○ Cylindrical
	  ○ Spherical
	• Coordinate transformations.
	
	2. Coulomb's Law and Electric Field Intensity + Charge Distributions
	• Coulomb's Law for electric force.
	• Electric field intensity due to point charges.
	• Electric field for:
	  ○ Line charge distributions
	  ○ Surface charge distributions
	  ○ Volume charge distributions

	• Examples and tutorial problems.
	3. Electric Flux Density, Gauss's Law, and Divergence • Definition of electric flux density **D** and its relation to **E**. • Gauss's Law and its mathematical forms. • Applying Gauss's Law to symmetric field problems. • Divergence and its physical interpretation in electrostatics.
	4. Del Operator and Divergence Theorem • Definition and components of the **Del (∇) operator**. • The divergence operation (**∇·A**). • Divergence Theorem and applications in field analysis.
	5. Energy and Potential • Electric potential and its relation to the electric field. • Calculating potential for different charge distributions. • Energy stored in the electric field. • Relationship among work, potential, and electric field.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	□ The instructor delivers detailed theoretical lectures. □ The instructor assigns periodic reports on the fundamental topics of the course. □ Continuous assessment: conducting short quizzes and regular exercises to monitor students' progress and identify areas that need reinforcement. □ Explanation and discussion: encouraging students to explain their solutions and reasoning to promote deep understanding and improve communication skills

Student Workload (SWL) The student's academic load is calculated for 15 weeks			
SWL منظم (h / sem) Regular academic load of the student during the semester	78	**SWL regulator(h/s)** Regular student load per week	4
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	72	**Unregulated SWL (h/s)** Irregular student academic load per week	4

إجمالي SWL (h / sem) The student's total academic load during the semester	125

Unit Evaluation
Course Evaluation

As		Time/Number	Weight (tags)	Week due	Related learning outcomes
Formative Assessment	Contests	2	10% (10)	5, 10	LO #1 , 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO #3 , 4, 6 and 7
	Projects /Laboratory.	1	10% (10)	continuous	every
	report	1	10% (10)	13	LO #5 , 8 and 10
Final Assessment	Midterm Exam	2 hr	10% (10)	7	LO #1-7
	Final Exam	2 hours	50% (50)	16	every
	Overall Rating		100% (100 degree)		

Delivery Plan (Weekly Curriculum)
Theoretical Weekly Curriculum

week	Covered Material
Week 3+2+1	Overview about scaler, vector, vector algebra, and types of coordinate systems.
Week 4+5	Coulomb's Law and Electric Field Intensity, line charge, surface charge, and volume charge, Tutorial
Week 6+7+8+9	Electric Flux Density, Gauss's Law, and Divergence
Week 10+11+12	Del operator and Divergence Theorem
Week 13+14	Energy and Potential
Week 15	Maxwel Equatiions

Learning and Teaching Resources

Learning and Teaching Resources

	text	Available in the library?
Required texts	Electricity and Magnetism by Purcell	Yes
Recommended texts		Yes
Websites		

Grading chart

Grading chart

group	degree	Appreciation	Tags (%)	definition
An-Najah Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Proper work with noticeable errors
	D - Satisfactory	medium	60 - 69	Fair but with significant shortcomings
	E - sufficient	Acceptable	50 - 59	The work meets the minimum standards
Group failure (0 – 49)	**FX -** Failed	Deposit (in processing)	(45-49)	More work required but credit granted
	F - Failed	Failure	(0-44)	Large amount of work required

Note: Signs that are more than 0.5 decimal places greater than or below the full mark will be rounded higher or lower (for example, a score of 54.5 will be rounded to 55, while a mark of 54.4 will be rounded to 54. The university has a policy of not tolerating "imminent traffic failure", so the only modification to the marks granted by the original mark(s) will be the automatic rounding described above.

نموذج وصف الوحدة

نموذج وصف المادة الدراسي

كلية الهندسة / قسم الطب الحياتي

Module Information معلومات المادة الدراسية					
Module Title	**Medical Equipment**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BME-317**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	BME.		**College**	ENG.	
Module Leader	Dr. Hayder A. Yousif		**e-mail**	hayderyousif@uowa.edu.iq	
Module Leader's Acad. Title	Doctor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/10/2025		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The goal of this one-semester course is to provide the students by a broad overview on " Medical Equipment" with focus on theory, working principle, generations and Medical Applications for the main equipments like X- ray , MRI , CTS and Dental chair. Also training the students in the laboratory to be familiar with most of equipment parts
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Explain the main components of each medical equipment and haw can match these components to produce a good picture that can help the doctors and patient in successful diagnosis and therapy .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Theory This section constitutes the lecture notes to provide undergraduate students of biomedical engineering, X ray theory, terms and components. Also the electrical part and the imaging part . the same section with CTS & MRI Part B - Laboratory. This section to enhance knowledge that started in the theory part, in order to help students to improve these equipments.

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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignment	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**	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	Introduction to Medical equipments
Week 2	X-Ray Equipment, X-ray definition and theory
Week 3	X-Ray Equipment, X-ray production,
Week 4	Design of X-ray tube, X-ray power supplies and circuits, Heat loading
Week 5	X-ray imaging part cassette . film and filters
Week 6	characteristics of X-ray tube,
Week 7	1st Mid-Exam

Week 8	X-ray control unit, X-ray switches and timing model
Week 9	method for exposure control unit
Week 10	Development of X-ray films (automatic and manual), X-ray fluoroscope machine
Week 11	ypical faults and maintenance of the X-ray,
Week 12	X-ray Computed Tomography scan (CTS),
Week 13	CTS generations, resolution, faults, risks and applications
Week 14	MRI equipments theory, main types, applications and improvement methods
Week 15	Tooth Chair, Tooth chair, main parts and operation, Pneumatic circuits, Hydraulic circuits, Typical faults and maintenance of Tooth chair.
Week 16	2nd Mid - Exam **- Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to X -ray components
Week 2	Lab 2:x- ray electrical generator and circuits
Week 3	Lab 3: x-ray imaging part
Week 4	Lab 4: CTS parts and gantry
Week 5	Lab 5: MRI coils and display part
Week 6	Lab 6: Dental Chair parts
Week 7	Lab 7: medical equipment hazards and safty

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	MEDICAL PHYSICS by John R. Cameron & James G. Skofronick	
Recommended Texts	ESSENTIAL GUIDE TOMEDCAL EQUIPMENT PRINCIPLES by David Mulvey	
Recommended 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.

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa Engineering College Biomedical Engineering Department	

MODULE DESCRIPTION FORM

Module Information					
Module Title	Engineering analysis			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	BME-315				
ECTS Credits	2				
SWL (hr/sem)	30				
Module Level			**Semester of Delivery**	1	
Administering Department	BME		**College**	ENG	
Module Leader	Ali mohammed abdulsadaa		**e-mail**	Ali.mohammed@uowa.edu.iq	
Module Leader's Acad. Title	Assistant lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	The topic of geometric analysis of frequency functions mathematically aims to clarify the practical and philosophical challenges of current geometric analyses that have stimulated this continuous development, as well as to provide the basic concepts of functions and their useful fields for further study of engineering sciences and applied analytical mathematics in the scientific and practical field. This is done starting from reviewing the basic principles, studying the meaning of the function and how to draw it on the attempt, analyzing the integrative in relation to time and frequency, finding the purpose for it, vectors, and finally the polar coordinates, in addition to introducing the principles of integration and calculus, their applications, and some functions in particular, in addition to increasing the opportunity for students to practice sound thinking methods, such as reflective, deductive, and inductive thinking, and increasing their skills in using the problem-solving method to understand what they are studying, and to reveal new relationships.
Module Learning Outcomes	1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to apply engineering design process to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline. 3. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Indicative Contents	B. Skills objectives of the course B1- Familiarity with the mathematical analytical relations that represent the types of algebraic functions and their drawing. C2- Familiarity with the laws of finding the derivative using the definition and returning it to the basic function under the influence of the integration properties. C3- Familiarity with finding the field and the corresponding field of a function with one variable and how to draw it in terms of Cartesian coordinates A4- Familiarity with concepts does not achieve the goal, solving immediate equations and performing algebraic operations on them.

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

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	6
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	50		

Module Evaluation					
		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	3 hrs.	10% (10)	7	LO # 1-7
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Fourier series
Week 2	Complex Fourier series
Week 3	examples
Week 4	Fourier transform
Week 5	Application of fourier transform
Week 6	examples
Week 7	Midterm exam
Week 8	Laplace transform
Week 9	Invers laplace transform
Week 10	examples
Week 11	The sequence
Week 12	Z transform
Week 13	Application of Z transform
Week 14	examples
Week 15	examples
Week 16	Preparation week before the final exam

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

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Signals and systems , Sanjay sharma. 2011	Yes
Recommended Texts	Signals and systems , Sanjay sharma. 2011	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

نموذج وصف الوحدة

نموذج وصف المادة الدراسي

كلية الهندسة / قسم الطب الحياتي

Module Information معلومات المادة الدراسية					
Module Title	**Trunk Anatomy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BME-314**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	BME.		**College**	ENG.	
Module Leader	MSc. Ghufran Basim Medeb		**e-mail**	ghufran.basim95@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	21/9/2025		**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 know the types of body tissues and distinguish their characteristics. 2. To understand nervous tissue histology 3. This course deals with the basic concept of Muscle tissue. 4. This is the basic subject for all body tissues. 5. To develop skills dealing with stain. 6. To Know the types of microscopes used in diagnosis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. 2. An ability to apply engineering design process to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline. 3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion. Discuss the most important tissues that cover the skeletal system 4. An ability to communicate effectively with a range of audiences. 5. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments which must consider the impact of engineering solutions in global, economic, environment, and social context. 6. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge Discuss the most important dyes used in diagnosis 7. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Movements of shoulder joint Ventral and dorsal flexion , Movements of shoulder joint Abduction and adduction , Movements of shoulder joint External and internal rotation , Movements of elbow joint Flexion and extension, Movements of forearm Pronation and supination [12 hrs].

	Bones and joints of the vertebral column and Lower limb , Femur , Shaft of the femur , Patella , Tibia and fibula , Metatarsal bones [12 hrs]. Muscle tissue- structure, contraction and innervation of skletetal muscle, cardiac and smooth muscles, nervous tissue- histogenesis, cells, synapses, nerve fibers, nerves, ganglia, membranes and vessels of the CNS, blood-brain-barrier, cytoarchitecture of the spinal cord, cerebellum and cerebrum. The heart, the conducting system, its blood supply.[12hrs] Arteries and veins of the and abdominal pelvis and lower limb , femoral artery Branches, Profunda Femoris Artery, Arteriala nastomosis in the ll , Cannulation of femoral artery, Popliteal artery , Genicular anastomosis , Veins of the l.l , Superficial veins :great saphenous vein , Venae comitantes , Perforating veins , Varicose veins , Deep vein thrombosis (DVT. [20 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module encourage students' participation Dissection of rats and handling of dyes an laboratory slides,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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	1, 6, 7
	Assignment	2	10% (10)	2, 12	1, 6, 7
	Projects / Lab.	1	10% (10)	Continuous	1, 6, 7
	Report	1	10% (10)	13	1, 6, 7
Summative assessment	Midterm Exam	2hr	10% (10)	7	1, 6, 7
	Final Exam	2hr	50% (50)	16	1, 6, 7
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the anatomy of thorax,Thoracic cage organization, the sternum, the ribs and thoracic vertebrae,
Week 2	Irregular bones - general features e.g. vertebrae , Flat bones - general features e.g. scapula, sternum and ribs , Gross anatomy of bone , Clavicle , Scapula
Week 3	Bones and joints of the trunk , Skeleton , Function of bones , Identifying characteristics , Classification of bones
Week 4	Thoracohumeral muscles , Superficial (first) layer of back muscles , Shoulder girdle muscles , Rotator cuff , Incisura scapulae Suprascapular notch , Incisura spinoglenoidalis, Trigonum clavipectorale / deltopectorale
Week 5	the intercostals space and articulation of the thoracic cage, Functional anatomy of respiration and diaphragm
Week 6	pulmonary trunk, and major veins the mediastinum, autonomic nervous system in the thorax, pleura and lungs, lymph drainage
Week 7	Mid-term Exam
Week 8	the heart, pericardium and surfaces of the heart, the heart chambers, the coronary arteries, vein of the heart, the conductive system, aorta
Week 9	muscles of the antero-lateral abdominal wall, the inguinal region, Bones and joints of the vertebral column
Week 10	muscles and joints of the back, bony pelvis, ligaments and sex differences, muscles and fascia of pelvic walls and floor
Week 11	the liver and biliary passages, the pancreas and the spleen
Week 12	the kidney, suprarenal and ureter, posterior abdominal wall and diaphragm, vessels and nerves on the posterior abdominal wall, lymphatic of the abdomen

Week 13	the lumbar spine and anatomy of the intervertebral disc, muscles and joints of the back, bony pelvis, ligaments and sex differences
Week 14	duodenum, alimentary tract jejunum and ileum, the large intestine, arterial supply of the gut, venous drainage of the gut Arteries and veins of the abdominal pelvis , the peritoneum stomach, and
Week 15	muscles and fascia of pelvic walls and floor internal pelvic organs:rectum, anal canal and urinary bladder
Week 16	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Essentials of Anatomy, (7 th editions), by Valerie C. Scanlon, PhD, Tina Sanders	Yes
Recommended Texts	Snell's Clinical Anatomy by Regions, 10th Edition,by Lawrence E.Wineskl,PHD	Yes
Recommended 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.

Course Description Form

1. Course Name:
Microprocessor
2. Course Code:
WBM-51-06
3. Semester / Year:
Semester
4. Description Preparation Date:
28/10/2026
5. Available Attendance Forms:
Presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30h Theory – 45h Lab / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Ali Abdulhussein Mohammed Email: ali.masaoodi@uowa.edu.iq
8. Course Objectives
Understanding Microprocessor Architecture: Students should acquire a comprehensive knowledge of the 8086 microprocessor architecture, including the bus interface, memory organization, and instruction set. **Programming Skills:** Develop students' proficiency in assembly language programming, with a focus on writing and executing programs specific to the 8086 microprocessor. **Interfacing Techniques:** Enable students to understand how to connect the 8086 microprocessor to other components and electronic devices, and acquire the skills necessary to design and implement interface circuits. **Problem Solving:** Equip students with the ability to analyze theoretical and practical problems related to the 8086 microprocessor, and to develop appropriate solutions using design and programming skills. **Application in Biomedical Engineering:** Understand the applications of microprocessors in the design and implementation of medical devices and systems, and employ them to meet diagnostic and therapeutic needs.

9. Teaching and Learning Strategies

1. Teaching Methods

- **Lectures and Demonstrations:**
  Use lectures to cover theoretical aspects, and live demonstrations to highlight practical applications.
- **Interactive Sessions:**
  Engage students in interactive sessions that allow them to explore microprocessor components and functions through virtual simulations.

2. Educational Activities

- **Hands-on Laboratory Work:**
  Organize lab sessions where students work in groups to build and test simple devices using microprocessors and electronics.
- **Applied Projects:**
  Implement mini-projects that require designing a part of a dev using the 8086 microprocessor, focusing on developing studen practical and innovative skills.
- **Simulation Programs:**
  Use tools and simulation software for microprocessor function and circuit design, enhancing understanding without relying solely on physical components.

3. Continuous Improvement

- **Review Results Analysis:**
  Collect student feedback systematically to improve course content and delivery, aligning with technological advancement and changing learning needs.
- **Content Updates:**
  Rely on insights from student evaluations and teaching strategi to continuously update concepts and course material.
- **Integration with Modern Developments:**
  Regularly review curricula to stay aligned with advancements i microprocessor technologies and their applications in biomedical devices.

10. Course Structure

Week	Hours	Unit or subject name and required learning outcomes	Learning method	Evaluation method
3-1	2 h theory / 3 h lab	Introduction to microprocessor, microcomputer.	Lectures and experiments.	Daily exams + classwork

5-4	2 h theory / 3 h lab	Microprocessor organization	Lectures and experiments.	Daily exams + classwork
6-8	2 h theory / 3 h lab	Computer language and assembly language	Lectures and experiments.	Daily exams + classwork
11-9	2 h theory / 3 h lab	Stacks and subroutines, microprocessors set and computer languages,	Lectures and experiments.	Daily exams + classwork
13-12	2 h theory / 3 h lab	Logic devices for interfacing, memory mapped I/O, the 8085 (8086) and its input/output mapping	Lectures and experiments.	Daily exams + classwork
15-13	2 h theory / 3 h lab	Interrupt routines, peripheral devices, PPI, practical interface.	Lectures and experiments.	Daily exams + classwork

11. Course Evaluation

1. **Daily quizzes** with practical and theoretical questions.
2. **Participation grades** awarded for answering challenging competitive questions among students.
3. **Periodic exams** covering the course material, in addition to a **midterm exam** and a **final exam**.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, and Pentium Pro Processor Architecture, Programming, and Interfacing", 6th Edition, Prentice-Hall Inc., 2003.
Main references (sources)	Walter A. Triebe, "The 8086 Microprocessor: Architecture, Software, and Interfacing Techniques", Prentice-Hall Inc., 1998.
Recommended books and references (scientific journals, reports…)	Browsing scientific websites to stay updated on the latest developments in the subject. www.sciencedirect.com

University of Warith Al-Anbiyaa / College of Engineering / Biomedical Engineering Department

Course Description Form

1. Course Name:
Diagnostic Instrumentation
2. Course Code:
WBM-51-03
3. Semester / Year:
1st Semester / 2023 2024
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
Weekly (Theoretical & Practical)
6. Number of Credit Hours (Total) / Number of Units (Total)
45 Hrs. Theoretical & 30 Hrs. Practical / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Hayder A. Yousif Email: hayder.ab@uowa.edu.iq
8. Course Objectives

Course Objectives	The main aim of this study is studying some diagnostic devices that are related to the human body (such as the sonar device, the medical endoscope device, and the vital activity monitoring device) and study the principle working with its effect on the human body. In this course the student will study the Diagnostic Instrumentation (Medical Ultrasound, Endoscopy, and Patient Alarm Systems) The student will be able to know the following: 1- The properties of ultrasound waves. The decibel notation for ultrasound intensity and pressure. The ultrasound properties of velocity, attenuation, and absorption. The ultrasound reflection, refraction and

	scattering, and principle working of ultrasound device. 2- Basic component of Endoscopy, Principle working of Endoscopy, and Types of Endoscopies.

9. Teaching and Learning Strategies

Strategy	The student will be able to understand the principle of operation of the Diagnostic Instrumentation and its dealings with the human body, and to graduate engineers specialized in the field of biomedical engineering, which relates to human life with the medical device and work in the medical engineering environment.

10. Course Structure

Week	Hours	Unit or subject name and Required Learning Outcomes	Learning method	Evaluation method
1	3	2	Theoretical & Practical	Daily test and oral questions
2	3	2	Theoretical & Practical	Daily test and oral questions
3	3	2	Theoretical & Practical	Daily test and oral questions
5&4	3	2	Theoretical & Practical	Daily test and oral questions
6	3	2	Theoretical & Practical	Daily test and oral questions
7	3	2	Theoretical & Practical	Daily test and oral questions
8	3	2	Theoretical & Practical	Daily test and oral questions
10&9	3	2	Theoretical & Practical	Daily test and oral questions
11	3	2	Theoretical & Practical	Daily test and oral questions
12 13&	3	2	Theoretical & Practical	Daily test and oral questions
& 14 15	3	2	Theoretical & Practical	Daily test and oral questions

11. Course Evaluation	
1- Weekly exams 2- Monthly exams 3- Participations inside the class 4-present the seminars 5- Writing reports	
12. Learning and Teaching Resources	
Required textbooks (curricular books any)	Handbook of Biomedical Instrumentation Second Edition - R S KHANDPUR
Main references (sources)	Handbook Of Biomedical Instrumentation 3rd Edition 933920543X · 9789339205430 By R S Khandpur
Recommended books and references (scientific journals, reports…)	Standard handbook of biomedical engineering & design - M Kutz
Electronic References, Websites	https://books.google.iq/books/about/Handbook of_Biomedical_Instrumentation.html?idesc=y

Course Description Form

1. Course Name:

Infrared and Thermal Imaging

2. Course Code:

WBM-51-02

3. Semester / Year:

First Semester / Five Year

4. Description Preparation Date:

12/24/2025

5. Available Attendance Forms:

Bologna system attendance form

6. Number of Credit Hours (Total) / Number of Units (Total)

30 Hours / 2 Units

7. Course administrator's name (mention all, if more than one name)

Name: Karrar Aqeel Hussein
Email: karrar.aqeel@uowa.edu.iq

8. Course Objectives

Course Objectives	Infrared thermal imaging aims to identify the technology of generating quantitative radiometric digital images of object scenes recorded at infrared thermal wavelengths. Besides qualitative visualization as well, it allows measuring the surface temperatures of objects.

9. Teaching and Learning Strategies

Strategy	□ Giving detailed theoretical lectures. □ Request periodic reports on the basic topics of the subject.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2	4	1	Introduction: Infrared and Thermal Imaging, History of IR, General Definition Of	Lecture	NA

			Thermography, Principle Used In Thermography, Thermal Imaging Cameras, History Of Electromagnetic Waves. Electromagnetic Waves and the Electromagnetic Spectrum, Nature of electromagnetic Waves, Radio Waves, Micro Waves, Infrared Waves, Visible Light, Ultra violet, X-rays, Gamma Rays.		
3,4,5	6	1	Basics of Geometrical Optics for Infrared Radiation, Behavior of Waves, Reflection, Refraction, Interference, Diffraction, Laws of Reflection and Refraction, Reflection of Light from Optical Surface, Smooth Surface Reflection, Rough Surface Reflection, Reflection Index, Snell's Law, Refraction in Prism. Basic Radiometry, Radiant Power, Excitance, Irradiance, Spectral Densities of Radiometric Quantities, Radiant intensity, Radiance and Lambertian Emitter, Radiation Transfer between surfaces.	Lecture	HW
5,6,7	6	1	Blackbody Radiation, Blackbody Radiation Definition, Planck Distribution Function for Blackbody Radiation, Different Representations of Planck's Law, Stefan–Boltzmann Law, Band Emission. Emissivity definition, Classification of Objects According to Emissivity, Emissivity and Kirchhoff 's Law, Parameters Affecting the Value of Emissivity. Instruments Overview, Introduction and Classification of Instruments, Instrument Manufacturers, Discussion of Instruments, Infrared thermocouples and probes, Portable hand-held instruments, Infrared cameras (thermal imagers).	Lecture	Quizzes

8	2	1	Diagnostic Thermal Image-Processing Capabilities, Quantitative Thermal Measurements of Targets, Detailed Processing and Image Diagnostics, Image Recording, Storage and Recovery, Image Comparison, Thermal Image Fusion, Report and Database Preparation.	Lecture	HW
9	2	1	Camera Systems, Standards, and Calibration, The Imaging System, Temperature Reference, Mounting the Imager, Camera Initialization, Patient Position and Image Capture, Location for Thermal Imaging, Ambient Temperature Control, Pre-Imaging Equilibration, Positions for Imaging, Field of View.	Lecture	Quizzes
10	2	1	Usage of IR-based technologies in medical applications: Screening of breast cancer, Screening of diabetic neuropathy and vascular disorders.	Lecture	HW
11	2	1	Usage of IR-based technologies in medical applications: Usage in Raynaud's phenomenon, Usage for body temperature monitoring.	Lecture	Quizzes
12	2	1	Usage of IR-based technologies in medical applications: Usage for diagnosis of skin diseases, Usage for diagnosis of rheumatic diseases.	Lecture	HW
13	2	1	Usage of IR-based Technologies in Medical Applications Usage for Diagnosis of Ocular Diseases, Usage for Diagnosis of Pain.	Lecture	HW
14	2	1	Why use Thermal Imaging Cameras, Infrared Thermometers		

15	2	1	- Thermal Imaging Cameras, Finding Problems Faster and with Extreme Accuracy, Use Thousands of Infrared Thermometers at the Same Time. Camera Types, Thermal Detector Types, The lens.	Lecture Lecture	HW Quizzes

11. Course Evaluation

1- Daily exams scientific questions.

2- Establishing grades for environmental duties and the reports assigned to them.

3- Semester exams for the curriculum, in addition to the mid-year exam and final exam

12. Learning and Teaching Resources

1. Practical applications of infrared thermal sensing and imaging equipment / by Herbert Kaplan. — 3rd ed. 2. Infrared Thermal Imaging Fundamentals, Research and Applications/ Michael n and Klaus-Peter Mollmann	

Course Description Form

1. Course Name:	
Control systems I	
2. Course Code:	
WBM-52-04	
3. Semester / Year:	
First Semester- 2025 / 2026	
4. Description Preparation Date:	
1 – 12 – 2025	
5. Available Attendance Forms:	
Class Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
75 \ 3	
7. Course administrator's name (mention all, if more than one name)	
Name: **Qayssar Ayad Ahmed** Email: **qayssar.ayad@uowa.edu.iq**	
8. Course Objectives	
Course Objectives	• Building the student scientifically and qualifying him to understand the applications of digital control in some scientific and engineering fields, especially electrical and mechanical applications. • Building and preparing the student psychologically to play his role as a reliable engineer in this field. • Urging the student to be creative and think about specialization projects and keep pace with the development taking place in this field in terms of the basis of digital control in engineering work systems. • Identify the types of digital control and some of their practical applications.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in developing the main features of this module to encourage student's participation in the exercises, while at the same time refining and expanding their critical thinking skill. 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. Building and preparing the student psychologically to play his role as an engineer.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	Learning Outcome:1 and 2	Introduction to Control System. Classification of control systems.	Lectures DATA SHOW	Quizzes and classroom activities
3-4	6	Learning Outcomes: 1 and 2	Transfer function representation Negative feedback, mathematical models, examples	Lectures DATA SHOW	Quizzes and classroom activities
5-6	6	Learning Outcomes: 1 and 2	Block diagram elements and representation, examples	Lectures DATA SHOW	Quizzes and classroom activities
7-8	6	Learning Outcomes: 1 and 2	Reduction rules an examples	Lectures DATA SHOW	Quizzes and classroom activities
9-10	6	Learning Outcomes: 1 and 2	Types of inputs and stability of the systems with examples	Lectures DATA SHOW	Quizzes and classroom activities
11-12	6	Learning Outcomes: 1 and 2	First and second order systems with examples.	Lectures DATA SHOW	Quizzes and classroom activities
13-14	6	Learning Outcomes: 1 and 2	Elements and representation of signal flow graph, introduction to state space domain	Lectures DATA SHOW	Quizzes and classroom activities

11. Course Evaluation

Quizzes (4%), Assignment (3%), lab. (10%), attendance (3%), Mid exam (30%), FINAL exam (50%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Modern Control Engineering, (5th Edition) By: Katsuhiko Ogata. Mechanical Engineering, University of Minnesota.

	2- Control Systems Engineering, (6th Edition) By: Norman S. Nise. Electrical and Computer Engineering Department at California State Polytechnic University.
Main references (sources)	Modern Control Engineering, (5th Edition)
Recommended books and references (scientific journals, reports…)	1- Internet files. 2- All solid scientific journals and sites that are related to the broad concept of engineering control
Electronic References, Websites	Tracking Scientific websites to view recent developments in the prescribed subject For fifth year students.

Course Description Form

1. Course Name:
Hospital systems and design
2. Course Code:
WBM-51-07
3. Semester / Year:
Semester
4. Description Preparation Date:
2025−12−11
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Natiq A. Omran Email: nataq.az@uowa.edu.iq
8. Course Objectives

Course Objectives	To increase student knowledge in the field of designing hospitals and recent trends associated with developing hospitals concerning general and specialized buildings, gardens, waiting areas, traffic routes, ventilation system, safety, etc… To enable him from dealing with different future modifications about adding additional departments or medical devices.
9. Teaching and Learning Strategies	
Strategy	1- Making the student able to demonstrate real knowledge of hospital systems and design concepts during the academic level and their applications. 2- Learn the fundamental hospital departments and their size, medical devices included, ventilation requirements, sterilization procedures, etc. 3- Learn and understand modern solution methods in modification cases.

10- **Module Aims, Learning Outcomes and Indicative Contents**	
Module Aims	1. To develop student knowledge in hospital design principles and modern trends in healthcare facilities. 2. To understand general and specialized hospital buildings, including circulation, ventilation, safety systems, and public areas. 3. To prepare students to plan for future modifications involving new departments or medical equipment. 4. To strengthen the student's ability to apply hospital design concepts in real architectural and biomedical contexts.
Module Learning Outcomes	1. Demonstrate a comprehensive understanding of hospital systems and design principles. 2. Identify the main hospital departments, their functions, required spaces, and associated medical equipment. 3. Explain ventilation, sterilization, and environmental safety requirements in hospital design. 4. Analyze healthcare facility distribution models, including centralization, decentralization, and network hospitals. 5. Evaluate care pathways and spatial organization within hospital departments such as maternity, outpatient, and inpatient areas. 6. Apply evidence-based design concepts to create healing and patient-centered environments. 7. Describe zoning, traffic flow, way finding systems, and the role of public spaces in hospital design. 8. Assess the planning needs of treatment areas including diagnostic imaging, operating theaters, ICUs, and emergency departments. 9. Examine global case studies of general, children's, and university hospitals to identify best design practices. 10. Propose solutions and modifications to hospital layouts for future needs or new technologies. 11. Integrate modern design strategies to enhance patient safety, workflow efficiency, and environmental comfort. 12. Apply theoretical hospital design knowledge to real-world architectural or biomedical scenarios.
Indicative Contents	1- Circuit Theory of Healthcare Architecture: definitions, spatial relationships, and functional planning. 2- Hospital design approaches: centralization vs. decentralization, networked healthcare systems. 3- Evidence-Based Design for healing environments. 4- Public spaces: circulation systems, entrances, wayfinding, waiting areas, gardens, and patient-centered zones. 5- Treatment areas: outpatient clinics, inpatient wards, operating theaters, imaging units, ICU, emergency department, and laboratories

11−Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1 +2+3	4	Introduction	Defining the hospital, the Perspective of the Patient, Healthcare as a Public Service, T Business Case for Hospitals, Changing Healthcare Needs.	Lectures presented PDF format	Daily exams + homework assignments + monthly exams
4+5+6	4	DESIGNING HOSPITALS:	Distribution of Healthcare Facilities: Centralization, Decentralization and the Network Hospital, The Design of Hospitals: Care Pathways, Processes and Spaces: The Example of the Maternity Department, Evidence-Based Design for Healing Environments, The Building Type and its Emergence.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
6+7	4	Limits and continuity	Limits: Introduction, limits found numerically and Algebraically, examples. Continuity: Introduction, Examples Evaluating limits at a point: introduction, Examples. Infinite limits: Introduction , Examples.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
8+9	4	PUBLIC SPACES	Zoning and Traffic System, Arrival and Entrance, Public Spaces in and Around the Hospital: Streets, Squares, Patios, Waiting Areas, Healing Gardens, Way finding: Signage and Orientation Systems	Lectures presented in PDF format	Daily exams homework assignments monthly exams
10 +11	4	TREATMENT AREAS	Planning: an Integral Approach, Outpatient Department, Inpatient Wards, Diagnostic Imaging, Operating Theater and Recovery Area, Intensive Care Unit, Emergency Department, Laboratory Department.	Lectures presented in PDF format	Daily exams homework assignments monthly

12	4	GENERAL HOSPITALS Part 1	Circle Bath, Butaro District Hospital Butaro, Rwanda MASS Design Group, Private Hospital, Lille, France Jean-Philippe Pargade Architectes, Extension Kolding Hospital Kolding, Denmark Schmidt Hammer Lassen Architects, AZ Groeninge Kortrijk, Belgium Baumschlager Eberle Architekten Zaans Medisch Centrum.	Lectures presented in PDF format	Daily exams homework assignments monthly
13	4	GENERAL HOSPITALS Part 2	Hôpital Riviera-Chablais, Medisch Spectrum Twente Enschede, Rey Juan Carlos Hospital, Meander Medisch Centrum, Cleveland Clinic Abu Dhabi.	Lectures presented in PDF format	Daily exams homework assignments monthly
14	4	CHILDREN'S HOSPITALS	Nemours Children's Hospital, Randall Children's Hospital, Juliana Children's Hospital, Mother-Child and Surgical Center, Children's Hospital, Royal Children's Hospital.	Lectures presented in PDF format	Daily exams homework assignments monthly
15	4	UNIVERSITY HOSPITALS	Center for Surgical Medicine, University Hospital, Düsseldorf , St. Olav's Hospital, Akershus University Hospital, Reconstruction of the Johann Wolfgang Goethe University Hospital, Erasmus MC Hospital and Education Center	Lectures presented in PDF format	Daily exams homework assignments monthly

12- Course Evaluation

- Daily exams with practical and scientific questions.
- Participation scores for difficult competition questions among students
- Establishing grades for environmental duties and the reports assigned to them
- Semester exams for the curriculum, in addition to the mid-year exam and final exam

13- Learning and Teaching Resources

Required textbooks (curricular books, if any)	Hospital_Design_Guide_How_to_get_started
Main references (sources)	• College library to obtain additional sources for academic curricula • Check scientific websites to see rec developments in the subject
Recommended books and references (scientific journals, reports…)	All reputable scientific journals that are related the broad concept of designing hospitals and th results

Course Description Form

1. Course Name:
Image Processing
2. Course Code:
WBM-51-05
3. Semester / Year:
Semester 1 / 2025-2026
4. Description Preparation Date:
20250- 9-20
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Faris Kareem SHAMMARI Email: faris.kar@uowa.edu.iq

8. Course Objectives	
Course Objectives	-Introduce the fundamental concepts of digital image formation and representation. -Study basic image processing techniques such as image denoising, enhancement, and restoration. -Learn image segmentation methods, feature extraction techniques, and structural analysis of images. -Cover classical computer vision techniques including motion tracking, detection, and recognition. -Introduce modern deep learning–based approaches for image and video analysis. -Apply practical techniques to common tasks such as: Image classification • Object detection and tracking • Semantic segmentation • Face recognition -Perform programming exercises and case studies to bridge theoretical concepts with practical implementation. -Equip students with the knowledge and skills required to design and develop advanced image processing and computer vision systems.
9. Teaching and Learning Strategies	
Strategy	1. **Theoretical lectures** to explain the fundamental concepts and mathematical models of image processing and computer vision. 2. **Demonstrations** to illustrate image processing workflows using real-world examples. 3. **Project-Based Learning**, where students develop a practical project in image processing or build a computer vision model.

	4. **Laboratory sessions** using MATLAB and various image datasets for hands-on practical implementation. 5. **Collaborative learning** through group discussions and analysis of real-world image and video problems. 6. **Case studies** to explore real applications such as face recognition, object detection, and medical image enhancement.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learning Outcomes 2 and 6	Introduction	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
2+3	4	Learning Outcomes 2 and 6	Human visual system. Sources of Digital Images, Simultaneous contrast. Optical illusions. Image acquisition.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
4	4	Learning Outcomes 2 and 6	Image formation model. Image sampling and quantization.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
5	4	Learning Outcomes 2 and 6	Representing digital images. Spatial and intensity resolution.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
6	4	Learning Outcomes 2 and 6	Image file format. Basic relationships between pixels. Distance measures.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
7	4	Learning Outcomes 2 and 6	Distance measures. Point operations. Arithmetic operations Set and logical operations.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
8	4	Learning Outcomes 2 and 6	**First mid teams**	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams.
9+10	4	Learning Outcomes 2 and 6	Set and logical operations. Spatial domain. Processes on spatial domain.	Theoretical lectures. Discussion lectures/tutorials.	Written exams. Quizzes. Scientific report writing. Homework.

				Practical laboratory experiments.	
11	4	Learning Outcomes 2 and 6	Basic intensity transformation functions.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
12	4	Learning Outcomes 2 and 6	Piecewise-linear transformation functions. Histograms. Histogram processing. Histogram equalization.	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
13	4	Learning Outcomes 2 and 6	What is a spatial filter? The mechanics of linear spatial filtering. Correlation and convolution. Smoothing spatial filters (linear and nonlinear). Sharpening spatial filters characteristics Foundation of sharpening filters. Laplacian filter	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.
14	4	Learning Outcomes 2 and 6	**Second mid teams**	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. .
15	4	Learning Outcomes 2 and 6	Image Segmentation, Application of image segmentation, Point Detection, Line Detection, Edge detection, Sobel Edge detection, Prewitt Edge detection	Theoretical lectures. Discussion lectures/tutorials. Practical laboratory experiments.	Written exams. Quizzes. Scientific report writing. Homework.

11. Course Evaluation

Monthly Exams: 2 × 15 = 30 marks
Homework Assignments: 5 marks
Quizzes: 5 marks
Laboratory Work: 10 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Digital Image Processing -Gonzales R.C., Woods R.E. 4th ed., 2018.
Main references (sources)	- Digital Image Processing using SCILAB, Rohit M. Thanki • Ashish Kothari, 2019.

	- Digital Image Processing Using MATLAB, Gonzalez R.C., Woods R and Eddins S., 3rd ed., 2020.
Recommended books and references (scientific journals, reports...)	All reputable scientific journals that are related to the broad concept mathematical theories and their results