Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Electric fields**	**Unit delivery**	
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-111		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**125**		
Unit level	2	**Delivery Semester**	1
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Ali Muhammad Abdul sadah Abdul wahid	**E-mail Address**	ali.mohammed@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
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	Understand the basics of electromagnetic fields: Recognize basic concepts such as electric field, magnetic field, and lines of force. Basic Laws Explained: A Study of Maxwell's Laws, Static Electricity, and Magnetism. Analysis of electromagnetic interactions: interpreting the effect of electric and magnetic fields on moving charges and particles. Applications of electromagnetic fields: such as electromagnetic waves, wireless communications, and measuring devices. . Develop analytical skills: solve problems using differential equations and vectors in the analysis of electromagnetic fields. Linking theory to practice: Understand how electromagnetic principles are used in the design of engineering devices and technological systems.
Unit Learning Outcomes Learning outcomes of the course	Ability to explain the basic concepts of electric and magnetic fields and their relationship to charges and moving particles. Apply Maxwell's laws to understand electromagnetic behavior in different systems. . Analyze electromagnetic interactions using mathematical equations to solve related problems. . Interpret the properties of electromagnetic waves such as propagation, reflection, and refraction in different media. . Link theory to practical applications, such as the design of electromagnetic systems and communication devices. Develop the ability to solve problems using simulation software or customized technical tools.
Indicative Contents Indicative Contents	Electric fields: Identify electric charges, electric field lines, and calculate field strength using Coulomb's and diving laws. . Magnetic fields: the study of magnetic field lines, bio-savar and ampere laws, and magnetism in materials. . Maxwell's laws: a comprehensive explanation of the four laws and their connection to the behavior of electromagnetic fields. Electromagnetic waves: Wave properties such as speed, wavelength, and frequency, with applications in communications and energy transmission. . Electromagnetic interactions: The effect of fields on moving charges and electric currents. Practical applications: The use of electromagnetic fields in technological devices such as engines, generators, and antennas.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	Learning and Teaching Strategies for the Electromagnetic Fields Unit: The module relies on interactive lectures to explain theoretical concepts and basic laws. Learning is enhanced through hands-on sessions and laboratory experiments to understand the behavior of electromagnetic fields. Simulation software is used to analyze and solve applied problems. It also encourages group discussions and problem solving to develop critical thinking and link theory to practical applications.

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	45	**SWL regulator(h/s)** Regular student load per week	3
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	106		

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 2+1	Electrostatic fields, Coulomb's law and electrical intensity The field resulting from the distribution of a continuous charge in a given volume
Week 4+3	Electric Flow Density Flow lines, displacement density Gauss's Law

Week5+6	Power and voltage Conductors and insulators
Week 8+7	Amplitudes and inductors
Week 9+10	Study of the magnetic field
Week 12+11	Magnetic Forces, Materials, and Inductance
Week 13	Electromagnetic fields

Learning and Teaching Resources

Learning and Teaching Resources

	text	**Available in the library?**
Required texts	William H. Hayt and Joun A. Buck, "Engineering Elecrtomagnetic". Sadiku, "Elements of Electromagnetic". Joseph A. Edminister, "Electromagnetics	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.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Engineering Mechanics**	**Unit delivery**
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar
Unit Code	WBM-21-05	
ECTS Credits	**8**	
SWL (ساعة / SEM)	**125**	

Unit level	3	**Delivery Semester**	1
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Hussein Amir Muhammad Aljawad	**E-mail Address**	hussein.aljawad@uowa.edu.iq
Title of Unit Commander	teacher	**Unit Commander Qualifications**	doctor
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	name	**E-mail Address**	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	Objectives of the Engineering Mechanics Unit: Introduce students to the basic concepts of geometric mechanics and understand Newton's laws of motion. Enable students to analyze mechanical systems using the principles of equilibrium and forces. Enhance the ability to solve problems related to moments, stresses and flexibility. Train students to apply engineering concepts in the design and analysis of machines and structures. Develop critical thinking and analytical skills in the study and analysis of mechanical systems. • Qualify students to understand the practical applications of engineering mechanics in engineering and science.
Unit Learning Outcomes Learning outcomes of the course	Engineering Mechanics Unit Learning Outcomes: Understanding basic concepts: The student will be able to grasp the basic concepts and laws of engineering mechanics, including Newton's laws and mechanical analysis. Analysis of forces and equilibrium: The student becomes able to analyze the forces acting on different systems and apply the conditions of equilibrium. Calculation of moments and stresses: The student can calculate moments and stresses in different materials and structures. Application of engineering principles: The student applies engineering concepts in the design and analysis of machines and structures. Mechanical problem solving: The student acquires the ability to solve problems using methods Analytical and mathematical modeling. Technical communication: The student can prepare technical reports and present the results of engineering analysis effectively. • Critical thinking: The student develops critical and creative thinking skills in dealing with the challenges of engineering mechanics.
Indicative Contents Indicative Contents	Define the basic concepts of geomechanics and Newton's laws. Analysis of forces and equilibrium in different engineering systems. Calculate moments and centers of gravity in composite objects. The study of stress and strain in materials and structures. Analysis of mechanical structures such as bridges and frame Practical applications of engineering mechanics in the design and analysis of machines.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	The learning and teaching strategy of the Engineering Mechanics Unit includes theoretical lectures to explain basic concepts, and solving practical exercises to enhance applied understanding. Interactive discussions and group projects are used to develop analytical and problem-solving skills. In addition, technology and simulation software are employed to illustrate engineering concepts and their applications.

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	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 1	Principles of Statistics
Week 2	Power Systems Results
Week 3	Power Systems Results
Week 4	Equilibrium of power systems
Week 5	Equilibrium of power systems
Week 6	Friction
Week 7	Friction

Learning and Teaching Resources Learning and Teaching Resources		
	text	**Available in the library?**
Required texts	e-Engineering Mechanics Static 5 13edition by Hibbeler-12-Engineering Mechanics Static 10 Engineering Mechanics Static 8edition by Singer Strength of Material by Pytel and Singer	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

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Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Human Rights and Democracy**	**Unit delivery**	
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☐ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-12-02		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**60**		
Unit level	1	**Delivery Semester**	2
Administrative Management	Watheq Qasim	**College**	College of engineering
Unit Commander		**E-mail Address**	Sh watkiq.mar@uowa.edu.iq
Title of Unit Commander	Assistant Doctor	**Unit Commander Qualifications**	Doctor
Unit Teacher		**E-mail Address**	
Peer Reviewer Name		**E-mail Address**	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	• **Human rights concepts**: Definition of fundamental rights such as the right to life, liberty, and equality. • **International documents**: study of international conventions such as the Universal Declaration of Human Rights and United Nations conventions. Civil **and political rights**: Understand rights such as freedom of expression, suffrage, and protection from torture. Economic**, Social and Cultural Rights**: Analysis of the rights of labor, education, and health care. • **Mechanisms for the protection of human rights**: study of international and local organizations working to protect rights such as the United Nations and the Council of Europe. International **human rights law**: Understand how human rights are applied in international and national courts. 1. • **Contemporary problems**: Discuss issues such as refugee rights, violence against women, and minority rights.
Unit Learning Outcomes Learning outcomes of the course	• **Understanding human rights**: knowledge of fundamental rights and their charters. • **Ability to enforce rights**: Understand domestic and international legal protection mechanisms. • **Criticism and analysis**: Ability to analyze contemporary issues related to human rights. 1. • **Contribute to the protection of rights**: demonstrate the ability to participate in the promotion and protection of human rights.
Indicative Contents Indicative Contents	1. **Human Rights Corporal**: Understand the rights enjoyed by each individual regardless of their nationality or culture. 2. **Study of international conventions**: Identify the most important treaties and conventions that protect human rights. 3. **Analysis of contemporary issues**: Identify contemporary challenges affecting human rights. 4. **Application of human values**: Promote awareness of the importance of respecting human rights in daily life. **Teaching Strategies:** 1.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	• **Interactive learning**: Encourage discussions and projects related to human rights. • **Case Studies**: Use case studies to discuss violations and solutions. • **Seminars and discussions**: Organizing dialogue sessions to raise awareness of contemporary issues. • **Online education**: Using online platforms to access information related to human rights.

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	35	**SWL regulator(h/s)** Regular student load per week	5
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	35	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL إجمالى (h / sem) The student's total academic load during the semester	75		

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)		

خطة التسليم (المنهج الأسبوعي) المنهاج الاسبوعي اعملي	
أسابيع	**المواد المغطاة**
1	حقوق الإنسان . تعريفها . اهدافها حقوق الإنسان في الحضارات القديمةوفيالشرائعة السماوية
2	حقوق الإنسان في تاريخ المعاصر والحديث: الاعتراف بالإنسان منذ الحرب العالمية ألاولى وطائفة الأمم المتحدة الاعتراف به وبالتالي الإنسان اللاتفاقية أوربية لحقوق الإنسان 1950 الأمريكية الميثاق العربي لحقوق الإنسان 1969 الميثاق العربي لحقوق الإنسان 1981
3	منظمات حقوق الإنسان وحقوق الإنسان (1- اللجنة الدولية للصليب الأحمر، 2- منظمة العفو الدولية منظمة مراقبة حقوق الإنسان، المنظمات الوطنية لحقوق الإنسان حقوق الإنسان في الدستور العراقي (الحق والحريات في دستور جمهورية العراق نهائي 2005)
4	اتفاق بين حقوق الإنسان والحريات العامة في الحماية العالمية لحقوق الإنسان في الإعلان العالمي لحقوق الإنسان في المواثيق غير المباشرة والدساتير الوطنية حقوق الإنسان الاقتصادية والاجتماعية والبيئية الثقافية والتنموية وحقوق الإنسان المدنية السياسية.
5	حقوق الإنسان الحديثة (الحق في التنمية، الحق في البيئة النظيفة، الحق في التضامن، الحق في الدين) ضمانات حماية حقوق الإنسان على الصعيد الوطني . صلاحيات في الدستور والقوانين الضمانات في مبدا بداية القانون اختلافات في ظل الدستورية الضمانات في حرية الصحافة والراي العام دور المنظمات غير الحكومية في حماية وحماية حقوق الإنسان
6	ضمانات محمية لحماية حقوق الإنسان على المستوى الدولي دور الأمم المتحدة ووكالاتها القضائية في توفير الضمانات المنظمات التنظيمية (الجامعة العربية ، الاتحاد الأوروبي ، الاتحاد الأوروبي ، منظمة الدول الأعضاء)

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**biochemistry**	**Unit delivery**	
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-11-07		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**200**		

Unit level	4	**Delivery Semester**	1
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Mariam Abdullah Saeb	**E-mail Address**	Mayram.ab@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	name	**E-mail Address**	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	1. To know the types of food particles distinguish their properties. 2. To understand the structure of chemical molecules 3. This course deals with the basic concept of proteins. 4. This is the basic theme of all organic and inorganic molecules of the body. 5. Develop skills to deal with concentration . 6. Know the types of tools used in diagnosis.
Unit Learning Outcomes Learning outcomes of the course	1. Learn about proteins and amino acids. 2. Summarizing what carbohydrates are . 3. Learn about the function of enzymes . 4. discuss the most important enzymes that play a vital role in the mechanism, 5. Discuss the characteristics of prteins in each system 6. Explanation of circulatory lipids and tissues 7. describe the importance of adipose tissue and other organ 8. Discuss the most important dyes used in diagnosis 9. Description of immunohistochemistry technique 10. Electron microscopy and its importance in chemical diagnosis were discussed
Indicative Contents Indicative Contents	The instructional content includes the following. Fat metabolism of fats, fat structure, fat synthesis, alternative pathway, lipid degradation, fatty acids [12 hours]. Carbohydrates, glucose metabolism, glucose structure, glycolysis, inhibitory cycles, glycogen synthesis, glucose formation [12 hours]. Proteins , protein metabolism , protein synthesis , protein stimulation , anabolic proteins , protein fate , amino acids. [12 hours]. Hormones hormone synthesis, types of hormones, hormone function, hormone receptors, pituitary hormones. [20]hour].

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students to prepare for thawing, measuring concentration and laboratory technique, this will be achieved through interactive classrooms and tutorials and by considering the type of simple experiments that include some sampling activities of interest to students.

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	123	**SWL regulator(h/s)** Regular student load per week	9
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	77	**Unregulated SWL (h/s)** Irregular student academic load per week	6
SWL إجمالى (h / sem) The student's total academic load during the semester	200		

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 1	Introduction to Chemistry Preparation of solutions, molars, molars, reagents, acids
Week 2	Alkaline, dielectric solution, concentration, titration
Week 3	Proteins , protein metabolism , protein synthesis , protein catalysis , protein synthesis , protein fate , amino acids
Week 4	Amino acid reaction, the relationship of amino acids with other molecules Protein synthesis , translation , transcription , globulin , albumin
Week 5	Liver function tests, bilirubin, GOT and AST , ALP , kidney function tests, urea, creatinine and uric acid
Week 6	Lipid metabolism, lipid synthesis, lipid synthesis, alternative pathway, lipid degradation, fatty acids
Week 7	Midterm Exam

Week 8	Cholesterol, triglycerides, HDL , LDL , ketone bodies, bile salt, lipase
Week 9	Carbohydrates, glucose metabolism, glucose synthesis, glycolysis, inhibitory cycles, glycogen synthesis, glucose formation
Week 10	Diabetes, hyperglycemia, HbA1C , fasting glucose, fructose, sucrose, lactose
Week 11	Enzymes, Enzyme metabolism, Enzyme types, Enzyme function, Enzyme synthesis
Week 12	Liver enzymes, kidney enzyme, digestive enzyme, coenzyme, glycolysis enzymes
Week 13	Hormones Hormone Synthesis , Types of Hormones , Hormone Function , Hormone Receptors , Pituitary Hormones
Week 14	Thyroid hormones, Adrenal hormones, sex hormones, digestive hormones, pinal hormones
Week 15	DNA, RNA, guanine, thiamine, cytosine, adenine, uracil
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

Learning and Teaching Resources

	text	Available in the library?
Required texts	Clinical Biochemistry, (8 editions), by Leipencotts	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.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Physics**		**Unit delivery**
Unit Type	**fundamental**		☒ نظريه ☒ حاضر ☐ المختبر ☐ تعليمي ☐ عملي ☐ Seminar
Unit Code	ENG 104		
ECTS Credits	**7**		
SWL (ساعة / SEM)	**175**		
Unit level	4	**Delivery Semester**	2
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Maryam Abdullah Saib	**E-mail Address**	Mayram.ab@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	name	**E-mail Address**	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	1. To real engineering problem solving and preparing the student for more advanced studies in engineering mechanics. 2. To understand static and moving bodies, force, moment, resultants, equilibrium, mas and acceleration, moment of inertia and polar moment of inertia, Impulse and momentum, energy and power. 3. To understand first and second Newtons Laws problems. 4. to use the techniques, skills, and modern engineering tools necessary for engineering practice.
Unit Learning Outcomes Learning outcomes of the course	On completion of the module the student is expected to be able to: 1. Explain the two Newton's laws used in engineering mechanics. 2. Overcome any misconceptions about engineering mechanics (force, energy, power, work etc). 3. Reiterate formal problem-solving skills in a form more convenient for engineering applications. 4. Get hold of four basic thinking skills: I. Consciously inconsistences involving their preconceptions about mechanics II. Arrange systematically the ideas of mechanics in a problem-solving form III. Apply mechanics principles to given realistic engineering problem IV. Solve realistic engineering problem.
Indicative Contents Indicative Contents	Indicative content includes the following. **Part A – Static** Static bodies, and force systems. [15 hrs] Resultant of forces. [9 hrs] Equilibrium of static bodies. [9 hrs] Three dimensional force system. [9 hrs] Centroid, center of mass, Moment of inertia and polar moment of inertia. [9 hrs] Distributed force – friction. [9 hrs] **Part B – Dynamic** Moving bodies. [6 hrs] Absolute motion. [6 hrs] Force, mass and acceleration. [6 hrs] Force, energy and power. [6 hrs] Impulse and momentum. [6 hrs]

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	1. Active learning: Encouraging students to actively participate by solving exercises and problems on their own, which enhances their understanding of mathematical concepts. 2. Cooperative learning: Teamwork to solve mathematical problems, which helps exchange ideas and develop analytical skills. 3. Continuous assessment: Conduct short tests and regular exercises to monitor students' progress and identify points that need strengthening. 4. Explanation and discussion: Encourage students to explain their solutions and ways of thinking to stimulate 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	108	**SWL regulator(h/s)** Regular student load per week	6
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	67	**Unregulated SWL (h/s)** Irregular student academic load per week	6
SWL إجمالى (h / sem) The student's total academic load during the semester	175		

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 1	Introduction to 2D and 3D system, rectangular component
Week 2	Power systems
Week 3	Determination
Week 4	Double moments
Week 5	Outcomes
Week 6	Balance
Week 7	Structures 1
Week 8	Structures 2
Week 9	Midterm exam 1
Week 10	Inertia
Week 11	Center of mass
Week 12	Distributed loads
Week 13	Friction 1
Week 14	Friction 2
Week 15	Midterm exam 2

Learning and Teaching Resources Learning and Teaching Resources		
	text	**Available in the library?**
Required texts	Engineering Mechanics, STATICS 6th Edition J.L. MERIAM	Yes
Required texts	Engineering Mechanics, DYNAMICS 6th Edition J.L. MERIAM	Yes
Websites		

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.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Mathematics II**			**Module Delivery**	
Module Type	**Basic learning**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENG102				
ECTS Credits	6				
SWL (hr/sem)	051				
Module Level		1	**Semester of Delivery**		**2**
Administering Department			**College**	**Engineering College**	
Module Leader	**Assist. Lect Hasan Allawi**		**e-mail**	Hassan.as@uowa.edu.iq	
Module Leader's Acad. Title		**Assist. Lect**	**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		1/6/2023	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Mathematics I	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	The aims of a mathematics module are to provide students with an understanding of mathematical concepts, skills, and techniques that can be applied to a range of real-world problems. This course aims to introduce the concepts of calculus, complex numbers, vectors, and linear algebra. Additionally, the module aims to prepare students for future academic and professional pursuits that require mathematical proficiency.
Module Learning Outcomes	By the end of this module the student should be able to: 1. Use asymptotic, first and second derivatives to graph functions. 2. Apply advanced rules/techniques of integration to compute integrals. sketch graphs of functions; approximation of functions. 3. Describe the polar coordinate system. 4. Convert from rectangular coordinates to polar coordinates. 5. Apply matrix techniques and elementary theory to problem in engineering. 6. Solve systems of linear equations and find the inverse of a matrix. 7. Perform the basic algebra operation of vectors. 8. Evaluate the scalar and vector product of two vectors. 9. Evaluate the gradient, divergence and curl of various scalar and vector fields. 10. Complex Numbers: Algebra of complex numbers, Solution of polynomial equations with complex roots, Argand Diagrams, Polar form of complex numbers, Exponential form of complex numbers, and Series expansion of trigonometric and exponential functions, De Moivre's theorem.
Indicative Contents	The Indicative Contents of a Mathematics module will depend on the level and scope of the course. However, some common topics that may be covered in a mathematics module include: 1. Arithmetic: Basic mathematical operations such as addition, subtraction, multiplication, and division. 2. Algebra: The study of mathematical symbols and the rules for manipulating these symbols to solve equations and represent real-world situations. 3. Geometry: The study of shapes, sizes, positions, and measurements of objects in space. 4. Calculus: The study of mathematical concepts such as limits, derivatives, and integrals. Overall, the Indicative Contents of a Mathematics module aims to provide students with a comprehensive understanding of mathematical concepts and their applications in various fields of study.

Learning and Teaching Strategies	
Strategies	

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

Student Workload (SWL)

Structured SWL (h/sem)	78	**Structured SWL (h/w)**	6
Unstructured SWL (h/sem)	72	**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	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1 Week 2 Week 3	**Transcendental Functions:** Inverse Functions and Their Derivatives, Natural Logarithms, Exponential Functions, Indeterminate Forms and L'Hôpital's Rule, Inverse Trigonometric Functions, Hyperbolic Functions and their inverse.
Week 4 Week 5	**Integration Techniques:** Integration by Parts, Trigonometric Integrals, Trigonometric Substitutions, Partial Fractions, Improper Integrals.
Week 6	**Polar Coordinates:** Polar Coordinates system, Graphing Polar Coordinate Equations, Areas and Lengths in Polar Coordinates
Week 7 Week 8 Week 9	**Matrices and Determinants**: Definitions, Properties and operations, Determinant, Inverse of a matrix, Solution of linear system equations, Eigenvalues and Eigenvectors**.**
Week 10 Week 11 Week 12	**Vector Theory:** Three-Dimensional Coordinate Systems, Representation of vectors in space, unit vectors, Scalar Product, Vector Product, Lines and Planes in Space, Vector Function.
Week 13 Week 14 Week 15	**Complex Numbers:** Complex numbers and operations, Solution of quadratic equations, The argand diagram, Polar form of a complex number, Demoiver's theorem.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	George B. Thomas Jr., "CALCULUS", 14th Ed	Yes
Recommended Texts	1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Ed. 2. Schaum's Outline of College Mathematics, Fourth Edition. 3. Mary Attenborough, "Mathematics for Electrical Engineering and Computing", 1st Ed.	No
Websites	Topics in a Calculus -Wolfram Mathworld.	

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	**Computer Programming**		**Unit delivery**
Unit Type	**secondary**		☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar
Unit Code	BME-12-04		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**75**		

Unit level	2	**Delivery Semester**	2
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Karrar aqeel huseein	**E-mail Address**	karrar.aqeel@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name		**E-mail Address**	E-mail Address
Date of accreditation of the Scientific Committee	22/1/2025	**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	1. **Teaching the basics of programming**: Understand basic concepts such as variables, conditional statements, and loops. 2. **Proficiency in programming languages**: Enable students to write programs using languages such as C and C++. 3. **Algorithm Design**: Develop the ability to design effective algorithms to solve software problems. 4. **Understanding data structures**: Learn how to use different data structures such as arrays and lists. 5. **Application of object-oriented programming (OOP):** Teaching object-oriented programming principles such as objects and classes. 6. **Teaching debugging techniques**: improving debugging and code analysis skills. 7. **Apply advanced programming concepts**: Enable students to use advanced programming libraries and frameworks.
Unit Learning Outcomes Learning outcomes of the course	Understand programming principles: Gain knowledge of programming basics such as variables, conditional statements, and loops. Proficiency in programming languages: Ability to write programs using languages such as C and C++. Algorithm Design: Develop skills to design and implement effective problem-solving algorithms. Use data structures: Effectively apply data structures such as arrays, lists, and trees. Object-oriented programming (OOP): Understand and apply object-oriented programming principles such as objects and classes. Error analysis and correction: Develop debugging skills and improve code. Apply advanced concepts: the use of software libraries and frameworks, and the programming of multi-threaded applications. 1.
Indicative Contents Indicative Contents	1. Basic programming concepts: Learn the basics of programming such as variables, graphic types, and conditional structures. 2. C/C++ Programming: Learn C or C++ as an application development tool. 3. Algorithms: The study of how algorithms are designed and implemented to solve software problems. 4. Data structures: Learn how to use structures such as threaded lists, arrays, trees. 5. Object-oriented programming (OOP): Learn the principles of object-oriented programming such as objects and classes. 6. Debugging: Techniques for finding and correcting errors in code. 7. Advanced concepts: Learn programming using libraries and frameworks, and programming multi-threaded applications.

Learning and Teaching Strategies Learning and Teaching Strategies

Strategies	1. Active Learning: Encourage students to actively participate by solving exercises and problems themselves, enhancing their understanding of mathematical concepts. 2. Collaborative learning: teamwork to solve mathematical problems, helping to exchange ideas and develop analytical skills. 3. Project-based learning: Using applied mathematical projects that link mathematics to everyday life, such as studying statistics or engineering designs. 4. Ongoing Assessment: Conduct regular quizzes and exercises to track students' progress and identify points that need to be strengthened. 5. Interpretation and Discussion: Encourage students to explain their solutions and ways of thinking to stimulate 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	35	**SWL regulator(h/s)** Regular student load per week	5
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	35	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL (h / sem) إجمالى The student's total academic load during the semester	75		

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)		

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.

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

MODULE DESCRIPTOR FORM

Module Information					
Module Title	ELECTRICAL CIRCUITS II			**Module Delivery**	
Module Type	BASIC			☒**Theory** ☒**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	BME-122				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		WBM	**College**	ENG	
Module Leader	Hussein Abdulkareem Saleh		**e-mail**	Hussein.abd@uowa.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Electrical Circuits I	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes, and Indicative Contents	
Module Aims	1. To develop problem-solving skills and understanding of circuit theory through the application of techniques. 2. To understand AC Principles, general alternating waveforms, sine wave, phasor relations, and average and effective values. 3. This course deals with the alternating principles of electrical circuits. 4. To understand the representation of sinusoidal waveform in domain and time domain. 5. To understand the series RL AC circuit, series RC AC circuit, and series RLC AC circuit 6. To perform series resonance circuits, parallel resonance and parallel quality factor are used.
Module Learning Outcomes	1. Recognize how A.C. electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what A.C. electric circuit means. 4. Discuss the reaction and involvement of resonance in electric circuits. 5. Describe،series RC AC circuit, series RLC AC circuit 6. Define Ohm's law. 7. Identify the basic applications of AC circuits. 8. Discuss the operations of sinusoids and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Identify the capacitor and inductor phasor relationship with respect to voltage and current.

Indicative Contents	Indicative content includes the following. AC Principles, general alternating waveforms, sine wave, phasor relations, average and effective values, complex numbers, representation of sinusoidal waveform in domain and time domain., Series AC Circuits, impedance and phasor diagram: resistor, inductor and capacitor, series RL AC circuit, series RC AC circuit, series RLC AC circuit, voltage divider rule, response of RLC to voltage and current, response of RLC to frequency, Parallel AC Circuits, parallel RL AC circuit, parallel RC AC circuit, parallel RLC AC circuit, AC Power; power triangle and power factor Electrical Circuit Analysis Methods, Mesh Analysis Method, Nodal Analysis Method, bridge networks, star-delta and delta-star circuits conversion, AC Network Theorems, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Resonance, series resonance; series quality factor, selectivity curve and bandwidth frequencies for series resonance circuits, Parallel Resonance, parallel quality factor, Pulse Waveforms and the R-C Response, pulse definition and duty cycle, R-C response to the square wave input., Polyphase Systems (Three-Phase), Transformers, AC Machine.
Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will focus on actively engaging students in exercises designed to enhance their critical thinking skills. This will be achieved through a combination of lectures, interactive tutorials, and hands-on experiments featuring engaging and practical activities.

Student Workload (SWL)			
Structured SWL (h/sem)	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	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**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	AC Principles, general alternating waveforms, sine wave.
Week 2	Phasor relations, average and effective values.
Week 3	Complex numbers.
Week 4	Representation of sinusoidal waveform in frequency domain and time domain.
Week 5	Series AC Circuits, impedance and phasor diagram: resistor, inductor and capacitor, series RL AC circuit, series RC AC circuit.
Week 6	Series RLC AC circuit, voltage divider rule, response of RLC to voltage and current, response of RLC to frequency.
Week 7	Mid-term Exam
Week 8	Parallel AC Circuits, parallel RL AC circuit, parallel RC AC circuit, parallel RLC AC circuit AC Power; power triangle and power factor .
Week 9	Electrical Circuit Analysis Methods, Mesh Analysis Method, Nodal Analysis Method.
Week 10	AC Network Theorems, Superposition Theorem, Thevenin's Theorem, Norton's Theorem.
Week 11	Resonance, series resonance..
Week 12	Series quality factor, selectivity curve and bandwidth frequencies for series resonance circuits.
Week 13	Parallel Resonance, parallel quality factor,
Week 14	Series magnetic circuit
Week 15	**Parallel magnetic circuit**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Introduction to AC circuit
Week 2	Lab 2: RL series AC circuit
Week 3	Lab 3: RC series AC circuit
Week 4	Lab 4: RLC series AC circuit
Week 5	Lab 5: RLC parallel AC circuit
Week 6	Lab 6: series resonance AC circuit
Week 7	Lab 7: parallel resonance AC circuit

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	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.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Medical Physics**	**Unit delivery**	
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-12-04		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**105**		
Unit level	1	**Delivery Semester**	2
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Kawthar Ali Hassan	**E-mail Address**	kawther.ha@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	name	**E-mail Address**	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	• Understand the applications of physical principles in medicine such as radiology and magnetism. • Improve medical imaging techniques such as X-ray andMRI for accurate diagnosis. • Develop radiation therapy techniques to accurately treat tumors and reduce side effects. • Ensure patient safety by reducing unnecessary radiation doses. • Analyze computer data and models to improve treatment and medical monitoring. • Training students on the use and calibration of medical devices to ensure their accuracy. • Provide the fundamentals of physics for its medical applications in the safe and effective treatment and diagnosis.
Unit Learning Outcomes Learning outcomes of the course	1. Understand the physical principles in medical diagnosis and treatment. 2. Master medical imaging techniques such as X-ray and MRI. 3. Apply radiation therapy techniques accurately. 4. Ensure radiation safety for patients and staff. 5. Calibration of medical devices to ensure their accuracy. 6. Analyze data to improve diagnosis and treatment. 7. Apply practical skills in medical work environments. 8.
Indicative Contents Indicative Contents	1. Basic physical principles (X-ray, electricity, magnetism). 2. Medical imaging techniques (X-ray, MRI, CT). 3. Radiation therapy (IMRT, IGRT). 4. Radiation protection to reduce exposure. 5. Calibration and testing of medical devices. 6. Biological and radiological measurements. 7. Research and development in medical physics.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	Improve medical imaging techniques such as X-ray and MRI to reduce radiation dose and increase image resolution. Radiation therapy using precise techniques such as IMRT and IGRT to improve tumor targeting and reduce the impact on healthy tissue. Reduce radiation doses through precise guidance techniques and provide protection to patients. Quality control in medical devices and ensuring their efficiency and safety. Research and development of new technologies such as artificial intelligence and nanotechnology to improve treatments. All these strategies aim to improve treatment efficiency and ensure patient safety.

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	5
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	5
SWL إجمالى (h / sem) The student's total academic load during the semester	105		

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 1	Introduction to Chemistry Preparation of solutions, molars, molars, reagents, acids
Week 2	Alkaline, dielectric solution, concentration, titration
Week 3	Proteins , protein metabolism , protein synthesis , protein catalysis , protein synthesis , protein fate , amino acids
Week 4	Amino acid reaction, the relationship of amino acids with other molecules Protein synthesis , translation , transcription , globulin , albumin
Week 5	Liver function tests, bilirubin, GOT and AST , ALP , kidney function tests, urea, creatinine and uric acid
Week 6	Lipid metabolism, lipid synthesis, lipid synthesis, alternative pathway, lipid degradation, fatty acids
Week 7	Midterm Exam

Week 8	Cholesterol, triglycerides, HDL , LDL , ketone bodies, bile salt, lipase
Week 9	Carbohydrates, glucose metabolism, glucose synthesis, glycolysis, inhibitory cycles, glycogen synthesis, glucose formation
Week 10	Diabetes, hyperglycemia, HbA1C , fasting glucose, fructose, sucrose, lactose
Week 11	Enzymes, Enzyme metabolism, Enzyme types, Enzyme function, Enzyme synthesis
Week 12	Liver enzymes, kidney enzyme, digestive enzyme, coenzyme, glycolysis enzymes
Week 13	Hormones Hormone Synthesis , Types of Hormones , Hormone Function , Hormone Receptors , Pituitary Hormones
Week 14	Thyroid hormones, Adrenal hormones, sex hormones, digestive hormones, pinal hormones
Week 15	DNA , RNA , guanine, thiamine, cytosine, adenine, uracil
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

Learning and Teaching Resources

	text	Available in the library?
Required texts	Clinical Biochemistry, (8 editions), by Leipencotts	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.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Microprocessors**	**Unit delivery**	
Unit Type	**fundamental**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-51-6		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**30**		
Unit level	3	**Delivery Semester**	2
Department of Administration	Biomedical	**College**	Engineering
Unit Commander	Hussein Abdul karim	**E-mail Address**	hussein.abd@uowa.edu.iq
Title of Unit Commander	Assistant Doctor	**Unit Commander Qualifications**	Doctor
Unit Teacher		**E-mail Address**	
Peer Reviewer Name		**E-mail Address**	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	• Understand the basic foundations of microprocessors: Learn about the components of a microprocessor and how it works. • Study Microprocessor Design: Learn how to design a processor using modules such as controller, arithmetic and logic unit, and memory. • Microprocessor Programming: Learn how to write and develop programs that run on microprocessors using languages such as Assembly or C. • Microprocessor applications: Understand how microprocessors are used in various applications such as embedded systems, hardware control, and data processing. • Performance analysis: The study of how microprocessor performance is measured and analyzed in certain applications.
Unit Learning Outcomes Learning outcomes of the course	1. Understanding microprocessor components: Know how microprocessor units are integrated. 2. Systems design using microprocessors: The ability to design electronic systems using microprocessors. 3. Microprocessor Programming: Writing processor-compatible programs using low-level programming languages. 4. Performance analysis: The ability to evaluate performance and troubleshoot potential problems in systems that use microprocessors. 5. Application of microprocessors: The ability to apply the processor in embedded systems such as controllers and smart cars.
Indicative Contents Indicative Contents	1. Introduction to Microprocessors: Definition of microprocessor and its basic components. 2. Microprocessor units: such as controller, arithmetic and logic unit, memory, and I/O interfaces. 3. Processor architectural design: Understand how the processor is designed at the circuit level. 4. Microprocessor Programming: Learn programming languages such as Assembly and C for software development. 5. Microprocessor applications: use in embedded systems, industrial control, and smart devices. 6. Performance analysis: How to measure processor efficiency in certain applications.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	1. Hands-on learning: Conducting hands-on experiments to design systems using microprocessors and programming. 2. Case Study: Analysis of real applications of microprocessors in different systems. 3. Project-based education: Design and implement practical projects using microprocessors. 4. Use of simulators: Train students to use microprocessor simulators to test software systems. 5. Interactive discussions: Discuss challenges related to the design and programming of microprocessors in advanced systems.

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	30	**SWL regulator(h/s)** Regular student load per week	5
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	15	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL إجمالى (h / sem) The student's total academic load during the semester	45		

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)		

Course Description Form

1. Course Name:
Analytical Mechanics
2. Course Code:
WBM-42-04
3. Semester / Year:
Semester
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
Presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 h/ 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Hussain Ameer Aljawad Email: Hussein.aljawad@uowa.edu.iq
8. Course Objectives

Course Objectives	The course will cover fundamental concepts on the vibrations of mechanical systems including, simple harmonic motion, free and force of undamped and damped vibrations, rotating unbalance, support motion, vibration measuring instruments, two and multi degrees of freedom.

9. Teaching and Learning Strategies	
Strategy	1.Model real and physical dynamic systems in terms of mathematical models. 2. Apply principles of mechanical vibrations such as Newton's second law, and the principle of conservation of energy to the mathematical models to obtain their governing equations of motion. 3. Solve the obtained equations of motion to understand behavior of oscillatory systems to various excitations such as harmonic excitation, and impulse excitation.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1+2	2	Introduction to vibrations	Introduction to vibrations, Simple harmonic motion	Presented the lectures and explain it.	Daily exams + classwork
3-5	2	Free undamped vibrations	mathematical models, conservation of energy to the mathematical models	Presented the lectures and explain it.	Daily exams + classwork
6-8	2	Free damped vibrations	Solve the obtained equations of motion to understand behavior of oscillatory systems	Presented the lectures and explain it.	Daily exams + classwork
9	2	Force of undamped vibrations	Solve the obtained equations of motion with force to understand behavior of oscillatory systems	Presented the lectures and explain it.	Daily exams + classwork
10-12	2	Force of damped vibrations,	Force of damped vibrations, Vibration isolation and Force transmissibility, Rotating unbalance vibration, vibration measuring instruments	Presented the lectures and explain it.	Daily exams + classwork
13-15	2	Multi-degrees of freedom system	Two-degrees of freedom systems, Multi-degrees of freedom system	Presented the lectures and explain it.	Daily exams + classwork

11. Course Evaluation	
1- Theoretical lectures. 2- Discussion Tutorials. 3- Application in group to activate the team spirit at work	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Text book of Mechanical vibrations (2nd Ed) V. D. Rao.
Main references (sources)	Theory of vibration with applications (5-Ed), William T. Thomson
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Analytical Mechanics
2. Course Code:
WBM-42-04
3. Semester / Year:
Semester
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
Presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 h/ 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Hussain Ameer Aljawad Email: Hussein.aljawad@uowa.edu.iq
8. Course Objectives

Course Objectives	The course will cover fundamental concepts on the vibrations of mechanical systems including, simple harmonic motion, free and force of undamped and damped vibrations, rotating unbalance, support motion, vibration measuring instruments, two and multi degrees of freedom.

9. Teaching and Learning Strategies	
Strategy	1.Model real and physical dynamic systems in terms of mathematical models. 2. Apply principles of mechanical vibrations such as Newton's second law, and the principle of conservation of energy to the mathematical models to obtain their governing equations of motion. 3. Solve the obtained equations of motion to understand behavior of oscillatory systems to various excitations such as harmonic excitation, and impulse excitation.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1+2	2	Introduction to vibrations	Introduction to vibrations, Simple harmonic motion	Presented the lectures and explain it.	Daily exams + classwork
3-5	2	Free undamped vibrations	mathematical models, conservation of energy to the mathematical models	Presented the lectures and explain it.	Daily exams + classwork
6-8	2	Free damped vibrations	Solve the obtained equations of motion to understand behavior of oscillatory systems	Presented the lectures and explain it.	Daily exams + classwork
9	2	Force of undamped vibrations	Solve the obtained equations of motion with force to understand behavior of oscillatory systems	Presented the lectures and explain it.	Daily exams + classwork
10-12	2	Force of damped vibrations,	Force of damped vibrations, Vibration isolation and Force transmissibility, Rotating unbalance vibration, vibration measuring instruments	Presented the lectures and explain it.	Daily exams + classwork
13-15	2	Multi-degrees of freedom system	Two-degrees of freedom systems, Multi-degrees of freedom system	Presented the lectures and explain it.	Daily exams + classwork

11. Course Evaluation	
1- Theoretical lectures. 2- Discussion Tutorials. 3- Application in group to activate the team spirit at work	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Text book of Mechanical vibrations (2nd Ed) V. D. Rao.
Main references (sources)	Theory of vibration with applications (5-Ed), William T. Thomson
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
biosensor
2. Course Code:
WBM-52-08
3. Semester /
Year: second \ fifth year
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Lecturer :Mustafa Habib Email: mustafa.ha@uowa.edu.iq
8. Course Objectives

Course Objectives	• **1- Identify the basic parts of the medical sensor and how to manufact** • **2- How medical allergens develop over time** • **3- Knowing the types of medical allergens** • **4- Classification of medical allergens according to use** • **5- The purpose of using medical sensors with the human body**
9. Teaching and Learning Strategies	
Strategy	1- Theoretical lectures. Using the whiteboard and data sh 2- Discussion lectures Tutorials. 3- Practical experiments in laboratories. 4- Homework assignments.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method
First	3	Definition, characteristics, principles, and requirements.	Definition, characteristics, principles, and requirements.	theory
Second	3	Electrodes and definition	Electrodes and definition	theory
Third	3	electronic CCT and types.	electronic CCT and types.	theory
Fourth	3	Surface electrodes	Surface electrodes	theory
Fifth	3	Needle electrodes	Needle electrodes	theory
Sixth	3	Transducers and properties.	Transducers and properties.	theory
Seventh	3			theory
Eighth	3	Resistive transducers and thermometric transducers.	Resistive transducers and thermometric transducers.	theory
ninth	3	Medical applications	Medical applications	theory
tenth	3	Piezoelectric	Piezoelectric	theory
eleventh	3	ultrasound transducers	ultrasound transducers	theory
twelveth	3	Mechanical transducers, and medical applications.	Mechanical transducers, and medical applications.	theory
Thirteenth	3			theory
fourteenth	3	Chemical transducers and medical applications	Chemical transducers and medical applications	theory
fifteenth	3	pressure measurement transducers.	pressure measurement transducers.	theory

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily prep arati etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wang, P., & Liu, Q. (201). Bio Business Media.
Main references (sources)	1- Wang, P., & Liu, Q. (2017 . Bio & Business Media. 2- Introduction to Biomedical l ngine
Recommended books and references (scientific journals, reports…)	Standard handbook of biomedical senso s
Electronic References, Websites	https://books.google.iq/books/about/Ha dbook

Course Description Form

1. Course Name
Neural networks
2. Course Code
WBM-52-05
3. Semester / Year
Quarterly
4. Date of preparation of this description
20/1/2025
5. Available attendance formats
Weekly (theoretical)
6. Number of Credit Hours (Total) / Total Number of Units
30 hours theoretical / 2 units
7. Course administrator name
Name: Dr. Saad Mahmoud Sarhan Email: saad.mah@uowa.edu.iq
8. Course Objectives

The subject of neural networks aims to acquire the following skills: 1. Creating a computing system that has the ability to simulate the human brain in solving problems. 2. The student should be able to organize and classify written data automatically. 3. Extract meaning from complex and inaccurate data. 4. Medical diagnosis by classifying medical images or signals. Know most of the engineering applications of the above vocabulary and how to benefit from them and employ them correctly in the field of biomedical engineering	**Course Objectives:**

9. Teaching and Learning Strategies
✓ The teacher gives detailed theoretical lectures ✓ The teacher requests periodic reports on the basic topics of the subject. ✓ The teacher is familiar with the basic concepts of neural networks of all kinds and practical applications, which enhances the method of learning and teaching. The teacher introduces students to the most important main applications of neural networks in the design of various medical devices theoretically and practically.

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Daily tests + homework + monthly tests	Lectures presented in PDF format	Comparison of biological and artificial neurons	Comparison of the structure and functioning of biological neurons and artificial neurons	2	1
Daily tests + homework + monthly tests	Lectures presented in PDF format	Models of artificial neural systems	Overview of front grilles with examples	4	2-3
Daily tests + homework + monthly tests	Lectures presented in PDF format	Neuroprocessing, learning and adaptation	Explain neural processing mechanisms, learning methods, and coping techniques	4	4.5
Daily tests + homework + monthly tests	Lectures presented in PDF format	Data processing	Steps that include feature scale, normalization, feature selection, and optimization	2	6
Daily tests + homework + monthly tests	Lectures presented in PDF format	Performance measurement	Techniques such as the use of verification kits, training and testing, and cross-checking	4	7.8
Daily tests + homework + monthly tests	Lectures presented in PDF format	Workbooks	Explain and apply near-neighbor algorithms (KNN), linear differential analysis (LDA), and supporting vector machines (SVM)	8	9-12
Daily tests + homework + monthly tests	Lectures presented in PDF format	Learning rules	Overview of learning rules such as Hebbian, Perceptron, Delta, Winner, Correlation, and Out-star rule	4	13-14

Daily tests + homework + monthly tests	Lectures presented in PDF format	Medical Signals	Overview of the different types of medical signals and the challenges associated with their treatment	2	15

11. Course Evaluation

1- Daily exams with practical and scientific questions.

2- Participation scores for challenging competition questions among students.

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

12. Learning and teaching resources

Neural networks and learning machines, third edition, Simon Haykin Neural networks theory, Alexander I. Galushkin	Required textbooks
• College library for additional curriculum resources. • View scientific websites to see the latest developments in the subject	Main references
All sober scientific journals related to artificial intelligence	Recommended books and references

Course Description Form

1. Course Name:
Computer Network
2. Course Code
WBM-52-05
3. Semester/Year:
Second Semester / Fifth Year
4. Date of preparation of this description:
19/3/2024
5. Available Attendance Forms:
Attend a lecture
6. Number of credit hours (total) / number of units (total):
2 hours / 60
7. Course administrator's name (if more than one name)
Name: Assistant Lecturer Fares Karim Email: Faris.kar@uowa.edu.iq
8. Course Objectives

Course Objectives Tuition	The article aims to show the means and methods contained in the computer network, where the article deals with explaining the means of communication and indicating their quality, efficiency, ways to improve their performance and the factors affecting them, and on the other hand, how to transfer data within the computer network and the methods and protocols used to transfer this data.

9. Teaching and learning strategies	
Strategy	B1 – To be able to know the methods of transmitting the signal and information through users and stations to transmit information B2 – To be able to design small networks and understand the mechanism of applying theoretical information in practical life

Course Structure

The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	Understand the principles of networking and the workplaces of this important specialization in the areas of life	Types of computer Networks (clients server, Peer-to-peer,& Wireless networks) classifying the computer networks (Home network, LAN, MAN, WAN, Wireless Networks,& Internet work)	Using illustrative images and explaining the use of networks in areas of life	Daily exams +Homework + Monthly exams

Second		Understand how to communicate and how to transfer information	The Reference models [1. The OSI model (design issues for the layers, connection oriented & connectionless layers' services, Service Primitives, & The OSI Layers)]	Lectures displayed in PDF format	Daily exams +Homework + Monthly exams
Third			Wired LANs: Ethernet Wireless LANs : IEEE 802.11, Bluetooth	Lectures displayed in PDF format	Daily exams +Homework + Monthly exams
Fourth				Lectures displayed in PDF format	Daily exams + homework + monthly exams
V+ Sixth			The TCP/IP Model	Lectures displayed in PDF format	Daily exams + homework + monthly exams
VII + VIII			IP Addressing	Lectures displayed in PDF format	Daily exams + homework + monthly exams
Ninth+Tenth			Routers & Cisco IOS	Lectures displayed in PDF format	Daily exams + homework + monthly exams
Eleventh			Cisco IOS	Lectures displayed in PDF format	Daily exams + homework + monthly exams
Twelfth			Wireless WANs ,Cellular Telephone and Satellite Networks	Lectures displayed in PDF format	Daily exams + homework + monthly exams + homework + monthly exams
Thirteenth					
Fourteenth			Synchronous Optical Network Virtual-Circuit Networks	Lectures displayed in PDF format	Daily exams + homework + monthly exams + homework + monthly exams
Fifteenth					

. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily, oral, monthly, written exams, reports .... etc

. Learning and Teaching Resources

1- Required textbooks:	Computer Networking_ A Top-Down Approach -James Kurose Keith Ross-7th Edition 2017
2- Main references (sources)	ollege Library to obtain additional resources for the curriculum. iew the scientific websites to see the latest developments in the article.
A- Recommended books and references (scientific journals, reports,.....)	
B- Electronic References, Websites	1- https://www.netacad.com/

	2- https://mikrotik.com/training/academy 3- https://www.hawaiiacademy.com/

MODULE DESCRIPTION FORM

Module Name:	
Control systems II	
Module Code:	
WBM-52-04	
Semester / Year:	
second semester- 2025	
Date of Preparation of this Description:	
22-1-2025	
Available Attendance Formats:	
Class Attendance	
Total Credit Hours / Total Units:	
75 \ 3	
Name of the Course Coordinator (if there are multiple names):	
Qayssar Ayad Ahmed qayssar.ayad@uowa.edu.iq	
Module Objectives:	
Module Objectives	1- 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. 2- Building and preparing the student psychologically to play his role as a reliable engineer in this field. 3- 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. 4- Identify the types of digital control and some of their practical applications.
1. **Teaching and Learning Strategy**	
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.

2. Module Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	Introduction to digital engineering control systems and methods of representing systems	Introduction to Discrete-Time Control System. Review of Mathematical Foundation.	Lectures DATA SHOW	Surprise exams and classroom activities
3-4	6	Analysis of digital control systems and design of a traditional digital controller	Analysis of Discrete-Time Systems. Design of Conventional Discrete-Time Controllers.	Lectures DATA SHOW	Surprise exams and classroom activities
5-6	6	Introduction to theory state space	State-space modeling	Lectures DATA SHOW	Surprise exams and classroom activities
7-8	6	How to analyze using the method (controllability and observability)	controllability and observability	Lectures DATA SHOW	Surprise exams and classroom activities
9-10	6	the definition, z-transform And analysis methods	Sampling theorem Z-transform	Lectures DATA SHOW	Surprise exams and classroom activities
11-12	6	How to design a digital controller using state-space method	Design of digital control systems using state-space methods	Lectures DATA SHOW	Surprise exams and classroom activities
13-14	6	Recognition digital PID controllers	Digital PID controllers and tuning	Lectures DATA SHOW	Surprise exams and classroom activities
Module Evaluation					
Quizzes (4%), Assignment (3%), lab. (10%), attendance (3%), Mid exam (30%), FINAL exam (50%)					

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:
Mechanics of materials II
2. Course Code:
WBM-32-02
3. Semester / Year:
Semester
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
Presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
45 h/ 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Hussain Amire Aljawad Email: Hussein.aljawad@uowa.edu.iq
8. Course Objectives

Course Objectives	The aim of teaching the curriculum for this subject is to learn the basics of the resistance of materials to external forces and pressures and how to calculate loads, stresses and other mechanical issues and their effect on the materials of objects internally. Materials force field, also known as materials mechanics, refers to various methods for calculating stresses and strains in structural members, such as beams and columns. Methods used to predict the response of a structure under loading and its susceptibility to different failure modes take into account material properties such as yield strength, ultimate strength, Young's modulus, and Poisson's ratio.

9. Teaching and Learning Strategies

Strategy	1- Making the student able to demonstrate real knowledge of engineering concepts related to materials mechanics during the academic level and their applications in the fields of biomedical engineering. 2- Learn and understand the basic definitions used in materials mechanics, such as stresses, ductility, bending moments, cutting force, and other concept 3- Learn and understand solution methods and mathematical applications in solving applications industry problems in the field of biomedicine.

	4- Learn and apply the laws and formulas that the student learns from numerc examples, which make him able to understand the future problems that will faced in medical engineering industries and applications.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Units and common principles And Analysis of Internal Forces and Stresses	Units and common principles, SI Units (System International Units), Types of Support in Structure, Types of Loads in Structures, Types of Beams in Structures, Determinate and Indeterminate Problems. Analysis of Internal Forces and Stresses, Introduction, Analysis of Internal Forces (Three-dimensional system (3D), Two-dimensional system (2D)).	Presented the lectures and explain it.	Daily exams + classwork
2	3	Normal stress And Shear stress and safety Factor	Normal stress, Simple Normal Stress, Tensile Stress, Compressive Stress, Beam Stress. Shear stress and safety Factor, Simple Shear Stress, Direct shear stress, Double shear stress, Punching shear stress, Allowable and Factor of Safety.	Presented the lectures and explain it.	Daily exams + classwork

3+4	3	Torsion of Circular Shaft And Torsion of non-circular section	Torsion of Circular Shaft, Introduction, Torsion, Torsional shear stress, Angle of Twist, Polar Moment of Inertia, Composite Shaft, Power Transmitted by Shaft. Torsion of circular shaft 2, Examples and Solutions. Torsion of non-circular sections, Shear Stress and Angle of Rotation.	Presented the lectures and explain it.	Daily exams + classwork
5-7	3	Thin walled pressure vessels	Thin walled pressure vessels, Types of stresses in Cylindrical thin-walled pressure vessels, Cylindrical Thin-Walled Pressure Vessels, Tangential (Hoop or Circumferential) Stress, Longitudinal Stress, Spherical Shell.	Presented the lectures and explain it.	Daily exams + classwork
8	3	Simple Strain and Deformations of Axially Loaded Members	Simple Strain and Deformations of Axially Loaded Members, Simple Strain, Sign Convention, Stress-Strain Diagram, Hooke's Law, Poisson' s Ratio, Cases of Poisson's Ratio.	Presented the lectures and explain it.	Daily exams + classwork
9+10	3	Deformation of axially loaded members	Deformation of axially loaded members, Case 1: prismatic bar, Case 2: Non-prismatic bar, Case 3: Bar	Presented the lectures and explain it.	Daily exams + classwork

			with varying cross-sectional and varying axial force		
11+12	3	Statically indeterminate problems	Statically indeterminate problems, Examples and Solutions.	Presented the lectures and explain it.	Daily exams + classwork
13	3	Thermal stresses and strains	Thermal stresses and strains, Thermal strain, Thermal Deformation.	Presented the lectures and explain it.	Daily exams + classwork
14-15	3	The Columns	The Columns, Definition, The Critical load of column, Radius of Gyration.	Presented the lectures and explain it.	Daily exams + classwork

11. Course Evaluation

1- Theoretical lectures.
2- Discussion Tutorials.
3- Application in group to activate the team spirit at work

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	MECHANICS OF MATERIALS/ R. C. HIBBELER
Main references (sources)	MECHANICS OF MATERIALS, E. J. HEARN
Recommended books and references (scientific journals, reports…)	Strength of material/schaums outline/William Nash
Electronic References, Websites	

Unit Description Form Course Description Form

Faculty of Engineering / Department of Biomedicine

Unit Information			
Course Information			
Unit Title	Limbs anatomy	**Unit delivery**	
Unit Type	basic	☒ Theory **Lecturer** ☒ **Laborator** y ☒ **Practical** ☐ ☐ Tutorial **Seminar** ☐	
Unit Code	BME-225		
ECTS Credits	7		
SWL (hr / without)	175		
Unit level	4	**Delivery Semester**	2
Department of Administration	Biomedical Engineering	**College**	College of Engineering
Unit Commander	Aref Al , Sayyad	**E-mail Address**	aref.alsayad@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher	Aref Al , Sayyad	**E-mail Address**	aref.alsayad@uowa.edu.iq
Peer Reviewer Name		**E-mail Address**	
Date of accreditation of the Scientific Committee	01/06/2023	**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 module aims to provide detailed knowledge about: the skeleton of the upper and lower limbs. The muscles that control the movement of the limbs . Nerves that supply nerve signals to the limbs. Blood vessels that feed the limbs. The unit highlights the relationships between anatomical components and their role in facilitating daily movements and functions. This knowledge helps to: Analysis of clinical conditions associated with the limbs. Dealing with injuries and diseases affecting the limbs.
Unit Learning Outcomes Learning outcomes of the course	Identify the anatomical components of the upper and lower extremities, including bones, muscles, nerves, and blood vessels Explain the functional relationship between the different anatomical components and their role in movement and support .clarify the nerve and vascular pathways of the limbs and understand their effect on normal function, .Analysis of common limb-related injuries and explain their impact on movement and vital functions .Application of anatomical knowledge in the interpretation of relevant clinical cases .Develop critical thinking skills to understand clinical conditions and diagnose periphery-related problems
Indicative Contents Indicative Contents	1. Introduction to limb anatomy: includes an overview of the components of the upper and lower limbs and their basic functions 2. Study of the skeleton of the limbs: Analysis of the bones that make up the limbs, including their locations and characteristics 3. Muscle anatomy: recognize the muscles of the limbs, their functions, and mechanisms of movement 4. Neural pathways: Explanation of the main nerves that supply the limbs and their motor and sensory functions.5. Blood vessels: identification of the arteries and veins that feed the limbs and their anatomical significance .6 Clinical relationships: linking anatomical information to clinical conditions, such as associated injuries and disorders By the parties.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	This module is based on a combination of interactive lectures and practical sessions to understand the detailed anatomy of the limbs. Multimedia, such as three-dimensional models and anatomical images, are used to enhance visual perception. It also encourages group discussions and problem solving for clinical case analysis. Activities conclude with practical applications for skills development .Basic Clinical

Student Workload (SWL) The student's academic load is calculated for 15 weeks			
SWL regulator (h/sim) Regular academic load of the student during the semester	64	**Regulator (h / w) SWL** Regular student load per week	4
SWL non-regulator (h/sim) Irregular academic load of the student during the semester	61	**Unregulated (h / w) SWL** Irregular student academic load per week	4
Total SWL (h/SEM) The student's total academic load during the semester	125		

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

Delivery Plan (Weekly Curriculum) Theoretical Weekly Curriculum	
week	Covered Material
The week 1+2+3	The student learns what is anatomy and methods of studying anatomy and medical terminology related to anatomy, and learning the situation
Week 5+4	The student learns the basic structures of the human body and its functions such as the skin and its accessories, the membranes of the body, muscles and joints, bone, ligaments, synovial fluid and its accessories, the function of each structure, cartilage, its types, functions and ligaments.
Week 7+6	Study the devices used in diagnosis, as well as knowing the mechanism of work of each device and its benefits and harms, such as X-ray, MRI, endoscope, device Drop, Sutar
Week 9+8	The student learns to study the bone of the upper limbs and study their shape and knowledge of their number and location and the functions it performs
The week 11+10	The student should know the names of the connections, their location, and the functions that they have as well as the origin of the holiday and the club Muscle implant

Week 12	The student learns about the armpit area and its protection, the boundaries that form it, the blood vessels, the lymph nodes circulating in it and the nerves that feed it The student learns the names of nerves And places that face each nerve and the functions it performs
Week 13	The student learns the lower limbs and the bones below them
Week 14	The student learns a full description of all the bones that are in the lower extremities such as the hip and thigh bones and the functions they perform
Week 15	The student learns a full description of all the bones that are in the lower extremities such as the hip and thigh bones and the functions they perform

Learning and Teaching Resources Learning and Teaching Resources		
	text	**Available in the library?**
Required texts	Clinical anatomy of the upper and lower limbs, (10 editions), by Cara Maud, MSPAS, PA-C	Yes
Recommended texts		Yes
Websites		

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

Signs that are greater than or less than 0.5 decimal places will be rounded up to the highest or lowest full sign (for example, Note:
, so the only amendment "the university has a policy of not tolerating the 'imminent traffic failure' .The score of 54.5 will be rounded to 55, while the score of 54.4 will be rounded to 54.On the marks granted by the original mark(s) will be the automatic rounding shown above

Unit Teacher

Assistant Lec.Aref Al-Saeed

Unit Description Form

Course Description Form

Unit Information Course Information				
Unit Title	Mathematics II			Unit delivery
Unit Type	Basic Learning			☒ Theory ☒ Roger that ☐ Lab ☒ Tutorial ☐ practical ☐ Seminar
Unit Code	ENG102			
ECTS Credits	6			
SWL (Hour /SEM)	051			
Unit level	4	Delivery Semester	2	
Administrative Management	Biomedical	College	Engineering Faculty	
Unit Commander	Eng. Hassan Allawi Sabbar	E-mail Address	Hassan.as@uowa.edu.iq	
Title of Unit Commander	Assistant Lecturer	Unit Commander Qualifications	Master	
Unit Teacher		E-mail Address		
Peer Reviewer Name	name	E-mail Address	E-mail Address	
Date of accreditation of the Scientific Committee	1/6/2023	Version number	1.0	

Relationship with other units Relationship with other subjects			
Prerequisites Unit	Mathematics I	Semester	1
Common Requirements Unit	Any	Semester	

Unit objectives, learning outcomes and how-to contents Course objectives, learning outcomes and instructional contents	
Objectives of the Unit Course Objectives	The Mathematics module aims to provide students with an understanding of mathematical concepts, skills and techniques that can be applied to a range of real-world problems. This course aims to introduce the concepts of calculus, complex numbers, vectors and linear algebra. In addition, the module aims to prepare students for future academic and career endeavors that require athletic competence.
Unit Learning Outcomes Learning outcomes of the course	By the end of this module, the student should be able to: 1. Use asymptotic, first and second derivatives to plot graph functions. 2. Apply advanced integration rules/techniques to calculate integrals. Drawing graphs of functions; rounding jobs. 3. Description of the polar coordinate system. 4. Convert from rectangular to polar coordinates. 5. Apply matrix techniques and elementary theory to the problem in geometry. 6. Solve the systems of linear equations and find the inverse of the matrix. 7. Perform the basic algebra of vectors. 8. Evaluate the dot product and vector of two vectors. 9. Evaluate the gradient and spacing and curling of different numerical and vector fields. 10. Complex numbers: algebra of complex numbers, solution of complex polynomial equations, Argand diagrams, polar form of complex numbers, exponential form of complex numbers, sequential expansion of trigonometric and exponential functions, de Moivre's theorem.
Indicative Contents Indicative Contents	The instructional contents of the Mathematics module depend on the level and scope of the course. However, some common topics that can be covered in the Mathematics module include: 1. Arithmetic: Basic arithmetic operations such as addition, subtraction, multiplication, and division. 2. Algebra: the study of mathematical symbols and the rules for manipulating these symbols to solve equations and represent real-world situations. 3. Geometry: The study of shapes, volumes, positions and measurements of objects in space. 4. Calculus: The study of mathematical concepts such as limits, derivatives, and integrals. In general, the instructional contents of the Mathematics module are intended to provide students with a comprehensive understanding of mathematical concepts and their applications in various fields of study.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classrooms and tutorials and consideration of the kind of simple experiments involving some sampling activities of interest to students.

Student Workload (SWL) Student Load			
SWL regulator (h/sem) Regular academic load of the student during the semester	78	**SWL regulator(h/s)** Regular student load per week	6
Unregulated SWL (h/sem) Irregular academic load of the student during the semester	72	**Unregulated SWL (h/s)** 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	**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	
	report	1	10% (10)	13	LO #5 , 8 and 10
Final Assessment	**Midterm Exam**	2 hours	10% (10)	7	LO #1-7
	Final Exam	3hr	50% (50)	16	every
	Overall Rating		100% (100 degree)		

Delivery Plan (Weekly Curriculum) Theoretical Weekly Curriculum	
week	Covered Material
Week 1 Week 2 Week 3	**Transcendental functions:** inverse functions and their derivatives, natural logarithms, exponential functions, indefinite forms and L'Hôpital rule, inverse trigonometric functions, hyperbolic functions and their inverse.
Week 4 Week 5	**Integration techniques:** integration by parts, trigonometric integrals, trigonometric alternatives, partial fractions, incorrect integrals.
Week 6	**Polar coordinates:** Polar coordinate system, graphing polar coordinate equations, areas and lengths in polar coordinates
Week 7 Week 8 Week 9	**Matrices and determinants**: definitions, properties and operations, determinant, matrix inverse, solving equations of linear system, eigenvalues and eigenvectors**.**
week 10 week 11 week 12	**Vector theory:** three-dimensional coordinate systems, vector representation in space, unit vectors, scalar product, vector product, lines and planes in space, vector function.
Week 13 Week 14 Week 15	**Complex numbers:** complex numbers and operations, solving quadratic equations, Argand diagram, polar form of a complex number, Demoivre's theorem.
Week 16	Preparatory week before the final exam

Learning and Teaching Resources Learning and Teaching Resources		
	text	Available in the library?
Required texts	George B. Thomas Jr., "Calculus," 14th Ed	Yes
Recommended texts	1. Erwin Kreszig, "Advanced Engineering Mathematics", tenth edition. 2. Shum Chart of University Mathematics, fourth edition. 3. Mary Attenborough, "Mathematics for Electrical and Computing Engineering", 1st Ed.	No
Websites	Topics in Calculus - Wolfram Mathworld.	

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

Unit Information

Course Information

Unit Title	**Computer Science**	**Unit delivery**	
Unit Type	**secondary**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-12-04		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**75**		

Unit level	2	**Delivery Semester**	2
Department of Administration	Biomedical Engineering	**College**	Faculty of Engineering
Unit Commander	Fares Karim Haliwat	**E-mail Address**	Faris.kar@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name		**E-mail Address**	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	1. **Teaching the basics of programming**: Understand basic concepts such as variables, conditional statements, and loops. 2. **Proficiency in programming languages**: Enable students to write programs using languages such as C and C++. 3. **Algorithm Design**: Develop the ability to design effective algorithms to solve software problems. 4. **Understanding data structures**: Learn how to use different data structures such as arrays and lists. 5. **Application of object-oriented programming (OOP):** Teaching object-oriented programming principles such as objects and classes. 6. **Teaching debugging techniques**: improving debugging and code analysis skills. 7. **Apply advanced programming concepts**: Enable students to use advanced programming libraries and frameworks.
Unit Learning Outcomes Learning outcomes of the course	Understand programming principles: Gain knowledge of programming basics such as variables, conditional statements, and loops. Proficiency in programming languages: Ability to write programs using languages such as C and C++. Algorithm Design: Develop skills to design and implement effective problem-solving algorithms. Use data structures: Effectively apply data structures such as arrays, lists, and trees. Object-oriented programming (OOP): Understand and apply object-oriented programming principles such as objects and classes. Error analysis and correction: Develop debugging skills and improve code. Apply advanced concepts: the use of software libraries and frameworks, and the programming of multi-threaded applications. 1.
Indicative Contents Indicative Contents	1. Basic programming concepts: Learn the basics of programming such as variables, graphic types, and conditional structures. 2. C/C++ Programming: Learn C or C++ as an application development tool. 3. Algorithms: The study of how algorithms are designed and implemented to solve software problems. 4. Data structures: Learn how to use structures such as threaded lists, arrays, trees. 5. Object-oriented programming (OOP): Learn the principles of object-oriented programming such as objects and classes. 6. Debugging: Techniques for finding and correcting errors in code. 7. Advanced concepts: Learn programming using libraries and frameworks, and programming multi-threaded applications.

Learning and Teaching Strategies Learning and Teaching Strategies

Strategies	1. Active Learning: Encourage students to actively participate by solving exercises and problems themselves, enhancing their understanding of mathematical concepts. 2. Collaborative learning: teamwork to solve mathematical problems, helping to exchange ideas and develop analytical skills. 3. Project-based learning: Using applied mathematical projects that link mathematics to everyday life, such as studying statistics or engineering designs. 4. Ongoing Assessment: Conduct regular quizzes and exercises to track students' progress and identify points that need to be strengthened. 5. Interpretation and Discussion: Encourage students to explain their solutions and ways of thinking to stimulate 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	35	**SWL regulator(h/s)** Regular student load per week	5
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	35	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL إجمالى (h / sem) The student's total academic load during the semester	75		

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)		

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

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Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Computer Programming**	**Unit delivery**	
Unit Type	**Secoundray**	☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar	
Unit Code	BME-12-04		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**75**		

Unit level	1	**Delivery Semester**	2
Administrative Management	UGx11 1	**College**	BME - 111
Unit Commander	Ali abd alhussain	**E-mail Address**	Ali.abdalhussain@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name		**E-mail Address**	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	1. **Teaching the basics of programming**: Understand basic concepts such as variables, conditional statements, and loops. 2. **Proficiency in programming languages**: Enable students to write programs using languages such as C and C++. 3. **Algorithm Design**: Develop the ability to design effective algorithms to solve software problems. 4. **Understanding data structures**: Learn how to use different data structures such as arrays and lists. 5. **Application of object-oriented programming (OOP):** Teaching object-oriented programming principles such as objects and classes. 6. **Teaching debugging techniques**: improving debugging and code analysis skills. 7. **Apply advanced programming concepts**: Enable students to use advanced programming libraries and frameworks.
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Indicative Contents Indicative Contents	1. Basic programming concepts: Learn the basics of programming such as variables, graphic types, and conditional structures. 2. C/C++ Programming: Learn C or C++ as an application development tool. 3. Algorithms: The study of how algorithms are designed and implemented to solve software problems. 4. Data structures: Learn how to use structures such as threaded lists, arrays, trees. 5. Object-oriented programming (OOP): Learn the principles of object-oriented programming such as objects and classes. 6. Debugging: Techniques for finding and correcting errors in code. 7. Advanced concepts: Learn programming using libraries and frameworks, and programming multi-threaded applications.

Learning and Teaching Strategies Learning and Teaching Strategies

Strategies	1. Active Learning: Encourage students to actively participate by solving exercises and problems themselves, enhancing their understanding of mathematical concepts. 2. Collaborative learning: teamwork to solve mathematical problems, helping to exchange ideas and develop analytical skills. 3. Project-based learning: Using applied mathematical projects that link mathematics to everyday life, such as studying statistics or engineering designs. 4. Ongoing Assessment: Conduct regular quizzes and exercises to track students' progress and identify points that need to be strengthened. 5. Interpretation and Discussion: Encourage students to explain their solutions and ways of thinking to stimulate deep understanding and improve communication skills.

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SWL غير منظم (h / sem) Irregular academic load of the student during the semester	35	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL إجمالى (h / sem) The student's total academic load during the semester	75		

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)		

Grading chart				
group	degree	Appreciation	Tags (%)	definition
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	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

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جامعة وارث الأنبياء / كلية الهندسة / قسم الطب الحياتي

وصف المقرر الدراسي

Course Description Form

1. Course Name:
Neck & Nervous Anatomy
2. Course Code:
WBM-32-04
3. Semester / Year:
Semester
4. Description Preparation Date:
2024-03-19
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 Aziz Omran Email: Natikaziz81@gmail.com
8. Course Objectives

Course Objectives	Neck, in land vertebrates, the portion of the body joining the head to the shoulders and chest. Some important structures contained in or passing through the neck include the seven cervical vertebrae and enclosed spinal cord, the jugular veins and carotid arteries, part of the esophagus, the larynx and vocal cords, and the sternocleidomastoid and hyoid muscles in front and the trapezius and other nuchal muscles behind. head, in human anatomy, the upper portion of the body, consisting of the skull with its coverings and contents, including the lower jaw. It is attached to the spinal column by way of the first cervical vertebra, the atlas, and connected with the trunk of the body by the muscles, blood vessels, and nerves that constitute the neck.

9. Teaching and Learning Strategies

Strategy	The objective of this course is to teach students generic anatomy so they can recognize different anatomical structures and their roles. At the conclusion of this course, the student should be able to identify the various human anatomical structures as Head and Neck, know how the blood and nerves nourish each one, and understand its function.

10. Course Structure

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1+2	2	- Views of the Skull, Bones of the skull,	The student learns the types of bones th make up the skull , the front view of th face, External view of the skull, Latera Inferior and Posterior Views of the Sku	Lectures present in PDF forma	Daily exams + homework assignments + monthly exams
3	2	The Scalp	- The student learns layers of the Scalp, , Nerve Supply of The Scalp, Blood Supply of The Scalp	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
4	2	Infratemporal Fossa	The student learns the boundaries of the infratemporal fossa, Inferior part of the temporalis muscle. Lateral and medial pterygoid Muscles, Maxillary artery, Pterygoid venous plexus, Mandibular, inferior alveolar, lingual, buccal, and chorda tympani nerves and Otic ganglion.	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams

5	2	The Face	The student learns Skin of the Face,Bone of the face, the muscles of the face	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
6 +7	2	-The Orbit, Eyeball	- The student learns The Orbital region Openings into the Orbital Cavity, *Blood Vessels of the Orbit, Branches of the Ophthalmic Artery, EyelidsLacrimal and ApparatusLacrimal Gland*	Lectures presented in PDF format	Daily exams + homework assignments + monthly
8+9+10	2	Neck description Blood Supply of Head and Neck1 Blood Supply of Head and Neck2	The student learns how the neck and head are supplied with blood by arteries	Lectures presented in PDF format	Daily exams + homework assignments + monthly
11+12	2	The brain, Pituitary Gland (Hypophysis Cerebri), Cranial Nerves.	The student will learn the definition of the brain and its components, the pituitary gland and its importance, the components of the brain and its trunk, the cerebellum and the medulla oblongata, and the spinal cord and what its components and branches cranial nerves, their types and locations.	Lectures presented in PDF format	Daily exams + homework assignments + monthly
13+14	2	The Digestive System in the Head and Neck, Endocrine Glands in the Head and Neck.	Students learn about the digestive system in the neck and head area and identify the components of the mouth, tongue, and salivary glands	Lectures presented in PDF format	Daily exams + homework assignments + monthly
15	2	Respiratory system definition	The student learns about the respiratory system, nose, nasal cavity, sinuses, and trachea	Lectures presented in PDF format	Daily exams + homework assignments + monthly

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Snell Clinical Anatomy by Regions (9th Edition) Atlas of Human Anatomy by Frank H. Netter Snell Clin Anatomy by Regions (9th Edition) Human Anatomy by Frederic H. Martini, Robert B. Tallitsch, L. Nath Gray's Basic Anatomy 2nd Edition.
Main references (sources)	College library to obtain additional sources for the acade curricula • Check scientific websites to see recent developments in subject
Recommended books and references (scientific journals, reports...)	Atlas of Human Anatomy by Frank H. Netter Snell Clin Anatomy by Regions (9th Edition) Human Anatomy by Frederic H. Martini, Robert B. Tallitsch, L. Nath Gray's Basic Anatomy 2nd Edition.

MODULE DESCRIPTION FORM

Module Name:	
Electronic III	
Module Code:	
WBM-32-06	
Semester / Year:	
2nd Semester / 2025	
Date of Preparation of this Description:	
28/1/2025	
Available Attendance Formats:	
Weekly (Theoretical)	
Total Credit Hours / Total Units:	
45 Hrs. Theoretical /3 Units	
Name of the Course Coordinator (if there are multiple names):	
Name: Ali Mohammed Email: ali.mohammed@uowa.edu.iq	
Module Objectives:	
Module Objectives	Oscillators are electronic circuits that generate a signal output without requiring an input signal. Several types of basic oscillator circuits use both discrete transistors and reference amplifiers as the advance gain element. Also, the popular 555 timer integrated circuit, in terms of oscillator applications, the operation of a sinusoidal oscillator is based on the principle of positive feedback, where a portion of the output signal is fed back to the input in such a way that it enhances itself and thus maintains a continuous output signal.
1. Teaching and Learning Strategy	
Strategy:	1. The student learns to describe the principles of operation of the oscillator.

	2. The student will learn to discuss the principle of feedback oscillators based describing and analyzing the feedback process to the resident coordinator of oscillators. 3. The student will learn to describe and analyze the business letter feedb process for oscillators 4. The student will learn to discuss and analyze the 555 timer and its use in oscillator. 5. The student will learn to explain and analyze the operation of Class A amplifi 6. The student will learn to explain and analyze the operation of type B and cl AB power amplifiers 7. The student will learn to explain and analyze the operation of Class C pov amplifiers 8. The student will learn to troubleshoot power amplifiers. 9. The student should link theoretical and practical ideas. 10. The student will learn to use the above techniques in designing and invent a new biomedical device. 11. Knowing most of the engineering applications of the above vocabulary and how to benefit from them and employ them correctly in the field of biomedical engineering.

2. Module Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	frequency response, Sinusoidal, Wien bridge, Oscillator and circuit.	The student learns the response and frequency of sinusoidal oscillators, their types, and the circuits for eachoscillator	Theoretical	Daily test and oral questions

2	3	Phase shift oscillator, Shaping of frequency response, and Ramp generator	The student learns other types of oscillators and their uses	Theoretical	Daily test and oral questions
3	3	Hartley oscillator, and crystal oscillator	The student learns other types of oscillators and their uses	Theoretical	Daily test and oral questions
4	3	Large signal amplifier (power amplifier).	The student will learn about power amplifiers and their types	Theoretical	Daily test and oral questions
5	3	Power amplifier classification, class A, class B, class A-B and class C.	The student learns power amplifiers and their classifications according to...Efficiency	Theoretical	Daily test and oral questions
6	3	The properties of Power amplifiers, theory of classification.	The student learns the properties of power amplifiers and the theoretical basis of classifications	Theoretical	Daily test and oral questions

7	3	Transformer coupled stage	The student will learn to use the coupled transformer method in power amplifiers	Theoretical	Daily test and oral questions
8	3	Direct coupled type, Transformer coupled type.	The student will learn the method of direct coupling in coupled transformers	Theoretical	Daily test and oral questions
9	3	Transformer-coupled, class B push pull, linear .amplifier	The student will learn to use the direct coupling method in type B amplifiers	Theoretical	Daily test and oral questions
10	3	Multivibrator: MTV's using transistor	The student will learn about multiple oscillators using transistors	Theoretical	Daily test and oral questions
11	3	Astable MTV, and Mono stable MTV.	For the student to learn the stable and single multivibrators and the difference between them	Theoretical	Daily test and oral questions
12	3	Design of the circuit, bistable MTV using op-amp	The student will learn to design multivibrator	Theoretical	Daily test and oral questions

			circuits of all types, especially dual ones		
13		Design of the circuit, A stable MTV using op-amp	The student will learn to design multivibrator circuits of all types, especially stable ones, using (operational) signal modulators.	Theoretical	Daily test and oral questions
14		Monostable MTV using . op-amp	The student learns to design single vibrator circuits using (operational) signal modulators.	Theoretical	Daily test and oral questions
15		Transmission matrix.	The student will learn to use the designed circuits and analyze them through electronic arrays.	Theoretical	Daily test and oral questions

Module Evaluation
1- Weekly exams

2- Monthly exams 3- Participations inside the class 4-present the seminars 5- Writing reports	
Learning and Teaching Resources.	
Required textbooks (curricular books, if any)	Thomas L. Floyd , " Electronic Devices ", Pearson Education © 2018.
Main references (sources)	Electronic Devices and Circuit Theory, Eleventh Edition, Robert L. Boylestad
Recommended books and references (scientific journals, reports...)	Thomas L. Floyd , " Electronic Devices ", Pearson Education © 2018
Electronic References, Websites	www.ieee.org

Course Description Form

1. Course Name:
Hospital systems and design
2. Course Code:
WBM-51-07
3. Semester / Year:
Semester 1(2024−2025)
4. Description Preparation Date:
2024−09−19
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: Marwan Shibein Email: marwan.sh@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. 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, Th 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	Circle Bath, Butaro District Hospital Butaro, Rwanda MASS Design Group, Private	Lectures presented in PDF format	Daily exams homework assignments

		Part 1	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.		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

11. 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

12. 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
4. Description Preparation Date:
2024−03−19
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 Kaream Helwat Email: faris.kaream@uowa.edu.iq

8. Course Objectives	
Course Objectives	**This course focuses on image processing and computer vision focuses on studying methods that allow a machine to learn and analyze images and video using geometry and statistical learning. The recent growth of digital imaging technologies, hardware advances, and machine learning models has led to many exciting recent developments in the field of image and video analytics. This course covers a range of topics, starting from the basics of image formation and processing to recent deep learning methods addressing**

9. Teaching and Learning Strategies	
Strategy	1- recognize the image and understanding of the content and the relationship between the location and color value and sorts images according to these color values from black and white images and ending with natural colors. 2-identify the source of the image and representation and formats stage before finishing out as a file in storage unit 3- understand the relationship between image points and how to configure entity within the image and demonstrate chromatography interdependence and on-site 4-discussed ways to enlarge and reduce the image and application of a set of algorithms necessary

	5- touched on the various filters that manipulate the values of the point and leave the various changes to the image 6- addressed to the frequency domain and the spatial domain and how apply filters 7- operations of the histogram, edge, segmentation, restoration, erosion and dolation, and others.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction		Lectures present in PDF format	Daily exams + homework assignments + monthly exams
2	4	Human visual system. Sources of Digital Images, Simultaneous contrast. Optical illusions. Image acquisition.		Lectures presented in PDF format	Daily exams homework assignments monthly exam
3	4	Image formation model. Image sampling and quantization.		Lectures presented in PDF format	Daily exams homework assignments monthly exam
4	4	Representing digital images. Spatial and intensity resolution.		Lectures presented in PDF format	Daily exams homework assignments monthly exam
5	4	Image file format. Basic relationships between pixels. Distance measures.		Lectures presented in PDF format	Daily exams homework assignments monthly
6	4	Distance measures. Point operations. Arithmetic operations Set		Lectures presented in PDF format	Daily exams homework assignments monthly

		and logical operations.			
7	4	First mid teams		Lectures presented in PDF format	Daily exams homework assignments monthly
8	4	Set and logical operations. Spatial domain. Processes on spatial domain.		Lectures presented in PDF format	Daily exams homework assignments monthly
9	4	Basic intensity transformation functions.		Lectures presented in PDF format	Daily exams homework assignments monthly
10	4	Piecewise-linear transformation functions. Histograms. Histogram processing. Histogram equalization.		Lectures presented in PDF format	Daily exams homework assignments monthly
11	4	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		Lectures presented in PDF format	Daily exams homework assignments monthly

12	4	**Second mid teams**		Lectures presented in PDF format	Daily exams homework assignments monthly
13	4	**Image Segmentation, Application of image segmentation, Point Detection, Line Detection, Edge detection, Sobel Edge detection, Prewitt Edge detection**		Lectures presented in PDF format	Daily exams homework assignments monthly
14	4	**Image Compression, Image Compression System, Compression type, Huffman Coding, Lossy compression**		Lectures presented in PDF format	Daily exams homework assignments monthly
15	4	**Color Image Processing, Color Models, Converting colors between model**		Lectures presented in PDF format	Daily exams homework assignments monthly

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Digital Image Processing -Gonzales R Woods R.E. 4th ed., 2018.
Main references (sources)	- Digital Image Processing using SCILAB, Ro M. Thanki • Ashish M. Kothari, 2019. - Digital Image Processing Using MATLA Gonzalez R.C., Woods R.E., and Eddins S., 3 ed., 2020.
Recommended books and references (scientific journals, reports…)	All reputable scientific journals that a related to the broad concept of mathemati theories and their results

Course description form

1. Course Name: Control II
2. Course Code: WBM-52-04
3. Semester/Year: Second/2023-2024
4. Date this description was prepared: 03/20/2024
5. Available forms of attendance: Weekly attendance - theoretical hall + practical laboratory
6. Number of study hours (total)/number of units (total): 90 hours/semester (3 theoretical hours per week + 3 practical hours)/3 units
7. Name of the course administrator (if more than one name is mentioned)
the name: Asst. Lecturer qaysar Ayad Email:qaysar.ayad@uowa.edu.iq ‘

8. Course objectives	
Objectives of the study subject	• Building the student scientifically and qualifying him to understand the applications of digital contr in some scientific and engineering fields, especiall 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 i this field in terms of the bas 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	1-The methodical book, as well as lectures and solvi mathematical problems. 2-Scientific library. 3- Visual presentation methods (data show) using t PowerPoint program or displaying PDF files to clar the lecture items, drawings and shapes. 4-Useful educational sites on the Internet. 5The teacher delivers detailed theoretical lectures, a students participate during the lecture in solving so engineering problems. 6- Adopting the homework method to solve t exercises by students. 7- The teacher is familiar with the basic concepts engineering control techniques and their scienti applications, which enhances the method of learni and teaching.

10. Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Surprise exams and classroom activities	Lectures DATA SHOW	Introduction to Discrete-Time Control System. Review of Mathematical Foundation.	Introduction to digital engineering control systems and methods of representing systems	6	1-2
Surprise exams and classroom activities	Lectures DATA SHOW	Analysis of Discrete-Time Systems. Design of Conventional Discrete-Time Controllers.	Analysis of digital control systems and design of a traditional digital controller	6	3-4
Surprise exams and classroom activities	Lectures DATA SHOW	State-space modeling	Introduction to theory state space	6	5-6
Surprise exams and classroom activities	Lectures DATA SHOW	controllability and observability	How to analyze using the method (controllability and observability)	6	7-8

Surprise exams and classroom activities	Lectures DATA SHOW	Sampling theorem Z-transform	the definition, z-transform And analysis methods	6	9-10
Surprise exams and classroom activities	Lectures DATA SHOW	Design of digital control systems using state-space methods	How to design a digital controller using state-space methods	6	11-12
Surprise exams and classroom activities	Lectures DATA SHOW	Digital PID controllers and tuning	Recognition digital PID controllers	6	13-14

11. Course evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.

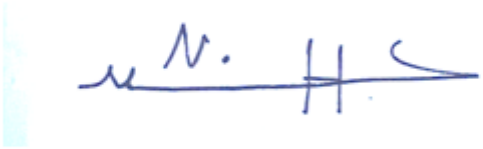
- Attendance + cup = 10%
- Monthly exam = 30%
- Practical laboratory = 10%
- Final exam = 50%
- Final total = 100%

12. Learning and teaching resources

1.Modern Control Engineering, (5th Edition) By: Katsuhiko Ogata. Mechanical Engineering, University of Minnesota	Required prescribed books
2.Control Systems Engineering, (6th Edition) By: Norman S. Nise. Electrical and Computer Engineering Department at California State Polytechnic University	Main references (sources)
-Internet files. -All solid scientific journals and sites that are related to the broad concept of engineering control	Recommended books and references (Scientific journals, reports,)

tracking Scientific websites to view recent developments in the prescribed subject For fifth year students.	Electronic references, Internet sites...

إسم التدريسي: م.م. حارث نوفل عبدعلي

التوقيع: 

التاريخ: 2024/3/20

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	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Studying the principle working of ultrasound device	Introduction to Medical Ultrasound	Theoretical & Practical	Daily test and oral questions
2	3	Learn about ultrasound transducers	Ultrasound Transducers	Theoretical & Practical	Daily test and oral questions
3	3	Learn about sonar imaging systems	Ultrasound Imaging Mode System	Theoretical & Practical	Daily test and oral questions
5&4	3	Learn about sonar imaging systems	Basic Modes of Transmission of Ultrasound	Theoretical & Practical	Daily test and oral questions
6	3	Introduction to the laparoscopic medical device	Introduction to Endoscopy	Theoretical & Practical	Daily test and oral questions
7	3	Learn about the basics of fibers in medical endoscopy	Basic Optics in Endoscopy	Theoretical & Practical	Daily test and oral questions
8	3	Identify the lighting sources used	Light Source	Theoretical & Practical	Daily test and oral questions
10&9	3	Knowing the types of endoscopies	Types of Endoscopies	Theoretical & Practical	Daily test and oral questions
11	3	Introduction to patient monitoring device	Introduction to Patient monitoring systems	Theoretical & Practical	Daily test and oral questions

12 13&	3	Knowledge of heart rate measurement and monitoring	Measurement of Heart Rate	Theoretical & Practical	Daily test and oral questions
& 14 15	3	Learn how to monitor a patient's blood pressure in the intensive care room	Pressure Monitoring	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

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Medical Equipment**	**Unit delivery**	
Unit Type	**fundamental**		☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar
Unit Code	WBM-31-06		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**45 hours**		

Unit level	3	**Delivery Semester**	1
Department of Administration	Biomedical	**College**	Engineering
Unit Commander	Eng. Mustafa Habib Giyad	**E-mail Address**	mustafa.ha@uowa.edu.iq
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher		**E-mail Address**	
Peer Reviewer Name	name	**E-mail Address**	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	• **Identify types of medical equipment**: Learn about a wide range of devices used in medicine, such as diagnostic and therapeutic devices. • **Understand how medical equipment works**: Study how medical devices such as manometers, X-rays, and monitoring devices work. • **Learn about safety standards**: Learn how to use medical equipment safely and in accordance with approved medical standards. • **Study of clinical applications of medical equipment**: Know how to apply medical equipment in the diagnosis and treatment of pathological conditions. • **Understand the role of devices in healthcare**: examine the impact of medical equipment in improving healthcare.
Unit Learning Outcomes Learning outcomes of the course	• **Learn about the different types of medical equipment**: Know how diverse medical devices work and are used. • **Practical applications of medical devices**: Ability to operate and maintain medical equipment efficiently. • **Understanding parts and components**: Ability to identify components of medical equipment and understand how they work. • **Handling medical equipment safely**: Adhere to safety guidelines while using medical devices. • **Analysis of data generated by medical devices**: Learn how to interpret data provided by medical devices such as monitoring devices or diagnostic devices.
Indicative Contents Indicative Contents	• **Introduction to medical equipment**: definition of medical equipment, classifications, and types. • **Types of medical equipment**: • **Diagnostic equipment**: such as X-ray machines, magnetic resonance imaging machine (MRI), electrocardiogram (ECG) machines. • **Therapeutic equipment**: such as ventilators, radiotherapy devices. • **Surgical equipment**: such as electric surgical instruments. • **Life aids**: such as monitors, insulin pumps. • **Medical Standards and Specifications**: Study of global health standards related to medical equipment, such as FDA or CE standards. • **Safety and maintenance**: Learn how to properly maintain medical equipment and ensure its safety. • **Clinical applications**: How these devices are used in hospitals or clinics to diagnose and treat patients.

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	• **Hands-on learning**: Conducting hands-on experiments using medical devices in a laboratory or simulated environment. • **Case Study**: Discuss real medical cases in which medical devices are used. • **Equipment Operation Training**: Provide practical training to students on how to operate and maintain medical equipment. • **Interactive activities**: Use simulators and software to teach students how to handle medical devices.

	• **Field trips**: Visit hospitals or medical laboratories to apply concepts in a real-world environment.

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	30	**SWL regulator(h/s)** Regular student load per week	5
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	15	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL إجمالي (h / sem) The student's total academic load during the semester	45		

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 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	

Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

Learning and Teaching Resources Learning and Teaching Resources		
	text	**Available in the library?**
Required texts	Clinical Biochemistry, (8 editions), by Leipencotts	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.

Unit Description Form

Course Description Form

Faculty of Engineering / Department of

Unit Information

Course Information

Unit Title	**Tissues**	**Unit delivery**	
Unit Type	**Secondary**		☒ نظريه ☒ حاضر ☒ المختبر ☐ تعليمي ☐ عملي ☐ Seminar
Unit Code	WBM-31-07		
ECTS Credits	**8**		
SWL (ساعة / SEM)	**45 hours**		

Unit level	2	**Delivery Semester**	1
Department of Administration	Biomedical	**College**	Biomedical
Unit Commander		**E-mail Address**	
Title of Unit Commander	Assistant Lecturer	**Unit Commander Qualifications**	Master
Unit Teacher	Eng. Kawthar Ali Hassan	**E-mail Address**	Kawther.ali@uowa.edu.iq
Peer Reviewer Name	name	**E-mail Address**	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	• **Understanding tissue types**: Identify the different types of tissues in the body such as epithelial, muscular, neurological, and connective tissue. • **Study the exact characteristics of each type of tissue**: Learn the structural and functional characteristics of each type of tissue. • **Recognize the role of tissues in organ formation**: Study how different tissues interact to form organs and systems in the body. • **Understand how tissues respond to injuries and changes**: Study how tissues are affected by injuries and pathological changes. • **Analysis of the relationship between tissues and overall health**: Understand the importance of tissues in maintaining health and normal body functioning.
Unit Learning Outcomes Learning outcomes of the course	• **Recognize different tissue types**: Ability to identify different types of tissues and their functions. • **Analysis of microscopic properties of tissues**: Know how to distinguish different tissues under a microscope. • **Practical application of tissue concepts**: Ability to apply tissue knowledge in fields such as medicine and biology. • **Understand the functional role of tissues in the body**: Know how tissues contribute to various body functions such as movement, sensation, and protection. • **Tissue-organ interaction**: Understand how tissues form organs and their diverse functions.
Indicative Contents Indicative Contents	• **Introduction to Tissues**: Definition of tissue types and their basic functions. • **Epithelial tissue**: The study of tissues covering the inner and outer surfaces of the body such as the skin and intestines. • **Muscle tissue**: The study of tissues responsible for movement such as skeletal muscle, cardiac, and soft muscle. • **Neural tissue**: The study of tissues that deal with nerve signals such as nerves and brain. • **Connective tissue**: The study of tissues that support and connect other tissues such as tendons and cartilage. • **Specialized tissues**: such as blood, bone and glands tissue. • **Pathological changes in tissues**: the study of how tissues change due to diseases or injuries

Learning and Teaching Strategies Learning and Teaching Strategies	
Strategies	• **Hands-on learning**: Using microscopes to examine tissue samples and characterize them below magnifier level. • **Interactive activities**: Discuss medical conditions related to tissue changes such as tumors or tissue infections. • **Case Study**: Analysis of medical conditions based on an understanding of tissue formation such as muscle or nerve diseases. • **Field trips**: Visit laboratories or hospitals to see tissue through techniques such as biopsies.

	• **Project-based activities**: Assign students projects to examine and study histology using different techniques.

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	30	**SWL regulator(h/s)** Regular student load per week	5
SWL غير منظم (h / sem) Irregular academic load of the student during the semester	15	**Unregulated SWL (h/s)** Irregular student academic load per week	5
SWL إجمالي (h / sem) The student's total academic load during the semester	45		

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 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	

Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

Learning and Teaching Resources Learning and Teaching Resources		
	text	**Available in the library?**
Required texts	Clinical Biochemistry, (8 editions), by Leipencotts	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.

Course Description Form of Infrared and Thermal Imaging

1. Course Name:
Infrared and Thermal Imaging
2. Course Code:
WBM−51−02
3. Semester / Year:
Semester 1/2023
4. Description Preparation Date:
2024−03−20
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: Maryam Abdullah Saib Email: Mayram.ab@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	Unit or subject name	Learning method	Evaluation method
1, 2	4	Introduction: Infrared and Thermal Imaging, History of IR, General Definition Of 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	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams

		Light, Ultra violet, X-rays, Gamma Rays.		
3, 4	4	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.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
5, 6, 7	6	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).	Lectures presented in PDF format	Daily exams homework assignments monthly exams
8	2	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.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
9	2	Camera Systems, Standards, and Calibration, The Imaging System,	Lectures presente	Daily exams homework

		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.	d in PDF format	assignments monthly
10	2	Usage of IR-based technologies in medical applications: Screening of breast cancer, Screening of diabetic neuropathy and vascular disorders.	Lectures presente d in PDF format	Daily exams homework assignments monthly
11	2	Usage of IR-based technologies in medical applications: Usage in Raynaud's phenomenon, Usage for body temperature monitoring.	Lectures presente d in PDF format	Daily exams homework assignments monthly
12	2	Usage of IR-based technologies in medical applications: Usage for diagnosis of skin diseases, Usage for diagnosis of rheumatic diseases.	Lectures presente d in PDF format	Daily exams homework assignments monthly
13	2	Usage of IR-based Technologies in Medical Applications Usage for Diagnosis of Ocular Diseases, Usage for Diagnosis of Pain.	Lectures presente d in PDF format	Daily exams homework assignments monthly
14	2	Why use Thermal Imaging Cameras, Infrared Thermometers - Thermal Imaging Cameras, Finding Problems Faster and with Extreme Accuracy, Use Thousands of Infrared Thermometers at the Same Time.	Lectures presente d in PDF format	Daily exams homework assignments monthly
15	2	Camera Types, Thermal Detector Types, The lens.	Lectures presente d in PDF format	Daily exams homework assignments monthly

11. Course Evaluation

- Daily exams scientific questions.
- 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

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 M¨ollmann

Course Description Form of thermofluids 1

1. Course Name:
Thermofluid 1
2. Course Code:
WBM- 41-05
3. Semester / Year:
semester 1 2024 -2025
4. Description Preparation Date:
2024\9\23
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 3Units
7. Course administrator's name (mention all, if more than one name)
Prof. Dr. Ghanim Kadhim Abdulsada Email: Ghanim.sada@uowa.edu.iq

8. Course Objectives	
Course Objectives	This subject aims to provide students with knowledge of basic concepts in thermofluids and systems used in thermal science, including thermodynamic laws, processes and cycles, work and heat

9. Teaching and Learning Strategies	
Strategy	• Using the smart board • Use illustrative pictures whenever possible

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1-2	3	Basic Fluid and Thermodynamics Properties State and unit ;	Thermofliid fundamental	Lectures presented i PDF forma	Daily exams + homework t assignments + monthly exams

3	3	Fluid static	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly exam
4 -5	3	Pressure head measurment ;	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly exam
6-7	3	Fluid flow and flow pattern ;	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly exam
8	3	Newton law of viscosity	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly
9 -10	3	Continuity Equation And energy relationships ;	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly
11 -12	3	Bernoulli equation Pressure drop in pipe	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly
13	3	Reynold number And friction factor	thermofluid	Lectures presented in PDF format	Daily exams homework assignments monthly
14 -15	3	Flow measurement and boundary layer	Thermofluid fundamental	Lectures presented in PDF format	Daily exams homework assignments monthly

11. Course Evaluation

- Daily exams scientific questions.
- 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

Lab exam

Fundamental of Thermal fluid Science By Cengel Y. A. , Turner R.H. and cimbala J .

12. Learning and Teaching Resources

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Course Description Form

1. Course Name
Digital Electronics
2. Course Code
WBM-41-06
3. Semester/Year
Quarterly
4. Date of preparation of this description
2024\9\23
5. Available attendance forms
Weekly (theoretical)
6. Number of credit hours (total) / total number of units
60 Theoretical Hours / 3 Units
7. Course Administrator Name
Name: Dr :Hussien kaream Email: hussien.kaream@uowa.iq
8. Course Objectives

Course Objectives:	• This course description provides a brief summary of the most important characteristics the course and the learning outcomes expected the student to achieve, proving whether he has made the most of the available learning opportunities. It must be linked to the program description.

1. Teaching and learning strategies	
Strategy	The student's ability to analyze, apply and arrange knowledge so that he can impose assumptions and interpretation as well as describe solutions. The ability to learn simple and deep in exploring knowledge and focusing on the application of knowledge to solve existing problems.Discrimination that the test increases the student's motivation towards study and is not a means of punishment for him.

2. Course Structure

The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	12 hours	Knowledge of circuit design Special Electronic MUX and Pal DUX	Introduction to Digital Electronics; Number Systems and Codes	Lectures / Assignments / Open Discussion / Real-life	Exams / Assignments / Quick Exams / Seminars

		represent the same number in counting systems, (decimal, octal, hexadecimal, binary) as well as converting the number from one counting system to another		Examples	and Discussions
4-6	12 hours	Learn logic gates (truth table, symbol, and action) As well as learning Boolean algebra and DeMorgan's theorem	Boolean Algebra and Logic Gates	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
7	4 hours	Rules of methods of writing logical equations in both forms (SOP, POS)	Rules of methods of writing logical equations in both forms (SOP, POS	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
8-9	8 hours	Karnaugh maps (2-variables, 3-variables, 4- and 5-variables Don't care	Karnaugh maps (2-variables, 3-variables, 4- and 5-variables Don't care	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
10	4 hours	Arithmetic operations (adder, parallel binary adder)	Arithmetic operations (adder, parallel binary adder) half and full	Lectures / Assignments / Open Discussion /	Exams / Assignments / Quick Exams /

		half and full adder	adder	Real-life Examples Practical connectivity	Seminars and Discussions
11	4 hours	Design of Combinational Logic Circuit	Combinational Logic Circuit	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
12-14	12	Design of Encoder and Decoder, Multiplexer and Demultiplexer	Encoder and Decoder, Multiplexer and Demultiplexer	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
15	4	Design Comparator and code conversions	Comparator and code conversions	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions

3. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily, oral, monthly, written exams, reports .... etc	
4. Learning and Teaching Resources	
1- Required textbooks	Digital logic and computer Design by Morris Mano
2- Main references (sources)	Digital Fundamental by Thomas L. Floyd
a) Recommended books and references (scientific journals, reports, ...)	Scientific journals in the specialty
b) Electronic references, websites, ...	Websites specialized in studying the material

Course Description Form

1. Course Name:

Medical Instrumentation

2. Course Code:

WBM-41-04

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 aim of this study is to understand the principle working some laboratory and diagnostic devices that related to pathological analyzes of diseases that effect on the human body, and to diagnose some diseases that related to the heart, brain, or muscle damage.

9. Teaching and Learning Strategies

Strategy	The student will be able to understand the principle of operation of the Laboratory and 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	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to laboratory medical devices	Introduction to Medical Instruments	Theoretical & Practical	Daily test and oral questions

2	3	Identifying the bio- electrical signals	Bio-electric signals	Theoretical & Practical	Daily test and oral questions
3	3	The main purpose of using a centrifuge	Centrifuge (Part 1)	Theoretical & Practical	Daily test and oral questions
4	3	Principle working , types and method of using the device	Centrifuge (Part 2)	Theoretical & Practical	Daily test and oral questions
5	3	The main purpose of using a blood cell counting device	Blood Cell Counter (Part1)	Theoretical & Practical	Daily test and oral questions
6	3	The principle working and method of using the device.	Blood Cell Counter (Part2)	Theoretical & Practical	Daily test and oral questions
7	3	Identify spectrophotometer and the purpose of its use in the laboratory, in addition to the method of calculating concentrations by knowing the absorbance	Spectrophotometer	Theoretical & Practical	Daily test and oral questions
8	3	Identify the colorimeter device and the purpose of its use in the laboratory, in addition to knowing the concentrations of the substance through the absorbance percentage	Colorimeter	Theoretical & Practical	Daily test and oral questions
9	3	Identifying the device and the purpose of its use in the laboratory, in addition to knowing the concentrations of specific elements such as sodium and potassium, according to the required test.	Flame photometer	Theoretical & Practical	Daily test and oral questions
10	3	Learn about heart signals, how they are generated, and how blood is pumped to the body	ECG (Part 1)	Theoretical & Practical	Daily test and oral questions
11	3	Learn about ways to measure cardiac electrical signals by knowing the principle of the device's operation	ECG (Part 2)	Theoretical & Practical	Daily test and oral questions
12	3	Identify muscle signals and how they are generated	EMG (Part 1)	Theoretical & Practical	Daily test and oral questions
13	3	Learn about methods of measuring muscle electrical signals and how to process them	EMG (Part 2)	Theoretical & Practical	Daily test and oral questions

14	3	Learn about brain signals and how it generate.	EEG (Part 1)	Theoretical & Practical	Daily test and oral questions
15	3	Learn how to record brain signals and how to process them	EEG (Part 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 of Communications I

1. Course Name:
Communications I
2. Course Code:
WBM-41-03
3. Semester / Year: 2025\2024
Semester
4. Description Preparation Date:
2023−09−23
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
75 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Mohammed Merza Email: ahmed.merza@uowa.edu.iq
8. Course Objectives

Course Objectives	■ clearly understand the meaning of terms like: 'Band-limited Signals', Nyquist rate, Aliasing, etc., derive the low pass sampling theorem and explain its implication. ■ explain the basic concept of time-division-multiplexing, ■ understand the way the amplitude of each sample of a continuous-time band-limited signal, is represented in PAM, PDM and PPM, ■understand the need for and the effect of quantization, different types of quantizers, and the need for companding of speech signals in PCM systems, ■explain the relationship between Q , the number of quantization levels; n, the bits per codeword; r, the bit-rate and B_T , the transmission bandwidth of a pulse-code modulated signal, ■determine the signal-to-quantization noise ratio as well as signal-to-noise ratio for PCM systems ■explain the operation of DM, ADM, DPCM, systems using the block diagrams of their transmitters and receivers, ■view information as removal of uncertainty, is familiar with the 'measure' of information and can determine the average rate at which a Discrete Memory Source (DMS) is giving information, ■understand the need for source coding' and can encode the output from a discrete memoryless source using Fano coding, Huffman coding. ■relate the concept of 'Mutual information' of a channel to information transfer through the channel and understands that Shannon's Information capacity theorem sets a fundamental limit on the rate at which error-free transmission can be achieved over power-limited, band-limited Gaussian channels.

9. Teaching and Learning Strategies	
Strategy	**1.Theoretical Lectures:** Instructors provide lectures on fundamental concep theories, and principles of communication engineering. This helps stude

	understand the theoretical underpinnings of different communication systems a technologies. **2. Practical Demonstrations:** Instructors demonstrate the practical applications of communication engineering concepts using real-world examples, simulations, and case studies. This helps students visualize how theoretical concepts are applied in practice. **3. Assessments**: Students are assessed through a combination of quizzes, exams, assignments, and practical assessments to evaluate their understanding of communication engineering concepts. Feedback from assessments helps students identify areas for improvement.

10. Course Structure

Week	Hours	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Communications System element	Lectures presen in PDF format	Daily exams + homework assignments + monthly exams
2+3	6	Signal representation using Fourier Series.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
4	3	Signal Spectrum using Fourier Transform	Lectures presented in PDF format	Daily exams homework assignments monthly exams
5+6	6	Filters: Filtering action, Filters Classification based on (response:" ideal & practical" and mode), characteristics of filters response	Lectures presented in PDF format	Daily exams homework assignments monthly exams
7+8+9	9	Amplitude Modulation	Lectures presented in PDF format	Daily exams homework assignments monthly
10+11+12	9	Frequency Modulation	Lectures presented in PDF format	Daily exams homework assignments monthly
13+14	6	Noise in communication systems	Lectures presented in PDF format	**Daily exams homework assignments monthly**
15	3	Sampling Theorem	Lecture presented in PDF format	**Daily exams homework assignments monthly**

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if ar	-(McGraw) Schaum's Outlines of Signals & Systems. -(Communications Engineering) Michael F Fundamentals of Communications Systems-McGraw-I Professional (2007)
Main references (sources)	Theory and Problems of Analog and Dig Communications_2nd_Ed_Schaum's Outline Series.
Recommended books and references (scientific journals, reports…)	All reputable scientific journals that are related to broad concept of mathematical theories and their result

Course Description Form

1. Course Name:
Biomaterial I
2. Course Code:
WBM-41-02
3. Semester / Year:
Semester 1/ 4th
4. Description Preparation Date:
2024-09-19
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: Ahmed Odea Email: ahmed.odea@uowa.iq

8. Course Objectives	
Course Objectives	Biomaterials are used in medical devices and a broad range of health care products. The goal of studying biomaterials is to understand how the body's natural tissues are organized on a compositional, structural, and properties basis

9. Teaching and Learning Strategies	
Strategy	1- Classification of biological materials used in medicine and their special requirements 2- An understanding of the concept of biocompatibility and methods for testing biomaterials 3- A description and explanation of the surfaces of biological materials and the different methods of analysis 4- Understand ways to improve biocompatibility and practical aspects of biomedical devices: sterilization, manufacturing, clinical trials and ethical issues. 5- Analysis of permanent and biodegradable agriculture by referring case studies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction	Introduction , Histo of Biomaterials Knowledge Develop Biomateri , basics biomaterials synthesis, characterization, testing, applications	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
2	2	uses of Biomaterials	uses of Biomaterials, How are biomaterials used in current medic practice, New examples of biomaterials application, classification of biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly exam
3	2	Selection of Biomedical materials Evaluation	Selection of Biomedical materials Evaluation (polymers, Metals, Composite Ceramics. Selection parameters for biomaterials. Analysis of the problem; Consideration of requirement; Consideration of available material and their properties leading to. Choice of material.	Lectures presented in PDF format	Daily exams homework assignments monthly exam
4	2	Subjects are important to Biomaterials	Subjects are important to Biomaterials science, Bio-ceramics, Types of Bio-ceramics – Tissue Attachment, Nearly Inert Crystalline Bio ceramics.	Lectures presented in PDF format	Daily exams homework assignments monthly exam
5	2	Porous	Porous	Lectures	Daily exams

		Ceramics	Ceramics, Bioactive Glasses and Glass-Ceramics	presented in PDF format	homework assignments monthly
6	2	Biodegradable Materials,	Biodegradable Materials, Resorbable Ceramics, Resorbable polymers, Resorbable metals,	Lectures presented in PDF format	Daily exams homework assignments monthly
7	2	Properties of Biomaterials	Properties of Biomaterials, Physical Properties, Impact of biomaterial surface physical properties on biological responses, Mechanical Properties of Biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly
8	2	Chemical Properties of Bio ceramics	Chemical Properties of Bio ceramics, Impact of biomaterial surface chemical properties on biological responses, Solubility and Erosion, Leaching of Constituents, Corrosion	Lectures presented in PDF format	Daily exams homework assignments monthly
9	2	Polymer as Biomaterial	Polymer as Biomaterial, General Techniques, Materials in Maxillofacial	Lectures presented in PDF format	Daily exams homework assignments monthly

			Prosthetic, Latexes, Polyurethane polymers, Acrylic Resins, Resin Teeth for Prosthodontics' Applications		
10	2	Polymer as Biomaterial	synthesis, testing and applications of polymers	Lectures presented in PDF format	Daily exams homework assignments monthly
11	2	Metals and Alloys	Metals and Alloys, Stainless Steels, CoCr Alloys, Titanium and its Alloys	Lectures presented in PDF format	Daily exams homework assignments monthly
12	2	Metals and Alloys	synthesis, testing and applications of Metals and Alloys	Lectures presented in PDF format	Daily exams homework assignments monthly
13	2	biomaterials characterization	biomaterials characterization, Physical and chemical characterizations , Mechanical characterization of biomaterials, Surface characterization of biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly
14	2	Corrosion	Defined and form of corrosion	Lectures presented in PDF format	Daily exams homework assignments monthly
15		Final exam			

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Biomaterials Science: An Introduction to Materials in Medicine
Main references (sources)	Biomaterials Science: An Introduction to Materials in Medicine
Recommended books and references (scientific journals, reports…)	An Introduction to Tissue-Biomaterial Interactions

Course Description Form

1. Course Name:	
Biomechanics I	
2. Course Code:	
WBM-41-01	
3. Semester / Year:	
1st Semester / 2025 \2024	
4. Description Preparation Date:	
19/4/2024	
5. Available Attendance Forms:	
Weekly (Theoretical & Practical)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45 Hrs. Theoretical & 45 Hrs. Practical / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Saed Muhmoud Sarhan Email: saed.muh@uowa.iq	
8. Course Objectives	
Course Objectives	• Understand the Fundamentals: Students should gain a solid understanding of the mechanical properties of Human Joints, and the mechanical interactions between forces and the human body. • Apply Knowledge Practically: Encourage the application of theoretical concepts in real-world situations, such as orthopedic biomechanics and rehabilitation. • Develop Problem-Solving Skills: Students should be able to analyze complex biomechanical problems • Cultivate Research Skills: Teach students how to conduct empirical research, analyze data, and present findings effectively.
9. Teaching and Learning Strategies	
Strategy	1. Teaching Methods • Lectures: Use lectures to introduce core theoretical concepts. Incorporate multimedia presentations to illustrate

complex biomechanical phenomena and their applications in biomedical.

- Case Studies: Analyze real-life case studies that require students to apply their theoretical knowledge to solve practical problems.

2. Learning Activities

- Laboratory Experiments: Design lab sessions that allow students to test and analyze mechanical properties, and use biomechanical testing equipment.
- Project-Based Learning: Assign projects that require design, implementation, and testing of models related to biomechanics, encouraging teamwork and innovation.

3. Continuous Improvement

- Feedback: Regularly collect feedback from students regarding the clarity of instructions, the relevance of course content, and the effectiveness of teaching methods.
- Curriculum Updates: Continuously update the curriculum based the latest scientific advancements in biomechanics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	Introducing importance of Biomechanics	Introduction to biomechanics	Theoretical & Practical	Daily test and oral questions
2	6	Ability to analyze human movements	kinematics concepts for analyzing human motion	Theoretical & Practical	Daily test and oral questions
3	6	Ability to analyze the forces acting on movement	kinetic concepts for analyzing human motion	Theoretical & Practical	Daily test and oral questions
4	6	Mechanical analysis Orthopedics and mobility	The biomechanics of human bone and development (1)	Theoretical & Practical	Daily test and oral questions
5	6	Mechanical analysis Orthopedics and mobility	The biomechanics of human bone and development (2)	Theoretical & Practical	Daily test and oral questions
6	6	Ability to analyze movements of the skeleton	the biomechanics of human skeletal	Theoretical & Practical	Daily test and oral questions

		skeletal and joint movements of the	articulations (1)		
7	6	Ability to analyze movements of the skeleton skeletal and joint movements of the	the biomechanics of human skeletal articulations (2)	Theoretical & Practical	Daily test and oral questions
8	6	Analyzing Muscle Strength human body	the biomechanics of human skeletal muscle (1)	Theoretical & Practical	Daily test and oral questions
9	6	Analyzing Muscle Strength human body	the biomechanics of human skeletal muscle (2)	Theoretical & Practical	Daily test and oral questions
10	6	Mechanical analysis Human body Upper limbs	the biomechanics of human upper extremity (1)	Theoretical & Practical	Daily test and oral questions
11	6	Mechanical analysis Human body Upper limbs	the biomechanics of human upper extremity (2)	Theoretical & Practical	Daily test and oral questions
12	6	Mechanical analysis Human body Lower limbs	the biomechanics of human lower extremity (1)	Theoretical & Practical	Daily test and oral questions
13	6	Mechanical analysis Human body Lower limbs	the biomechanics of human lower extremity (2)	Theoretical & Practical	Daily test and oral questions
14	6	Human body spine mechanical Analysis	the biomechanics of human spine (1)	Theoretical & Practical	Daily test and oral questions
15	6	Human body spine mechanical Analysis	the biomechanics of human spine (2)	Theoretical & Practical	Daily test and oral questions

11. Course Evaluation

- Formative Assessments: Include quizzes, in-class activities, and lab reports to provide ongoing feedback and adjust teaching approaches as needed.
- Summative Assessments: Conduct mid-term and final exams to evaluate comprehensive understanding.

12. Learning and Teaching Resources

Required textbooks (curricular books if any)	Basic Biomechanics (Susan J. Hall)
Main references (sources)	Basic Biomechanics (Susan J. Hall)

Recommended books and references (scientific journals, reports…)	Journal of Biomechanics, ISSN 0021-9290
Electronic References, Websites	www.sciencedirect.com

Course Description Form

1. Course Name:
Pathology
2. Course Code:
WBM-22-06
3. Semester / Year: 2024
Semester
4. Description Preparation Date:
2024-09-23
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2Units
7. Course administrator's name (mention all, if more than one name)
Name: Aref alsayed Email: aref.alseyed@uowa.ed.iq
8. Course Objectives

Course Objectives	Pathology is the study of all structural and functional abnormalities (at the level of cells, tissues, organs and body fluids) that take place as a result of a disease.

9. Teaching and Learning Strategies

Strategy	•The objectives of this course include teaching the student's general pathology, enabling them to distinguish between various structural and functional abnormalities.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to the pathology	Basic terminology in Pathology, Epidemiology, Etiology, Pathogenesis, Morphologic changes and Clinical features (signs and symptoms).	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
2	2	Diagnostic techniques used in pathology:	Histopathology, Cytopatholo Hematopathology, Immunohistochemistry, Microbiological examinatio Biochemical examination, Cytogenetics, Molecular techniques, Autopsy, Biops and Types of Biopsies	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
3	2	Cell Injury and Cell Death	Causes of Cell Injury, Reversible Cell Injury, Cell Death, Necrosis, Apoptosis, Other Pathways of Cell Death, Mechanisms of Cell Injury and Death.	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
4	2		Causes of Inflammation, Sequence of Events in	Lectures presented in	Daily exams + homework

		Inflammation	Inflammation, Features of Acute and Chronic Inflammation, Radiation cell damage	PDF format	assignments + monthly exams
5	2	Tissue Repair	Angiogenesis, Clinicopathologic Features of Tissue Repair	Lectures presented in PDF format	Daily exams + homework assignments + monthly
6	2	Environmental and Nutritional Diseases:	Health Effects of Climate Change ,Toxicity of Chemical and Physical Agents - Environmental Pollution Air Pollution ,Metals as Environmental Pollutants Industrial and Agricultural - Exposures Effects of Tobacco Effects of Alcohol, Nutritional Diseases, Malnutrition, Vitamin Deficiencies, Diet and Systemic Diseases	Lectures presented in PDF format	Daily exams + homework assignments + monthly
7	2	Benign; malignant tumors and carcinogen	Benign; malignant tumors and carcinogen, Local symptoms, Systemic symptoms, Metastasis, Causes of cancers, Diagnosis of the cancer.	Lectures presented in PDF format	Daily exams + homework assignments + monthly
8	2	Hemodynamic dysfunctions:	Overview of Hemorrhage, Conditions that can cause bleeding, symptoms of bleeding - Overview Hyperemia, Types of hyperemia Causes of hyperemia, symptoms of hyperemia, Definition of the Infarction, Anemic infarcts, Hemorrhagic infarcts, Overview of the shock, causes of shock, Pathogenesis of Septic Shock, Stages of Shock.	Lectures presented in PDF format	Daily exams + homework assignments + monthly
9	2	Hemodynamic dysfunctions:	Thrombosis, Definition, Major factors in pathophysiology of thrombus and Origin of Thrombi at Different Sites - Embolism, Definition and Types, etiology, pathogenesis - Edemas, Definition, Clinical classification of oedema, Mechanism of oedema	Lectures presented in PDF format Altas	Daily exams + homework assignments + monthly
10	2	Pulmonary Infection:	Tuberculosis (TB): Definition, Incidence, Major factors, HIV-	Lectures presented in PDF format	Daily exams + homework assignments + monthly

			associated Tuberculosis, Diagnosis and treatment – Pneumonia, Definition, causes, Diagnosis and treatment		
11	2	Disorders of the Upper Respiratory	: cute rhinitis Definition, causes and pathogenesis- Sinusitis Definition, causes and pathogenesis, Diagnosis - Laryngitis Definition, causes and pathogenesis, Diagnosis- A cute epiglottitis Definition, causes, pathogenesis and Diagnosis	Lectures presented in PDF format	Daily exams + homework assignments + monthly
12	2	Chronic Obstructive Pulmonary Disease (COPD):	Chronic bronchitis, etiopathogenesis and clinical features- Emphysema, Classification, Clinical Features.	Lectures presented in PDF format	Daily exams + homework assignments + monthly
13	2	Stem Cells	Sources of stem cells, Classification of stem cells on the basis of potency	Lectures presented in PDF format	Daily exams + homework assignments + monthly
14	2	Ischemic Heart Disease (IHD),	Ischemic Heart Disease (IHD), Definition, etiopathogenesis and effects of myocardial Ischemic, Hypertensive heart disease, Definition, etiopathogenesis and Rheumatic Fever, Incidence, etiopathogenesis	Lectures presented in PDF format	Daily exams + homework assignments + monthly
15	2	The Gastrointestinal Tract:	Congenital anomalies, Definition, etiopathogenesis- Muscular Dysfunctions, Definition, etiology and pathogenesis	Lectures presented in PDF format	Daily exams + homework assignments + monthly

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Robbins Basic Pathology (Vinay Kumar, Abul K. Abbas, Jo Aster)
Main references (sources)	Robbins essential pathology 2021 (Vinay kumar, Abul ab some other blokes)
Recommended books and references (scientific journals, reports...)	2-Robbins essential pathology 2021 (Vinay kumar, Abul ab some other blokes) (z-lib.org)

Course Description Form

1. Course Name
Digital Electronics
2. Course Code
WBM-41-06
3. Semester/Year
Quarterly
4. Date of preparation of this description
2024\9\23
5. Available attendance forms
Weekly (theoretical)
6. Number of credit hours (total) / total number of units
60 Theoretical Hours / 3 Units
7. Course Administrator Name
Name: Dr :Hussien kaream Email: hussien.kaream@uowa.iq
8. Course Objectives

Course Objectives:	• This course description provides a brief summary of the most important characteristics the course and the learning outcomes expected the student to achieve, proving whether he has made the most of the available learning opportunities. It must be linked to the program description.

1. Teaching and learning strategies	
Strategy	The student's ability to analyze, apply and arrange knowledge so that he can impose assumptions and interpretation as well as describe solutions. The ability to learn simple and deep in exploring knowledge and focusing on the application of knowledge to solve existing problems.Discrimination that the test increases the student's motivation towards study and is not a means of punishment for him.

2. Course Structure

The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	12 hours	Knowledge of circuit design Special Electronic MUX and Pal DUX	Introduction to Digital Electronics; Number Systems and Codes	Lectures / Assignments / Open Discussion / Real-life	Exams / Assignments / Quick Exams / Seminars

		represent the same number in counting systems, (decimal, octal, hexadecimal, binary) as well as converting the number from one counting system to another		Examples	and Discussions
4-6	12 hours	Learn logic gates (truth table, symbol, and action) As well as learning Boolean algebra and DeMorgan's theorem	Boolean Algebra and Logic Gates	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
7	4 hours	Rules of methods of writing logical equations in both forms (SOP, POS)	Rules of methods of writing logical equations in both forms (SOP, POS	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
8-9	8 hours	Karnaugh maps (2-variables, 3-variables, 4- and 5-variables Don't care	Karnaugh maps (2-variables, 3-variables, 4- and 5-variables Don't care	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
10	4 hours	Arithmetic operations (adder, parallel binary adder)	Arithmetic operations (adder, parallel binary adder) half and full	Lectures / Assignments / Open Discussion /	Exams / Assignments / Quick Exams /

		half and full adder	adder	Real-life Examples Practical connectivity	Seminars and Discussions
11	4 hours	Design of Combinational Logic Circuit	Combinational Logic Circuit	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
12-14	12	Design of Encoder and Decoder, Multiplexer and Demultiplexer	Encoder and Decoder, Multiplexer and Demultiplexer	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions
15	4	Design Comparator and code conversions	Comparator and code conversions	Lectures / Assignments / Open Discussion / Real-life Examples Practical connectivity	Exams / Assignments / Quick Exams / Seminars and Discussions

3. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily, oral, monthly, written exams, reports .... etc	
4. Learning and Teaching Resources	
1- Required textbooks	Digital logic and computer Design by Morris Mano
2- Main references (sources)	Digital Fundamental by Thomas L. Floyd
a) Recommended books and references (scientific journals, reports, ...)	Scientific journals in the specialty
b) Electronic references, websites, ...	Websites specialized in studying the material

Course Description Form

1. Course Name:

Medical Instrumentation

2. Course Code:

WBM-41-04

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 aim of this study is to understand the principle working some laboratory and diagnostic devices that related to pathological analyzes of diseases that effect on the human body, and to diagnose some diseases that related to the heart, brain, or muscle damage.

9. Teaching and Learning Strategies

Strategy	The student will be able to understand the principle of operation of the Laboratory and 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	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to laboratory medical devices	Introduction to Medical Instruments	Theoretical & Practical	Daily test and oral questions

2	3	Identifying the bio- electrical signals	Bio-electric signals	Theoretical & Practical	Daily test and oral questions
3	3	The main purpose of using a centrifuge	Centrifuge (Part 1)	Theoretical & Practical	Daily test and oral questions
4	3	Principle working , types and method of using the device	Centrifuge (Part 2)	Theoretical & Practical	Daily test and oral questions
5	3	The main purpose of using a blood cell counting device	Blood Cell Counter (Part1)	Theoretical & Practical	Daily test and oral questions
6	3	The principle working and method of using the device.	Blood Cell Counter (Part2)	Theoretical & Practical	Daily test and oral questions
7	3	Identify spectrophotometer and the purpose of its use in the laboratory, in addition to the method of calculating concentrations by knowing the absorbance	Spectrophotometer	Theoretical & Practical	Daily test and oral questions
8	3	Identify the colorimeter device and the purpose of its use in the laboratory, in addition to knowing the concentrations of the substance through the absorbance percentage	Colorimeter	Theoretical & Practical	Daily test and oral questions
9	3	Identifying the device and the purpose of its use in the laboratory, in addition to knowing the concentrations of specific elements such as sodium and potassium, according to the required test.	Flame photometer	Theoretical & Practical	Daily test and oral questions
10	3	Learn about heart signals, how they are generated, and how blood is pumped to the body	ECG (Part 1)	Theoretical & Practical	Daily test and oral questions
11	3	Learn about ways to measure cardiac electrical signals by knowing the principle of the device's operation	ECG (Part 2)	Theoretical & Practical	Daily test and oral questions
12	3	Identify muscle signals and how they are generated	EMG (Part 1)	Theoretical & Practical	Daily test and oral questions
13	3	Learn about methods of measuring muscle electrical signals and how to process them	EMG (Part 2)	Theoretical & Practical	Daily test and oral questions

14	3	Learn about brain signals and how it generate.	EEG (Part 1)	Theoretical & Practical	Daily test and oral questions
15	3	Learn how to record brain signals and how to process them	EEG (Part 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 of Communications I

1. Course Name:
Communications I
2. Course Code:
WBM-41-03
3. Semester / Year: 2025\2024
Semester
4. Description Preparation Date:
2023−09−23
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
75 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Mohammed Merza Email: ahmed.merza@uowa.edu.iq
8. Course Objectives

Course Objectives	■ clearly understand the meaning of terms like: 'Band-limited Signals', Nyquist rate, Aliasing, etc., derive the low pass sampling theorem and explain its implication. ■ explain the basic concept of time-division-multiplexing, ■ understand the way the amplitude of each sample of a continuous-time band-limited signal, is represented in PAM, PDM and PPM, ■understand the need for and the effect of quantization, different types of quantizers, and the need for companding of speech signals in PCM systems, ■explain the relationship between Q , the number of quantization levels; n, the bits per codeword; r, the bit-rate and B_T , the transmission bandwidth of a pulse-code modulated signal, ■determine the signal-to-quantization noise ratio as well as signal-to-noise ratio for PCM systems ■explain the operation of DM, ADM, DPCM, systems using the block diagrams of their transmitters and receivers, ■view information as removal of uncertainty, is familiar with the 'measure' of information and can determine the average rate at which a Discrete Memory Source (DMS) is giving information, ■understand the need for source coding' and can encode the output from a discrete memoryless source using Fano coding, Huffman coding. ■relate the concept of 'Mutual information' of a channel to information transfer through the channel and understands that Shannon's Information capacity theorem sets a fundamental limit on the rate at which error-free transmission can be achieved over power-limited, band-limited Gaussian channels.

9. Teaching and Learning Strategies	
Strategy	**1.Theoretical Lectures:** Instructors provide lectures on fundamental concep theories, and principles of communication engineering. This helps stude

	understand the theoretical underpinnings of different communication systems a technologies. **2. Practical Demonstrations:** Instructors demonstrate the practical applications of communication engineering concepts using real-world examples, simulations, and case studies. This helps students visualize how theoretical concepts are applied in practice. **3. Assessments**: Students are assessed through a combination of quizzes, exams, assignments, and practical assessments to evaluate their understanding of communication engineering concepts. Feedback from assessments helps students identify areas for improvement.

10. Course Structure

Week	Hours	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Communications System element	Lectures presen in PDF format	Daily exams + homework assignments + monthly exams
2+3	6	Signal representation using Fourier Series.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
4	3	Signal Spectrum using Fourier Transform	Lectures presented in PDF format	Daily exams homework assignments monthly exams
5+6	6	Filters: Filtering action, Filters Classification based on (response:" ideal & practical" and mode), characteristics of filters response	Lectures presented in PDF format	Daily exams homework assignments monthly exams
7+8+9	9	Amplitude Modulation	Lectures presented in PDF format	Daily exams homework assignments monthly
10+11+12	9	Frequency Modulation	Lectures presented in PDF format	Daily exams homework assignments monthly
13+14	6	Noise in communication systems	Lectures presented in PDF format	**Daily exams homework assignments monthly**
15	3	Sampling Theorem	Lecture presented in PDF format	**Daily exams homework assignments monthly**

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if ar	-(McGraw) Schaum's Outlines of Signals & Systems. -(Communications Engineering) Michael F Fundamentals of Communications Systems-McGraw-I Professional (2007)
Main references (sources)	Theory and Problems of Analog and Dig Communications_2nd_Ed_Schaum's Outline Series.
Recommended books and references (scientific journals, reports…)	All reputable scientific journals that are related to broad concept of mathematical theories and their result

Course Description Form

1. Course Name:
Biomaterial I
2. Course Code:
WBM-41-02
3. Semester / Year:
Semester 1/ 4th
4. Description Preparation Date:
2024-09-19
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: Ahmed Odea Email: ahmed.odea@uowa.iq

8. Course Objectives	
Course Objectives	Biomaterials are used in medical devices and a broad range of health care products. The goal of studying biomaterials is to understand how the body's natural tissues are organized on a compositional, structural, and properties basis

9. Teaching and Learning Strategies	
Strategy	1- Classification of biological materials used in medicine and their special requirements 2- An understanding of the concept of biocompatibility and methods for testing biomaterials 3- A description and explanation of the surfaces of biological materials and the different methods of analysis 4- Understand ways to improve biocompatibility and practical aspects of biomedical devices: sterilization, manufacturing, clinical trials and ethical issues. 5- Analysis of permanent and biodegradable agriculture by referring case studies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction	Introduction , Histo of Biomaterials Knowledge Develop Biomateri , basics biomaterials synthesis, characterization, testing, applications	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
2	2	uses of Biomaterials	uses of Biomaterials, How are biomaterials used in current medic practice, New examples of biomaterials application, classification of biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly exam
3	2	Selection of Biomedical materials Evaluation	Selection of Biomedical materials Evaluation (polymers, Metals, Composite Ceramics. Selection parameters for biomaterials. Analysis of the problem; Consideration of requirement; Consideration of available material and their properties leading to. Choice of material.	Lectures presented in PDF format	Daily exams homework assignments monthly exam
4	2	Subjects are important to Biomaterials	Subjects are important to Biomaterials science, Bio-ceramics, Types of Bio-ceramics – Tissue Attachment, Nearly Inert Crystalline Bio ceramics.	Lectures presented in PDF format	Daily exams homework assignments monthly exam
5	2	Porous	Porous	Lectures	Daily exams

		Ceramics	Ceramics, Bioactive Glasses and Glass-Ceramics	presented in PDF format	homework assignments monthly
6	2	Biodegradable Materials,	Biodegradable Materials, Resorbable Ceramics, Resorbable polymers, Resorbable metals,	Lectures presented in PDF format	Daily exams homework assignments monthly
7	2	Properties of Biomaterials	Properties of Biomaterials, Physical Properties, Impact of biomaterial surface physical properties on biological responses, Mechanical Properties of Biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly
8	2	Chemical Properties of Bio ceramics	Chemical Properties of Bio ceramics, Impact of biomaterial surface chemical properties on biological responses, Solubility and Erosion, Leaching of Constituents, Corrosion	Lectures presented in PDF format	Daily exams homework assignments monthly
9	2	Polymer as Biomaterial	Polymer as Biomaterial, General Techniques, Materials in Maxillofacial	Lectures presented in PDF format	Daily exams homework assignments monthly

			Prosthetic, Latexes, Polyurethane polymers, Acrylic Resins, Resin Teeth for Prosthodontics' Applications		
10	2	Polymer as Biomaterial	synthesis, testing and applications of polymers	Lectures presented in PDF format	Daily exams homework assignments monthly
11	2	Metals and Alloys	Metals and Alloys, Stainless Steels, CoCr Alloys, Titanium and its Alloys	Lectures presented in PDF format	Daily exams homework assignments monthly
12	2	Metals and Alloys	synthesis, testing and applications of Metals and Alloys	Lectures presented in PDF format	Daily exams homework assignments monthly
13	2	biomaterials characterization	biomaterials characterization, Physical and chemical characterizations , Mechanical characterization of biomaterials, Surface characterization of biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly
14	2	Corrosion	Defined and form of corrosion	Lectures presented in PDF format	Daily exams homework assignments monthly
15		Final exam			

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Biomaterials Science: An Introduction to Materials in Medicine
Main references (sources)	Biomaterials Science: An Introduction to Materials in Medicine
Recommended books and references (scientific journals, reports…)	An Introduction to Tissue-Biomaterial Interactions

Course Description Form

1. Course Name:	
Biomechanics I	
2. Course Code:	
WBM-41-01	
3. Semester / Year:	
1st Semester / 2025 \2024	
4. Description Preparation Date:	
19/4/2024	
5. Available Attendance Forms:	
Weekly (Theoretical & Practical)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45 Hrs. Theoretical & 45 Hrs. Practical / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Saed Muhmoud Sarhan Email: saed.muh@uowa.iq	
8. Course Objectives	
Course Objectives	• Understand the Fundamentals: Students should gain a solid understanding of the mechanical properties of Human Joints, and the mechanical interactions between forces and the human body. • Apply Knowledge Practically: Encourage the application of theoretical concepts in real-world situations, such as orthopedic biomechanics and rehabilitation. • Develop Problem-Solving Skills: Students should be able to analyze complex biomechanical problems • Cultivate Research Skills: Teach students how to conduct empirical research, analyze data, and present findings effectively.
9. Teaching and Learning Strategies	
Strategy	1. Teaching Methods • Lectures: Use lectures to introduce core theoretical concepts. Incorporate multimedia presentations to illustrate

complex biomechanical phenomena and their applications in biomedical.

- Case Studies: Analyze real-life case studies that require students to apply their theoretical knowledge to solve practical problems.

2. Learning Activities

- Laboratory Experiments: Design lab sessions that allow students to test and analyze mechanical properties, and use biomechanical testing equipment.
- Project-Based Learning: Assign projects that require design, implementation, and testing of models related to biomechanics, encouraging teamwork and innovation.

3. Continuous Improvement

- Feedback: Regularly collect feedback from students regarding the clarity of instructions, the relevance of course content, and the effectiveness of teaching methods.
- Curriculum Updates: Continuously update the curriculum based the latest scientific advancements in biomechanics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	Introducing importance of Biomechanics	Introduction to biomechanics	Theoretical & Practical	Daily test and oral questions
2	6	Ability to analyze human movements	kinematics concepts for analyzing human motion	Theoretical & Practical	Daily test and oral questions
3	6	Ability to analyze the forces acting on movement	kinetic concepts for analyzing human motion	Theoretical & Practical	Daily test and oral questions
4	6	Mechanical analysis Orthopedics and mobility	The biomechanics of human bone and development (1)	Theoretical & Practical	Daily test and oral questions
5	6	Mechanical analysis Orthopedics and mobility	The biomechanics of human bone and development (2)	Theoretical & Practical	Daily test and oral questions
6	6	Ability to analyze movements of the skeleton	the biomechanics of human skeletal	Theoretical & Practical	Daily test and oral questions

		skeletal and joint movements of the	articulations (1)		
7	6	Ability to analyze movements of the skeleton skeletal and joint movements of the	the biomechanics of human skeletal articulations (2)	Theoretical & Practical	Daily test and oral questions
8	6	Analyzing Muscle Strength human body	the biomechanics of human skeletal muscle (1)	Theoretical & Practical	Daily test and oral questions
9	6	Analyzing Muscle Strength human body	the biomechanics of human skeletal muscle (2)	Theoretical & Practical	Daily test and oral questions
10	6	Mechanical analysis Human body Upper limbs	the biomechanics of human upper extremity (1)	Theoretical & Practical	Daily test and oral questions
11	6	Mechanical analysis Human body Upper limbs	the biomechanics of human upper extremity (2)	Theoretical & Practical	Daily test and oral questions
12	6	Mechanical analysis Human body Lower limbs	the biomechanics of human lower extremity (1)	Theoretical & Practical	Daily test and oral questions
13	6	Mechanical analysis Human body Lower limbs	the biomechanics of human lower extremity (2)	Theoretical & Practical	Daily test and oral questions
14	6	Human body spine mechanical Analysis	the biomechanics of human spine (1)	Theoretical & Practical	Daily test and oral questions
15	6	Human body spine mechanical Analysis	the biomechanics of human spine (2)	Theoretical & Practical	Daily test and oral questions

11. Course Evaluation

- Formative Assessments: Include quizzes, in-class activities, and lab reports to provide ongoing feedback and adjust teaching approaches as needed.
- Summative Assessments: Conduct mid-term and final exams to evaluate comprehensive understanding.

12. Learning and Teaching Resources

Required textbooks (curricular books if any)	Basic Biomechanics (Susan J. Hall)
Main references (sources)	Basic Biomechanics (Susan J. Hall)

Recommended books and references (scientific journals, reports…)	Journal of Biomechanics, ISSN 0021-9290
Electronic References, Websites	www.sciencedirect.com

Course Description Form

1. Course Name:
Physiology I
2. Course Code:
WBM-31-04
3. Semester / Year:
Third Year\First semester
4. Description Preparation Date:
2025-02-1
5. Available Attendance Forms:
presence in the classroom, lab
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: Ahmed oudah kadhim Email: ahmed.oudah@uowa.edu.iq
8. Course Objectives

Course Objectives	The study objectives can be summarized as follows: • Understand body fluids and water/electrolyte balance. • Learn the functions of blood cells (RBCs, WBCs) and hemoglobin. • Recognize anemia and polycythemia. • Understand the immune system and types of immunoglobulins. • Study hemostasis and the role of platelets. • Differentiate between internal and external coagulation pathways. • Know the ABO blood group system and transfusion reactions.

9. Teaching and Learning Strategies

Strategy	Assessment is based on hand-in assignments, written exam, Case study, Quizzes, seminars, Practical testing and Online testing.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4	Learn about the Body fluids	Body fluids	Lectures presented PDF forma + lab	Daily exams + homework assignments + monthly exams
2	4	Learn about the fluid compartment	fluid compartment	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
3	4	Learn about the water balance, electrolyte balance	water balance, electrolyte balance	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
4+5	4	Learn about the RBC, hemoglobin	RBC, hemoglobin	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
6	4	Learn about the anemia polycythemia	anemia polycythemia	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
7	4	Learn about the WBC, Immunity	WBC, Immunity	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
8	4	Learn about the type of	type of immunoglobulins,	Lectures presented in PDF	Daily exams homework assignments

		immunoglobulins,		format + lab	monthly
9	4	Learn about the homeostasis	homeostasis,	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
10	4	Learn about the platelets	platelets,	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
11+12	4	Learn about the external and internal pathways of coagulation	external and internal pathways of coagulation	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
13+14	4	Learn about the blood groups (ABO system) and transfusion reaction.	blood groups (ABO system) and transfusion reaction.	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
15	2		Mid exam		

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Principiles of anatomy and physiology, by Gerard J. Tortora& Bryan H. Derrickson 12PthP ed. Volume 1 2009
Main references (sources)	Text book of medical physiology, by Guton & Hall . eleven ed. 2020.

Recommended books and references (scientific journals, reports…)	Check out websites in this field

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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. Recognize all types of body tissues. 2. Summarize What is Structure of the Cell and Cell Organelles. 3. Learn about the function of cartilage in the body. 4. Discuss the most important tissues that cover the skeletal system 5. Discuss the characteristics of tissues in the reproductive system 6. Explain what Chromosomes and Genes 7. Describe the importance of the tissues of the respiratory system 8. Discuss the most important dyes used in diagnosis 9. Description of the immunohistochemistry technique 10. Electron microscopy and its importance in histological diagnosis were discussed
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.

جامعة وارث الأنبياء / كلية الهندسة / قسم هندسة الطب الحياتي
وصف المقرر الدراسي

نموذج وصف المقرر

1. اسم المقرر	
The Trunk Anatomy	
2. كود المقرر	
WBM-31-03	
3. الفصل / السنة	
الفصلي	
4. تاريخ اعداد هذا الوصف	
2024/4/19	
5. اشكال الحضور المتاحة	
اسبوعي (نظري)	
6. عدد الساعات الدراسية (الكلي) / عدد الوحدات الكلي	
30 ساعة نظري & 30 ساعة عملي / 3 وحدات	
7. اسم مسؤول المقرر الدراسي	
الاسم: م.م ناطق عزيز عمران الايميل: Natikaziz81@gmail.com	
8. اهداف المقرر	
اهداف المادة الدراسية:	دراسة تشريح جذع الجسم البشري بصورة مناطقية والعلاقة بين الاعضاء المختلفة من الناحية التشريحية والوظيفية. In this course, the student will study the trunk anatomy of the human body. The student will be able to- : -1 Understand the function of the heart, Borders of the heart, layers of the heart, Heart Chambers, Coronary circulation of the heart . -2 know the conductive system. Thoracic cage organization, functional anatomy of respiration and diaphragm.

-3 Describe the characteristics of pulmonary trunk, and major veins, the mediastinum, autonomic nervous system in the thorax.	

9. استراتيجيات التعليم والتعلم

ج- الاهداف المعرفية
أ1- التعرف على تشريح الجذع المتعلق بجسم الانسان
أ2- فهم عمل الاجزاء والاعضاء الجذعية
أ3- معرفة الاجزاء الداخلية الجذعية

ب - الاهداف المهاراتية الخاصة بالمقرر
ب1 – المهارات المتعلقة بطريقة عمل الاجزاء الجذعية
ب2 – معرفة وظائف الاعذاء الداخلية للجسم البشري المتعلقة بالمناطق الجذعية
ب3 – معرفة علاقة تشريح الجذع بتخصص هندسة الطب الحياتي

10. بنية المقرر

الاسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
2 & 1	2 نظري + 2 عملي	التعرف على القلب واجزاءه	The heart	نظري + عملي	امتحان يومي + تقرير
3	2 نظري + 2 عملي	التعرف على الاجزاء التي تتوسط القفص الصدري	The mediastinum	نظري + عملي	امتحان يومي + تقرير
5 & 4	2 نظري + 2 عملي	معرفة تضاريس الجدار الداخلي للبطن	Topography of the anterior abdominal wall	نظري + عملي	امتحان يومي + تقرير
6&7	2 نظري + 2 عملي	التعرف على عضلات ومفاصل الجزء الخلفي للجسم	The muscles and joints of the back	نظري + عملي	امتحان يومي + تقرير
8	2 نظري + 2 عملي	معرفة القفص الصدري واجزاءه	Thoracic cage organization	نظري + عملي	امتحان يومي + تقرير
10 & 9	2 نظري + 2 عملي	معرفة التوصيل الكهربائي للقلب البشري	The conductive system	نظري + عملي	امتحان يومي + تقرير
11	2نظري + 2 عملي	التعرف على الاغشية الداخلية في جوف البطن	The peritoneum	نظري + عملي	امتحان يومي + تقرير

12	2نظري + 2 عملي	معرفة وظائف الكبد والبنكرياس	The pancreas and spleen	نظري + عملي	امتحان يومي + تقرير
13	2 نظري + 2 عملي	معرفة الاعصاب المتواجدة على الجدار الخلفي للبطن	The nerves on the posterior abdominal wall	نظري + عملي	امتحان يومي + تقرير
14 & 15	2 نظري + 2 عملي	شرح الاعضاء التناسلية الانثوية الداخلية	Female internal genital organs	نظري + عملي	امتحان يومي + تقرير

11. تقييم المقرر

1- امتحانات يومية بأسئلة عملية وعلمية .
2- درجات مشاركة لأسئلة المنافسة الصعبة بين الطلاب.
3- وضع درجات للواجبات البيتية والتقارير المكلفة بهم.
4- امتحانات فصلية للمنهج الدراسي اضافة الى امتحان نصف السنة والامتحان النهائي.

12. مصادر التعليم والتدريس

الكتب المقررة المطلوبة	Last's Anatomy e-Book: Regional and Applied
المراجع الرئيسية	Gray's Atlas of Anatomy E-Book
الكتب والمراجع الساندة التي يوصي بها	rahams' and McMinn's Clinical Atlas of Human Anatomy E-Book

Course Description Form

1. Course Name:

Bio–Tribology

2. Course Code:

WBM-52-06 / BioTribology

3. Semester / Year:

Semester 2

4. Description Preparation Date:

2025

5. Available Attendance Forms:

Weekly / theoretical

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

26/2

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

Name: Lec. Natiq Aziz Omran
Email:

8. Course Objectives

Course Objectives	• To introduce students to Bio tribology and its multiple applications. • To differentiate between surface types and their interaction modes. • To justify the choice of materials used in implants and prosthetics. • To calculate friction and lubrication values for various surfaces. • To evaluate the quality and suitability of prosthetics for users.

9. Teaching and Learning Strategies

Strategy	• Textbooks and lectures. • Detailed theoretical lectures by the instructor. • Student participation in solving applied problems during lectures. • Use of blended e-learning methods.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Student understands the lecture	Introduction to Bio tribology	Theoretical lecture	Daily Quiz + Discussion
2	2	Student understands the lecture	Types of Surfaces	Theoretical lecture	Daily Quiz Discussion
3	2	Student understands the lecture	Friction Calculations	Theoretical lecture	Daily Quiz Discussion
4	2	Student understands the lecture	Types of Friction	Theoretical lecture	Daily Quiz Discussion
5	2	Student understands the lecture	Laws of Static and Dynamic Friction	Theoretical lecture	Daily Quiz Discussion
6	2	Student understands the lecture	Theories and Types of Wear	Theoretical lecture	Daily Quiz Discussion
7	2	Student understands the lecture	Wear Measurements	Theoretical lecture	Daily Quiz Discussion
8	2	Student understands the lecture	Friction and Wear Measurement	Theoretical lecture	Daily Quiz Discussion
9	2	Student understands the lecture	Lubrication Mechanism	Theoretical lecture	Daily Quiz Discussion
10	2	Student understands the lecture	Hydrodynamic Lubrication	Theoretical lecture	Daily Quiz Discussion

11	2	Student understands the lecture	Elastic Hydrodynamic Lubrication	Theoretical lecture	Daily Quiz Discussion
12	2	Student understands the lecture	Human Joints	Theoretical lecture	Daily Quiz Discussion
13	2	Student understands the lecture	Lubrication of Human Joints	Theoretical lecture	Daily Quiz Discussion
14	2	Student understands the lecture	Bio tribology of Artificial Joints	Theoretical lecture	Daily Quiz Discussion
15	2	Student understands the lecture	Lubrication of Artificial Joints	Theoretical lecture	Daily Quiz Discussion

11. Course Evaluation

Mid exam	25%
Participation , assignments, presentation,	15%
Final exam	60%
`total	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Biotribology by J. Paulo Davim, 2013
Main references (sources)	Biotribology by J. Paulo Davim, 2013
Recommended books and references (scientific journals, reports…)	Journal of Biotribology, ISSN 2352-5738
Electronic References, Websites	Websites of companies manufacturi medical implants and prosthetics

Course Description Form

1. Course Name:
Mechanics of materials I
2. Course Code:
WBM-31-02
3. Semester / Year:
Semester
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
Presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
45 h/ 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Hussain Ameer Aljawad Email: Hussein.aljawad@uowa.edu.iq
8. Course Objectives

Course Objectives	The aim of teaching the curriculum for this subject is to learn the basics of the resistance of materials to external forces and pressures and how to calculate loads, stresses and other mechanical issues and their effect on the materials of objects internally. Materials force field, also known as materials mechanics, refers to various methods for calculating stresses and strains in structural members, such as beams and columns. Methods used to predict the response of a structure under loading and its susceptibility to different failure modes take into account material properties such as yield strength, ultimate strength, Young's modulus, and Poisson's ratio.

9. Teaching and Learning Strategies

Strategy	1- Making the student able to demonstrate real knowledge of engineering concepts related to materials mechanics during the academic level and their applications in the fields of biomedical engineering. 2- Learn and understand the basic definitions used in materials mechanics, such as stresses, ductility, bending moments, cutting force, and other concept 3- Learn and understand solution methods and mathematical applications in solving applications industry problems in the field of biomedicine. 4- Learn and apply the laws and formulas that the student learns from numerc examples, which make him able to understand the future problems that will faced in medical engineering industries and applications.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Units and common principles And Analysis of Internal Forces and Stresses	Units and common principles, SI Units (System International Units), Types of Support in Structure, Types of Loads in Structures, Types of Beams in Structures, Determinate and Indeterminate Problems. Analysis of Internal Forces and Stresses, Introduction, Analysis of Internal Forces (Three-dimensional system (3D), Two-dimensional system (2D)).	Presented the lectures and explain it.	Daily exams + classwork
2	3	Normal stress And Shear stress and safety Factor	Normal stress, Simple Normal Stress, Tensile Stress, Compressive Stress, Beam Stress. Shear stress and safety Factor, Simple Shear Stress, Direct shear stress, Double shear stress, Punching shear stress, Allowable and Factor of Safety.	Presented the lectures and explain it.	Daily exams + classwork

3+4	3	Torsion of Circular Shaft And Torsion of non-circular section	Torsion of Circular Shaft, Introduction, Torsion, Torsional shear stress, Angle of Twist, Polar Moment of Inertia, Composite Shaft, Power Transmitted by Shaft. Torsion of circular shaft 2, Examples and Solutions. Torsion of non-circular sections, Shear Stress and Angle of Rotation.	Presented the lectures and explain it.	Daily exams + classwork
5-7	3	Thin walled pressure vessels	Thin walled pressure vessels, Types of stresses in Cylindrical thin-walled pressure vessels, Cylindrical Thin-Walled Pressure Vessels, Tangential (Hoop or Circumferential) Stress, Longitudinal Stress, Spherical Shell.	Presented the lectures and explain it.	Daily exams + classwork
8	3	Simple Strain and Deformations of Axially Loaded Members	Simple Strain and Deformations of Axially Loaded Members, Simple Strain, Sign Convention, Stress-Strain Diagram, Hooke's Law, Poisson' s Ratio, Cases of Poisson's Ratio.	Presented the lectures and explain it.	Daily exams + classwork
9+10	3	Deformation of axially loaded members	Deformation of axially loaded members, Case 1: prismatic bar, Case 2: Non-prismatic bar, Case 3: Bar	Presented the lectures and explain it.	Daily exams + classwork

			with varying cross-sectional and varying axial force		
11+12	3	Statically indeterminate problems	Statically indeterminate problems, Examples and Solutions.	Presented the lectures and explain it.	Daily exams + classwork
13	3	Thermal stresses and strains	Thermal stresses and strains, Thermal strain, Thermal Deformation.	Presented the lectures and explain it.	Daily exams + classwork
14-15	3	The Columns	The Columns, Definition, The Critical load of column, Radius of Gyration.	Presented the lectures and explain it.	Daily exams + classwork

11.Course Evaluation

1- Theoretical lectures.
2- Discussion Tutorials.
3- Application in group to activate the team spirit at work

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	MECHANICS OF MATERIALS/ R. C. HIBBELER
Main references (sources)	MECHANICS OF MATERIALS, E. J. HEARN
Recommended books and references (scientific journals, reports...)	Strength of material/schaums outline/William Nash
Electronic References, Websites	

Course Description Form

1. Course Name:
Physiology II
2. Course Code:
WBM-32-05
3. Semester / Year:
Third Year\second semester
4. Description Preparation Date:
2025-02-1
5. Available Attendance Forms:
presence in the classroom, lab
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: Ahmed oudah kadhim Email: ahmed.oudah@uowa.edu.iq
8. Course Objectives

Course Objectives	The study objectives can be summarized as follows: • The circulatory system: Understand how the heart and blood vessels work, how blood is pumped and distributed in the body, and the mechanisms of regulating blood pressure. • The nervous system: Know the types of nervous tissue, how nerve signals are transmitted, and the role of the autonomic nervous system in regulating the various functions of the body. • The senses: Understand the mechanisms of the different senses such as hearing, sight, and touch, and how sensory signals are converted into nerve signals. • Muscle physiology: Study the different types of muscles, how they contract and relax, and the mechanisms of muscle fatigue. • Renal and respiratory physiology: Understand the functions of the kidneys and respiratory system, and how fluid, acid, and base balance are regulated in the body.

9. Teaching and Learning Strategies

Strategy	Assessment is based on hand-in assignments, written exam, Case study, Quizzes, seminars, Practical testing and Online testing.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learn about the	Cardiovascular system, action	Lectures	Daily exams

		cardiovascular system, action partial	partial,	presented PDF forma + lab	+ homework assignments + monthly exams
2	4	Learn about the functional design of cardiovascular system, electrophysiology of the heart ECG	functional design of cardiovascular system, electrophysiology of the heart ECG	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
3	4	Learn about the cardiac cycle, cardiac output	cardiac cycle, cardiac output	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
4	4	Learn about the blood pressure, muscle and nerve	blood pressure, muscle and nerve	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
5	4	Learn about the excitable tissue, nervous tissue	excitable tissue, nervous tissue	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
6	4	Learn about the types of nerves, excitation of the muscle	types of nerves, excitation of the muscle	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
7	4	Learn about the theories of contraction, muscle contraction change	theories of contraction, muscle contraction change	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
8	4	Learn about the	fatigue, smooth muscle	Lectures	Daily exams

		fatigue, smooth muscle		presented in PDF format + lab	homework assignments monthly
9	4	Learn about the cardiac muscle, neuromuscular transmission	cardiac muscle, neuromuscular transmission	Lectures presented in PDF format + lab	Daily exams homework assignments monthly
10	4	Learn about the autonomic nervous system, anatomical consideration and autonomic reflex arch	autonomic nervous system, anatomical consideration and autonomic reflex arch	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
11	4	Learn about the sympathetic and parasympathetic nervous system, higher anatomical centers and neurotransmitters in autonomic nervous system	sympathetic and parasympathetic nervous system, higher anatomical centers and neurotransmitters in autonomic nervous system	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
12	4	Learn about the micturition, introduction to special senses	micturition, introduction to special senses	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
13	4	Learn about the hearing vestibular apparatus, vision and the eye muscle contractility,	hearing vestibular apparatus, vision and the eye muscle contractility,	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan
14	4	Learn about the electroencephalography, biophysics of circulation	electroencephalography, biophysics of circulation,	Lectures presented in PDF	Daily exams homework assignments

				format + lab	monthly exan
15	4	Learn about the Renal physiology, respiratory physiology	renal physiology, respiratory physiology	Lectures presented in PDF format + lab	Daily exams homework assignments monthly exan

11.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

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Principiles of anatomy and physiology, by Gerard J. Tortora& Bryan H. Derrickson 12PthP ed. Volume 1 2009
Main references (sources)	Text book of medical physiology, by Guton & Hall . eleven ed. 2020.
Recommended books and references (scientific journals, reports...)	Check out websites in this field

Course Description Form of bone injury and fractions

1. Course Name:

Bone injury and fracture

2. Course Code:

WBM/32/07

3. Semester / Year:

Semester 2

4. Description Preparation Date:

2024-02-19

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: Kawthar Ali Hasan
Email: Kawtharali@uowa.edu.iq

8. Course Objectives

Course Objectives	• The student will be able to identify bones and bone remodeling . • The student should be able to know the synovial membrane and bone cells. • Enabling students to obtain general knowledge of diseases that affect • Enabling students to obtain general knowledge of the types of fractures, methods of treating them, and the duration of their recovery • Enabling students to obtain general knowledge to diagnose and treat the disease

9. Teaching and Learning Strategies

Strategy	• Using the smart board • Use illustrative pictures whenever possible

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Bone cells, bone matrix, bone remodeling synovium	Introduction about bon	Lectures presented i PDF forma	Daily exams + homework assignments + monthly exams

2	2	Simple and comminuted fracture ,healing ,pathological fracture	Bone fracture	Lectures presented in PDF format	Daily exams homework assignments monthly exam
3	2	Management of fracture , reduction , immobilization, exercise	Bone fracture 2	Lectures presented in PDF format	Daily exams homework assignments monthly exam
4	2	Gout, osteoporosis , osteoarisritis	Disease of the bone	Lectures presented in PDF format	Daily exams homework assignments monthly exam
5	2	Arthritis , symptoms ,diagnosis, osteoarthritis ,treatment	Infection of the bone	Lectures presented in PDF format	Daily exams homework assignments monthly
6	2	Arthritis , signs and symptoms , disability , diagnosis	Joint disease	Lectures presented in PDF format	Daily exams homework assignments monthly
7	2	Osteoarthritis ,rheumatoid arthritis , lupus, gout	Joint disease2	Lectures presented in PDF format	Daily exams homework assignments monthly
8	2	Regulation of bone metabolism , osteoporosis , rickets, hyperparathyroidism	Bone metabolism	Lectures presented in PDF format	Daily exams homework assignments monthly
9	2	Causes of Rheumatic fever, symptoms ,rheumatic heart disease ,prevention , treatment	Rheumatic fever	Lectures presented in PDF format	Daily exams homework assignments monthly
10	2	Introduction, cervical disc herniation, diagnosing IVDD, treatment	**Intervertebral disc disorder**	Lectures presented in PDF format	Daily exams homework assignments monthly
11	2	Stabilizers, mechanism, predisposing factors	Patellar Dislocation ,knee dislocation and tibal shaft dislocation	Lectures presented in PDF format	Daily exams homework assignments monthly
12 +13	4	Rupture of rotator cuff , causes , types , acute calcific tendinitis	Disorders of the shoulder	Lectures presented in PDF format	Daily exams homework assignments monthly

14+15	4	Predisposition, mechanism , x ray, complications of prolonged immobilization	Intertrochanteric, Subtrochanteric & Femur Shaft Fracures	Lectures presented	Daily exams homework

11.Course Evaluation

- Daily exams scientific questions.
- Establishing grades for environmental duties
- Semester exams for the curriculum, in addition to the mid-year exam and final exam

12.Learning and Teaching Resources

ley & solomons system of orthopaedics and trauma

Mayo clinical family health book

Course Description Template

Course Description

This course description provides a brief summary of the most important course features and learning outcomes expected of the student to achieve, demonstrating whether they have made the most of the available learning opportunities. These should be linked to the program description.

1. Educational Institution	Warith Al-Anbiya University
2. Scientific Department / Center	Department of Biomedical Engineering
3. Course Name/Code	Numerical Analysis / WBM -32-02
4. Available Forms of Attendance	Weekly
5. Semester/Year	Chapter Two/2023
6. Number of Hours (Total)	120 Hours
7. Date of this description	12/3/2023
8. Course Objectives	
• To provide the numerical methods of solving the non-linear equations, interpolation, differentiation, and integration. • To improve the student's skills in numerical methods by using numerical analysis software and computer facilities.	

9. Course Outputs and Methods of Teaching, Learning and Assessment

A. Cognitive Objectives

A1- The student will be able to use numerical methods in solving equations and employ them appropriately.

A2- Gain experience and knowledge in the types of differential equations and methods of solving them numerically.

A3. Gain experience and knowledge in solving types of integrals numerically.

A4- Making the student able to show the real knowledge of mathematical concepts during the study ladder and their applications in the engineering field.

A5- Develop an understanding of the basic ideas and concepts of numerical methods.

B . Skills objectives of the course

B1 - How to write programs using MATLAB to solve mathematical problems and find numerical solutions.

B2 - Solving mathematical models that represent numerically different physical and engineering models and finding the best one that suits the experimental data .

B3 – Skills of calculating the types of integrals by various numerical methods.

B4 – Skills of calculating differential equations using a set of numerical methods.

B5- Exercises solving skills from the textbook and from the auxiliary resources that have application in the practical aspect.

Teaching and learning methods

- ✓ The lecturer is to give theoretical lectures.
- ✓ Explanation and clarification using modern electronic means.
- ✓ The method of the lecture is based on brainstorming and feedback.
- ✓ The method of self-learning through extra-curricular assignments that require exerting skills and self-explanations in experiential methods.
- ✓ The teacher requests periodic reports for the basic topics of the subject.
- ✓ The instructor conducts practical experiments related to the theoretical aspect.

Evaluation methods

- ✓ Daily exams with practical and scientific questions.
- ✓ Participation scores for competition questions among students.

- ✓ Scoring homework and reports assigned to them.
- ✓ Scoring for practical experience reports.
- ✓ Semester exams for the curriculum in addition to the mid-year exam and the final exam.

C. Emotional and Value Goals

A1- Observation and perception.

A2- Analysis and Interpretation

A3. Conclusion and evaluation

C4- Preparation and Evaluation

d. General and qualifying skills transferred (other skills related to employability and personal development).

D1- Skills necessary to work within the local labor market to maintain all medical devices related to fluid issues.

D2- Enabling the student to use the special and general equations of the study subjects and how to benefit from them in analyzing the problems and extracting the results accurately.

D3- Holding special workshops for students for the purpose of self-development for them.

D4- Developing the student's ability to analyze information and interpret the data obtained through conducting practical experiments, using manual skills, or using computers such as simulation of systems.

10. Course Structure					
Evaluation Method	Method of education	Unit Name/Topic	Required Learning Outcomes	Hours	The week
Daily exams + homework	Lectures presented in pdf format	Linear Interpolation: Newton-Gregory	Learning the calculation using technique of estimating the value of a function for any intermediate value of the independent variable.	2	The first
Daily exams + homework	Lectures presented in pdf format	Linear Interpolation: Lagrange interpolating polynomial	Learning the calculation of the Lagrange interpolating polynomial of lowest degree that interpolates a given set of data.	2	Second
Daily exams + homework	Lectures presented in pdf format	Interpolation: General Equation	Learning the calculation using technique of General Equation	2	Third
Daily exams + homework	Lectures presented in pdf format	Numerical integration: Equal segments Trapezoidal method	To calculate the area under the curve of a function plotted on a graph. The trapezoidal rule that computes a function f(x) with a set of linear functions.	2	Fourth
Daily exams + homework	Lectures presented in pdf format	Numerical integration: Unequal segments	To calculate the area under the curve of a function plotted	2	V

		Trapezoidal method	on a graph. The trapezoidal rule that computes a function f(x) with a set of linear functions.		
Daily exams + homework	Lectures presented in pdf format	Numerical integration: Simpson's rules	Learning the calculation using technique of Simpson's rules which solves several approximations for definite integrals	2	Sixth
Daily exams + homework	Lectures presented in pdf format	Numerical Integration: Gaussian Quadrature Method	Learning the calculation of the definite integral of a function, usually stated as a weighted sum of function values at specified points within the domain of integration.	2	Seventh
Daily exams + homework	Lectures presented in pdf format	Solution of non-linear equations: Bisection method	Learning the numerical calculation of the bisection method which is one of the first numerical methods developed to find the root of a nonlinear equation.	2	Eighth
Daily exams +	Lectures presented	Solution of non-linear equations:	Learning the numerical calculation of	2	Ninth

homework	in pdf format	Newton Raphson method	the Newton-Raphson method which is the method of choice for solving nonlinear systems of equations.		
Daily exams + homework	Lectures presented in pdf format	Solution of non-linear equations: Secant method	Learning the numerical calculation of the Secant method which is a very effective numerical procedure used for solving nonlinear equations of the form f(x) = 0	2	X
Daily exams + homework	Lectures presented in pdf format	Numerical solution of ODE: Taylor series	Learning the numerical calculation of the Taylor series that provides a means to predict a function value at one point in terms of the function value and its derivatives at another point.	2	Eleventh
Daily exams + homework	Lectures presented in pdf format	Euler method and modified Euler method	Learning the numerical calculation of the Euler's method which is the first order numerical methods for solving ordinary differential	2	Twelfth

			equations with given initial value.		
Daily exams + homework	Lectures presented in pdf format	Runge - Kutta method	To calculate using the technique of Runge - Kutta method for solving the initial-value problems of differential equations.	2	Thirteenth
Daily exams + homework	Lectures presented in pdf format	Finite differences method	Learning the numerical calculation of the finite differences method for solving partial differential equations.	2	Fourteenth
Daily exams + homework	Lectures presented in pdf format	Matrix method	Learning the numerical calculation of Matrix method to find the solution to the system of equations such as Gaussian elimination method.	2	Fifteenth

11. Infrastructure	
1. Numerical Methods of Engineers, Chapra &Canale, 6th Edition.	1- Required Textbooks
2. Applied Numerical Analysis, Gerald & Wheatley, 7th Edition.	2- Key Reference(s)

All solid scientific journals that have to do with the broad concept of mathematical theories and their results.	A) Recommended Books and References (Scientific Journals, Reports, ...)
1. books-world.net 2. www.pdfdrive.com	B) Electronic References, Websites, ...

12. Course Development Plan
1- Keeping pace with the scientific development in the field of specialization and providing students with all the Publication of the Scientific Subject. 2- Updating and revising lectures annually. 3- use Modern Means of Education.

Course Description Template

Course Description

Analysis of mathematical equations from the significance of time to the significance of frequency by using integrative and differential properties

1. Educational Institution	Warith Al-Anbiya University
2. Scientific Department / Center	Department of Biomedical Engineering
3. Course Name/Code	WBM-31-01/ Engineering Analysis
4. Available Forms of Attendance	Weekly
5. Semester/Year	First Semester /2024
6. Number of Hours (Total)	60 Hours
7. Date of this description	21/9/2024
8. Course Objectives	
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.

9. Course Outputs and Methods of Teaching, Learning and Assessment

A. Cognitive Objectives

A1- Making the student able to show the real knowledge of analytical mathematical concepts during the study ladder and their applications in the field of communication science and the transmission and knowledge of the properties of waves.

A2- Learn and understand the basic definitions used in geometric mathematics such as real value medals , exponents and roots, equations, inequalities and graphs.

A3- Learn and understand solution methods and temporal applications in calculus and derivative

A4- Learn and apply laws and formulas that result directly from mathematical concepts such as quadratic equations, exponential functions, properties of logarithmic relations , and Euler transformations.

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.

Teaching and learning methods

- ✓ The teaching to give preferential theoretical lectures
- ✓ The teacher requests periodic reports for the basic topics of the subject.

Evaluation methods

- ✓ Daily exams with practical and scientific questions
- ✓ Participation scores for challenging competition questions among students
- ✓ Scoring homework and reporting assignments.
- ✓ Semester exams for the curriculum in addition to the mid-year exam and the final exam

C. Emotional and Value Goals

A1- Encouraging the student to think about ways to solve real-time equations and draw all kinds of functions.

A2- Encouraging the student to think about the importance of derivative applications and integration in solving engineering problems.

A3- Encouraging the student to integrate in knowledge in terms of benefiting from mathematical information in other theoretical and practical fields of study and relying on each other

A4- Encouraging the student to acquire growing skills for mathematics in terms of language, symbols, information, and thinking styles.

Teaching and learning methods

- ✓ The lecturer gives detailed theoretical lectures
- ✓ The teacher is familiar with the basic concepts, equations, and functions of all kinds and their practical applications, which enhances the method of learning and teaching.
- ✓ The teacher introduces students to the most important applications of mathematical equations in the design of various medical devices theoretically and practically.

Evaluation methods

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

d. General and qualifying skills transferred (other skills related to employability and personal development).

D1- Enabling students to write assignments on topics related to mathematics.
D2- Enabling students to solve algebraic equations in a way that can match the practical reality of communication systems.
D3. Housing students from obtaining professional exams organized by local or international bodies.
D4- Enabling students to develop continuously after graduation.
D5- Holding special seminars for students for the purpose of self-development of their personalities

10. Course Structure					
Evaluation Method	Method of education	Unit Name/Topic	Required Learning Outcomes	Hours	The week
Daily exams + homework + monthly exams	Lectures presented in pdf format	Introduction	Introduction to wave analytics, Fourier series representation of periodic signals, trigonometric Fourier series orthogonality conditions for sine and coding function	4	The first Second
Daily exams + homework + monthly exams	Lectures presented in pdf format	Fourier series expansion	Fourier series expansion , even and odd function , half range expansion ,complex exponetion fourier	4	Third
Daily exams + homework + monthly exams	Lectures presented in pdf format	complex exponetion fourier	complex exponetion fourier Parssival's theorem for periodic function power, trigonometric series approximation	4	fourth fifth
Daily exams + homework + monthly exams	Lectures presented in pdf format	Fourier integral, Fourier transform	Fourier integral, Fourier transform, definition and properties	4	sixth
Daily exams + homework + monthly exams	Lectures presented in pdf format	multiplication and convolution	multiplication and convolution, duality, inverse Fourier transform, unit impulse function	4	seventh
Daily exams + homework + monthly exams	Lectures presented in pdf format	unit step function	unit step function, rectangular function, Sinc function, Parssival's theorem for aperiodic function energy	4	eighth ninth

Daily exams + homework + monthly exams	Lectures presented in pdf format	Laplace transform	Laplace transform, definition and properties asymptotes and dominant terms, Examples	4	tenth
Daily exams + homework + monthly exams	Lectures presented in pdf format	Laplace transform	Laplace transform of special functions	4	eleventh
Daily exams + homework + monthly exams	Lectures presented in pdf format	initial value	initial value and final value theorems	4	twelfth
Daily exams + homework + monthly exams	Lectures presented in pdf format	Laplace transform	inverse Laplace transform	4	Xiii
Daily exams + homework + monthly exams	Lectures presented in pdf format	partial fractions	partial fractions theorem	4	fourteenth

11. Infrastructure	
Signals and systems , Sanjay sharma. 2011	1- Required Textbooks
✓ College Library for additional curriculum resources. Refer to scientific websites to view the latest developments in the subject .	2- Key Reference(s)
All solid scientific journals that have to do with the broad concept of mathematical theories and their results.	A) Recommended Books and References (Scientific Journals, Reports, ...)
www.ieee.org	B) Electronic References, Websites, ...

12-Course Development Plan
1- Keeping pace with the scientific development in the field of specialization and providing students with every new development. 2- Updating and revising lectures annually. 3- use Modern Means of Teaching and Learning.

Course Description Form of Histology

1. Course Name:

Histology

2. Course Code:

WBM/31/05

3. Semester / Year:

Semester 1

4. Description Preparation Date:

2024-09-15

5. Available Attendance Forms:

presence in the classroom

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

60 Hours / 2 Units

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

Name: Kawthar Ali Hasan
Email: Kawtharali@uowa.edu.iq

8. Course Objectives

Course Objectives	The Histology course aims to equip students with the following skills: • Provide students with general knowledge about tissues • Understand the characteristics of tissues and the damage that may occur in them • Learn about the types of specialized tissues • Recognize histological stains and their importance in sample preparation and early disease detection • Understand the relationship between histology and physiology

9. Teaching and Learning Strategies

Strategy	• Using the smart board and illustrative images whenever possible • Use of light microscopes with different magnifications through objective and ocular lenses

10. Course Structure

Week	Hours	Unit or subject name	Learning method	Evaluation method
1	2	Epithelial tissues	Lectures presented in	Daily exams , homework

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Information Technology**			**Module Delivery**	
Module Type	Secondary			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	WBM-21-04				
ECTS Credits	8				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	1	
Administering Department	BME.		**College**	ENG.	
Module Leader	Ali Abdul-Hussein Mohammed		**e-mail**	ali.masaoodi@uowa.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	M.S.c	
Module Tutor	Ali Abdul-Hussein Mohammed		**e-mail**	ali.masaoodi@uowa.edu.iq	
Peer Reviewer Name	Non		**e-mail**	…	
Scientific Committee Approval Date	2025/9/16		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aims of this module are to introduce students to the foundational principles and practices of IT in contemporary society. The course enables learners to understand essential components such as computer hardware, software, data processing, networking, cybersecurity, programming, cloud computing, and bioinformatics. The module also emphasizes the ethical, social, and global implications of IT. It aims to develop students' analytical, technical, and problem-solving skills, preparing them to apply IT effectively in academic, personal, and professional contexts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students will be able to: 1. Understand the key concepts of IT including hardware, software, networking, and databases. 2. Apply programming and algorithmic thinking to solve basic problems. 3. Demonstrate knowledge of cybersecurity threats and solutions. 4. Utilize multimedia tools and data formats for digital content processing. 5. Explore cloud computing and internet-based applications. 6. Understand bioinformatics fundamentals and data retrieval techniques. 7. Analyze ethical and social issues associated with information technology. 8. Develop practical skills in using modern IT tools and platforms.
Indicative Contents المحتويات الإرشادية	1. Introduction to IT and its impact in various sectors 2. Computer hardware and software fundamentals 3. Data representation, storage, and processing 4. Multimedia technologies: text, audio, image, video, animation 5. Networking, internet, and cloud computing 6. Cybersecurity principles and global data protection 7. Algorithmic thinking and programming basics 8. Database concepts and file management 9. Internet applications, APIs, and cloud services 10. Bioinformatics: biological data formats, analysis, and tools

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this module by encouraging students to participate in discussions, while improving and expanding their critical thinking skills. This will be achieved through discussions during the weekly lectures and after the oral presentations by answering the questions of their colleagues. Enhancing the principle of teamwork by participating in the implementation of the laboratory Assignments and developing the student skills in programming using Python by implementing challenged project assignments.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**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)	4,10	LO #1,2,3,4 and 9
	Project Assignment	1	10% (10)	12	All
	Lab. Assignment	1	10% (10)	Continuous	All
	Seminar	1	10% (10)	The student chooses the week and the topics	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Information Technology:** • Definition and scope of IT in the digital age • History and evolution of computing and IT systems • Types of computers: microcomputers, mainframes, supercomputers, mobile devices • IT in education, healthcare, government, and business • The digital divide: global inequality in access and usage • Social, cultural, and economic impacts of IT
Week 2	**Computer Hardware and Software:** • Components of a computer system: input, output, storage, processing • Brief introduction on CPU architecture, control unit, ALU, registers • RAM, ROM, and cache memory • Storage technologies: HDDs, SSDs, flash memory, optical storage
Week 3	• System vs application software • File types, formats, and extensions • Operating system basics: process management, user interfaces, multitasking
Week 4	**Data Representation and Processing** • Number systems: binary, decimal, hexadecimal • Character encoding standards: ASCII, Unicode • Binary representation of Image, audio, and video. Data compression: lossless vs. lossy • Data integrity and error checking • Input-process-output (IPO) model, Data types and data formats
Week 5	**Multimedia: Video, Audio & Animation** • Text encoding, UTF-8, plain text, richtext, hypertext, text compression, text as UI element, glyphs, TrueType (TTF), font rendering, anti-aliasing, text editors. • Digital audio, sampling rate, quantization, bit depth, compression (MP3, WAV), audio processing (trimming, effects, mixing) • Digital images and graphics, resolution, bit depth, Bitmaps (JPEG, PNG, GIF), image compression, vector graphics (SVG, AI), color model RGB, • Video principles, frames, formats, editing, compression, encoding, 2D animation.
Week 6	**Networking, Internet, and Cloud Computing** • Network types: LAN, WAN, MAN, PAN • Network topologies: star, bus, ring, mesh • Communication protocols: TCP/IP, HTTP, FTP • IP addressing, DNS, MAC addresses • Internet architecture and services: WWW, email, VoIP, DNS • Cloud computing: SaaS, PaaS, IaaS • Multimedia delivery over the internet: streaming protocols, buffering, latency

Week 7	**Midterm Exam**
Week 8	**Cybersecurity Introduction** • Cyber threats: malware, ransomware, phishing, DoS/DDoS attacks • Encryption and authentication methods • Password management and two-factor authentication • Ethical issues: data privacy, surveillance, algorithmic bias • Intellectual property, copyright, software piracy • Digital forensics and cybercrime law • GDPR and global data protection regulations
Week 9	**Algorithms Principles** • Problem decomposition and abstraction • Algorithm design principles • Flowcharting symbols, Pseudocode and structured logic • Sorting and searching algorithms • Complexity: time and space considerations
Week 10	**Programming Fundamentals** • Introduction to programming languages • Data types, variables, and expressions • Brief introduction into control structures: if-else, loops, switch-case • Functions, procedures, and modular programming • Arrays and data collections • GUI vs command-line applications • IDEs and version control systems (Git)
Week 11	**Database & File Management** • Concepts of databases: tables, fields, records, keys • Database models: relational, hierarchical, object-oriented • SQL fundamentals: SELECT, INSERT, UPDATE, DELETE, JOIN • Data validation and integrity • File organization: sequential, indexed, hashed • Flat files vs. relational databases • Biological Databases and Data Retrieval, overview of biological databases
Week 12	**Internet Applications and Cloud Services** • Static vs. dynamic web pages • Front-end frameworks, • Role of the back end: APIs, databases, authentication • RESTful APIs and HTTP methods • Introduction to back-end frameworks, Intro to XML and JSON
Week 13	• Introduction for cloud computing, cloud benefits • Characteristics: on-demand, scalability, multitenancy, elasticity • Service models • Cloud providers: AWS, Azure, GCP overview

	• Internet of Things (IoT) and Cloud Integration • Data collection and streaming • Real-time analytics and dashboards • Smart devices and cloud-based control
Week 14	**Bioinformatics & Computational Biology** • Central dogma of molecular biology • DNA, RNA, protein structures and sequences • Biological databases: NCBI, GenBank, UniProt, PDB • Sequence retrieval and data formats (FASTA, GFF) • Comparative genomics and genome browsers • Sequence annotation and metadata
Week 15	• DNA sequence manipulation with Python • Protein translation & reading frames, translate DNA/RNA sequences into proteins and explore different reading frames. • Fundamentals of sequence alignment • Building basic bioinformatics workflows: integrating python and conceptual tools for simple data analysis and visualization.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Brian K. Williams_ Stacey C. Sawyer - Using information technology, a practical introduction to computers communications	Yes
Recommended Texts	Wang, Xinkun. Next-generation sequencing data analysis. CRC Press, 2023.	No
Recommended Websites		

Grading Scheme
مخطط الدرجات

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	BME-213				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	**Assist. lect. Hussein Ameer Aljawad**		**e-mail**	Salah.mahdi@uokerbala.edu.iq	
Module Leader's Acad. Title	**Assist. lect**		**Module Leader's Qualification**	MSc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

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	Building and preparing the student psychologically to play his role as an engineer
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Motivate the student to be creative and think about specialization projects and keep developing with the current development in the engineering mechanics
Indicative Contents المحتويات الإرشادية	Motivate the student to be creative and think about specialization projects and keep developing with the current development in the engineering mechanics

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 محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects .	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 to Dynamics
Week 2	Rectilinear Motion
Week 3	Plane Curvilinear Motion
Week 4	Normal and Tangent coordinates (n-t)
Week 5	Polar Coordinates (r-θ)
Week 6	Relative Motion
Week 7	MID Exam 1
Week 8	Constrained Motion of Connected Particles
Week 9	Work and Energy
Week 10	Potential Energy
Week 11	Impact
Week 12	lmpulse-Momentum
Week 13	Conservation of Energy and Momentum
Week 14	Steady Mass Flow
Week 15	MID Exam 2
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	ENGINEERING MECHANICS: DYNAMICS, (5th editions), by J. L. MERIAM and L. G. KRAIGE.	No
Recommended Texts	Engineering Mechanics: Dynamics, (14th edition, by R. C. Hibbeler	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/mechanical-engineering	

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

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

MODULE DESCRIPTION FORM

Module Information					
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		1	**Semester of Delivery**		1
Administering Department		Biomedecal	**College**	Engineering	
Module Leader	Hasan Allawi		**e-mail**	Hassan.as@uowa.edu.iq	
Module Leader's Acad. Title		Assist lecture	**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		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	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	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	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	
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)			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	37	**Unstructured SWL (h/w)**	2.5
Total SWL (h/sem)	100		

Module Evaluation

		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)

	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)

	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

	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	No

	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	
Websites	/https://www.sanfoundry.com	

Grading Scheme
مخطط الدرجات

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 FORM

Module Information					
Module Title	**Electronic**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**BBE-211**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Biomedical engineering		**College**	College of engineering	
Module Leader	Ali Mohammed		**e-mail**	Ali.mohammed@uowa.edu.iq	
Module Leader's Acad. Title	Assistant Teacher		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Ali Mohammed		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	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 electronic circuit through the application of techniques. 2. To understand diode circuits analysis and application. 3. To understand clipper, clamper and zener diode circuits. 4. This course deals with the basic concept of electronic circuits. 5. To understand the main types of transistor and analyzing them. 6. To perform an analysis for cascaded connection of transistor.
Module Learning Outcomes	1. Recognize how electronic elements works in electronic circuits. 2. List the various terms associated with electronic circuits. 3. Summarize what is meant by a basic electronic circuit. 4. Describe the different types of diode and transistor. 5. Identify the basic electronic elements and their applications. 6. Learn about the practical applications of diode in terms of wave cutting and wave modification. 7. Learn about Zener diode, its properties and composition 8. Learn about the bipolar Junction Transistor, its structure and working principle.
Indicative Contents	Indicative content includes the following. Semiconductor: 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, clampers, Zener Diode: construction, characteristics and circuits, applications, Other Types of Diodes: Varactor diodes, current regulator diode, tunnel diode, schottky diode, PIN diode, Bipolar Junction Transistor(BJT): transistor structure, BJT connection configuration, biasing, characteristics, amplification parameters, D.C. load line, Q-point and waveform distortion, BJT switch operation, BJT amplifier operation, H-Parameters, equivalent circuits for C.C., C.B. and C.E. with its circuit's 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)	109	**Structured SWL (h/w)**	7
Unstructured SWL (h/sem)	91	**Unstructured SWL (h/w)**	6
Total SWL (h/sem)	200		

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**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Semiconductor: N-type, P-type, P-N junction, V-I characteristics,
Week 2	Diode Applications, half-wave rectifier, fullwave rectifier,
Week 3	parameters, D.C. load line, Q-point and waveform distortion
Week 4	power supply with filters and regulators, clippers, clampers,
Week 5	Zener Diode:construction, characteristics and circuits, applications,
Week 6	Bipolar Junction Transistor(BJT): transistor structure,

Week 7	Mid-term Exam
Week 8	BJT connection configuration, biasing, characteristics,amplification
Week 9	BJT switch 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 C.E. with its circuit's applications.
Week 15	Darlington's amplifier
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Lab 1: Diode characterstics
Week 2	Lab 2: Rectifiers and filters
Week 3	Lab 3: Clippers, clampers and voltage amplifiers
Week 4	Lab 4: Zener diode as voltage regulator
Week 5	Lab 5: BJT characteristics and DC Biasing
Week 6	Lab 6: common Emitter Amplifier
Week 7	Lab 7: common Collector 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

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.

Course Description Form

1. Course Name:
Electronic II
2. Course Code:
WBM-22-07
3. Semester / Year:
Semester
4. Description Preparation Date:
2024-03-19
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
105 Hours / 7 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ali Mohammed Email: ali.mohammed@uowa.edu.iq
8. Course Objectives

Course Objectives	**The study of electronics aims to identify and understand all basic electronic components by understanding their internal structure and the materials from which they are made. This will help students understand how to work with them, their functions, how to connect them, and the practical applications in which these components can be utilized. Students will also understand the mathematical equations and relationships specific to each electronic component by thoroughly analyzing the component and providing an appropriate description. Students will also explore these components in the laboratory and observe their behavior.**

9. Teaching and Learning Strategies

Strategy	1- Enabling the student to demonstrate a tr understanding of electronic components during t academic phase. 2- Understand the rules and foundations upon whi each electronic component is built. 3- Learn and understand the methods of connecti electronic components together to perform vario tasks. 4- Learn about the applications of electronics and importance in practical life. 5- Understand the mathematical ratios a relationships for each electronic component.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1 +2+3	4	JFET Transistor	Chemical structure of transistor, types, propert mathematical equations, examples, practical applications	Lectures presented PDF format	Daily exams + homework assignments + monthly exams
4+5	4	MOSFET Transistor	Chemical structure of transistor, its types, properties, mathematic equations, examples, practical applications	Lectures presented in PDF format	Daily exams homework assignments monthly exam
6+7	4	AC analysis	AC analysis with transistors	Lectures presented in PDF format	Daily exams homework assignments monthly exam
8+9+10	4	Transistor responses	The response of each type of transistor to frequencies and the differences between them.	Lectures presented in PDF format	Daily exams homework assignments monthly exam
10 +11+12	4	Multistage transistor	Analysis of circuits containing more than one transistor	Lectures presented in PDF format	Daily exams homework assignments monthly
13+14+15	4	Integrated circuits	Introduction to integrated circuits, their components, and how they work	Lectures presented in PDF format	Daily exams homework assignments monthly

11.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

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Boylestad, R.L., and Nashelsky, L., Electronic Devices circuit Theory, 9th Ed., Pearson Education, Inc., 2013.
Main references (sources)	• College library to obtain additio sources for the academic curricula • Check scientific websites to see rece developments in the subject

Recommended books and references (scientific journals, reports...)	All reputable scientific journals that a related to the broad concept mathematical theories and their resu

Model Unit Description
Subject Description Form
Faculty of Engineering / Department of Biomedicine

Unit information Subject information					
Unit Title	**English language**			**Unit delivery**	
Unit Type	**Support**			☒**theory** ☒**present** ☐**The laboratory** ☒**Educational** ☐**practical** ☒**The seminar**	
unity symbol	BME-12-04				
ECTS Credits	**8**				
SWL (hour/SEM)	**30**				
Unit level	1		**Semester for delivery**	2	
Administration Department	Biomedical		**The college**	College of Engineering	
Unit Commander	Saad Mahmoud		**e-mail**	saad.mah@uowa.edu.iq	
Unit Commander Title	Assistant Doctor		**Unit Commander Qualifications**	PhD	
Unit teacher			**e-mail**		
Peer Reviewer Name	name		**e-mail**	e-mail	
Scientific Committee Approval Date	26/5/2025		**issue number**	1.0	

Relationship with other units Relationship with other subjects			
Prerequisites Unit	nothing	**Semester**	
Common Requirements Unit	nothing	**Semester**	

Unit objectives, learning outcomes and guiding content Course objectives, learning outcomes and guiding content	
Unit objectives Subject objectives	English language study aims to improve global communication skills and enhance career and academic opportunities. Teaching strategies include blended learning, interactive learning, and technology-based learning. Academic outcomes include language proficiency, the ability to read and interpret scientific research, and the ability to interact effectively in multicultural environments.
Unit learning outcomes Learning outcomes for the subject	1. Master fundamental skills, including reading, writing, listening, and speaking. 2. Critical and creative thinking: Cultivate the ability to analyze information and make logical decisions. 3. Social Interaction: The ability to communicate effectively in various social and professional environments. 4. Specialized knowledge: the acquisition of knowledge in a particular field of study or specialization. 5. Independence and self-learning: the ability to continuously learn and achieve goals independently
Guidance Contents Guidance Contents	1. Educational information: Provides basic concepts and principles to support the learning and thinking process. 2. Procedures and steps: Clear instructions on how to do certain tasks or activities. 3. Tips and tricks: Guidance to help improve performance or achieve better results. 4. Tools and Resources: A list of helpful resources such as books, websites, or apps. 5. Cultural and behavioral guidelines: Tips on how to handle social or professional situations appropriately.

Learning and teaching strategies Learning and teaching strategies	
Strategies	• Interactive learning: Encouraging students to participate in classroom activities such as discussions, presentations, and problem solving.. • Blended learning: merging traditional education with technological tools such as online platforms to stimulate self-learning.. • Project-based learning: Students learn by working on real-world projects, helping to reinforce practical skills.. • Collaborative Learning: Encouraging teamwork among students to improve collaboration and knowledge sharing.. • Performance-oriented instruction: Guiding students to improve their academic performance through continuous assessments and clear goals..

Student workload(SWL) The student's academic load is calculated for 15 weeks.			
SWL Regulator (h/sem) Regular student load during the semester	78	**SWL Regulator (H/W)** Regular weekly student load	5
SWL unregulated (h/sem) Irregular student load during the semester	72	**SWL unregulated (h/w)** Irregular student load per week	5
totalSWL (h/sem) The student's total academic load during the semester	30		

Unit Evaluation Course material evaluation					
like		**time/number**	**Weight (in marks)**	**Due week**	**Related learning outcomes**
Formative assessment	**Competitions**	2	10% (10)	5, 10	LO#1, 2, 10, 11
	Appointments	2	10% (10)	2, 12	LO #3, 4, 6, 7
	Projects/The laboratory.	1	10% (10)	continuous	all
	a report	1	10% (10)	13	LO #5, 8, and 10
Final evaluation	**Midterm Exam**	2 s	10% (10)	7	LO #1-7
	Final Exam	2 hours	50% (50)	16	all
Overall Rating			100%(100 degrees)		

Delivery Plan (Weekly Syllabus) Theoretical weekly curriculum	
week	**Covered Materials**
Week 1	The first step in increasing their reading comprehension is to learn how to get the basic information.
Week 2	The first step in increasing their reading comprehension is to learn how to get the basic information.
Week 3	Sentence Structure: Learn all about the basic parts and components that make up a sentence and how to structure them to form meaningful sentences
Week 4	Sentence Structure: Learn all about the basic parts and components that make up a sentence and how to structure them to form meaningful sentences

Week 5	In **English**, **tenses** play a pivotal role in helping you present the information you intend to convey in a clear and accurate manner
Week 6	In **English**, **tenses** play a pivotal role in helping you present the information you intend to convey in a clear and accurate manner
Week 7	In **English**, **tenses** play a pivotal role in helping you present the information you intend to convey in a clear and accurate manner
The week8	In **English**, **tenses** play a pivotal role in helping you present the information you intend to convey in a clear and accurate manner
The week9	Indirect questions are a way of being polite. They are very, very common in English, especially when you're talking to someone you don't know.
week10	Indirect questions are a way of being polite. They are very, very common in English, especially when you're talking to someone you don't know.
Week 11	The **sentence** is the foundation of prose writing. A thorough understanding of core **sentence** structure and **sentence** elements
Week 12	The **sentence** is the foundation of prose writing. A thorough understanding of core **sentence** structure and **sentence** elements
Week 13	The **sentence** is the foundation of prose writing. A thorough understanding of core **sentence** structure and **sentence** elements
Week 14	Learn how to write **meeting minutes** to stay organized and impress your colleagues— plus formatting tips, samples, templates, and expert .
Week 15	Learn how to write **meeting minutes** to stay organized and impress your colleagues— plus formatting tips, samples, templates, and expert .
Week 16	Learn how to write **meeting minutes** to stay organized and impress your colleagues— plus formatting tips, samples, templates, and expert .

Learning and teaching resources

Learning and teaching resources

	text	Available in the library?
Required texts	Clinical Biochemistry,(8 editions), by Leipencotts	Yes
Recommended Texts		Yes
Websites		

Grading chart

Grading chart				
group	**degree**	Appreciation	**Tags(%)**	**identification**
Success Group (50 - 100)	**A**-excellent	privilege	90 - 100	Outstanding performance
	for-very good	very good	80 - 89	Above average with some errors
	G-good	good	70 - 79	Good work with noticeable errors.
	D-Satisfactory	middle	60 - 69	Fair but with major shortcomings
	h-Enough	acceptable	50 - 59	The work meets minimum standards.
Group failure (0 – 49)	**FX** -to fail	Failed(Under Processing)	(45-49)	More work needed but credit given
	F -to fail	Failed	(0-44)	A lot of work required.

note: Marks that are 0.5 decimal places above or below the highest or lowest full mark will be rounded off (e.g. a mark of 54.5 will be rounded off to 55, while a mark of 54.4 will be rounded off to 54. The University has a policy of not condoning 'imminent pass failure', so the only adjustment to marks awarded by the original mark(s) will be the automatic rounding described above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Mathematics I**			**Module Delivery**	
Module Type	**Basic learning**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENG101				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	**Engineering College**	
Module Leader	**Assist. Lec: Karrar Aqeel Hussein**		**e-mail**	karraraqeel@uowa.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/6/2024		**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 aims of a mathematics module are to provide students with an understanding of mathematical concepts, skills, and techniques that can be applied to a range of real-world problems. This includes topics such as An introductory class in the theory and techniques of differentiation and integration of algebraic and trigonometric functions. Additionally, the module aims to prepare students for future academic and professional pursuits that require mathematical proficiency.
Module Learning Outcomes	On successful completion of this module, students will be able to: 1. Find the domain and range of a function and graphs. 2. Evaluate limits, and determine continuity and differentiability of functions. 3. Apply rules of calculus to solve engineering problems including differential equations. 4. Differential calculus, these concepts are used to analyze rates of change, optimization problems, and the behavior of functions in engineering applications. 5. Integration: Table of integrals, Rules of integration, Definite integrals, Area bounded by curves, Integration by parts, Integration by substitution and using partial fractions. 6. Student should use more than one method to solve the integration. 7. Express and evaluate a double and triple integral in terms of the Cartesian. 8. Calculate area, volume, and surface area of integral. 9. Application of Integration: Centres of mass, Moments of inertia.
Indicative Contents	The Indicative Contents of a Mathematics module will depend on the level and scope of the course. However, some common topics that may be covered in a mathematics module include: 1- Arithmetic: Basic mathematical operations such as addition, subtraction, multiplication, and division. 2- Algebra: The study of mathematical symbols and the rules for manipulating these symbols to solve equations and represent real-world situations. 3- Geometry: The study of shapes, sizes, positions, and measurements of objects in space. 4- Calculus: The study of mathematical concepts such as limits, derivatives, and integrals. Overall, the Indicative Contents of a Mathematics module aims to provide students with a comprehensive understanding of mathematical concepts and their applications in various fields of study.
Learning and Teaching Strategies	
Strategies	

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

Student Workload (SWL)			
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	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	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	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**Functions:** Domain and Range, Functions and their graphs, Trigonometric Functions.
Week 2 **Week 3**	**Limits and Continuity:** Limit of a Function and Limit Laws, One-Sided Limits Continuity, Limits Involving Infinity, Asymptotes of Graphs.
Week 4 **Week 5** **Week 6**	**Derivatives**: Tangent Lines and the Derivative at a Point, The Derivative as a Function, Differentiation Rules, Derivatives of Trigonometric Functions, The Chain Rule, Implicit Differentiation, Linearization and Differentials.
Week 7 **Week 8** **Week 9**	**Applications of Derivatives:** Extreme Values of Functions, The Mean Value Theorem, Monotonic Functions and the First Derivative Test, Concavity and Curve Sketching, Applied Optimization, Antiderivatives
Week 10 **Week 11** **Week 12**	**Integrals:** The Definite Integral, The Fundamental Theorem of Calculus, Indefinite Integrals and the Substitution Method, Definite Integral Substitutions and the Area Between Curves.
Week 13 **Week 14** **Week 15**	**Applications of Definite Integrals:** Volumes using Cross-Sections, Volumes using Washer and Cylindrical Shells methods, Arc Length, Areas of Surfaces of Revolution, Work and Fluid Forces, Moments and Centers of Mass.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	George B. Thomas Jr., "CALCULUS", 14th Ed	Yes
Recommended Texts	1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Ed. 2. Schaum's Outline of College Mathematics, Fourth Edition. 3. Mary Attenborough, "Mathematics for Electrical Engineering and Computing", 1st Ed.	No
Websites	Topics in Calculus -Wolfram Mathworld.	

Grading Scheme مخطط الدرجات				
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.