Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2025

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University OF Babylon

Faculty /institute: college of engineering

Scientific Department: Department of Biomedical Engineering

Academic or professional program Name: Academic program

Final certificate Name: Bachelor's degree in Biomedical Engineering

Academic system: ABET

Description preparation Date:

File completion Date

Signature Dr. Fawaz Al-Bakri

Head of Department name:

Date 26/05/2025

Signature

scientific Associate Name

Date 28/05/2025

The file is checked by:

Department of Quality Assurance and University Performance Dr. Zainab Ali Omran

Director of Quality Assurance and University Performance Department

Date:

Signature:

Approval of the Dean

1. Program Vision

The vision of the Department of Biomedical Engineering is to create an innovative, interdisciplinary academic program that emphasizes the fundamentals of biomedical engineering; state of the art applications pertaining to biomedical instrumentation, biomechanics, biomaterials, biotechnology, biocomputing and other healthcare related areas in an environment of life-long learning and research.

2. Program Mission

The mission of the Department of Biomedical Engineering is to provide a student-centered environment that facilitates a culture of inter-disciplinary learning and innovation, while encouraging active participation in scholarly and professional activities to serve the biomedical engineering profession and society, while advancing regional economic development.

3. Program Objectives

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

4. Program Accreditation

Accreditation Board for Engineering and Technology (ABET)

5. Other external influences

There are no sponser.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	15	8.621%	-
College Requirements	7	13	7.471%	-

Department Requirements	60	146	83.908%	-
Summer Training	1	-	-	-
Other	Workshop	-	-	-

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
Third /first semester	UREQ311	English Language V	2	0
Third /first semester	MDER310	Engineering Analysis	3	0
Third /first semester	MDER311	Mechanics of Materials I	5	0
Third /first semester	MDER312	The Trunk Anatomy	2	2
Third /first semester	MDER313	Physiology I	2	2
Third /first semester	MDER314	Histology	2	0
Third /first semester	MDER315	Electronics III	2	0
Third /first semester	MDER316	Fiber Optics	2	0
Third /second semester	UREQ321	English Language VI	2	0
Third /second semester	CREQ321	Engineering Statistics	3	0
Third /second semester	MDER321	Mechanics of Materials II	3	2
Third /second semester	MDER322	Neck &Nervous Anatomy	2	2
Third /second semester	MDER323	Physiology II	2	2
Third /second semester	MDER324	Medical Equipment	3	2
Third /second semester	MDER325	Bone Injury and Fractures	2	0
Fourth /First semester	UREQ411	English Language VII	1	0
Fourth /First semester	MDER410	Biomechanics I	2	3
Fourth /First semester	MDER411	Biomaterials I	2	0
Fourth /First semester	MDER412	Communications I	2	3
Fourth /First semester	MDER413	Medical Instrumentation	2	2
Fourth /First semester	MDER414	Thermo-Fluid Mechanics I	2	2
Fourth /First semester	MDER415	Digital Electronics I	2	3

Fourth /First semester	MDER416	Pathology	2	0
Fourth /second semester	UREQ421	English Language VIII	2	0
Fourth /second semester	MDER420	Biomechanics II	3	3
Fourth /second semester	MDER421	Biomaterials II	2	0
Fourth /second semester	MDER422	Communication II	2	3
Fourth /second semester	MDER423	Analytical Mechanics	2	0
Fourth /second semester	MDER424	Therapeutic Instrumentation	3	2
Fourth /second semester	MDER425	Digital Electronics II	2	3
Fourth /second semester	MDER 426	Thermo-Fluid Mechanics II	2	2
Fifth /first semester	MDER510	Biostatics	2	0
Fifth /first semester	MDER511	Diagnostic Instrumentation	2	2
Fifth /first semester	MDER512	Control I	2	2
Fifth /first semester	MDER513	Image Processor	2	2
Fifth /first semester	MDER514	Microprocessor	2	3
Fifth /first semester	MDER515	Hospital System & Design	2	0
Fifth /first semester	MDER516	Project I	0	4
Fifth /second semester	MDER520	Elective II	3	0
Fifth /second semester	MDER522	Control II	3	3
Fifth /second semester	MDER523	Computer Network	2	0
Fifth /second semester	MDER524	Biotribology	2	0
Fifth /second semester	MDER525	Neural Networks	2	0
Fifth /second semester	MDER526	Biomedical Sensors	3	0
Fifth /second semester	MDER527	Project II	0	4

8. Expected learning outcomes of the program

Knowledge	
Learn about electronic devices and how to maintain them	Learn about the concept of biomedical engineering and study and understand prosthetic limbs.
Skills	
The skills goals special to the programme .	The student's knowledge of the concept of electronic circuit.

	The student's ability to analyze the medical device circuit and systems.
Ethics	
Teacher-student relationships: Trust, respect, and fairness should underpin every interaction. Ethical considerations guide teachers in fostering safe and supportive learning environments where students feel heard and valued.	Honesty: is a very important trait to have in Education. Honesty means being loyal, truthful, trustworthy, sincere, and fair. It is admirable in several cultures and religions.
Conflict of Interest ethic in Education is a condition in which your main responsibility to a student is negotiated by engaging priorities. Conflicts of Interest can display in a variety of contexts and for several various reasons	Responsibility: Along with all the ethics, responsibility is also one of the vital ethics in Education. The student's responsibility takes place when students take an energetic part in their studying by acknowledging they are responsible for their academic success.

9. Teaching and Learning Strategies

1- VERBAL COMMUNICATION
Student able to express his ideas clearly and confidently in speech:
- Verbal communication.
- Able to Express ideas clearly and confidence at talk.

2- TEAMWORK
Work confidently within a group:
- Teamwork

- The work in confidence within a group
3- ANALYSING & INVESTIGATING
Gather information systematically to establish facts & principles. Problem solving:
- Analysis and investigation.
- Collect information systematically and scientifically to establish facts and principles for a solution to a problem.
4- INITIATIVE/SELF MOTIVATION
Able to act on initiative, identify opportunities & proactive in putting forward ideas & solutions:
- Initiative.
- Motivation to work and the ability to take initiative, identify opportunities and develop ideas and solutions.
5- WRITTEN COMMUNICATION

10. Evaluation methods

1- Exams
2- Project discussion
3- summer training
4- Practical exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
	20	7	-	-	27	10

Professional Development

Mentoring new faculty members

Successful mentoring relationships go through four phases: preparation, negotiating, enabling growth, and closure. These sequential phases build on each other and vary in length. In each phase, there are specific steps and strategies that lead to mentoring excellence.

Professional development of faculty members

The Biomedical Engineering curriculum emphasizes the continuous integration of classical and modern engineering principles with the life sciences and health care. Biomedical Engineers apply these skills to innovation in the health care industry, basic biological sciences, and the underpinning of medical practice.
Consistent with the mission of Babylon University and the College of Engineering, the Bachelor of Science program in Biomedical Engineering aims to create world-class engineers who will, after graduation, contribute to social and economic development through the application of engineering to the solution of problems in medicine and biology.

12. Acceptance Criterion

central

13. The most important sources of information about the program

College and University website
University Guide
The most important books and resources for the department

14. Program Development Plan

The academic program is developed annually through an annual update of academic curricula and vocabulary that keeps pace with the scientific development taking place in the medical and electronic fields and that is compatible with the needs of the labor market.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4

Third Year	UREQ311	English Language V	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER310	Engineering Analysis	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER311	Mechanics of Materials I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER312	The Trunk Anatomy	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER313	Physiology I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER314	Histology	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER315	Electronics III	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER316	Fiber Optics	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	UREQ321	English Language VI	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	CREQ321	Engineering Statistics	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER321	Mechanics of Materials II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER322	Neck &Nervous Anatomy	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER323	Physiology II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER324	Medical Equipment	Basic	*	*	*	*	*	*	*	*	*	*	*	*
Forth year	UREQ411	English Language VII	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER410	Biomechanics I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER411	Biomaterials I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER412	Communications I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER413	Medical Instrumentation	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER414	Thermo-Fluid	Basic	*	*	*	*	*	*	*	*	*	*	*	*

		Mechanics I													
	MDER415	Digital Electronics I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER416	Pathology	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	UREQ421	English Language VIII	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER420	Biomechanics II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER421	Biomaterials II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER422	Communicatio n II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER423	Analytical Mechanics	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER424	Therapeutic Instrumentation	Basic	*	*	*	*	*	*	*	*	*	*	*	*
Fifth YEAR	MDER510	Biostatics	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER511	Diagnostic Instrumentation	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER512	Control I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER513	Image Processor	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER514	Microprocessor	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER515	System & Design	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER516	Project I	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER520	Elective II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER522	Control II	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER523	Computer	Basic	*	*	*	*	*	*	*	*	*	*	*	*

		Network													
	MDER524	Biotribology	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER525	Neural Networks	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER526	Biomedical Sensors	Basic	*	*	*	*	*	*	*	*	*	*	*	*
	MDER527	Project II	Basic	*	*	*	*	*	*	*	*	*	*	*	*

Course Description Form

1. Course Name:
ElectronicIII
2. Course Code:
BMER315
3. Semester / Year:
1nd semester / third year
4. Description Preparation Date:
16 /9 /2024
5. Available Attendance Forms:
In class
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs Tutorial : 1 Units :2
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Ali Shaban Hassooni Email: eng.ali.shaban@uobabylon.edu.iq
8. Course Objectives

Course Objectives	Developing skills in understanding, analyzing, and designing circuits, feedback amplifiers, oscillators, and power amplifiers and their practical applications

9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Feedback Amplifier: concept of feedback, stability & root locus, types of feedback circuit	Feedback Amplifier: concept of feedback, stability & root locus, types of feedback circuit	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	Feedback amplifier ac model, feedback amplifier analyses & Design	Feedback amplifier ac model, feedback amplifier analyses & design	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	2	Oscillators: Frequency response, Sinusoidal, Wien Bridge, oscillator and circuit	Oscillators: Frequency response, Sinusoidal, Wien Bridge, oscillator and circuit	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Phase shift oscillator, Shaping of frequency response,	Phase shift oscillator, Shaping of frequency response,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	Ramp generator, Hartly oscillator, Crystal oscillator.	Ramp generator, Hartly oscillator, Crystal oscillator.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Large signal amplifier (power amplifier), Power amplifier classification	Large signal amplifier (power amplifier), Power amplifier classification	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Class A, class B, class A-B, and class C,	Class A, class B, class A-B, and class C,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	The properties of these amplifier, Theory of classification, Transformer coupled stage	The properties of these amplifier, Theory of classification, Transformer coupled stage	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Direct coupled type, Transformer-coupled, Class B push pull, Linear amplifiers	Direct coupled type, Transformer-coupled, Class B push pull, Linear amplifiers	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Mid-term Exam + Multivibrators: MTV's using transistor	Mid-term Exam + Multivibrators: MTV's using transistor	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Multivibrators: MTV's using transistor	Multivibrators: MTV's using transistor	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	A stable MTV, Monostable MTV, Design of the circuits	A stable MTV, Monostable MTV, Design of the circuits	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	Bistable MTV, A stable MTV using op-amp,	Bistable MTV, A stable MTV using op-amp,	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
14	2	Monostable MTV using op-amp, Transmission matrix	Monostable MTV using op-amp, Transmission matrix	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Mult vibration application	Mult vibration application	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Electronic Devices and Circuit Theory 11th-ed Robert L. Boylestad Louis Nashelsky
Recommended books	INTEGRATED ELECTRONICS MILLMAN · HALKIAS.
Electronics References, Websites	https://books-world.net/electronic-devices-and-circuit-theory-11th-ed/

Course Description Form

1. Course Name:
Physiology I
2. Course Code:
MDER313
3. Semester / Year:
first semester / Third year
4. Description Preparation Date:
15, 9, 2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs practice:2 Units : 3
7. Course administrator's name (mention all, if more than one name)
Name: Ashwaq Mokhief Salmman e-mail m.ash_aljbouri@yahoo.comEmail:
8. Course Objectives

Course Objectives	1. To understand the composition and functions of different body fluids, including blood, plasma, interstitial fluid, and intracellular fluid. 2. To identify and describe the various fluid compartments in the body, including the intracellular and extracellular compartments, and understand how fluid distribution is regulated. 3. To comprehend the mechanisms involved in maintaining water balance in the body, including water absorption, reabsorption, and excretion, as well as the role of hormones such as antidiuretic hormone (ADH). 4. To gain knowledge of electrolyte balance and its importance for various physiological processes, including the regulation of ions such as sodium, potassium, calcium, and chloride, and the mechanisms involved in maintaining electrolyte homeostasis. 5. To acquire a comprehensive understanding of red blood cells (RBCs), including their structure, function, production through erythropoiesis, and an understanding of conditions such as anemia and polycythemia. 6. To explore the role of white blood cells (WBCs) in the immune response, including the different types of WBCs, their functions, and their significance in defending against pathogens and diseases. 7. To develop knowledge of immunology, including the immune system's innate and adaptive responses, the role of immunoglobulins (antibodies) in specific defense mechanisms, and an understanding of different types of immunoglobulins (IgG, IgA, IgM, IgE, IgD). 8. To understand the structure and function of platelets, their role in blood clotting

	(hemostasis), and an awareness of disorders related to platelet function.

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and seminars.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Body fluids	Body fluids	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	fluid compartment	fluid compartment	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	water balance	water balance	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	electrolyte balance	electrolyte balance	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	RBC	RBC	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	hemoglobin, erthropoiesis	hemoglobin, erthropoiesis	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Mid-term Exam + anemia, polycythemia	Mid-term Exam + anemia, polycythemia	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	WBC	WBC	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
9	2	Immunity	Immunity	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	type of immunoglobulins	type of immunoglobulins	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	homeostasis	homeostasis	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	platelets	platelets	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	external and internal pathways of coagulation	external and internal pathways of coagulation	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	blood groups (ABO system) and transfusion reaction	blood groups (ABO system) and transfusion reaction	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Hypersensitivity	Hypersensitivity	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, practice 10%, and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	.D. U. Silverthon (2010) Human physiology. 5 Edition -1
Recommended books	

Course Description Form

1. Course Name:
Engineering Analysis
2. Course Code:
MDER310
3. First Semester / Year:
First/Third
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
IN CLASS
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory :2 hrs tutorial : 1hrs units:2
7. Course administrator's name (mention all, if more than one name)
Name: dr alaa Imran al-muttairi E mail : al_al_44@uobabylon.edu.iq
8. Course Objectives

Course Objectives	1. To develop a deep understanding of Fourier series, Fourier transform, and Laplace transform, and their significance in engineering analysis. 2. To explore the concepts of periodic functions and their representation through Fourier series, enabling the analysis of periodic phenomena in engineering systems. 3. To investigate the properties and applications of Fourier series, including the determination of coefficients, identification of odd and even functions, and half-range expansion techniques. 4. To explore the properties and applications of the Fourier transform, including signal processing, spectral analysis, and filtering techniques in engineering applications. 5. To investigate the convolution and multiplication properties of functions in the Fourier domain, facilitating the understanding of signal processing operations and system behavior. 6. To introduce the Laplace transform and its applications in solving linear differential equations, providing a powerful mathematical tool for system analysis and control. To understand the properties and applications of the Laplace

	transform, including frequency-domain representation of engineering systems. To understand the inverse Laplace transform and its application in obtaining time-domain solutions from Laplace-domain representations, enabling the analysis and synthesis of engineering systems.

9. Teaching and Learning Strategies

Strategy	The material is presented theoretically, followed by assigning students homework. Practical networking demonstrations are integrated into the lectures using Packet Tracer software. Additionally, students are tasked with conducting seminars on certain subjects and presenting them to their peers.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand fundamental mathematical techniques used in engineering analysis. Gain proficiency in applying mathematical methods to solve engineering problems.	Introduction to engineering analysis ,Natural Signals, and Periodic Signals.	Classroom	Quiz and oral questions
2	3	Differentiate between natural (non-periodic) signals and periodic signals. Identify common examples of each type of signal in engineering applications.	Fourier series , Dirichlet Conditions and Trigonometric Fourier series form	Classroom	Quiz and oral questions
3	3	Understand the concept of representing periodic functions using Fourier series. Learn how to express periodic signals using trigonometric or exponential Fourier series forms.	Symmetry Conditions.	Classroom	Quiz and oral questions
4	3	Recognize the conditions under which a function can be accurately represented using a Fourier series. Apply Dirichlet conditions and symmetry conditions to determine the suitability of a function for Fourier series representation.	Exponential Fourier series form and Parssival's theorem for periodic function power.	Classroom	Quiz and oral questions

5	3	Apply Fourier series techniques to analyze electrical circuits. Understand how periodic signals are used to model and analyze circuit behavior.	Fourier Series applications in circuit analysis .	Classroom	Quiz and oral questions
6	3	Understand the concept of transforming signals from the time domain to the frequency domain. Learn how to use the Fourier transform to analyze non-periodic signals.	Fourier transform definition .	Classroom	Quiz and oral questions
7	3	Gain familiarity with key properties of the Fourier transform, such as linearity, time shifting, frequency shifting, and scaling. Apply these properties to simplify signal analysis and manipulation.	Properties of Fourier transform.	Classroom	Quiz and oral questions
8	3	Understand how convolution in the time domain corresponds to multiplication in the frequency domain.	Convolution property and inverse Fourier transform .	Classroom	Quiz and oral questions
9	3	Understand how frequency-domain analysis can provide insights into circuit performance and response.	Fourier transform on electrical circuits applications.	Classroom	Quiz and oral questions
10	3	Understand the definition of the Laplace transform.	Laplace transform definition, Laplace transform of special functions	Classroom	Quiz and oral questions
11	3		Midterm Exam		
12	3	Explore the properties of the Laplace transform.	Properties of Laplace Transform.	Classroom	Quiz and oral questions

13	3	Master the techniques for finding the inverse Laplace transform.	Inverse Laplace transform.	Classroom	Quiz and oral questions
14	3	Apply Laplace transform methods to analyze circuits.	Laplace transform applications to circuits	Classroom	Quiz and oral questions
15	3	Apply Laplace transform methods to analyze circuits.	Laplace transform applications to circuits		

11. Course Evaluation

D h as daily pr Mid Exam = 30% , attendance and quizzes = 10%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of electric circuits, Alexander, Charles K , 6th edition , McGraw-Hill, 2013.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
HISTOLOGY
2. Course Code:
MDER314
3. Semester / Year:
first semester / Third year
4. Description Preparation Date:
15, 9, 2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs practice:2 hrs Units : 3
7. Course administrator's name (mention all, if more than one name)
Name: Asma Mekkey e-mail Med.asmaa.mohm@uobabylon.edu.iq
8. Course Objectives

Course Objectives	**• Acquire a basic background in histology and to understand the properties of cells and their interactions with one another as components of tissues and organs.** **•To understand how structure and function correlate at the microscopic level.** **•To be able to describe the normal structure and function of various cell types, tissues, and organs, and to differentiate their histological structures from each other through examination.** **•To acquire basic background on tissues to be able to know the pathological tissue in the next stage.** **•To describe the tissues in different organs of human.**

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and seminars.

10. Course Structure

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

1	2	Lectures presentations	and solving exercises **Tissue preparation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
2	2	Lectures presentations	and solving exercises **Light microscope**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
3	2	Lectures presentations	and solving exercises **Extracellular matrix**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
4	2	Lectures presentations	and solving exercises **Epithelial tissue**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
5	2	Lectures presentations	and solving exercises **Classification of epithelial tissue**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
6	2	Lectures presentations	and solving exercises **Polarity and Cell-Surface Specializations**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
7	2	Lectures presentations	and solving exercises **Glands**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	

8	2	Lectures presentations	and solving exercises **Exocrine and endocrine gland**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
9	2	Lectures presentations	and solving exercises **Mid-term exam +classification of glands**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
10	2	Lectures presentations	and solving exercises **Connective tissue**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
11	2	Lectures presentations	and solving exercises **Classification of connective tissue**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
12	2	Lectures presentations	and solving exercises **The cartilage**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
13	2	Lectures presentations	and solving exercises **The bone**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	
14	2	Lectures presentations	and solving exercises **The muscle**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes	

15	2	Lectures presentations and solving exercises **The nervous system**		Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, practice 10%, and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	**Junqueirs – Basic histology text book 13th addition Anthony L.MESCHER**
Recommended books	**Text book of histology 4th addition**

Course Description Form

1. Course Name:

Mechanics of Materials I

2. Course Code:

MDER311

3. Semester / Year:

1st semester / Third Year

4. Description Preparation Date:

15, 9, 2024

5. Available Attendance Forms:

In class

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

Theory :2 Hrs Tutorial : 1 Units : 2

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

Name: Prof. Dr. Ahmed Namah Hadi
Email: ahmed.hadi.eng@uobabylon.edu.iq

8. Course Objectives

Course Objectives	To analyses forces, deflection, torsion, bending , pure bending , moment with shear diagram for different materials

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to mechanics of Materials	Introduction to mechanics of Materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	3	External Forces with Strain	External Forces with Strain	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	3	Internal Forces with Stain	Internal Forces with Stain	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	3	Thermal Stress	Thermal Stress		
5	3	Deflection with Poisson Ration.	Deflection with Poisson Ration .	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	3	Torsion according mechanics of materials	Torsion according mechanics of materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	3	Angle of Twist in Shaft	Angle of Twist in Shaft	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	3	Statically indeterminate Torque loaded	Statically indeterminate Torque loaded	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	3	Pure Bending	Pure Bending		
10	3	Pure Bending with Composite Materials	Pure Bending with Composite Materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	3	Analysis and Design of Beam with Bending.	Analysis and Design of Beam with Bending for simple shaft	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	3	Analysis and Design of Beam with Bending.	Analysis and Design of Beam with Bending.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	3	Shear and Bending Moment Diagram	Shear and Bending Moment Diagram	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	3	Transverse Stress	Transverse Stress	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
15	3	Buckling and Columns	Buckling and Columns	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, experimental practice 10% and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Ferdinand P. Beer et.al., Mechanics of Materials, Textbook Sixth Edition, 2012.
Recommended books	R. C. HIBBELER ,Mechanics of Materials, Textbook, 2008.
Electronics References, Websites	R. C. HIBBELER ,Mechanics of Materials, Textbook, 2008.

Course Description Form

1. Course Name:
The Trunk Anatomy
2. Course Code:
MDER312
3. Semester / Year:
first semester / Third year
4. Description Preparation Date:
15, 9, 2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs practice : 2hrs units: 3
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Haithem e-mail
8. Course Objectives

Course Objectives	1. To understand the organization and functional anatomy of the thoracic cage, including the role of the diaphragm in respiration. 2. To gain knowledge of the heart's anatomy, the conductive system, and the major blood vessels involved in systemic and pulmonary circulation. 3. To explore the anatomy and functions of the lungs, pleura, and their role in respiration. 4. To study the topography of the anterior abdominal wall, including its layers, nerve supply, and fascia. 5. To gain an overview of the general topography of the abdomen, including the peritoneum, major abdominal organs, and their arterial supply and venous drainage.

9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and seminars.

10. Course Structure					
	Hours	**Required Learning**			**Evaluation**

Week		Outcomes	Unit or subject name	Learning method	method
1	2	Theory and practice	Thoracic Cage Organization and Functional Anatomy of Respiration – part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	Theory and practice	Thoracic Cage Organization and Functional Anatomy of Respiration – part 2	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	Theory and practice	The Heart and Conductive System – part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Theory and practice	The Heart and Conductive System –part 2	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	Theory and practice	Aorta, Pulmonary Trunk, and Major Veins	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Theory and practice	The Mediastinum and Autonomic Nervous System in the Thorax	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Theory and practice	Pleura and Lungs – part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Theory and practice	Pleura and Lungs – part 2	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Theory and practice	Pleura and Lungs	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Theory and practice	Radiographic and Sectional Anatomy of the Thorax – part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11	2	Theory and practice	Radiographic and Sectional Anatomy of the Thorax – part 2	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	Theory and practice	Topography of the Anterior Abdominal Wall – part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	Theory and practice	Topography of the Anterior Abdominal Wall – part 2	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	Theory and practice	Muscles of the Antero-lateral Abdominal Wall and Inguinal Region	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Theory and practice	General Topography of the Abdomen, Peritoneum, and Alimentary Tract	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, practice 10%, and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	
Recommended books	

Course Description Form

1. Course Name:
Neck & Nervous Anatomy
2. Course Code:
MDER322
3. Semester / Year:
2nd semester / Third year
4. Description Preparation Date:
15, 9, 2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs App: 2 Hrs Units : 3
7. Course administrator's name (mention all, if more than one name)
Name dr. haitham Email:
8. Course Objectives

Course Objectives	1. To understand the anatomy and organization of the nervous system: Gain knowledge about the structure and function of nervous tissue, the organization of the central and peripheral nervous systems, and the roles of cranial and spinal nerves. 2. To explore the gross anatomy of the brain: Learn about the cerebral hemispheres, including the different lobes and their functions, as well as the composition and significance of gray and white matter within the hemispheres. 3. To study functional localization and key structures in the brain: Explore the concept of functional localization within the cerebrum, including the basal ganglia, limbic system, and diencephalon. Understand their roles in motor control, emotions, learning, and sensory processing. 4. To gain knowledge about the central nervous system and its support

	structures: Study the ventricular system and cerebrospinal fluid (CSF), which play essential roles in protecting and nourishing the brain. Learn about the brainstem, cerebellum, and spinal cord, and their functions in vital processes such as respiration, coordination, and sensory transmission. 5. To understand the anatomical features of the head and neck: Explore the anatomy of the skull, scalp, face, oral cavity, nasal cavity, and neck, including the nerves, blood vessels, and muscles associated with these regions. Gain knowledge about the lymphatic drainage, investigations, and blood supply of the CNS.

9. Teaching and Learning Strategies

Strategy	• Lectures: Conducting interactive lectures to introduce and explain the theoretical concepts and principles related to Fourier series, Fourier transform, Laplace transform, and their applications. The lectures should include visual aids, examples, and demonstrations to enhance understanding and engagement. • Problem-solving sessions: Organize regular problem-solving sessions where students can practice applying the concepts learned in lectures to solve engineering analysis problems. Provide guided exercises and real-world examples to reinforce their understanding and develop problem-solving skills. • Multimedia resources: Provide access to multimedia resources such as video tutorials, online simulations, and interactive animations that complement the lectures and allow students to explore concepts at their own pace. These resources can help reinforce learning and provide alternative explanations for complex topics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the organization and structure of the nervous system, including cranial and spinal nerves.	Introduction: Nervous tissue and organization of the nervous system	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	Understand the organization and structure of the nervous system, including cranial and spinal nerves.	Cranial nerves and spinal nerves	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

3	2	Describe the gross anatomy and functional localization of key structures in the cerebral hemisphere and brain.	Gross anatomy of the cerebral hemisphere and Gray and white matter of the hemisphere	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Explain the roles of basal ganglia, limbic system, diencephalon, brainstem, cerebellum, and spinal cord in motor control, emotions, coordination, and sensory processing.	Functional localization in the cerebrum, Basal ganglia , and Limbic system	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	study the ventricular system and cerebrospinal fluid (CSF), gaining insight into their roles in protecting and nourishing the brain	Diencephalon and CSF and ventricular system	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	explore the brainstem and cerebellum, understanding their contributions to vital processes such as coordination, motor control, and sensory transmission	Brain stem and Cerebellum	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	examine the structure and functions of the spinal cord and peripheral nerves, including their roles in transmitting signals throughout the body.	Spinal cord	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Meninges and dural venous sinuses	Meninges and dural venous sinuses	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	introduce investigations of the central nervous system (CNS), discussing	Blood supply of the CNS and Investigations of the CNS	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

		various imaging techniques and their clinical applications			
10	2	The skull, The scalp and facial muscles and Nerves and vessels of the face	The skull, The scalp and facial muscles and Nerves and vessels of the face	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	The bony orbit and extraocular muscles, and Nerves and vessels of the orbit	The bony orbit and extraocular muscles, and Nerves and vessels of the orbit	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	The nasal cavity and The paranasal sinuses	The nasal cavity and The paranasal sinuses	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	The oral cavity and teeth and Hard and soft palate	The oral cavity and teeth and Hard and soft palate	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	The tongue, Salivary glands , and Muscles of mastication and the temporomandibular joint	The tongue, Salivary glands , and Muscles of mastication and the temporomandibular joint	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	The pharynx ,The larynx , The ear ,Cranial fossae , Cranial nerves , and Fascia of the neck	The pharynx ,The larynx , The ear ,Cranial fossae , Cranial nerves , and Fascia of the neck	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	
Recommended books	
Electronics References, Websites	

Course Description Form

1. Course Name:
Medical Equipment
2. Course Code:
MDER324
3. Semester / Year:
Second semester/ Third year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
5 / 3
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Amir F. Al-Bakri Email: amir.albakri@uobabylon.edu.iq
8. Course Objectives

Course Objectives	- This program aims to enrich your problem-solving skills to address the upcoming challenges within the application of medical physics in the field of Biomedical Engineering. - The module will enable you to understand the principles of physics underpinning the generation of medical images widely used by allied health professionals and medical consultants within the health care sector. - Undertaking this module at level 3 will enable you to become proficient in further applying these fundamental concepts in processing and enhancing medical images using digital and computer algorithms to be delivered as part of a module on medical image processing at level 5. This module has been carefully designed and developed to allow you to enhance your sound knowledge in medical physics, its principle and applications and thereby prepare yourself for a technical, research or development role within medical physics or imaging systems.

9. Teaching and Learning Strategies

Strategy	In this module you will be attending lectures and seminars. You will also participate in classroom and small group discussions. Each of these activities is supported by pre and post-session, directed self-study such as quizzes or assignments. This module develops your understanding of medical imaging (x-ray system, CT scanner, and MRI system) in biomedical engineering and will use examples of how physics is applied to image formation in a variety of modalities.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
16	Th. 2 Prac. 2 Tut. 1	Theoretical and Practical experiences	X-ray, CT scan, and MRI systems	Theory and practice	Test, Laboratory, Quizzes and final exam

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Introduction to Biomedical Imaging, Andrew Webb
References	HANDBOOK OF BIOMEDICAL INSTRUMENTATION by R S Khandpur

Course Description Form

1. Course Name:
Bone injury and fractures
2. Course Code:
MDER325
3. Semester / Year:
2nd semester / Third year
4. Description Preparation Date:
15, 9, 2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs Units :2
7. Course administrator's name (mention all, if more than one name)
Name: Ashwaq Mokhief Salmman e-mail m.ash_aljbouri@yahoo.comEmail:
8. Course Objectives

Course Objectives	1. To understand the histology of bone and its cellular composition, including osteoblasts, osteocytes, and osteoclasts. 2. To comprehend the functions of bone, such as providing structural support, protecting organs, aiding in movement, and participating in hematopoiesis. 3. To examine the synovium and its role in producing synovial fluid, lubricating joints, and contributing to the immune response within joints. 4. To explore bone remodeling, the continuous process of resorption and formation of bone tissue, regulated by hormones, mechanical forces, and cellular interactions. 5. To differentiate between bone deposition, the formation of new bone tissue by osteoblasts, and bone resorption, the breakdown and removal of existing bone tissue by osteoclasts. 6. To study metabolic bone diseases, including osteoporosis, osteomalacia, rickets, Paget's disease, and hyperparathyroidism, and their respective characteristics and implications.

9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and seminars.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The bone (histology), the function of bone.	The bone (histology), the function of bone.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	the synovium.	the synovium.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	bone remodeling	bone remodeling	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	bone deposition, bone resorption	bone deposition, bone resorption	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	. Metabolic bone diseases; osteoporosis, osteomalacia and rickets, pagets disease, hyperparathyroidism	. Metabolic bone diseases; osteoporosis, osteomalacia and rickets, pagets disease, hyperparathyroidism	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Bone fracture types, bone fracture physiology, pathology	Bone fracture types, bone fracture physiology, pathology	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Healing and repair, factors delayed healing and complications,	Healing and repair, factors delayed healing and complications,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	pathological fractures, x ray function.	pathological fractures, x ray function.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	fibrous dysplasia, avascular bone necrosis, subperiosteal haematoma,	fibrous dysplasia, avascular bone necrosis, subperiosteal haematoma,	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
10	2	. Mid-term Exam + infection of bone; pathological, reactive and reparative processes, complications acute osteomylitis	. Mid-term Exam + infection of bone; pathological, reactive and reparative processes, complications acute osteomylitis	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	tuberculosis of bone and joints, disease of the joints; osteoarthritis,	tuberculosis of bone and joints, disease of the joints; osteoarthritis,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	immunopathological joint disease; rheumatoid arthritis, systemic lupus erythematosus or	immunopathological joint disease; rheumatoid arthritis, systemic lupus erythematosus or	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	systemic sclerosis,	systemic sclerosis,,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	rheumatic fever, Gout & Gouty arthritis, pseudogout, turner's syndrome,	rheumatic fever, Gout & Gouty arthritis, pseudogout, turner's syndrome,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	intervertebral disc diseases	intervertebral disc diseases	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Handbook of fractures/Kenneth A. Egol, Kenneth J. Koval, Joseph D. Zuckerman.— 4th ed. 2010 -1 2- Pathology of Bone and Joint Disorders With Clinical and Radiographic Correlation By Edward F. McCarthy, Frank J. Frassica · 2015
Recommended books	

Course Description Form

1. Course Name: Third stage –

English Language

2. Course Code:

UREQ321

3. Semester

Second semester / third

4. Description Preparation Date

19-1-2025

5. Available Attendance Forms: Theory

6. Number of Credit Hours (Total) / Number of Units (Total): 1 Hrs, unit:1

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

Name: Abeer Abd Al-Hameed Mahmood

Email: Eng.abeer.abd@uobabylon.edu.iq

8. Course Objectives

Course Objectives	
	Developing Language Skills: • Improve overall proficiency in English, focusing on listening, speaking, reading, and writing skills. • Enhance vocabulary knowledge and understanding of grammar rules and structures. **Communication Skills:** • Build the ability to communicate effectively in various everyday situations, such as social interactions, travel, work, and study. • Practice using functional language for expressing opinions, making suggestions, giving advice, etc. **Cultural Awareness:** • Introduce students to different cultures and customs through authentic texts, dialogues, and activities.

- Develop an understanding of cultura
- l nuances in language use and communication.

	Grammar and Vocabulary: • Reinforce and expand on essential grammar points and language patterns. • Increase vocabulary range and usage through thematic units and contexts. **Listening and Speaking:** • Improve listening skills through a variety of audio materials, including dialogues, interviews, and recordings of native speakers. • Enhance speaking abilities by providing opportunities for role-plays, discussions, debates, and presentations. **Reading and Writing:** • Develop reading comprehension skills with engaging texts, articles, and stories that reflect real-world contexts. • Practice different types of writing, such as emails, letters, reports, and essays, to enhance writing skills. **Exam Preparation (if applicable):** • Provide practice tasks and exercises that prepare students for English proficiency exams, such as Cambridge English: First (FCE) or similar exams. **Language Functions and Situations:** • Cover a range of language functions and situations, including expressing likes and dislikes, describing experiences, talking about future plans, etc. • Offer language practice in contexts relevant to students' daily lives and future needs. **Critical Thinking and Problem-Solving:** • Encourage students to think critically and analyze language use in different contexts. • Develop problem-solving skills through language tasks that require creative thinking and application of learned concepts. **Self-Study and Autonomy:** • Promote self-study habits by providing supplementary materials, exercises, and online resources. • Encourage learners to take ownership of their learning process and set language learning goals.

9. Teaching and Learning Strategies	
Strategy	The teaching and learning strategies in the "New Headway Intermediate" series aim to create an engaging and effective learning experience for students, enabling them to develop their language skills in a communicative and interactive way.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Unit 4 – Doing the right things Modal verbs (1)	Theory	
2	2		Unit 4 – Doing the right things Modal verbs (1)	Theory	
3	2		Unit 4 – Doing the right things Requests and offers	Theory	
4	2		Unit 5 – On the move Future forms	Theory	
5	2		Unit 5 – On the move Future forms	Theory	

6	2		Unit 5 – On the move Travelling around	Theory	
7	2		Mid – exam	Theory	
8	2		Unit 6 – Likes and dislikes Like	Theory	
9	2		Unit 6 – Likes and dislikes Verb + -ing or infinitive?	Theory	
10	2		Unit 6 – Likes and dislikes Verb + -ing or infinitive?	Theory	
11	2		Unit 6 – Likes and dislikes Sign and soundbites	Theory	
12	2		Review	Theory	

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	

Course Description Form

1. Course Name:
Mechanics of Materials II
2. Course Code:
MDER321
3. Semester / Year:
2st semester / Third Year
4. Description Preparation Date:
19, 1, 2025
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2Hrs APP:2 Tutorial: 1 Units:3
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ahmed Namah Hadi Email: ahmed.hadi.eng@uobabylon.edu.iq
8. Course Objectives

Course Objectives	To analyses forces, deflection, torsion, bending , pure bending , moment with shear diagram for different materials .....
9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to mechanics of Materials	Introduction to mechanics of Materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	3	External Forces with Strain	External Forces with Strain	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	3	Internal Forces with Stain	Internal Forces with Stain	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	3	Thermal Stress	Thermal Stress		
5	3	Deflection with Poisson Ration.	Deflection with Poisson Ration .	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	3	Torsion according mechanics of materials	Torsion according mechanics of materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	3	Angle of Twist in Shaft	Angle of Twist in Shaft	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	3	Statically indeterminate Torque loaded	Statically indeterminate Torque loaded	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	3	Pure Bending	Pure Bending		
10	3	Pure Bending with Composite Materials	Pure Bending with Composite Materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	3	Analysis and Design of Beam with Bending.	Analysis and Design of Beam with Bending for simple shaft	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	3	Analysis and Design of Beam with Bending.	Analysis and Design of Beam with Bending.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	3	Shear and Bending Moment Diagram	Shear and Bending Moment Diagram	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	3	Transverse Stress	Transverse Stress	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
15	3	Buckling and Columns	Buckling and Columns	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, experimental practice 10% and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Ferdinand P. Beer et.al., Mechanics of Materials, Textbook Sixth Edition, 2012.
Recommended books	R. C. HIBBELER ,Mechanics of Materials, Textbook, 2008.
Electronics References, Websites	R. C. HIBBELER ,Mechanics of Materials, Textbook, 2008.

Course Description Form

1. Course Name:
Physiology II
2. Course Code:
MDER323
3. Semester / Year:
2nd semester / Third year
4. Description Preparation Date:
19, 1, 2025
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs App: 2 Hrs Units : 3
7. Course administrator's name (mention all, if more than one name)
Name: dr. anwar abedalhameed Email:
8. Course Objectives

Course Objectives	1. Enable the student to describe and understand the functions of the cells, tissues and organs of the human body. 2. Describe and understand the functional mechanisms that control the functions of the human body systems. 3. Identify the interrelationships and compatibility between body systems in order to maintain a healthy state.

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction Cardiovascular system	Introduction Cardiovascular system	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
2	2	Action potential, functional design of cardiovascular system	Action potential, functional design of cardiovascular system	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	Electrophysiology of the heart ECG, cardiac cycle, cardiac output	Electrophysiology of the heart ECG, cardiac cycle, cardiac output	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Blood pressure, muscle and nerve, excitable tissue	Blood pressure, muscle and nerve, excitable tissue	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	Nervous tissue, types of nerves, excitation of the muscle	Nervous tissue, types of nerves, excitation of the muscle	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Theories of contraction, muscle contraction changes, fatigue	Theories of contraction, muscle contraction changes, fatigue	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	**Mid-term Exam** +Smooth muscle, cardiac muscle, neuromuscular transmission	**Mid-term Exam** +Smooth muscle, cardiac muscle, neuromuscular transmission	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Autonomic nervous system, anatomical consideration and autonomic reflex arch	Autonomic nervous system, anatomical consideration and autonomic reflex arch	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Sympathetic and parasympathetic nervous system	Sympathetic and parasympathetic nervous system	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Higher autonomic centers and neurotransmitters in autonomic nervous system	Higher autonomic centers and neurotransmitters in autonomic nervous system	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Micturition, Introduction to special senses	Micturition, Introduction to special senses	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	Hearing, vestibular apparatus, vision and the eye muscle contractility	Hearing, vestibular apparatus, vision and the eye muscle contractility	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
13	2	Electroencephalography, biophysics of circulation	Electroencephalography, biophysics of circulation	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	Renal physiology	Renal physiology	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Respiratory physiology	Respiratory physiology	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Silverthorn, D. U. (2015). *Human physiology*. Jones & Bartlett Publishers.
Recommended books	Pocock, G., Richards, C. D., & Richards, D. A. (2013). Human physiology. Oxford university press.
Electronics References, Websites	

Course Description Form

1. Course Name:
Engineering Statistics
2. Course Code:
CREQ321
3. Semester / Year:
2nd semester / Third year
4. Description Preparation Date:
19, 1, 2025
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2Hrs tutorial:1Hrs Units : 2
7. Course administrator's name (mention all, if more than one name)
Name: dr. mohammed jabar Email:
8. Course Objectives

Course Objectives	1. Engineers need to collect, organize, analyze, and Interpret data in simple flowcharts in order to make decisions. 2. Statistics helps in identifying scientific and engineering problems using statistical models for problem-solving to helping make decisions based on probability. 3. Identifying system random selection operations in experiments and analyzing the primary data for hypothesis testing is determined. 4. Engineering statistics are used in the quality control and efficiency of processes and systems. 5. Study the probabilities and simulation of the systems before applying them.

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the basic concepts and terminology of engineering statistics, including the various kinds of variables, measurement, and measurement scales.	Introduction - provide an overview of the basic statistical concepts	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	understand how data can be appropriately organized and displayed.	present a set of basic procedures and statistical measures for describing data	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	Definitions and fundamentals- basic definition, population, sample, random sample, frequency distributions and histogram and polygon, relative and cumulative frequencies.	Definitions and fundamentals- basic definition, population, sample, random sample, frequency distributions and histogram and polygon, relative and cumulative frequencies.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Measure of central location and measure of variation and dispersion.	Measure of central location and measure of variation and dispersion.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	Probability theory: Relative frequency Venn diagram, intersection, union, conditional probability, mutually exclusive events, permutations and combinations, applications	Probability theory: Relative frequency Venn diagram, intersection, union, conditional probability, mutually exclusive events, permutations and combinations, applications	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Probability Distributions: Discrete distribution; binomial distribution and Poisson distribution	Probability Distributions: Discrete distribution; binomial distribution and Poisson distribution	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	**Mid-term Exam + Mean and Variance of Discrete Probability Distributions**	**Mid-term Exam + Mean and Variance of Discrete Probability Distributions**	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
8	2	Probability Distributions: continuous distribution; normal distribution, t-distribution, applications	Probability Distributions: continuous distribution; normal distribution, t-distribution, applications	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Sampling theory: sampling distributions, and sampling distribution of means, applications.	Sampling theory: sampling distributions, and sampling distribution of means, applications.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Sampling theory: distribution of the sample proportion	Sampling theory: distribution of the sample proportion	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Estimation of Population's Mean (Large Samples)	Estimation of Population's Mean (Large Samples)	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	Confidence Intervals for the Mean (Small Samples)	Confidence Intervals for the Mean (Small Samples)	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	Correlation Coefficient, Regression, Simple Linear Regression, Coefficient of Determination	Correlation Coefficient, Regression, Simple Linear Regression, Coefficient of Determination	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	Hypothesis testing: a single population mean	Hypothesis testing: a single population mean	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Hypothesis testing: a single population proportion	Hypothesis testing: a single population proportion	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Applied statistics and probability for engineers, 3rd ed. Montgomery,DC and Runger, GC.
Recommended books	Probability and statistics for engineers, 2008, India ed. Devore, JL.

Electronics References, Websites	https://online.stanford.edu/courses/stats110-statistical-methods-engineering-and-physical-sciences

Course Description Form

1. Course Name:
Biomaterials I
2. Course Code:
MDER411
3. Semester / Year:
First semester/ Fourth year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
2 / 2
7. Course administrator's name (mention all, if more than one name)
Name: Sura Baha Email:eng.sura.baha@ uobabylon.edu.iq
8. Course Objectives

Course Objectives	1. To understand of Biomaterials. 2. This course deals with the History of Biomaterials. 3. This is the basic subject Fields of Knowledge to Develop Biomaterials. 4. To understand Selection of Biomedical Materials. To perform Properties of Biomaterials. .....

9. Teaching and Learning Strategies	
Strategy	In this module you will be attending lectures and seminars. You will also participate in classroom and small group discussions. Each of these activities is supported by pre and post-session, directed self-study such as quizzes or assignments. This module develops your understanding biomaterial in biomedical fields .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	Th. 2	Theoretical and Practical experiences	Introduction to Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam

2	Th. 2	Theoretical and Practical experiences	Biocompatibility and Biological Interactions	Theory and practice	Test, Laboratory, Quizzes and final exam
3	Th. 2	Theoretical and Practical experiences	Physical and Chemical Characterization	Theory and practice	Test, Laboratory, Quizzes and final exam
4	Th. 2	Theoretical and Practical experiences	Mechanical Characterization, Biological Tests of Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
5	Th. 2	Theoretical and Practical experiences	Metals and Alloys Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
6	Th. 2	Theoretical and Practical experiences	Ceramic Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
7	Th. 2	Theoretical and Practical experiences	Polymer and Composites Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
8	Th. 2	Theoretical and Practical experiences	Orthopedics and Dental Applications of Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam

9	Th. 2	Theoretical and Practical experiences	Mid. Exam + Neural Application of Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
10	Th. 2	Theoretical and Practical experiences	Biomaterials in Drug Delivery System	Theory and practice	Test, Laboratory, Quizzes and final exam
11	Th. 2	Theoretical and Practical experiences	Biomaterials in Tissue Engineering	Theory and practice	Test, Laboratory, Quizzes and final exam
12	Th. 2	Theoretical and Practical experiences	Hydrogels and Injectable Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
13	Th. 2	Theoretical and Practical experiences	Ethics and Regularity Consideration	Theory and practice	Test, Laboratory, Quizzes and final exam
14	Th. 2	Theoretical and Practical experiences	Emerging Trends in Biomaterial for Biomedical Engineering	Theory and practice	Test, Laboratory, Quizzes and final exam
15	Th. 2	Theoretical and Practical experiences	Smart Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam

16	Th. 2	Theoretical and Practical experiences	**Preparatory week before the final Exam**	Theory and practice	Test, Laboratory, Quizzes and final exam

11. Course Evaluation
Exam ,quiz ,report ,final exam

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	

Textbook	https://www.coursera.org/browse/physical-science-and-engineering
References	

Course Description Form

1. Course Name:
Biomechanics I
2. Course Code:
MDER410
3. Semester / Year:
1st / Fourth Year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs App:3 Tutorial : 1Units : 3
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ahmed Namah Hadi Email: ahmed.hadi.eng@uobabylon.edu.iq
8. Course Objectives

Course Objectives	To analyses biomechanics different forces for human body with improvement the motion of human body according biomechanics analyses

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Biomechanics with known the definision of biomechanics and advantage	Introduction to Biomechanics with known the definision of biomechanics and advantage .	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	3	Biomechanic for muscles and types of mucles for human body with all Types	Biomechanic for muscles and types of mucles for human body for upper extermity	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	3	Biomechanic for muscles and types of mucles for human body	Biomechanic for muscles and types of mucles for human body for lower extermity	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	3	Biomechanics for bones of human body.	Biomechanics for bones of human body.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	3	Biomechanics for bones of human body	Biomechanics for bones of human body with joint types and motion.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	3	Biomechanics for upper extremity	Biomechanics for upper extremity, motion analysis	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	3	Biomechanics for upper extremity	Biomechanics for upper extremity with injury according biomechanics for joints	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	3	Biomechanics for upper extremity	Biomechanics for upper extremity – different problems according biomechanics		
9	3	Biomechanics for lower extremity.	Biomechanics for upper extremity.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	3	Biomechanics for lower extremity.	Biomechanics for upper extremity, joint analyses according biomechanics with injury	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	3	Biomechanics for lower extremity.	Biomechanics for lower extremity – different problems according biomechanics	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	3	Biomechanics for foot	Biomechanics for foot	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	3	Biomechanics for foot motion	Biomechanics for foot motion with analyses motion	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
14	3	Biomechanics for spine human body	Biomechanics for spine human body	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	3	Biomechanics for spine human body	Biomechanics for spine human body , different problems according biomechanics analyses	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, experimental practice 10% and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Susan.J.hall et.al., Basic Biomechanics, Textbook, 2015.
Recommended books	Susan.J.hall et.al., Basic Biomechanics, Textbook, 2015.
Electronics References, Websites	Taylor and Francis, Biomechanics of Human Motion, Textbook ,2018.

Course Description Form

1. Course Name:	
Medical Instrumentation	
2. Course Code:	
MDER413	
3. Semester / Year:	
First semester/ Fourth year	
4. Description Preparation Date:	
15/9/2024	
5. Available Attendance Forms: In class	
6. Number of Credit Hours (Total) / Number of Units (Total):	
5 / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: wadah falah Email: wadah.falah@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	1- This program aims to enrich your problem-solving skills to address the upcoming challenges within the application of medical physics in the field of Biomedical Engineering. 2- The module will enable you to understand the principles of physics underpinning the generation of medical signals widely used by allied health professionals and medical consultants within the health care sector. 3- Undertaking this module at level 4 will enable you to become proficient in further applying these fundamental concepts in processing and enhancing medical signals using digital and computer algorithms to be delivered as part of a module on medical signal processing at level 5. This module has been carefully designed and developed to allow you to enhance your sound knowledge in medical physics, its principle and applications and thereby prepare yourself for a technical, research or development role within medical physics or biomedical signal systems.
9. Teaching and Learning Strategies	
Strategy	In this module you will be attending lectures and seminars. You will also participate in classroom and small group discussions. Each of these activities is supported by pre and post-session, directed self-study such as quizzes or assignments. This module develops your understanding of medical signaling (ECG, EMG, and EEG) in biomedical engineering and will use examples of how physics is applied to signal formation in a variety of modalities.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
16	Th. 2 Prac. 2 Tut. 1	Theoretical and Practical experiences	ECG, EMG and EEG	Theory and practice	Test, Laboratory, Quizzes and final exam

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	

Textbook	Medical Instrumentation Application and Design, John G. Webster
References	ECG from Basics to Essentials Step by Step by Roland X. Stroobandt, S. Serge Barold, Alfons F. Sinnaeve SURFACE ELECTROMYOGRAPHY, Physiology, Engineering, and Applications

Course Description Form

1. Course Name: Communication I
2. Course Code:
MDER412
3. Semester / Year: First / 2025
1 semester /fourth
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
5/3
7. Course administrator's name (mention all, if more than one name)
Name: Mr. Ahmed Toman Thahab Email: eng.ahmed.thahab@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• Learning domain transform and signal analysis. • Essential parts of a communication system. • Transmitting data and its impairments . • A full understand of bandpass transmission and modulation techniques. • The reasons behind converting analogue signals into digital. • Noise sources in electrical elements.

9. Teaching and Learning Strategies	
Strategy	The core strategy that will be implemented in delivering this module is presenting the material and encourage students to participate through exercises and critical thinking questions. Moreover, interactive tutorials, homework and Matlab tutorials are assigned to students in delivering this module. Various lab experiments related to the material are implemented in delivering the material.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introducing students to signals and their representation in the two main domains	Introduction – signals, types of signals, representation of signals: time representation and frequency representation, Block diagram of communication .	Lecture and discussion	Exam
2	3	Teaching students to analyze periodic and aperiodic signals.	Fourier Series and Fourier transform	Lecture and Home work	Exam &Homework
3	3	Explaining the properties of the Fourier transform	Properties of Fourier Transform and Inverse Fourier transform and Applications	Lecture and Home work	Exam & Homework
4	3	Illustrating the principle energy and power spectral density and their properties	Power spectral density and Energy spectral Density	Lecture and Discussion	Exam &Homework
5	3	illustrating the principles of baseband, passband signals and modulation	baseband and passband transmission, modulation	Lecture and Discussion	Exam & Homework
6	3	illustrating the principle of AM and its spectrum	Amplitude modulation(AM), types of AM, Spectrum of AM Signal	Lecture and Lab Experiment	Exam & Homework
7	3	Understating the circuits that generate and detect AM signals.	AM generation and detection, Comparison between AM types.	Lecture and Lab Experiment	Exam & Homework
8	3	Introducing the principle of FM nad its spectrum and compare it with AM	Frequency modulation(FM), spectrum of AM signals	Lecture and Lab Experiment	Exam & Homework
9	3	Driving the bandwidth equation and power calculation equations	Bessel Function, Bandwidth, power of FM signals, Phase modulation.	Lecture and Home work	Exam & Homework
10	3	Introducing students to sampling theory and its application in signal processing	Sampling theorem and Nyquist rate, Reconstruction of Signal	Lecture and Home work	Exam & Homework

11	3	Introducing other modulation schemes regarding pulse modulation	Pulse Modulation , Pulse amplitude modulation , pulse duration modulation , Pulse position modulation.	Lecture and Home work	Exam & Homework
12	3	Introducing students the importance of digital signals and analogue signal conversion to digital	Pulse code modulation, quantization, uniform quantization signal to quantization to noise ratio	Lecture and Home work	Exam & Homework
13	3	Illustrating the transmission scheme	Frequency division multiplexing, time division multiplexing.	Lecture and Home work	Exam & Homework
14	3	Introducing the types of noise and its sources	PCM and time division multiplexing, Noise.	Lecture and Home work	Exam & Homework
15	3		Assessment Exam	-	-

11. Course Evaluation

The quizzes and home work 10%, mid term exam is 30%, LAB assessment 10% and the final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Modren digital and Analog communication systems by Lathi
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Communication systems by Simon Haykins
Electronic References, Websites	

Course Description Form

1. Course Name:

Digital Electronics I

2. Course Code:

MDER415

3. Semester / Year:

1st semester / Fourth year

4. Description Preparation Date:

15/9/2024

5. Available Attendance Forms:

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

Theory : 2Hrs Practical : 3 Hrs Units : 3

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

Name: Prof. Dr. Mahmoud Shaker Nasr
Email: eng.mahmoud.shaker@uobabylon.edu.iq

8. Course Objectives

Course Objectives	• To learn the digital electronics and how to manage the digital information and the design of digital and logic systems.

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Practice in the lab. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**Introduction**	**Introduction**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
2	2	**Dif. Between analog and digital signals, and the types of data transfer**	**Dif. Between analog and digital signals, and the types of data transfer**	Theory, discussions, quizzes, and	Final and Mid term exams, home works,

				practice.	and quizzes
3	2	**Numbering systems-1**	**Numbering systems-1**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
4	2	**Numbering systems-2**	**Numbering systems-2**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
5	2	**Complements, signed numbers, binary codes and algebra**	**Complements, signed numbers, binary codes and algebra**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
6	2	**Theory and operation of Logic gates-1**	**Theory and operation of Logic gates-1**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
7	2	**Theory and operation of Logic gates-2**	**Theory and operation of Logic gates-2**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
8	2	**SOP, POS, NAND and NOR implementation**	**SOP, POS, NAND and NOR implementation**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
9	2	**Kmap, don't care; combinational logic circuits**	**Kmap, don't care; combinational logic circuits**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
10	2	**Binary adder and subtractor and design procedure**	**Binary adder and subtractor and design procedure**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
11	2	**Decimal adders and comparators circuits design**	**Decimal adders and comparators circuits design**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
12	2	**Decoders and encoders circuits design,**	**Decoders and encoders circuits design,**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
13	2	**Multiplexers and demultiplexers circuit design.**	**Multiplexers and demultiplexers circuit design.**	Theory, discussions, quizzes, and	Final and Mid term exams, home works,

				practice.	and quizzes
14	2	**Project design -1**	**Project design -1**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
15	2	**Project design -1**	**Project design -1**	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, lab. evaluation 10% and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Thomas L. Floyd "Digital Fundamentals" , Eleventh Edition Global, Edition 2015.
Recommended books	David Money and Harris' Sarah L. Harris "In Praise of Digital Design and Computer Architecture", British Library Cataloguing-in-Publication Data, 2013.
Electronics References, Websites	Thomas L. Floyd "Digital Fundamentals" , Eleventh Edition Global, Edition 2015.

Course Description Form

1. Course Name:
English Language VII
2. Course Code:
UREQ411
3. Semester / Year:
First semester/ Fourth year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
1 / 1
7. Course administrator's name (mention all, if more than one name)
Name: Noor ahmed Email:
8. Course Objectives

Course Objectives	1. To enable the students to communicate effectively and appropriately in real life situation. 2. To use English effectively for study purpose across the curriculum; 3. To develop interest in and appreciation of Literature; 4. To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing; 5. to revise and reinforce structure already learnt. 6. Students will have the opportunity to consider aspects of current English language teaching theory and develop their awareness of how these theories translate to the classroom to influence teaching practice.

9. Teaching and Learning Strategies	
Strategy	**Focus on academic language, literacy and vocabulary** **Link background knowledge and culture to learning** **Increase comprehensible input and language output** Promote classroom interaction

10. Course Structure					
	Hours	**Required Learning**			**Evaluation**

Week		Outcomes	Unit or subject name	Learning method	method
1	Th. 1 Tut. 1	Theoretical and Practical experiences	**The tense system:** auxiliary verbs, modal auxiliary verbs, full verbs. **English tense usage:** time, the simplest aspect, the continuous aspect, the perfect aspect, active and passive.	Theory and practice	Test, Laboratory, Quizzes and final exam
2	Th. 1 Tut. 1	Theoretical and Practical experiences	**The present perfect:** Present perfect simple and continuous (unfinished past, present result, indefinite past).	Theory and practice	Test, Laboratory, Quizzes and final exam
3	Th. 1 Tut. 1	Theoretical and Practical experiences	**Narrative tenses:** past simple, past perfect, past continuous, present perfect, time clauses).	Theory and practice	Test, Laboratory, Quizzes and final exam
4	Th. 1 Tut. 1	Theoretical and Practical experiences	**Questions:** question forms, asking for descriptions, indirect questions**.** **Negatives:** forming negatives, negative questions.	Theory and practice	Test, Laboratory, Quizzes and final exam
5	Th. 1 Tut. 1	Theoretical and Practical experiences	**Listening and speaking**: listen to syllabus subjects-related tapes, and discussing presentation given by students.	Theory and practice	Test, Laboratory, Quizzes and final exam
6	Th. 1 Tut. 1	Theoretical and Practical experiences	**Future forms:** will and going to for (prediction, intentions, and decisions), present continuous for arrangements, present simple for timetable, future continuous,	Theory and practice	Test, Laboratory, Quizzes and final exam

7	Th. 1 Tut. 1	Theoretical and Practical experiences	**Expressing quantity:** meaning, usage of all quantifiers with different examples.	Theory and practice	Test, Laboratory, Quizzes and final exam
8	Th. 1 Tut. 1	Theoretical and Practical experiences	**Everyday English**, social expressions, hot verbs (make and do), formal language and informal language.	Theory and practice	Test, Laboratory, Quizzes and final exam
9	Th. 1 Tut. 1	Theoretical and Practical experiences	**Mid-term Exam +** Discussing answers of mid-term exam.	Theory and practice	Test, Laboratory, Quizzes and final exam
10	Th. 1 Tut. 1	Theoretical and Practical experiences	**Modal auxiliary verbs:** uses of modal auxiliary verbs for (probability, present, future, ability, advice, obligation, permission, willingness, and refusal)	Theory and practice	Test, Laboratory, Quizzes and final exam
11	Th. 1 Tut. 1	Theoretical and Practical experiences	**Relative clauses:** defining relative clauses, non-defining relative clauses.	Theory and practice	Test, Laboratory, Quizzes and final exam
12	Th. 1 Tut. 1	Theoretical and Practical experiences	**Expressing habit:** as present simple, present continuous	Theory and practice	Test, Laboratory, Quizzes and final exam
13	Th. 1 Tut. 1	Theoretical and Practical experiences	**Reading and speaking skills:** reading exercises, discussing presentation given by students	Theory and practice	Test, Laboratory, Quizzes and final exam

14	Th. 1 Tut. 1	Theoretical and Practical experiences	**Hypothesizing:** first and second conditional, third conditional, other structures of hypothesis.	Theory and practice	Test, Laboratory, Quizzes and final exam
15	Th. 1 Tut. 1	Theoretical and Practical experiences	**Determiners:** each and every, enough, articles (a/an, the, zero article).	Theory and practice	Test, Laboratory, Quizzes and final exam
16	Th. 1 Tut. 1	Theoretical and Practical experiences	**Preparatory week before the final Exam**	Theory and practice	Test, Laboratory, Quizzes and final exam

11. Course Evaluation
Exam ,quiz ,report

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Murphy, R. (2019). English Grammar in Use. Cambridge University Press.
References	Murphy, R. (2019). English Grammar in Use. Cambridge University Press.

Course Description Form

1. Course Name:
Pathology
2. Course Code:
MDER416
3. Semester / Year:
First semester/ Fourth year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
2 / 2
7. Course administrator's name (mention all, if more than one name)
Name: Dr. sabreen Email:
8. Course Objectives

Course Objectives	1. To develop problem pathology through the application of techniques. 2. To understand pathogenesis, Biopsy, tissue processing & fixation 3. This course deals with the basic concept of inflammation. 4. This is the basic subject for all the heart diseases. 5. To understand valvular disorders and respiratory system disorders. .....

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the tests, 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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	Th. 2	Theoretical and Practical experiences	Introduction	Theory and practice	Test, Laboratory, Quizzes and final exam

2	Th. 2	Theoretical and Practical experiences	Pathology	Theory and practice	Test, Laboratory, Quizzes and final exam
3	Th. 2	Theoretical and Practical experiences	Pathogenesis	Theory and practice	Test, Laboratory, Quizzes and final exam
4	Th. 2	Theoretical and Practical experiences	Biopsy	Theory and practice	Test, Laboratory, Quizzes and final exam
5	Th. 2	Theoretical and Practical experiences	Tissue processing & fixation	Theory and practice	Test, Laboratory, Quizzes and final exam
6	Th. 2	Theoretical and Practical experiences	Diagnostic techniques in pathology	Theory and practice	Test, Laboratory, Quizzes and final exam
7	Th. 2	Theoretical and Practical experiences	Cell injury, necrosis	Theory and practice	Test, Laboratory, Quizzes and final exam
8	Th. 2	Theoretical and Practical experiences	**Mid-term Exam** + radiation & cell damage	Theory and practice	Test, Laboratory, Quizzes and final exam

9	Th. 2	Theoretical and Practical experiences	Inflammation; acute & chronic inflammation, healing and repair	Theory and practice	Test, Laboratory, Quizzes and final exam
10	Th. 2	Theoretical and Practical experiences	Stem cells, hemodynamic disorders	Theory and practice	Test, Laboratory, Quizzes and final exam
11	Th. 2	Theoretical and Practical experiences	Arterial diseases, the heart; heart failure; acute & chronic	Theory and practice	Test, Laboratory, Quizzes and final exam
12	Th. 2	Theoretical and Practical experiences	Myocardial infarction, angina pectoris	Theory and practice	Test, Laboratory, Quizzes and final exam
13	Th. 2	Theoretical and Practical experiences	Valvular disorders, respiratory system disorders	Theory and practice	Test, Laboratory, Quizzes and final exam
14	Th. 2	Theoretical and Practical experiences	Inflammation, tuberculosis	Theory and practice	Test, Laboratory, Quizzes and final exam
15	Th. 2	Theoretical and Practical experiences	Emphysema, pneumonia and neoplasia	Theory and practice	Test, Laboratory, Quizzes and final exam

16	Th. 2	Theoretical and Practical experiences	**Preparatory week before the final Exam**	Theory and practice	Test, Laboratory, Quizzes and final exam

11. Course Evaluation
Exam ,quiz ,report ,final exam

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Wallig, M. A., Bolon, B., Haschek, W. M., & Rousseaux, C. G. (Eds.). (2017). *Fundamentals of toxicologic pathology*. Academic press.
References	Kumar, V., Abbas, A., & Aster, J. C. (Eds.). (2017). *Robbins basic pathology e-book*. Elsevier Health Sciences.

Course Description Form

1. Course Name:
Thermo-Fluid Mechanics I
2. Course Code:
MDER414
3. Semester / Year:
1nd semester / fourth year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs App: 2 Hrs Units : 3
7. Course administrator's name (mention all, if more than one name)
Name:haider krady Email:
8. Course Objectives

Course Objectives	• To cover the *basic principles* of thermodynamics, fluid mechanics, and heat transfer. • To present numerous and diverse real-world *engineering examples* to give students a feel for how thermal-fluid sciences are applied in engineering practice. • To develop an *intuitive understanding* of thermal-fluid sciences by emphasizing the physics and physical arguments.

9. Teaching and Learning Strategies

Strategy	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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		**Properties and Units**	Theory, discussions,	Final and Mid term exams,

				quizzes	home works, and quizzes
2	2		**Fluid Static Pressure Head**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2		**Flow Patterns**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2		**Newton's Law of Viscosity**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2		**Continuity Equation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2		**Energies Relationships Bernoulli Equation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2		**Mid-term Exam - Reynolds Number Friction Factor**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2		**Pressure Drop in Pipes and Fittings**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2		**Pumps, Flow measurement, Boundary layer**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2		**Heat Transfer :Conduction,**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2		**Convection, Radiation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2		**steady heat conduction**	Theory, discussions,	Final and Mid term exams,

				quizzes	home works, and quizzes
13	2		**Thermal resistance**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2		**Heat Exchangers**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2		**Refrigeration**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	**Yunus A. Cengel, John B. Cimbala, Fluid Mechanics: fundamentals and applications, Third edition, McGraw-Hill Science/Engineering/Math, 2013** **Yunus A. Cengel, Heat Transfer a Practical Approach, second edition, McGraw – Hill, 2003**
Recommended books	**Yunus A. Cengel, John B. Cimbala, Robert H. Turner, Fundamental of Thermal-fluid science, fifth edition, McGraw Hill education, 2017**
Electronics References, Websites	

Course Description Form

1. Course Name:
Analytical Mechanics
2. Course Code:
BMER423
3. Semester / Year:
Fourth Grade/ SECOND
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms:
IN PERSON
6. Number of Credit Hours (Total) / Number of Units :
Theory:2 units:2
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Fawaz F. Al-Bakri
Email: fawaz.al-bakri@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• Increase the range of solvable problems by developing standard techniques with a wide range of applicability • Understand the mathematical structure of mechanics
9. Teaching and Learning Strategies	
Strategy	• The student will acquire the basic knowledge for the study of holonomic systems with particular regard to the kinematics and dynamics of rigid bodies • The student will learn mathematic instruments, such as theorems and algorithms, which permit to face real problems in applied mathematics, physics, informatics and many other fields. With these mathematical instruments, student gets new abilities to clear useful theoretical and application problems. • At the end of course student will be able to get new mathematical techniques of knowledge and understanding to face all possible links moreover, if it is possible, they will propose untreated new problems.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
(1)	2	To help students understand some Units of Measurement. To help students understand some types of Work in Engineering. To help students understand some types of Energy in Engineering	- Units of Measurement. - Types of Work in Engineering. - Types of Energy in Engineering	- Lectures - Hand-on activities - Simulation	- Mid-Term exam - Quizzes - Assignments - Project - Final term exam
(2)	2	To help students understand the Newtonian Mechanics. To help students understand the Lagrangian Mechanics	- Newtonian Mechanics. - Lagrangian Mechanics		
(3)	2	To help students understand Linear Spring, Damper and mass elements (Translational Motion). To help students understand Angular Spring, Damper and Inertia elements (Rotational Motion).	- Translational Motion - Rotational Motion.		
(4)	2	To help students derive a mathematical model for a single degree of freedom system (SDOF) using Newtonian Mechanics. To help students derive a mathematical model for a single degree of freedom system (SDOF) using Lagrangian Mechanics	- Model for a single degree of freedom system (SDOF) using Newtonian Mechanics. - Model for a single degree of freedom system (SDOF) using Lagrangian Mechanics		
(5)	2	To help students understand the Conservative and Non-Conservative forces To help students understand the Classification of Vibrations	- Conservative and Non-Conservative forces - Classification of Vibrations		
(6)	2	To help students understand the Simple Harmonic Motion.	- Simple Harmonic Motion		

(7)	2	To help students understand the Standard form of the differential equation for SDOF systems	- Standard form of the differential equation for SDOF systems		
(8)	2	To help students understand the Undamped Vibration Response.	- Undamped Vibration Response.		
(9)	2	To help students understand the Underdamped Vibration Response for SDOF System.	- Underdamped Vibration Response for SDOF System		
(10)	2		- Midterm exam		
(11)	2	To help students understand the Critical damped Vibration Response for SDOF System.	- Critical damped Vibration Response for SDOF System		
(12)	2	To help students understand the Overdamped Vibration Response for SDOF System	- Overdamped Vibration Response for SDOF System		
(13)	2	To help students understand the Forced Vibration Response for SDOF System. To help students understand the Forced Response of an Undamped System due to a Single-Frequency Excitation	- Forced Vibration Response for SDOF System		
(14)	2	To help students Derive the Equations of Motion for TDOF Systems.	- Derive the Equations of Motion for TDOF Systems		
(15)		To help students understand Natural Frequencies for TDOF Systems	- Natural Frequencies for TDOF Systems - Final Exam.		

11. Course Evaluation

30% Midterm Exam, 2% Assignments, 2% Attendance, 3% Quizzes, 3% Project, 60 Final Exam.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mechanical Vibrations: Theory and Applications, SI S. Graham Kelly, 2012.
Main references (sources)	Vibrations, BALAKUMAR BALACHANDRAN, EDWARD B. MAGRAB, Third Edition, 2019.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Biomaterials II
2. Course Code:
MDER421
3. Semester / Year:
Second semester/ Fourth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
2 / 2
7. Course administrator's name (mention all, if more than one name)
Name: Sura Baha Email: Sura Baha.@uobabylon.edu.iq
8. Course Objectives

Course Objectives	1. To understand of Biomaterials. 2. This course deals with the History of Biomaterials. 3. This is the basic subject Fields of Knowledge to Develop Biomaterials. 4. To understand Selection of Biomedical Materials. To perform Properties of Biomaterials. .....

9. Teaching and Learning Strategies	
Strategy	In this module you will be attending lectures and seminars. You will also participate in classroom and small group discussions. Each of these activities is supported by pre and post-session, directed self-study such as quizzes or assignments. This module develops your understanding biomaterial in biomedical fields .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	Th. 2	Theoretical and Practical experiences	Introduction to Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam

2	Th. 2	Theoretical and Practical experiences	Biocompatibility and Biological Interactions	Theory and practice	Test, Laboratory, Quizzes and final exam
3	Th. 2	Theoretical and Practical experiences	Physical and Chemical Characterization	Theory and practice	Test, Laboratory, Quizzes and final exam
4	Th. 2	Theoretical and Practical experiences	Mechanical Characterization, Biological Tests of Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
5	Th. 2	Theoretical and Practical experiences	Metals and Alloys Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
6	Th. 2	Theoretical and Practical experiences	Ceramic Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
7	Th. 2	Theoretical and Practical experiences	Polymer and Composites Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
8	Th. 2	Theoretical and Practical experiences	Orthopedics and Dental Applications of Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam

9	Th. 2	Theoretical and Practical experiences	Mid. Exam + Neural Application of Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
10	Th. 2	Theoretical and Practical experiences	Biomaterials in Drug Delivery System	Theory and practice	Test, Laboratory, Quizzes and final exam
11	Th. 2	Theoretical and Practical experiences	Biomaterials in Tissue Engineering	Theory and practice	Test, Laboratory, Quizzes and final exam
12	Th. 2	Theoretical and Practical experiences	Hydrogels and Injectable Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam
13	Th. 2	Theoretical and Practical experiences	Ethics and Regularity Consideration	Theory and practice	Test, Laboratory, Quizzes and final exam
14	Th. 2	Theoretical and Practical experiences	Emerging Trends in Biomaterial for Biomedical Engineering	Theory and practice	Test, Laboratory, Quizzes and final exam
15	Th. 2	Theoretical and Practical experiences	Smart Biomaterials	Theory and practice	Test, Laboratory, Quizzes and final exam

16	Th. 2	Theoretical and Practical experiences	**Preparatory week before the final Exam**	Theory and practice	Test, Laboratory, Quizzes and final exam

11. Course Evaluation	
Exam ,quiz ,report ,final exam	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	https://www.coursera.org/browse/physical-science-and-engineering
References	

Course Description Form

1. Course Name:

Biomechanics II

2. Course Code:

MDER420

3. Semester / Year:

2st Semester/ Fourth Year

4. Description Preparation Date:

19/1/2025

5. Available Attendance Forms:

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

Theory : 2 Hrs Tutorial : 1 Units : 3

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

Name: Prof. Dr. Ahmed Namah Hadi
Email: ahmed.hadi.eng@uobabylon.edu.iq

8. Course Objectives

Course Objectives	To analyses biomechanics different forces for human body with improvement the motion of human body according biomechanics analyses

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Biomechanics with known the definision of biomechanics and advantage	Introduction to Biomechanics with known the definision of biomechanics and advantage .	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	3	Biomechanic for muscles and types of mucles for human body with all Types	Biomechanic for muscles and types of mucles for human body for upper extermity	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	3	Biomechanic for muscles and types of mucles for human body	Biomechanic for muscles and types of mucles for human body for lower extermity	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	3	Biomechanics for bones of human body.	Biomechanics for bones of human body.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	3	Biomechanics for bones of human body	Biomechanics for bones of human body with joint types and motion.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	3	Biomechanics for upper extremity	Biomechanics for upper extremity, motion analysis	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	3	Biomechanics for upper extremity	Biomechanics for upper extremity with injury according biomechanics for joints	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	3	Biomechanics for upper extremity	Biomechanics for upper extremity – different problems according biomechanics		
9	3	Biomechanics for lower extremity.	Biomechanics for upper extremity.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	3	Biomechanics for lower extremity.	Biomechanics for upper extremity, joint analyses according biomechanics with injury	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	3	Biomechanics for lower extremity.	Biomechanics for lower extremity – different problems according biomechanics	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	3	Biomechanics for foot	Biomechanics for foot	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	3	Biomechanics for foot motion	Biomechanics for foot motion with analyses motion	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
14	3	Biomechanics for spine human body	Biomechanics for spine human body	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	3	Biomechanics for spine human body	Biomechanics for spine human body , different problems according biomechanics analyses	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, experimental practice 10% and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Susan.J.hall et.al., Basic Biomechanics, Textbook, 2015.
Recommended books	Susan.J.hall et.al., Basic Biomechanics, Textbook, 2015.
Electronics References, Websites	Taylor and Francis, Biomechanics of Human Motion, Textbook ,2018.

Course Description Form

1. Course Name: Communication II
2. Course Code:
MDER422
3. Semester / Year: second
Second semester /fourth
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total) 3
Theory:2 APP:3 unts:3
7. Course administrator's name (mention all, if more than one name)
Name: Mr. Ahmed Toman Thahab Email: eng.ahmed.thahab@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• Learning domain transform and signal analysis. • Essential parts of a communication system. • Transmitting data and its impairments . • A full understand of bandpass transmission and modulation techniques. • The reasons behind converting analogue signals into digital. • Noise sources in electrical elements.

9. Teaching and Learning Strategies	
Strategy	The core strategy that will be implemented in delivering this module is presenting the material and encourage students to participate through exercises and critical thinking questions. Moreover, interactive tutorials, homework and Matlab tutorials are assigned to students in delivering this module. Various lab experiments related to the material are implemented in delivering the material.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introducing students to signals and their representation in the two main domains	Introduction – signals, types of signals, representation of signals: time representation and frequency representation, Block diagram of communication .	Lecture and discussion	Exam
2	3	Teaching students to analyze periodic and aperiodic signals.	Fourier Series and Fourier transform	Lecture and Home work	Exam &Homework
3	3	Explaining the properties of the Fourier transform	Properties of Fourier Transform and Inverse Fourier transform and applications	Lecture and Home work	Exam & Homework
4	3	Illustrating the principle energy and power spectral density and their properties	Power spectral density and Energy spectral density	Lecture and Discussion	Exam &Homework
5	3	illustrating the principles of baseband, passband signals and modulation	baseband and passband transmission, modulation	Lecture and Discussion	Exam & Homework
6	3	illustrating the principle of AM and its spectrum	Amplitude modulation(AM), types of AM, Spectrum of AM signal	Lecture and Lab Experiment	Exam & Homework
7	3	Understating the circuits that generate and detect AM signals.	AM generation and detection, Comparison between AM types.	Lecture and Lab Experiment	Exam & Homework
8	3	Introducing the principle of FM nad its spectrum and compare it with AM	Frequency modulation(FM), spectrum of AM signals	Lecture and Lab Experiment	Exam & Homework
9	3	Driving the bandwidth equation and power calculation equations	Bessel Function, Bandwidth, power of FM signals, Phase modulation.	Lecture and Home work	Exam & Homework
10	3	Introducing students to sampling theory and its application in signal processing	Sampling theorem and Nyquist rate, Reconstruction of Signal	Lecture and Home work	Exam & Homework

11	3	Introducing other modulation schemes regarding pulse modulation	Pulse Modulation , Pulse amplitude modulation , pulse duration modulation , Pulse position modulation.	Lecture and Home work	Exam & Homework
12	3	Introducing students the importance of digital signals and analogue signal conversion to digital	Pulse code modulation, quantization, uniform quantization signal to quantization to noise ratio	Lecture and Home work	Exam & Homework
13	3	Illustrating the transmission scheme	Frequency division multiplexing, time division multiplexing.	Lecture and Home work	Exam & Homework
14	3	Introducing the types of noise and its sources	PCM and time division multiplexing, Noise.	Lecture and Home work	Exam & Homework
15	3		Assessment Exam	-	-

11. Course Evaluation

The quizzes and home work 10%, mid term exam is 30%, LAB assessment 10% and the final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Modren digital and Analog communication systems by Lathi
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Communication systems by Simon Haykins
Electronic References, Websites	

Course Description Form

1. Course Name:
Digital Electronics II
2. Course Code:
MDER425
3. Semester / Year:
2nd semester / Fourth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2Hrs Practical : 3 Hrs Units : 3
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Mahmoud Shaker Nasr Email: eng.mahmoud.shaker@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• To learn the digital electronics and how to manage the digital information and the design of digital and logic systems.
9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Practice in the lab. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Latches and flip flops.	Latches and flip flops.	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
2	2	S-R FF, D FF characteristics and applications.	S-R FF, D FF characteristics and applications.	Theory, discussions, quizzes, and	Final and Mid term exams, home works,

				practice.	and quizzes
3	2	J-K FF, and T FF, characteristics and applications .	J-K FF, and T FF, characteristics and applications .	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
4	2	Asynchronous counters (ripple counters) design and applications part 1.	Asynchronous counters (ripple counters) design and applications part 1.	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
5	2	Asynchronous counters (ripple counters) design and applications, part 2	Asynchronous counters (ripple counters) design and applications, part 2	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
6	2	up-down counters design and applications	up-down counters design and applications	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
7	2	Synchronous counters, synchronous counters design, part1	Synchronous counters, synchronous counters design, part1	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
8	2	Synchronous counters, synchronous counters design, part 2	Synchronous counters, synchronous counters design, part 2	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
9	2	up- down counters, mod-counters, design and applications, part 1.	up- down counters, mod-counters, design and applications, part 1.	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
10	2	up- down counters, mod-counters, design and applications, part 2	up- down counters, mod-counters, design and applications, part 2	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
11	2	Registers, shift registers, serial in/serial out, serial in/ parallel out, parallel in/ parallel out, parallel in/ serial out.	Registers, shift registers, serial in/serial out, serial in/ parallel out, parallel in/ parallel out, parallel in/ serial out.	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
12	2	Ring counter, Johnson counters, applications.	Ring counter, Johnson counters, applications.	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
13	2	Square wave generators using 555 (clock generator) , design and	Square wave generators using 555 (clock generator) , design and	Theory, discussions, quizzes, and	Final and Mid term exams, home works,

		applications.	applications.	practice.	and quizzes
14	2	A/D converter design and applications	A/D converter design and applications	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes
15	2	D/A converter design and applications	D/A converter design and applications	Theory, discussions, quizzes, and practice.	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, lab. evaluation 10% and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Thomas L. Floyd "Digital Fundamentals" , Eleventh Edition Global, Edition 2015.
Recommended books	David Money and Harris' Sarah L. Harris "In Praise of Digital Design and Computer Architecture", British Library Cataloguing-in-Publication Data, 2013.
Electronics References, Websites	Thomas L. Floyd "Digital Fundamentals" , Eleventh Edition Global, Edition 2015.

Course Description Form

1. Course Name:
English Language VIII
2. Course Code:
UREQ421
3. Semester / Year:
Second semester/ Fourth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
1 / 1
7. Course administrator's name (mention all, if more than one name)
Name: haider menkash Email:
8. Course Objectives

Course Objectives	1- 1. To enable the students to communicate effectively and appropriately in real life situation. 2- 2. To use English effectively for study purpose across the curriculum; 3- 3. To develop interest in and appreciation of Literature; 4- 4. To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing; 5- 5. to revise and reinforce structure already learnt. 6– 6. Students will have the opportunity to consider aspects of current English language teaching theory and develop their awareness of how these theories translate to the classroom to influence teaching practice.

9. Teaching and Learning Strategies	
Strategy	**Focus on academic language, literacy and vocabulary** **Link background knowledge and culture to learning** **Increase comprehensible input and language output** Promote classroom interaction

10. Course Structure					
	Hours	**Required Learning**			**Evaluation**

Week		Outcomes	Unit or subject name	Learning method	method
1	Th. 1 Tut. 1	Theoretical and Practical experiences	**The tense system:** auxiliary verbs, modal auxiliary verbs, full verbs. **English tense usage:** time, the simplest aspect, the continuous aspect, the perfect aspect, active and passive.	Theory and practice	Test, Laboratory, Quizzes and final exam
2	Th. 1 Tut. 1	Theoretical and Practical experiences	**The present perfect:** Present perfect simple and continuous (unfinished past, present result, indefinite past).	Theory and practice	Test, Laboratory, Quizzes and final exam
3	Th. 1 Tut. 1	Theoretical and Practical experiences	**Narrative tenses:** past simple, past perfect, past continuous, present perfect, time clauses).	Theory and practice	Test, Laboratory, Quizzes and final exam
4	Th. 1 Tut. 1	Theoretical and Practical experiences	**Questions:** question forms, asking for descriptions, indirect questions**.** **Negatives:** forming negatives, negative questions.	Theory and practice	Test, Laboratory, Quizzes and final exam
5	Th. 1 Tut. 1	Theoretical and Practical experiences	**Listening and speaking**: listen to syllabus subjects-related tapes, and discussing presentation given by students.	Theory and practice	Test, Laboratory, Quizzes and final exam
6	Th. 1 Tut. 1	Theoretical and Practical experiences	**Future forms:** will and going to for (prediction, intentions, and decisions), present continuous for arrangements, present simple for timetable, future continuous,	Theory and practice	Test, Laboratory, Quizzes and final exam

7	Th. 1 Tut. 1	Theoretical and Practical experiences	**Expressing quantity:** meaning, usage of all quantifiers with different examples.	Theory and practice	Test, Laboratory, Quizzes and final exam
8	Th. 1 Tut. 1	Theoretical and Practical experiences	**Everyday English**, social expressions, hot verbs (make and do), formal language and informal language.	Theory and practice	Test, Laboratory, Quizzes and final exam
9	Th. 1 Tut. 1	Theoretical and Practical experiences	**Mid-term Exam +** Discussing answers of mid-term exam.	Theory and practice	Test, Laboratory, Quizzes and final exam
10	Th. 1 Tut. 1	Theoretical and Practical experiences	**Modal auxiliary verbs:** uses of modal auxiliary verbs for (probability, present, future, ability, advice, obligation, permission, willingness, and refusal)	Theory and practice	Test, Laboratory, Quizzes and final exam
11	Th. 1 Tut. 1	Theoretical and Practical experiences	**Relative clauses:** defining relative clauses, non-defining relative clauses.	Theory and practice	Test, Laboratory, Quizzes and final exam
12	Th. 1 Tut. 1	Theoretical and Practical experiences	**Expressing habit:** as present simple, present continuous	Theory and practice	Test, Laboratory, Quizzes and final exam
13	Th. 1 Tut. 1	Theoretical and Practical experiences	**Reading and speaking skills:** reading exercises, discussing presentation given by students	Theory and practice	Test, Laboratory, Quizzes and final exam

14	Th. 1 Tut. 1	Theoretical and Practical experiences	**Hypothesizing:** first and second conditional, third conditional, other structures of hypothesis.	Theory and practice	Test, Laboratory, Quizzes and final exam
15	Th. 1 Tut. 1	Theoretical and Practical experiences	**Determiners:** each and every, enough, articles (a/an, the, zero article).	Theory and practice	Test, Laboratory, Quizzes and final exam
16	Th. 1 Tut. 1	Theoretical and Practical experiences	**Preparatory week before the final Exam**	Theory and practice	Test, Laboratory, Quizzes and final exam

11. Course Evaluation
Exam ,quiz ,report

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Murphy, R. (2019). English Grammar in Use. Cambridge University Press.
References	Murphy, R. (2019). English Grammar in Use. Cambridge University Press.

Course Description Form

1. Course Name:
Therapeutic Instrumentation
2. Course Code:
MDER424
3. Semester / Year:
Second semester/ Fourth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
Theory:2 APP:2 tutrial:1 units:3
7. Course administrator's name (mention all, if more than one name)
Name: wadah.falah Email:
8. Course Objectives

Course Objectives	1. To develop problem-solving skills and an understanding of Therapeutic Instrumentation through the application of techniques. 2. To understand how to deal with medical device malfunctions. 3. To understand how to calibrate medical devices. 4. To develop the student skills to develop the medical system to fit the work with the vital variables of the human body. 5. To understand how biosignals are processed. 6. To understand the types of medical devices required to treat human body problems.

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

10. Course Structure

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

1	Th. 2	Theoretical and Practical experiences	Introduction – what is the Therapeutic Instrumentation	Theory and practice	Test, Laboratory, Quizzes and final exam
2	Th. 2	Theoretical and Practical experiences	Sensors and transducers	Theory and practice	Test, Laboratory, Quizzes and final exam
3	Th. 2	Theoretical and Practical experiences	Pacemakers (types, working, anatomy of circuit, problems, and development)	Theory and practice	Test, Laboratory, Quizzes and final exam
4	Th. 2	Theoretical and Practical experiences	Defibrillators (types, working, anatomy of circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
5	Th. 2	Theoretical and Practical experiences	Lithotripsy (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
6	Th. 2	Theoretical and Practical experiences	Anesthesia machine (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
7	Th. 2	Theoretical and Practical experiences	Ventilators (types, working, anatomy of circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam

8	Th. 2	Theoretical and Practical experiences	Hemodialysis (types, working, anatomy of circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
9	Th. 2	Theoretical and Practical experiences	Wax Bath Devices, Infrared (IR), Ultraviolet (UV), and Ultrasonic Therapeutic devices (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
10	Th. 2	Theoretical and Practical experiences	Microwaves and Short Waves Devices, Electrotherapy, Electrical Stimulation for Pain Relief (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
11	Th. 2	Theoretical and Practical experiences	Med term Exam and solving the problem and practical	Theory and practice	Test, Laboratory, Quizzes and final exam
12	Th. 2	Theoretical and Practical experiences	Tooth Chair (Dental Unit) (types, working, anatomy of circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
13	Th. 2	Theoretical and Practical experiences	Cardioversion, Cardio tachometer (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
14	Th. 2	Theoretical and Practical experiences	Pressure-Volume-Flow Diagrams, Medical Gases, Oxygen Therapy (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam

15	Th. 2	Theoretical and Practical experiences	Physiotherapy Devices (types, working, anatomy of the circuit, problems, development)	Theory and practice	Test, Laboratory, Quizzes and final exam
16	Th. 2	Theoretical and Practical experiences	**The preparatory week before the Final Exam**	Theory and practice	Test, Laboratory, Quizzes and final exam

11. Course Evaluation
Exam ,quiz ,report ,final exam

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Medical instrumentation application and Design fourth edition by John G.Webster, Editor
References	Handbook of Medical Instrumentation third edition by R.S. Khandpur.

Course Description Form

1. Course Name:
Thermo-Fluid Mechanics II
2. Course Code:
MDER426
3. Semester / Year:
2nd semester / fourth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs App: 2 Hrs Units : 3
7. Course administrator's name (mention all, if more than one name)
Name:ameer kamel Email:
8. Course Objectives

Course Objectives	• To cover the *basic principles* of thermodynamics, fluid mechanics, and heat transfer. • To present numerous and diverse real-world *engineering examples* to give students a feel for how thermal-fluid sciences are applied in engineering practice. • To develop an *intuitive understanding* of thermal-fluid sciences by emphasizing the physics and physical arguments.

9. Teaching and Learning Strategies

Strategy	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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		**Properties and Units**	Theory, discussions,	Final and Mid term exams,

				quizzes	home works, and quizzes
2	2		**Fluid Static Pressure Head**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2		**Flow Patterns**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2		**Newton's Law of Viscosity**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2		**Continuity Equation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2		**Energies Relationships Bernoulli Equation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2		**Mid-term Exam - Reynolds Number Friction Factor**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2		**Pressure Drop in Pipes and Fittings**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2		**Pumps, Flow measurement, Boundary layer**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2		**Heat Transfer :Conduction,**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2		**Convection, Radiation**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2		**steady heat conduction**	Theory, discussions,	Final and Mid term exams,

				quizzes	home works, and quizzes
13	2		**Thermal resistance**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2		**Heat Exchangers**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2		**Refrigeration**	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	**Yunus A. Cengel, John B. Cimbala, Fluid Mechanics: fundamentals and applications, Third edition, McGraw-Hill Science/Engineering/Math, 2013** **Yunus A. Cengel, Heat Transfer a Practical Approach, second edition, McGraw – Hill, 2003**
Recommended books	**Yunus A. Cengel, John B. Cimbala, Robert H. Turner, Fundamental of Thermal-fluid science, fifth edition, McGraw Hill education, 2017**
Electronics References, Websites	

Course Description Form

1. Course Name: Control I
2. Course Code:
MDER512
3. Semester / Year:
1st /fifth
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory:2 App 2hrs tutorial:1 units:3
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof Dr. Hayder Mahdi Abdulridha Email: drenghaider@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• To provide the fundamental knowledge of control system engineering and the concept of mathematical modeling of the physical system. • The subject gives various classical analysis tools for design and stability of system in time and frequency domain
9. Teaching and Learning Strategies	
Strategy	1- Thinking strategy according to the student's ability (Example: If the student is able to learn the correct concept of management, he will acquire the skill of managing and organizing his personal life) 2- High thinking skill strategy (for example, if the student wants to make a good decision, it is important that he thinks well before he makes the decision, and if he decides without thinking, or if he cannot think well, or if he cannot decide, or perhaps he will not decide, then this This means he does not have high thinking skills. 3- Critical thinking strategy in learning (Critical Thanking) (it is a term that symbolizes the highest levels of thinking, which aims to pose a problem and then analyze it logically to reach the desired solution)
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1- Introduction	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
2- Mathematical Modeling of Electrical and Mechanical Systems	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
3- Block Diagrams and Signal Flow Graphs	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
4- Time Domain Response	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
5- Transient Response	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
6- Steady State Error	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework

7- Stability Analysis	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
8- Root Locus	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
9- Frequency Response	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
10- State Space Analysis	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
11- Solving State Space Equations	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
12- Controllability and Observability	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
13- PID Controllers	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework

14- Pole Placement	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
15- State Observers	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Modern Control Engineering by K. OGATA
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Diagnostic Instrumentation	
2. Course Code:	
MDER511	
3. Semester / Year:	
First semester/ Fifth year	
4. Description Preparation Date:	
15/9/2024	
5. Available Attendance Forms: In class	
6. Number of Credit Hours (Total) / Number of Units (Total):	
5 / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Amir F. Al-Bakri Email: amir.albakri@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	1- This program aims to enrich your problem-solving skills to address the upcoming challenges within the application of medical physics in the field of Biomedical Engineering. 2- The module will enable you to understand the principles of physics underpinning the generation of medical diagnostic instrumentations widely used by allied health professionals and medical consultants within the health care sector. 3- Undertaking this module at level 5 will enable you to become proficient in further applying these fundamental concepts in processing and enhancing medical image using digital and computer algorithms to be delivered as part of a module on medical image processing at level 5. This module has been carefully designed and developed to allow you to enhance your sound knowledge in medical physics, its principle and applications and thereby prepare yourself for a technical, research or development role within medical physics or biomedical image systems..
9. Teaching and Learning Strategies	
Strategy	In this module you will be attending lectures and seminars. You will also participate in classroom and small group discussions. Each of these activities is supported by pre and post-session, directed self-study such as quizzes or assignments. This module develops your understanding of US imaging in biomedical engineering and will use examples of how physics is applied to image formation in a variety of modalities.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
16	Th. 2 Prac. 2 Tut. 1	Theoretical and Practical experiences	Ultrasound, ECHO, patient monitor and Endoscope	Theory and practice	Test, Laboratory, Quizzes and final exam

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Introduction to Biomedical Imaging by Andrew G. Webb
References	Fundamentals of medical imaging by Paul Suetens Basic Concepts in Doppler Echocardiography Methods of clinical applications based on a multi-modality Doppler approach by James V. Chapman Medical devices and technology surgical and image-guided technologies by Lee, Hua Singh Principles of Flexible Endoscopy for Surgeons by Eric M.

Course Description Form

1. Course Name:
Microprocessor
2. Course Code:
MDER514
3. Semester / Year:
1st semester / Fifth year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs APP: 3 Units :3
7. Course administrator's name (mention all, if more than one name)
Name: ali shaban Email: eng.ali.shaban @uobabylon.edu.iq
8. Course Objectives

Course Objectives	This module aims to provide students with a comprehensive understanding of microprocessors microcontrollers, and embedded systems.

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to microprocessor , microcontroller , and embedded systems.	Micro processor princeble.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
2	2	Learning internal architecture of 8086 and number of registers and types	. 8086 microprocessors Architecture	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	2	Define addressing modes and its types	Addressing mode	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Define addressing modes and its types	Addressing mode	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	How data transfer in processor and between processor and memory and input /output devices	Data Movement Instructions	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Data Movement Instructions	Data Movement Instructions	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Instruction set .	Arithmetic and Logic Instructions	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Program Control Instructions – Part 1	Program Control Instructions – Part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Instruction set and programming techniques	Program Control Instructions – Part 2.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Mid-term Exam +.	Mid-term Exam +	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Interrupts. define interrupt and types of interrupts	Interrupts.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	8086 Hardware Specifications. Introduction to the Microcontroller Architecture.	Hardware specification	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	Types of memory and advantage and dis advantage of each types	Memory Organization.	Theory, discussions,	Final and Mid term exams,

				quizzes	home works, and quizzes
14	2	Introduction to Microcontroller	Microcontroller Programming – Part 1	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	. Introduction to Microcontroller	Microcontroller Programming – Part 2	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 10% , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	The Intel Microprocessor Architecture, Programming, and Interfacing , Eighth Edition ,by Brey, Barry B. , 2009
Recommended books	PIC Microcontrollers by Milan Verle, available online at the link below

Course Description Form

1. Course Name:

Image Processing

2. Course Code:

MDER513

3. Semester / Year:

1st semester / Fifth year

4. Description Preparation Date:

15/9/2024

5. Available Attendance Forms:

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

Theory : 2 Hrs Practical : 2 Units : 3

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

Name: Dr. defaf shaker
eng.defaf.shaker@uobabylon.edu.iq

8. Course Objectives

Course Objectives	To develop problem solving skills and understanding the latest techniques of digital image processing and to apply all theories and methods of image processing technique using MATLAB. .....

9. Teaching and Learning Strategies

Strategy	• Theory in class room. • Practical experiments in the lab. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	General introduction to digital image processing, digital Image Representation, images as Matrices.	General introduction to digital image processing, digital Image Representation, images as Matrices.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
2	4	Reading images, writing images, displaying images, image types,	Reading images, writing images, displaying images, image types,	Theory, practical experiments,	Final and Mid term exams, home works,

		image classes, converting between classes, Array indexing.	image classes, converting between classes, Array indexing.	discussions, and quizzes	and quizzes
3	4	Background on MATLAB and the Image Processing Toolbox, Introduction to M-Function Programming.	Background on MATLAB and the Image Processing Toolbox, Introduction to M-Function Programming.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
4	4	Intensity transformation and spatial filtering, histogram equalization, histogram matching (specification),	Intensity transformation and spatial filtering, histogram equalization, histogram matching (specification),	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
5	4	Function adapthisteq, image enhancement, simple image formation model: sampling and quantization.	Function adapthisteq, image enhancement, simple image formation model: sampling and quantization.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
6	4	Image Restoration and reconstruction: Modeling the Degradation Function, Direct Inverse Filtering, Wiener Filtering, image reconstruction.	Image Restoration and reconstruction: Modeling the Degradation Function, Direct Inverse Filtering, Wiener Filtering, image reconstruction.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
7	4	Color image processing: Color Image Representation in MATLAB, Spatial Filtering of Color Images, color image smoothing and sharpening.	Color image processing: Color Image Representation in MATLAB, Spatial Filtering of Color Images, color image smoothing and sharpening.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
8	4	Morphological image processing: dilation and erosion, combining dilation and erosion, opening and closing.	Morphological image processing: dilation and erosion, combining dilation and erosion, opening and closing.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
9	4	Hit-or-Miss transformation, Function bwmorph.	Hit-or-Miss transformation, Function bwmorph.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
10	4	Gray scale Morphology: dilation and erosion, opening and closing.	Gray scale Morphology: dilation and erosion, opening and closing.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
11	4	Midterm exam, and solutions to the exam questions Introduction to image segmentation.	Midterm exam, and solutions to the exam questions Introduction to image segmentation.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes

12	4	Thresholding: Global thresholding, Otsu's Method for optimum global thresholding,	Thresholding: Global thresholding, Otsu's Method for optimum global thresholding,	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
13	4	Variable thresholding based on Local Statistics, Image Thresholding Using Moving Averages.	Variable thresholding based on Local Statistics, Image Thresholding Using Moving Averages.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
14	4	Region-Based Segmentation : Region Growing, Region Splitting and Merging.	Region-Based Segmentation : Region Growing, Region Splitting and Merging.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes
15	4	Image Compression, video compression.	Image Compression, video compression.	Theory, practical experiments, discussions, and quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following: mid term exam 30 % , practical exam 10%, daily evaluation 10%, and final exam. 50 %	
12. Learning and teaching Resources	
Required textbooks (curricular books)	Digital Image Processing Using MATLAB By Rafael C. Gonzalez, Richard E. Woods, and Steven L. Eddins

Course Description Form

1. Course Name:
Hospitals Systems and Design:
2. Course Code:
MDER515
3. Semester / Year:
1st semester / fifth year
4. Description Preparation Date:
15/9/2024
5. Available Attendance Forms:
In class
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs Units :2
7. Course administrator's name (mention all, if more than one name)
Name: Asst. hind ali Email:
8. Course Objectives

Course Objectives	Understand the structural components of a hospital management system. Identify and categorize stakeholders for the hospital management system. Analyze different types of hospital management systems and their uses. Demonstrate how to digitize and automate hospital processes.

9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Hospital Components, Types, Size, Hospital Architecture, Building Shapes, Master Plan, Planning Attributes	Hospital Components, Types, Size, Hospital Architecture, Building Shapes, Master Plan, Planning Attributes	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

2	2	Traffic and Circulation, Expansion and Modernization	Traffic and Circulation, Expansion and Modernization	Theory, discussions, quizzes	Final and Mid term exams, home works,

					and quizzes
3	2	Design Criteria, Functional Relationships, Site Plan,	Design Criteria, Functional Relationships, Site Plan,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Material Handling, Engineering and Communication Systems,	Material Handling, Engineering and Communication Systems	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	, Patient Housing System.,	, Patient Housing System	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Nursing Unit,	Nursing Unit,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Specialized Units	Specialized Units,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Medical Radiology, Clinical Laboratory, Surgery Suite	Medical Radiology, Clinical Laboratory, Surgery Suite	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Hospital Support System, Dietary,	Hospital Support System, Dietary,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Hospital Administrative System,	Hospital Administrative System,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Hospital Equipment Planning	Hospital Equipment Planning	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

12	2	Intensive Care Complex	Intensive Care Complex	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	, Medical Services System	, Medical Services System	Theory, discussions, quizzes	Final and Mid term exams, home works,
					and quizzes
14	2	Equipment Engineering requirements	Equipment Engineering requirements	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Maintenance Programs and Staff	Maintenance Programs and Staff	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Hospitals and Medical Facilities: Construction and Design Manual
Recommended books	INTEGRATED ELECTRONICS MILLMAN · HALKIAS.
Hospital system References, Websites	https://books-world.net/electronic-devices-and-circuit-theory-11th-ed/

Course Description Form

1. Course Name:
Biotribology
2. Course Code:
MDER524
3. Semester / Year:
2nd semester / Fifth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs Units : 2
7. Course administrator's name (mention all, if more than one name)
Name: ahmed nhma Email: ahmed.hadi.eng@uobabylon.edu.iq
8. Course Objectives

Course Objectives	To study the interaction between living tissues and synthetic materials, with a focus on preventing and treating wear, friction, and lubrication-related problems in the human body.

9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding of the fundamental concepts of tribology.	Introduction to Biotribology	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

2	2	Understanding of the fundamental concepts of tribology	Basic Concept of Biotribology	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	Understanding of the fundamental concepts of tribology, including friction, wear, lubrication, and surface interactions, as they apply to biological systems	Friction and Wear	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Lubricant Materials	Lubricant Materials	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	Biotribology of Hip Joint	Biotribology of Hip Joint	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Biotribology of Regenerated Cartilage	Biotribology of Regenerated Cartilage	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Wear Measurements	Wear Measurements	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Frictional Heating of Articulating Surfaces	Frictional Heating of Articulating Surfaces	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Biotribology of Titanium Alloys 157	Biotribology of Titanium Alloys 157	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
10	2	Biotribology of Artificial Knee	Biotribology of Artificial Knee	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Mid.Exam + Biotribology of the Dental Application	Mid.Exam + Biotribology of the Dental Application	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

12	2	Improve Biotribology for Different Biomedical Application	Improve Biotribology for Different Biomedical Application	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

13	2	Recently Methods for Improvement Biotriboloy Properties	Recently Methods for Improvement Biotriboloy Properties	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	Future Directions in Biotribology	Future Directions in Biotribology	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Preparatory week before the final Exam	Preparatory week before the final Exam	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	Biotribology , Wiley , J. Paulo Davim
Recommended books	Biotribology of Natural and Artificial Joints, eruo Murakami
Electronics References, Websites	

Course Description Form

1. Course Name:	
Computer Network	
2. Course Code:	
MDER523	
3. Semester / Year:	
Second/fifth	
4. Description Preparation Date:	
19/1/2025	
5. Available Attendance Forms:	
In class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2/2	
7. Course administrator's name (mention all, if more than one name)	
Name: dr alaa Imran al-muttairi E mail : al_al_44@uobabylon.edu.iq	
8. Course Objectives	1- To Understand the fundamentals of computer networks and their importance in modern computing. 2- To Explore different types of networks and network topologies. 3- To Familiarize students with the OSI model and its layers and understand the functions and responsibilities of each OSI layer. 4- To Learn about IPv4 addressing, including the structure of IP addresses and subnetting. 5- To Understand the functions and roles of different devices in a computer network. 6- To Explore the process of packet delivery and forwarding in an IP-based network. 7- To Understand the purpose and operation of the Address Resolution Protocol (ARP). Introduce IPv6 addressing and its advantages over IPv4. To Understand the practical implications of wave propagation in wireless network design
Course Objectives	
9. Teaching and Learning Strategies	

Strategy	The material is presented theoretically, followed by assigning students homework. Practical networking demonstrations are integrated into the lectures using Packet Tracer software. Additionally, students are tasked with conducting seminars on certain subjects and presenting them to their peers.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Basic concepts of computer networks	Introduction to computer networks.	In classroom	Quiz + oral questions
2	2	Types of networks (LAN, WAN, MAN), Network topologies (Bus, Star, Mesh, Ring), Network protocols and standards, Client-server models versus peer-to-peer models	OSI computer network reference model – Part 1.	In classroom	Quiz + oral questions
3	2	OSI model and its layers	OSI computer network reference model – Part 2.	In classroom	Quiz + oral questions
4	2	TCP/IP model and its layers	TCP/IP (Internet) computer network reference model.	In classroom	Quiz + oral questions
5	2	IPv4 addressing and subnets, Classful and classless addressing, Subnet masks and subnet calculations	Network Layer , IPV4 addresses (Glassful addressing).	In classroom	Quiz + oral questions

6	2	IPv4 addressing and subnets, Classful and classless addressing, Subnet masks and subnet calculations	Network Layer , IPV4 addresses (Classless addressing).	In classroom	Quiz + oral questions
7	2	Network Address Translation (NAT) translation and private addressing, Overview of network devices: Switches, Routers, Firewalls, Hubs	Computer Network Devices.	In classroom	Quiz + oral questions
8	2	Understanding packet routing within networks	Delivery and Forwarding of IP Packets.	In classroom	Quiz + oral questions
9	2	Understanding ARP protocol	Address Resolution Protocol (ARP).	In classroom	Quiz + oral questions
10	2	IPv6 addressing: structure and types	Network Layer , IPV6 addresses.	In classroom	Quiz + oral questions
11	2	Understanding wave propagation, Understanding the Fresnel equation	Free Space Wave Propagation – Friis Equation.	In classroom	Quiz + oral questions
12	2		Midterm Exam	In classroom	Quiz + oral questions

13	2	Recognizing the power budget calculation at the receiver end	Wave Propagation – Related Power to Electrical field.	In classroom	Quiz + oral questions
14	2	Understanding the impact of radio waves after reflection from the ground	Ground Reflection and diffraction Part-1	In classroom	Quiz + oral questions
15	2	Practical lecture	Ground Reflection and diffraction Part-2	In classroom	Quiz + oral questions

11. Course Evaluation

متحان الند (30%) + الكوز اليومي مع السمنر (5%) + الحضور والمشاركة (5%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Data and Computer Communications, Eighth Edition, William Stallings
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Control II
2. Course Code:
MDER522
3. Semester / Year:
Second/fifth
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms:
on Campus
6. Number of Credit Hours (Total) / Number of Units (Total)
5/3
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof Dr. Hayder Mahdi Abdulridha Email: drenghaider@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• To provide the fundamental knowledge of control system engineering and the concept of mathematical modeling of the physical system. • The subject gives various classical analysis tools for design and stability of system in time and frequency domain
9. Teaching and Learning Strategies	
Strategy	1- Thinking strategy according to the student's ability (Example: If the student is able to learn the correct concept of management, he will acquire the skill of managing and organizing his personal life) 2- High thinking skill strategy (for example, if the student wants to make a good decision, it is important that he thinks well before he makes the decision, and if he decides without thinking, or if he cannot think well, or if he cannot decide, or perhaps he will not decide, then this This means he does not have high thinking skills. 3- Critical thinking strategy in learning (Critical Thanking) (it is a term that symbolizes the highest levels of thinking, which aims to pose a problem and then analyze it logically to reach the desired solution)
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning	Evaluation method
1- Introduction to discrete-time systems	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
2- Mathematical Modeling of Electrical and Mechanical Systems	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
3- Block Diagrams and Signal Flow Graphs	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
4- Discrete-Time Domain Response	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
5- Transient Response	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
6- Steady State Accuracy	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework

7- Stability Analysis	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
8- Root Locus	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
9- Frequency Response	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
10- State Space Analysis for discrete-time Equations	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
11- Solving State Space for discrete-time Equations	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
12- Controllability and Observability	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
13- PID Controllers	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework

14- Pole Placement	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework
15- State Observers	2	Theoretical principles and applications	Control I	Lectures presentations and solving exercises	1-Mid exam 2-Semester exam 3-Evaluating the performance of the student's activity in the lecture 4-Homework

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Modern Control Engineering by K. OGATA
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Biomedical Sensors
2. Course Code:
BMER526
3. Semester / Year:
2nd semester / Fifth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms:
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6. Number of Credit Hours (Total) / Number of Units (Total)
Theory : 2 Hrs Tutorial : 1 Units : 2
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Mahmoud Shaker Nasr Email: eng.mahmoud.shaker@uobabylon.edu.iq
8. Course Objectives

Course Objectives	To develop problem solving skills and understanding of the advanced circuits of biosensors and practical applications in biomedical .....
9. Teaching and Learning Strategies	
Strategy	• Theory in class room. • Quizzes and home works.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to biosensors, Biomedical sensors, definition, components and general working principle. Characteristics of biosensors, Types of erroe in biomedical sensors measurements,	Introduction to biosensors, Biomedical sensors, definition, components and general working principle. Characteristics of biosensors, Types of erroe in biomedical sensors measurements,	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

		selectioning of a specific	selectioning of a specific		

		biomedical sensor.	biomedical sensor.		
2	2	Construction of biosensors design, Classification of bio sensors,Types of biosensors Biosensors applications. Signal conditioning of biosensor signals.	Construction of biosensors design, Classification of bio sensors,Types of biosensors Biosensors applications. Signal conditioning of biosensor signals.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
3	2	Biochemical sensors, introduction and general block diagram. Potentiometeric biochemical sensor, construction and operation.	Biochemical sensors, introduction and general blockd iagram. Potentiometeric biochemical sensor, construction and operation.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
4	2	Voltametric biochemical sensor, construction and operation.	Voltametric biochemical sensor, construction and operation.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
5	2	Amperometric biochemical sensor, construction and operation.	Amperometric biochemical sensor, construction and operation.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
6	2	Conductometric biochemical sensor, construction and operation. Optical sensors basic construction and general operation.	Conductometric biochemical sensor, construction and operation. Optical sensors basic construction and general operation.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
7	2	Optical fiber, construction, types and theory of operation. Light sources and detectors in optical system.	Optical fiber, construction, types and theory of operation. Light sources and detectors in optical system.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
8	2	Optical phenomenon used in optical bio sensors . Optical sensing element immobilization.	Optical phenomenon used in optical bio sensors . Optical sensing element immobilization.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
9	2	Optical biosensor based on Surface Plasmon Resonance (SPR). Analysis of Sensogram to detect and measure the concentration of an analyte.	Optical biosensor based on Surface Plasmon Resonance (SPR). Analysis of Sensogram to detect and measure the concentration of an analyte.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

10	2	Mid-term Exam + Piezoelectric and acoustic biosensor, definition and construction.	Mid-term Exam + Piezoelectric and acoustic biosensor, definition and construction.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
11	2	Piezoelectric materials construction and operation, Techniques of piezoelectric biosensor. Acoustic biosensor construction and operation.	Piezoelectric materials construction and operation, Techniques of piezoelectric biosensor. Acoustic biosensor construction and operation.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
12	2	Temperature sensor, introduction, and application. RTD temperature sensors, construction, theory of operation and application in biosensor.	Temperature sensor, introduction, and application. RTD temperature sensors, construction, theory of operation and application in biosensor.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
13	2	NTC temperature sensors, construction, theory of operation and application in biosensor.	NTC temperature sensors, construction, theory of operation and application in biosensor.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
14	2	Thermocouple temperature sensors, construction, theory of operation and application in biosensor.	Thermocouple temperature sensors, construction, theory of operation and application in biosensor.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes
15	2	Noncontact temperature sensors, construction, theory of operation and application in biosensor.	Noncontact temperature sensors, construction, theory of operation and application in biosensor.	Theory, discussions, quizzes	Final and Mid term exams, home works, and quizzes

11 Course Evaluation :	
Distributing the score out of 100 according to the following : mid term exam 30 % , daily evaluation 10%, and final exam. 60 %	
12. Learning and teaching Resources	
Required textbooks (curricular books, if any)	J. G. Webster, Medical Instrumentation, application and Design, John Wiley and Sons.
Recommended books	J. J. Carr and J. M. Brown, Introduction to Biomedical Equipment Technology, Pearson Education
Electronics References, Websites	J. J. Carr and J. M. Brown, Introduction to Biomedical Equipment Technology, Pearson Education

Course Description Form

1. Course Name:
Signals and Systems
2. Course Code:
MDER520
3. Semester / Year:
Second semester/ Fifth year
4. Description Preparation Date:
19/1/2025
5. Available Attendance Forms: In class
6. Number of Credit Hours (Total) / Number of Units (Total):
3 / 2
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Amir F. Al-Bakri Email: amir.albakri@uobabylon.edu.iq
8. Course Objectives

Course Objectives	1. Explain the mathematical basis for the frequency content of a signal with particular reference to the Fourier series and the Fourier transform. 2. Explain the mathematical basis of the frequency response of a linear, time-invariant system, analog or discrete-time. 3. Derive mathematical models for and analyze the response of linear, time-invariant systems, analog or discrete-time. Effectively solve linear, constant coefficient ordinary differential and difference equations.

9. Teaching and Learning Strategies	
Strategy	In this module you will be attending lectures. You will also participate in classroom and small group discussions. Each of these activities is supported by pre and post-session, directed self-study such as quizzes or assignments. This module develops your understanding of biomedical signal processing in biomedical engineering and will use examples of how physics is applied to signal formation in a variety of modalities.

10. Course Structure

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

16	Th. 2 Tut. 1	Theoretical and Practical experiences	Signals and systems	Theory and practice	Test, Quizzes and final exam

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .....etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Textbook	Signals and Systems, Alan V. Oppenheim
References	Digital signal processing, principles, algorithms, and applications, John G. Proakis