Course Description Form

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

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

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

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

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

Course Description Form of thermofluids 1

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

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

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

10. Course Structure

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

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

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

11. Course Evaluation

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

Lab exam

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

12. Learning and Teaching Resources

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Course Description Form

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

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

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

2. Course Structure

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

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

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

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

Course Description Form

1. Course Name:

Medical Instrumentation

2. Course Code:

WBM-41-04

3. Semester / Year:

1st Semester / 2023 2024

4. Description Preparation Date:

19/3/2024

5. Available Attendance Forms:

Weekly (Theoretical & Practical)

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

45 Hrs. Theoretical & 30 Hrs. Practical / 3 Units

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

Name: Dr. Hayder A. Yousif
Email: hayder.ab@uowa.edu.iq

8. Course Objectives

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

9. Teaching and Learning Strategies

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to laboratory medical devices	Introduction to Medical Instruments	Theoretical & Practical	Daily test and oral questions

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

14	3	Learn about brain signals and how it generate.	EEG (Part 1)	Theoretical & Practical	Daily test and oral questions
15	3	Learn how to record brain signals and how to process them	EEG (Part 2)	Theoretical & Practical	Daily test and oral questions

11. Course Evaluation

1- Weekly exams
2- Monthly exams
3- Participations inside the class
4-present the seminars
5- Writing reports

12. Learning and Teaching Resources

Required textbooks (curricular books any)	Handbook of Biomedical Instrumentation Second Edition - R S KHANDPUR
Main references (sources)	Handbook Of Biomedical Instrumentation 3rd Edition 933920543X · 9789339205430 By R S Khandpur
Recommended books and references (scientific journals, reports…)	Standard handbook of biomedical engineering & design - M Kutz
Electronic References, Websites	https://books.google.iq/books/about/Handbook of_Biomedical_Instrumentation.html?idesc=y

Course Description Form of Communications I

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

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

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

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

10. Course Structure

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

Course Description Form

1. Course Name:
Biomaterial I
2. Course Code:
WBM-41-02
3. Semester / Year:
Semester 1/ 4th
4. Description Preparation Date:
2024-09-19
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Odea Email: ahmed.odea@uowa.iq

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

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

10. Course Structure

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

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

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

Course Description Form

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

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

9. Teaching and Learning Strategies

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

10. Course Structure

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

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

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

Course Description Form

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

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

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

2. Course Structure

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

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

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

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

Course Description Form

1. Course Name:

Medical Instrumentation

2. Course Code:

WBM-41-04

3. Semester / Year:

1st Semester / 2023 2024

4. Description Preparation Date:

19/3/2024

5. Available Attendance Forms:

Weekly (Theoretical & Practical)

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

45 Hrs. Theoretical & 30 Hrs. Practical / 3 Units

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

Name: Dr. Hayder A. Yousif
Email: hayder.ab@uowa.edu.iq

8. Course Objectives

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

9. Teaching and Learning Strategies

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to laboratory medical devices	Introduction to Medical Instruments	Theoretical & Practical	Daily test and oral questions

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

14	3	Learn about brain signals and how it generate.	EEG (Part 1)	Theoretical & Practical	Daily test and oral questions
15	3	Learn how to record brain signals and how to process them	EEG (Part 2)	Theoretical & Practical	Daily test and oral questions

11. Course Evaluation

1- Weekly exams
2- Monthly exams
3- Participations inside the class
4-present the seminars
5- Writing reports

12. Learning and Teaching Resources

Required textbooks (curricular books any)	Handbook of Biomedical Instrumentation Second Edition - R S KHANDPUR
Main references (sources)	Handbook Of Biomedical Instrumentation 3rd Edition 933920543X · 9789339205430 By R S Khandpur
Recommended books and references (scientific journals, reports…)	Standard handbook of biomedical engineering & design - M Kutz
Electronic References, Websites	https://books.google.iq/books/about/Handbook of_Biomedical_Instrumentation.html?idesc=y

Course Description Form of Communications I

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

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

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

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

10. Course Structure

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

Course Description Form

1. Course Name:
Biomaterial I
2. Course Code:
WBM-41-02
3. Semester / Year:
Semester 1/ 4th
4. Description Preparation Date:
2024-09-19
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Odea Email: ahmed.odea@uowa.iq

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

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

10. Course Structure

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

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

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

Course Description Form

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

	complex biomechanical phenomena and their applications in biomedical. • Case Studies: Analyze real-life case studies that require students to apply their theoretical knowledge to solve practical problems. 2. Learning Activities • Laboratory Experiments: Design lab sessions that allow students to test and analyze mechanical properties, and use biomechanical testing equipment. • Project-Based Learning: Assign projects that require design, implementation, and testing of models related to biomechanics, encouraging teamwork and innovation. 3. Continuous Improvement • Feedback: Regularly collect feedback from students regarding the clarity of instructions, the relevance of course content, and the effectiveness of teaching methods. • Curriculum Updates: Continuously update the curriculum based the latest scientific advancements in biomechanics.

10. Course Structure

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

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

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