

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	<ul style="list-style-type: none"> • 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 assignments + monthly exams
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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:	
Biomaterial I	
2. Course Code:	
WBM-41-02	
3. Semester / Year:	
Semester 1/ 4 th	
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	<ol style="list-style-type: none"> 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 , History of Biomaterials Knowledge Develop Biomaterials , 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 medical practice, New examples of biomaterials application, classification of biomaterials	Lectures presented in PDF format	Daily exams homework assignments monthly exams
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 exams
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 exams
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)	<u>Biomaterials Science: An Introduction to Materials in Medicine</u>
Main references (sources)	<u>Biomaterials Science: An Introduction to Materials in Medicine</u>
Recommended books and references (scientific journals, reports...)	<u>An Introduction to Tissue-Biomaterial Interactions</u>

Course Description Form

1. Course Name:	
Biomechanics I	
2. Course Code:	
WBM-41-01	
3. Semester / Year:	
1 st 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	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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

Course Description Form

1. Course Name:
pathology
2. Course Code:
MED-404
3. Semester / Year:
first semester 2025
4. Description Preparation Date:
28/9/2025
5. Available Attendance Forms:
Presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
30h Theory – 7 units
7. Course administrator's name (mention all, if more than one name)
Name: Aref alsayad Email: aref.alsayad@uowa.edu.iq
8. Course Objectives
<ul style="list-style-type: none">• To know the Pathology–Biopsycell number, size, shape, and properties of cell and distinguish their characteristics.• To understand cell injury, Structure of a cell• This course deals with the basic concept of stem cell.• the basic subject for all body tissues.
9. Teaching and Learning Strategies
1. Teaching Methods <ul style="list-style-type: none">• Lectures and Demonstrations: Use lectures to cover theoretical aspects, and live demonstrations to highlight practical applications.• Review Results Analysis: Collect student feedback systematically to improve course content and delivery, aligning with technological advancement and changing learning needs.

- The main strategy that will be adopted in delivering this module is to encourage students' Structure of the laboratory technique This will be achieved through classes, interactive tutorials and considering type of simple experiments involving some simplified activities that are interesting to the students .

10. Course Structure

Week	Hours	Unit or subject name and required learning outcomes	Learning method	Evaluation method
1	2	1	Pathology-Biopsy	Lectures
2	2	1	cell injury	Lectures
3	2	1	inflammation	Lectures
4	2	1	inflammation	Lectures
5	2	1	stem cell	Lectures
6	2	1	stem cell	Lectures
7	2	1	The cardiac	Lectures
8	2	1	cycle	Lectures
9	2	1	Heart failure	Lectures
10	2	1	Asthma	Lectures
11	2	1	Cell Division	Lectures
12	2	1	Emphysema	Lectures
13	2	1	Pneumonia	Lectures
14	2	1	Valvular	lectures

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	pathology (7th editions) by Silva Anderus A L (ed.).
Main references (sources)	Human pathology (6 th editions), by John Recharged

Recommended books and references (scientific journals, reports...)

Human pathology (6 th editions), by John Recharged

Course Description Form

1. Course Name:					
Digital Electronics I					
2. Course Code:					
MED-406					
3. Semester / Year:					
First semester- 2025 - 2026					
4. Description Preparation Date:					
1-12-2025					
5. Available Attendance Forms:					
Class Attendance					
6. Number of Credit Hours (Total) / Number of Units (Total)					
56 \ 3					
7. Course administrator's name (mention all, if more than one name)					
Name: Qayssar Ayad Ahmed					
Email: qayssar.ayad@uowa.edu.iq					
8. Course Objectives					
Course Objectives		<ul style="list-style-type: none"> • Building the student scientifically and qualifying him to understand the principles of Digital electronics and its applications in some scientific and engineering fields. • Urging the student to be creative and think about specialization projects and keep pace with the development taking place in this field in terms of the basis of digital electronics in engineering work systems. • Identify the types of digital electronics and some of their practical applications. 			
9. Teaching and Learning Strategies					
Strategy		<p>The main strategy that will be adopted in developing the main features of this module to encourage student's participation in the exercises, while at the same time refining and expanding their critical thinking skill. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1-2	4	Learning Outcomes: 1, 2	Binary systems, binary numbers, octal numbers and hex numbers,	Lectures DATA SHOW	Quizzes and classroom activities
3-4	4	Learning Outcomes: 1, 2	number base conversions, complements, signed numbers, binary codes,	Lectures DATA SHOW	Quizzes and classroom activities
5-6	4	Learning Outcomes: 1, 2	AND, OR, NOT, XOR, XNOR	Lectures DATA SHOW	Quizzes and classroom activities
7-8	4	Learning Outcomes: 1, 2	SOP, POS, NAND and NOR implementation,	Lectures DATA SHOW	Quizzes and classroom activities
9-10	4	Learning Outcomes: 1, 2	K- map, don't care, combinational logic circuits, analysis and design procedure	Lectures DATA SHOW	Quizzes and classroom activities
11-12	4	Learning Outcomes: 1, 2	binary adders and subtraction, decimal adders, comparators	Lectures DATA SHOW	Quizzes and classroom activities
13-14	4	Learning Outcomes: 1, 2	decoders, encoders, multiplexers, Demultiplexers	Lectures DATA SHOW	Quizzes and classroom activities

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

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas-L.-Floyd-Digital-Fundamentals-Prentice-Hall-2015
Main references (sources)	Thomas-L.-Floyd-Digital-Fundamentals-Prentice-Hall-2015
Recommended books and references (scientific journals, reports...)	Internet files. All solid scientific journals and sites that are related to the broad concept of digital electronics.
Electronic References, Websites	Tracking Scientific websites to view recent developments in the prescribed subject For fourth year students.

Course Description Form

1. Course Name:					
Thermofluidic dynamics					
2. Course Code:					
WBM-41-07					
3. Semester / Year:					
Semester 2					
4. Description Preparation Date:					
3-9-2025					
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)					
Name: Asst. lec. Hussain Ameer Aljawad Email: hussein.aljawad@uowa.edu.iq					
8. Course Objectives					
Course Objectives			This subject aims to provide students with knowledge of basic concepts in fluids and systems used in thermal science, including thermodynamic laws, processes and cycles, work and heat		
9. Teaching and Learning Strategies					
Strategy		<ul style="list-style-type: none"> - 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	1+3	Properties and units, fluid static	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams

2	2	1+3	fluid flow, flow patterns	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
3	2	1+3	Newton's law of viscosity	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
4	2	1+3	continuity equation	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
5	2	1+3	Bernoulli equation	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
6	2	1+3	Reynolds number	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
7	2	1+3	friction factor,	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
8	2	1+3	pressure drop in pipes and fittings	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
9	2	1+3	pumps, flow measurement	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
10	2	1+3	boundary layer	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
11+ 12	2	1+3	heat transfer, conduction,	Lectures presented in PDF format	Daily exams + homework assignments

					+ monthly exams
13 +14	2	1+3	radiation, heat exchangers,	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams
15	2	1+3	drugs delivery, controlled release.	Lectures presented in PDF format	Daily exams + homework assignments + monthly exams

11. Course Evaluation

Daily exams scientific questions.

Establishing grades for experimental duties and the reports

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fluid Mechanics, 7th, Frank M. White, University of Rhode Island
Main references (sources)	Fundamental of Thermal fluid Science By Cengel Y. A. , Turner R.H. and cimbala J .
Recommended books and references (scientific journals, reports...)	Fox and McDonald's, "INTRODUCTION TO FLUID MECHANICS " EIGHTH EDITION, PHILIP J. PRITCHARD
Electronic References, Websites	

Course Description Form

1. Course Name:					
Biomaterial I					
2. Course Code:					
WBM-41-02					
3. Semester / Year:					
Semester 1/ 4 th					
4. Description Preparation Date:					
2025-9-25					
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: Osama Abdulbari Email: oasma.abedelbari@uowa.edu.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		<p>1- Classification of biological materials used in medicine and their special requirements</p> <p>2- An understanding of the concept of biocompatibility and methods for testing biomaterials</p> <p>3- A description and explanation of the surfaces of biological materials and the different methods of analysis</p> <p>4- Understand ways to improve biocompatibility and practical aspects of biomedical devices: sterilization, manufacturing, clinical trials and ethical issues.</p> <p>5- Analysis of permanent and biodegradable agriculture by referring to ca studies</p>			
10. Course Structure					
Week	Hour s	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method

1	2	Introduction	Introduction, History of Biomaterials of Knowledge to Develop Biomaterials, basics of 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 medical 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 exams
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 exams
5	2	Porous Ceramics	Porous Ceramics, Bioactive Glasses and Glass-Ceramics	Lectures presented in PDF format	Daily exams 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 Prosthetic, Latexes, Polyurethane polymers, Acrylic Resins, Resin Teeth for Prosthodontics' Applications	Lectures presented in PDF format	Daily exams + homework assignments + monthly

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)	<u>Biomaterials Science: An Introduction to Materials in Medicine</u>
Main references (sources)	<u>Biomaterials Science: An Introduction to Materials in Medicine</u>

Recommended books and references (scientific journals, reports...)

[An Introduction to Tissue-Biomaterial Interactions](#)

Course Description Form

1. Course Name:	
Communications I	
2. Course Code:	
WBM-41-03	
3. Semester / Year:	
First semester/ 2025	
4. Description Preparation Date:	
4-9-2025	
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	1-The study and detailed analysis of each theories concerning the designs of telecommunication systems 2- The application of the basic principles through linking theoretical and practical laboratory
9. Teaching and Learning Strategies	
Strategy	<p>1.Theoretical Lectures: Instructors provide lectures on fundamental concepts, theories, and principles of communication engineering. This helps students understand the theoretical underpinnings of different communication systems and technologies.</p> <p>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.</p> <p>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.</p>

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	1&2	Introduction to Communications System element	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams
2+3	6	1&2	Signal representation using Fourier Series.	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams
4	3	1&2	Signal Spectrum using Fourier Transform	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams
5+6	6	1&2	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	1&2	Amplitude Modulation	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams
10+11+	9	1&2	Frequency Modulation	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams
13+14	6	1&2	Noise in communication systems	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams
15	3	1&2	Sampling Theorem	Lectures presented In PDF format	Daily exams + homework assignments + monthly exams

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)	-(McGraw) Schaum's Outlines of Signals & Systems. -(Communications Engineering) Michael Fitz-Fundamentals of Communications Systems-McGraw-Hill Professional (2007)
Main references (sources)	Theory and Problems of Analog and Digital Communications_2nd_Ed_Schaum's Outline Series.
Recommended books and references (scientific journals, reports...)	All reputable scientific journals that are related to the concept of mathematical theories and their results

Course Description Form

1. Course Name:	
Biomechanics	
2. Course Code:	
WBM-42-04	
3. Semester / Year:	
First semester/2025	
4. Description Preparation Date:	
30/07/2025	
5. Available Attendance Forms:	
Presence in the classroom	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 h/ 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Saad M. Sarhan Email: saad.mah@uowa.edu.iq	
8. Course Objectives	
Course Objectives	The topic of biomechanics aims to enable students to acquire the following skills: <ul style="list-style-type: none"> • Improving technical performance (technique). • Developing and innovating new tools. • Enhancing training methods. • Improving overall performance. • Preventing injuries and facilitating rehabilitation processes.
9. Teaching and Learning Strategies	
Strategy	<ul style="list-style-type: none"> •The instructor delivers detailed theoretical lectures. •The instructor requests periodic reports on the core topics of the subject. •The instructor ensures mastery of the fundamental concepts and their practical applications, enhancing the teaching and learning process. •The instructor introduces students to key applications, such as prosthetics and assistive devices in the field of biomedical engineering, both theoretically and practically.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	9	1,2,3	The Biomechanics of the Human Upper Extremity	Lectures	Quizzes and HWs
4-6	9	1,2,3	The Biomechanics of the Human Lower Extremity	Lectures	
7-8	6	1,2,3	The Biomechanics of the Human Spine	Lectures	
9-10	6	1,2,3	Linear Kinematics of Human Movement	Lectures	
11-12	6	1,2,3	Angular Kinematics of Human Movement	Lectures	
13-15	9	1,2,3	Equilibrium and Human Movement	Lectures	

11. Course Evaluation

Mid-term exam	30%
Quizzes and HWs	10%
Technical reports	10%
Final Exam	50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	BASIC BIOMECHANICS EIGHTH EDITION Susan J. Hall, Ph.D.
Main references (sources)	The college library provides access to additional resources for the curriculum.
Recommended books and references (scientific journals, reports...)	Browsing scientific websites to stay updated on the latest developments in the subject.
Electronic References, Websites	

Course Description Form

1. Course Name:	
Medical Instrumentation	
2. Course Code:	
WBM-41-04	
3. Semester / Year:	
1 st Semester / 2025 2026	
4. Description Preparation Date:	
19/3/2025	
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: Asst. Lecturer Mustafa Habib Chyad Email: mustafa.ha@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	2&1	Introduction to Medical Instruments	Theoretical & Practical	Daily test and oral questions
2	3	2&1	Bio-electric signals	Theoretical & Practical	Daily test and oral questions
3	3	2&1	Centrifuge (Part 1)	Theoretical & Practical	Daily test and oral questions
4	3	2&1	Centrifuge (Part 2)	Theoretical & Practical	Daily test and oral questions
5	3	2&1	Blood Cell Counter (Part1)	Theoretical & Practical	Daily test and oral questions
6	3	2&1	Blood Cell Counter (Part2)	Theoretical & Practical	Daily test and oral questions
7	3	2&1	Spectrophotometer	Theoretical & Practical	Daily test and oral questions
8	3	2&1	Colorimeter	Theoretical & Practical	Daily test and oral questions
9	3	2&1	Flame photometer	Theoretical & Practical	Daily test and oral questions
10	3	2&1	ECG (Part 1)	Theoretical & Practical	Daily test and oral questions
11	3	2&1	ECG (Part 2)	Theoretical & Practical	Daily test and oral questions
12	3	2&1	EMG (Part 1)	Theoretical & Practical	Daily test and oral questions
13	3	2&1	EMG (Part 2)	Theoretical & Practical	Daily test and oral questions
14	3	2&1	EEG (Part 1)	Theoretical & Practical	Daily test and oral questions
15	3	2&1	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

MODULE DESCRIPTION FORM

Module Name:	
Digital Electronics II	
Module Code:	
MED-406	
Semester / Year:	
Second Semester- 2026	
Date of Preparation of this Description:	
11-2-2026	
Available Attendance Formats:	
Class Attendance	
Total Credit Hours / Total Units:	
56 \ 3	
Name of the Course Coordinator (if there are multiple names):	
Qayssar Ayad Ahmed qayssar.ayad@uowa.edu.iq	
Module Objectives:	
Module Objectives	<ol style="list-style-type: none">1- Building the student scientifically and qualifying him to understand the principles of Digital electronics and its applications in some scientific and engineering fields.2- Urging the student to be creative and think about specialization projects and keep pace with the development taking place in this field in terms of the basis of digital electronics in engineering work systems.3- Identify the types of digital electronics and some of their practical applications.
1. Teaching and Learning Strategy	
Strategy:	The main strategy that will be adopted in developing the main features of this module to encourage student's participation in the exercises, while at the same time refining and expanding their critical thinking skill. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

2. Module Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Latches and flip flops	S-R FF, D FF, J-K FF, and T FF, applications	Lectures DATA SHOW	Surprise exams and classroom activities
3-4	4	Counters, asynchronous counter	(ripple counters), up-down counters,	Lectures DATA SHOW	Surprise exams and classroom activities
5-6	4	Synchronous counters	design, up-down) counters mod-counters, applications	Lectures DATA SHOW	Surprise exams and classroom activities
7-8	4	Registers	shift register, serial in/serial out, serial in/parallel out, parallel in/parallel out, parallel in /serial out	Lectures DATA SHOW	Surprise exams and classroom activities
9-10	4	Ring counter, Johanson counters, applications	applications, square wave generators, one shot	Lectures DATA SHOW	Surprise exams and classroom activities
11-12	4	A/D and D/A	Explanation and applications of conversions	Lectures DATA SHOW	Surprise exams and classroom activities
13-14	4	Memory types	RAM, ROM, flash RAM.	Lectures DATA SHOW	Surprise exams and classroom activities

3. Module Evaluation

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

4. Learning and Teaching Resources.

Required textbooks (curricular books, if any)	Thomas-L.-Floyd-Digital-Fundamentals-Prentice-Hall-2015
Main references (sources)	Thomas-L.-Floyd-Digital-Fundamentals-Prentice-Hall-2015
Recommended books and references (scientific journals, reports...)	Internet files. All solid scientific journals and sites that are related to the broad concept of digital electronics.

**University of Wraith Al-Anbiyaa / College of Engineering / Biomedical Engineering
Department Course Description**

Electronic References, Websites	Tracking Scientific websites to view recent developments in the prescribed subject For fourth year students.
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Module Description Form

1. Course Name:					
Therapeutic Instrumentation					
2. Course Code:					
WBM-42-05					
3. Semester / Year:					
2 nd Semester / 2026					
4. Description Preparation Date:					
12/2/2026					
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		<ol style="list-style-type: none"> 1. Identify the therapeutic devices that deal with the human body 2. How to design the therapeutic device 3. Identifying cases that require the use of a therapeutic device 			
9. Teaching and Learning Strategies					
Strategy		To make the student able to understand the principle of operation of the therapeutic medical device 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	2	Physiotherapy devices	Theoretical & Practical	Daily test and oral questions
2	3		Infrared (IR) therapeutic device	Theoretical & Practical	Daily test and oral questions
3	3		ultrasonic therapeutic devices	Theoretical & Practical	Daily test and oral questions
4	3		Microwave device	Theoretical & Practical	Daily test and oral questions
5	3		short waves devices	Theoretical & Practical	Daily test and oral questions
6	3		Wax bath device	Theoretical & Practical	Daily test and oral questions
7	3		Lithotripsy	Theoretical & Practical	Daily test and oral questions
8	3		Artificial pulmonary ventilators	Theoretical & Practical	Daily test and oral questions
9	3		Ventilators classification	Theoretical & Practical	Daily test and oral questions
10	3		Medical gases	Theoretical & Practical	Daily test and oral questions
11	3		Anesthesia machine	Theoretical & Practical	Daily test and oral questions
12 & 13	3		Cardiac defibrillators	Theoretical & Practical	Daily test and oral questions
14	3		Tooth chair (dental unit)	Theoretical & Practical	Daily test and oral questions
15	3		Pneumatic and hydraulic circuit	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)	<ol style="list-style-type: none"> 1. Introduction to Biomedical Engineering, Joseph D. Bronzino, 3rd Ed. 2012, Academic Press. 2. Handbook of Biomedical Instrumentation Second Edition - R S KHANDPUR
Main references (sources)	<ol style="list-style-type: none"> 1. Introduction to Biomedical Engineering, Joseph D. Bronzino, 3rd Ed. 2012, Academic Press. 2. Medical Devices and Systems, Joseph D. Bronzino, 1st Ed. 2006, CRC, Taylor & Francis. 3. The Biomedical Engineering Handbook, Joseph D. Bronzino, 4th Ed. 2015, CRC Press.

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

Course Description Form

1. Course Name:	
Analytical Mechanics	
2. Course Code:	
WBM-42-04	
3. Semester / Year:	
Semester	
4. Description Preparation Date:	
10/2/2026	
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 forced of undamped and damped vibrations, rotating unbalance, support motion, vibration measuring instruments, two and multi degrees of freedom.
9. Teaching and Learning Strategies	
Strategy	1. Model real and physical dynamic systems in terms of mathematical models. 2. Apply principles of mechanical vibrations such as Newton's second law, and the principle of conservation of energy to the mathematical models to obtain their governing equations of motion. 3. Solve the obtained equations of motion to understand behavior of oscillatory systems to various excitations such as harmonic excitation, and impulse excitation.

10. Course Structure

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

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text book of Mechanical vibrations (2nd Ed) V. D. Rao.
Main references (sources)	Theory of vibration with applications (5-Ed), William T. Thomson
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Biomaterials
2. Course Code:
WBM-41-02
3. Semester / Year:
Second Semester / Fourth Year
4. Description Preparation Date:
27/02/2026
5. Available Attendance Forms:
In-class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Credits
7. Course administrator's name (mention all, if more than one name)
Prof. Dr. Ahmed Hadi Abdulameer a.alyasari@uokerbala.edu.iq
8. Course Objectives
Biomaterials are used in medical devices and a wide range of healthcare products. The objective of studying biomaterials is to understand how natural body tissues are organized structurally and in terms of their biological properties.
9. Teaching and Learning Strategies
<ul style="list-style-type: none">• Classification of biological materials used in medicine and their specific requirements.• Understanding the concept of biocompatibility and methods for testing biomaterials.• Description and analysis of biomaterial surfaces and different methods of characterization.• Improving biocompatibility and practical aspects: sterilization manufacturing, clinical trials, and ethical issues.• Analysis of permanent and biodegradable implants through case studies.

10. Course Structure				
Week	Hours	Unit or subject name and required learning outcomes	Learning method	Evaluation method
1	2	Introduction and history of biomaterials; fundamentals; synthesis, characterization, testing, applications.	Lecture notes as pdf	Quizzes and monthly exams
2	2	Applications and classification of biomaterials in medical practice.	Lecture notes as pdf	Quizzes and monthly exams
3	2	Evaluation and selection of biomedical materials (polymers, metals, ceramics, composites).	Lecture notes as pdf	Quizzes and monthly exams
4	2	Important topics in biomaterials; bioceramics and tissue attachment.	Lecture notes as pdf	Quizzes and monthly exams
5	2	Porous ceramics, bioactive glasses, glass-ceramics.	Lecture notes as pdf	Quizzes and monthly exams
6	2	Biodegradable and resorbable materials (ceramics, polymers, metals).	Lecture notes as pdf	Quizzes and monthly exams
7	2	Physical and mechanical properties of biomaterials and their biological effects.	Lecture notes as pdf	Quizzes and monthly exams
8	2	Chemical properties of bioceramics; dissolution, corrosion, leaching.	Lecture notes as pdf	Quizzes and monthly exams
9	2	Polymers as biomaterials; dental and maxillofacial applications.	Lecture notes as pdf	Quizzes and monthly exams

10	2	Synthesis, testing, and applications of polymers.	Lecture notes as pdf	Quizzes and monthly exams
11	2	Metals and alloys; stainless steel, Co–Cr alloys, titanium and its alloys.	Lecture notes as pdf	Quizzes and monthly exams
12	2	Synthesis, testing, and applications of metals and alloys.	Lecture notes as pdf	Quizzes and monthly exams
13	2	Physical, chemical, and mechanical characterization of biomaterials.	Lecture notes as pdf	Quizzes and monthly exams
14	2	Corrosion – definition and forms.	Lecture notes as pdf	Quizzes and monthly exams
15		Final Exam		

11. Learning and Teaching Resources

Required Textbook	Biomaterials Science: An Introduction to Materials in Medicine