



كلية هندسة المواد/قسم هندسة المعادن
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Description of Academic Syllabus & Program

Department of Metallurgical
Engineering

College of Materials Engineering



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الوصف الاكاديمي



Introduction

It is one of the basic and leading branches in applied and engineering sciences, concerned with the study of the composition of metals, their properties, and ways of benefiting from them in various industrial and technological fields. It includes knowledge of methods of extraction from ores, processing and manufacturing, in addition to developing and improving properties to suit the needs of daily life and modern technologies. Creating new alloys using a variety of methods, with wide applications including the medical, aerospace and aerospace industries, as well as advanced infrastructures and technologies.

University Name	University of Babylon
College	College of Materials Engineering
Academic Department	Metallurgical Engineering
Academic Program Name	Bachelor of Metallurgical Engineering
Final Degree Name	Bachelor of Metallurgical Engineering
Study System	Polonia path (First, Second & third stage) Semester-base (Fourth stage)
Approved Program	Curricula and Courses as per the Ministry
Other External Influences	Practical Training in factories and companies
Date of Description Preparation	9/2/2026
Date of File Completion	9/3/2026



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الوصف الاكاديمي



Academic Program Description Form

University Name: University of Babylon

Faculty/Institute: Faculty of Materials Engineering

Scientific Department: Metallurgical Engineering


Academic or Professional Program Name: Bs.C.

Final Certificate Name: Bs.C. Metallurgical Engineering

Academic System: Bologna System

Description Preparation Date: 25\9\2025


File Completion Date: 11\5\2026

Signature: 

Head of Department

Name: Basem Al-Zubaidy

Date:

Signature: 

Scientific Associate


Name: Auda Jabbar Braihi

Date:

The file is checked by:

Department of Quality Assurance and University Performance :Raed Hussein Alwan

Director of the Quality Assurance and University Performance Department:

Signature: 

Approval of the Dean

Abdel Al-Raheem K. Abed Ali

Date: 17/5/2026



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



1. Program Vision

The program should be distinguished in preparing scientifically and technically qualified engineers who are able to keep pace with developments in metallurgical engineering with an emphasis on community service

2. Program Mission

To provide a comprehensive education that combines academic theory and practical application to provide students with the skills necessary to produce modern alloys using advanced casting and manufacturing methods

3. Program Objective

The objectives are divided into two main categories:

1. General Objects:

- Preparing engineering cards capable of working in factories, laboratories, and companies.
- Promoting scientific research and discussing matters related to engineering applications.
- Meeting the needs of the labor market through creative engineering skills.

2. Specific Objective:

- Developing engineering skills and innovation.
- Introduce students to metallurgical engineering and its importance.
- Instilling ethical and professional values in engineering work.
- Establishing cooperation with engineering institutions to promote and develop scientific expertise.

4. Program Accreditation:

There is a presentation to obtain accreditation

5. Other external Influences:

- | | |
|---------------------------|---------------------------------|
| 1-Visits to fieldwork | 2-The experimental part |
| 3-Scientific consulting | 4-Lbraries and internet network |
| 5-Podiums of social media | 6-The need of work market |



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الوصف الاكاديمي



6. Program Structure				
Program Structure	Number of courses	Credit hours	Percentage	Reviews *
College Requirements	4	22	8%	-
Department Requirements	32	68	92%	-
Summer training	1	-	-	-
Other	-	-	-	-

7. Academic Program Description for Metallurgical Engineering Department

First, Second & Third Stage according to Polonia Path				
First Stage				
Semester	Code	Course Name	Credit Hours	
			Th	Pr
Semester one	MET1111	Engineering Materials Science	4	
	MET1102	Engineering Mechanics I	3	
	MET1103	Engineering Drawing	3	
	MET1104	MathmeticsI	2	
	MET1115	Principles of Producyion Engineering	3	
	UOBAB1102	Arabic language	2	
	UOBAB1101	English language	2	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



Total			20	
Semester two	MET1201	Extraction Metallurgy	6	
	MET1212	Engineering Mechanics II	3	
	MET1204	Computer Aided Engineering Drawing/ Auto CAD	2	
	UOBABb4	Computer Programming	1	
	UOBAB1104	Freedom, Democracy and Human rights	2	
	MET1205	Elective-I	3	
	MET1213	Mathmetics 2	2	
Total			19	

Second Stage

Semester	Code	Course Name	Credit Hours	
			Th	Pr
Semester three	MET2301	Engineering Metallurgy I	3	2
	MET2302	Strength of materials I	3	1
	UOBAB2004	Computer 2	1	
	MET2304	Nonmetallic Materials	2	2
	MET2305	Metallurgical Thermodynamic	2	2
	ME2313	Mathmetics	3	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



	UOBAB2301	Crimes of the Baath Party Regime in Iraq	2	
Total			16	8
Semester four	MET2411	Engineering Metallurgy II	3	2
	MET2403	Elective-II	2	
	MET2414	Chemical Metallurgy	4	2
	MET2415	Welding Technology	3	2
	MET2412	Strength of materials II	2	2
	UOBAB2302	English language	2	
	UOBAB2001	Arabic language 2	2	
Total			19	4

Third Stage

Semester	Code	Course Name	Credit Hours	
			Th	Pr
Semester three	MET3501	Phase Transformation	2	2
	MET3502	Mechanical Metallurgy I	2	2
	MET3503	Metals Machining	2	2
	MET3504	Corrosion Engineering I	2	2
	MET3505	Inspection of Metallic Materials	2	2



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الوصف الاكاديمي



	MAT31	Engineering Analysis	2	
Total			12	10
Semester four	MET3611	Heat Treatment	2	2
	MET3612	Mechanical Metallurgy 2	2	2
	MET3613	Corrosion Engineering 2	2	2
	MET3604	Elective-3	2	
	MAT32	Numerical Analysis	2	
	MAT33	Heat Transfer	3	2
Total			13	6

8. Outcomes of the Program

A. Knowledge		L-outcomes
1A	Knowledge the general concepts of engineering	Comprehensive understanding of all properties and
2A	Knowledge the basics of materials and types in general and minerals in particular	
3A	Studying and knowing the engineering of materials of all kinds and their field of application	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



4A	Focusing on mineral materials and dealing with them in all their operations, from the mine to the final manufacturing	characteristics of materials and especially of metals and new alloys
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B-Skills		L-outcomes
1B	Skill in reading and analyzing all engineering plans and designs	Solving the problems, ability to design and develop, knowing selection of materials and analysis the failure
2B	Full knowledge of the properties and uses of materials and their selection for specific applications	
3B	Full knowledge of engineering materials and how they are extracted, manufactured and tested	
4B	Motivate students to reproduce and link information together by posing a question to other students	

C. Values		L-outcomes
1C	Graduates will understand the ethical and professional responsibilities associated with metallurgical engineering practice, including issues related to safety, sustainability, and social impact	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



2C	Students will acquire teamwork and leadership skills, enabling them to work collaboratively in multidisciplinary teams, demonstrate effective leadership qualities, and contribute to the achievement of common goals	Reinforcement professional ethics and social questionnaire
3C	Participating in continuous learning, following the developments in metallurgical engineering in all professional life	
4C	Reinforcement values of transparency and integrity in dealing with engineering tests	

9. Learning and Teaching Strategies

<p>A. Interactive Lectures: Using modern tools like PowerPoint</p> <p>B. Group Discussions: Encouraging students to discuss engineering questions</p> <p>C. Practical Projects: Using digital platforms and tools for interactive learning</p> <p>D. Engineering Designing Programs: Training the students to use engineering programs as Ansys, AutoCAD for programming the engineering problems and find the optimum answers for them</p> <p>E. Projects for Engineering Research: Encouragement the students to produce scientific research about engineering applications and failure analysis</p>	<p>A. Laboratories Assays: Training the students to use accurate methods for experimental work</p> <p>B. Exercises for Making Samples: Participating students in manufacturing alloys in different methods as casting, powder metallurgy</p> <p>C. Teamwork: Group of students are organized to discuss the latest engineering matters</p> <p>D. Seminars: Seminars are set between students and faculty members to exchange ideas and discuss engineering problems</p> <p>E. Field Training: Opportunities are provided to train students in laboratories,</p>
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الوصف الاكاديمي



F. Analysis Engineering Data: Training students to use a lot of data and finding the optimum method to summarization	companies and government institutions to gain real experience F. Organize Specialized Workshops on modern applications of engineering alloys as bio applications
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10. Assesment Methods
A) Continuous Assessment: Class participation, periodic tests, presentations B) Practical Assessment: Projects, hands-on workshops, laboratories experiments C) Theoretical Assessment: Theoretical exams, writing reports D) Feedback and Guidance: Providing students with ongoing constructive feedback E) Final Exam: Includes a written exam and final graduation project

11. Teaching Faculty								
S	Name	Academic Title	Specialization		Special Skills	No. Faculty		
			General	Special		Permanent	Temporary	
1.	Haydar Hassan Jaber Jamal Al Deen	Prof.	Met. Eng.	Corrosion Eng. & Biometals			√	
2.	Haydar Abdulhassan Hussain Al-Ethari	Prof.	Mechanic Eng.	Cutting Metals			√	
3.	Ahmed O. Al-Roubaiy	Prof.	Mat. Eng.	Met. Eng /Welding Eng.			√	
4.	Jassim Mohammed Salman	Prof.	Mat. Eng.	Met. Eng./Casting & Light			√	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



				Metals				
5.	Saad Hameed Al-Shafie	Prof.	Production Eng.	Advanced Metals Machining			√	
6.	Haydar Abed Hassan Al-Juboori	Prof.	Industrial Eng.	Industrial Eng.			√	
7.	Ali Hubi Haleem	Prof.	Met. Eng.	Corrosion Eng.			√	
8.	Nawal Mohammed Dawood	Prof.	Mat. Eng.	Advanced Biometals			√	
9.	Abdulsameea Jasim Abdulzehra Alkilabi	Prof.	Mat. Eng.	Met. Eng /Welding &Met. Eng.			√	
10.	Zuheir Talib Khulief	Prof.	Mat. Eng.	Met. Eng.			√	
11.	Nabaa Sattar Radhi	Prof.	Mat. Eng.	Met. Eng.			√	
12.	Basem Mohysen Mohammed Zubaidy	Ass. Prof.	Mat. Eng.	Met. Eng.			√	
13.	Zaineb Fadhil Kadhim	Ass. Prof.	Mat. Eng.	Met. Eng./Thermodynamic			√	
14.	Khalid M. Al-Janabi	Ass. Prof.	Met. Eng.	Met. Eng.			√	
15.	Baraa Hasan Hadi	Ass. Prof.	Mat. Eng.	Met. Eng.			√	
16.	Nagham Yass Khudair	Ass. Prof..	Mechanic Eng.	Thermally			√	
17.	Wafa Mahdi jodia	Lect.	Mechanic Eng.	Production Eng.			√	
18.	Hussein Fawzy Mahdy	Lect.	Prod. Eng. &Metallurgy	Prod. Eng			√	
19.	Muqdad Jaber	Lect.	Mat. Eng.	Met. Eng.			√	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



20.	Rula Sami Khudhair	Lect.	Computer Eng.	Artificial Intelligence & Robotics			√	
21.	Zaineb Fouad hamza	Lect.	Mat. Eng.	Met. Eng.			√	
22.	Ruaa Hatem Kadhim	Lect.	Mat. Eng.	Met. Eng.			√	
23.	Shahad Ali Hammood	Lect.	Mat. Eng.	Met. Eng.			√	
24.	Qabas Khalid Naji	Lect.	Mat. Eng.	Met. Eng.			√	
25.	Osama Ihsan Ali	Lect.	Mat. Eng.	Met. Eng.			√	
26.	Zainab Abidulellah	Lect.	Mat. Eng.	Met. Eng.			√	
27.	Walaa Amer Mughir	Lect.	Mechanic Eng.	Applied Mechanics			√	
28.	Khaldun Emad Fadhel Aldawoudi	Ass.	Mat. Eng.	Met. Eng.			√	
29.	Manar Assaf	Ass. Lect.	Mat. Eng.	Met. Eng.			√	
30.	Rafaah Ibrahim Jabaar	Ass. Lect.	Electric. Eng.	Power			√	
31.	Aenas Laith Ali	Ass. Lect.	Mat. Eng.	Met. Eng.			√	

Met. Eng.=Metallurgical Engineering; Mat. Eng.=Materials Engineering, Prod. Eng.=Production Engineering, Prof.=Professor, Ass. Prof.=Assist Professor, Lect.=Lecturer, Ass. Lect.=Assist Lecturer

12.Faculty Development

Orientation of Junior Faculty Members

A-Guidance and counselling programs

B-Workshops and training on Curricula and assessments

C-Continuous development through conferences and e-learning



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



D- Adherence to the Ministry's instruction through education and periodic review

E-Building a culture of cooperation and continuous assessment

Developing Senior Faculty

A-Providing the necessary environment and resources to develop the skills of the faculty levels of quality in academic performance.

B-Participating in workshops, continuing education courses, and specialized training courses.

C-Developing the skills of the faculty member in the field of students evaluation and relying on effective alternatives in this regard.

D-Developing the skills of the faculty member in relying on modern technology and innovating new alternatives in learning and teaching.

E- Raising the level of the faculty member's skill in the field of scientific and professional research, management and community service.

F-Exchange the experiences between faculty members in the scientific department and other corresponding departments locally and globally.

G-Developing the multiple administrative skills of the faculty members, such as working as a team or taking skills decision making in academic and administrative work.

H-developing the skills of the faculty member to deal with challenges facing him in performing his job duties and academic by overcoming potential career difficulties.

13.Acceptance Criteria

Ministry Central Acceptance



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



14. Sources of Feedback and Evaluation

***Ministry of Higher Education and Scientific Research**

***Councils of Engineering Collages in Iraq**

***Arabian and Foreign Colleges of Engineering Materials**

15.Academic Program Development Plan

A-Updating the Curricula: Adding modern Curricula such as nanotechnology and bio applications as well as developing old materials to suit the requirements of the modern labor market.

B-Technology in Education: Combination of engineering programs as ANSYS, AutoCAD and E-learning platforms to enhance the technical skills of students.

C-Practical Training: Signing partnerships with engineering institutions to provide field training that enhances the practical experience of students.

D-Faculty Development: Organizing workshops and training programs for faculty members on the latest developments in metals and alloy applications and manufacturing methods.

E-Continuous Evaluation: Adopting a continuous evaluation system that includes practical projects, presentations, and practical tests to comprehensively assess student's skills.

F-Promoting Scientific Research: Encouraging students and faculty members to conduct research related to advanced manufacturing methods for alloys, metals and composite materials.



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



G-Follow up and Feedback: Establish a system to review the academic plan regularly based on the opinions of students and employers to ensure continuous development.



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



مخطط مهارات البرنامج

مخرجات التعلم المطلوبة من البرنامج

مخطط مهارات البرنامج															
مخرجات التعلم المطلوبة من البرنامج															
Values				Skills				Knowledge				Core (C) or Option (O)	Course Name	Course Code	Year
C4	C3	C2	C1	B4	B3	B2	B1	A4	A3	A2	A1				
√		√		√	√		√	√	√		√	C	Engineering Materials Science	MET1111	Semeste r one



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



√	√	√	√	√		√		√			√	C	Engineering Mechanics I	MET1102
√	√		√		√	√	√		√	√	√	C	Engineering Drawing	MET1103
√		√	√	√		√		√	√		√	C	Mathmetics 1	MET1104
√			√	√	√		√	√		√	√	C	Principles of Producyion Engineering	MET1115
√		√	√	√		√	√	√		√	√	C	English language	UOBABb1101
√	√		√	√		√			√		√	C	Arabic language	UOBAB1102



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



√			√	√		√	√		√		√	C	Extraction Metallurgy	MET1201	Semester two
√		√	√	√		√		√		√	√	C	Engineering Mechanics II	MET1212	
√	√	√		√			√	√		√	√	C	Computer Aided Engineering Drawing/ Auto CAD	MET1204	
√	√		√		√		√	√		√	√	C	Computer 1	UOBABb4	
√		√		√		√		√	√		√	C	Freedom, Democracy	UOBAB1104	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



														and Human rights		
√	√	√	√	√		√	√		√	√	√	C	Elective-I	MET1205		
√	√		√	√		√		√	√		√	C	Engineering Metallurgy I	MET2301	Semester three	
√	√		√	√	√		√	√		√	√	C	Strength of materials I	MET2302		
√	√	√		√		√	√	√	√	√	√	C	Mathmetics	ME2313		
√	√	√	√	√		√	√	√	√	√	√	C	Nonmetallic Materials	ME2314		
√		√		√		√	√		√	√	√	C	Metallurgical Thermodyne	ME2315		



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



√	√	√		√		√		√	√	√	√	C	Welding Technology	MET2415	
√				√		√	√		√	√	√		Arabic language 2	UOBAB2001	
√	√		√	√		√	√	√		√	√	C	English language	UOBAB02302	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي





Course Description Form

1. Course Name:	
Engineering Material Science	
2. Course Code:	
MET1111	
3. Semester / Year:	
4. Description Preparation Date:	
3/9/2025	
5. Available Attendance Forms:	
weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
63	
7. Course administrator's name (mention all, if more than one name)	
Name: Khalid M.Abed	
Email: Mat.khalid mutashar@uobabylon.edu	
8. Course Objectives	
Course Objectives	This course aims to teach the student the types of materials involved in the construction and installation of engineering equipment used in industry. This course also studies the mechanical properties of engineering materials and how they differ according to the nature and composition of the material. It includes introducing the student to the crystalline structure of metallic elements and the extent of its impact on the mechanical properties of metal in addition to other properties. Introducing the student to ceramic, polymeric and composite materials, the mechanical behavior of engineering materials and their examination process
9. Teaching and Learning Strategies	



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

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
1	4		Introduction to engineering materials - definition of engineering materials - types - specifications - classification of engineering materials -	Direct lecture	Give abrupt questions to the students The classical discussion
2	4		Atomic Structure and the Periodic Table - types of bonds in engineering materials	Direct lecture	Give abrupt questions to the students The classical discussion
3	4		Crystalline – Non Crystalline and amorphous materials - Types of crystalline structure of materials	Direct lecture	Give abrupt questions to the students The classical discussion
4	4		Unit cell - The Crystals forms (- B.C.C) (F.C.C-H.C.P)- Miller Indices	Direct lecture	Give abrupt questions to the students The classical discussion
5	4		Mechanical properties of materials (stress-strain) -stress-strain curve)- ductility-failure	Direct lecture	Give abrupt questions to the students The classical discussion
6	4		Behavior Of Material Under Mechanical Loads	Direct lecture	Give abrupt questions to the students The classical discussion
7	4		Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit	Direct lecture	Give abrupt questions to the students The classical discussion



8	4		Thermal properties of materials (thermal expansion - thermal conductivity) Magnetic properties of materials - chemical properties of materials	Direct lecture	Give abrupt questions to the students The classical discussion
9	4		Iron - its most important ores - extraction - blast furnace -Carbon steel - its most important types - properties – uses -Alloy steel - the most important types - properties - uses	Direct lecture	Give abrupt questions to the students The classical discussion
10	4		- Non-ferrous metals (copper and its alloys - aluminum and its alloys - nickel and its alloys - - Cutting Tool Materials	Direct lecture	Give abrupt questions to the students The classical discussion
11	4		Ceramic materials - their properties, types and uses Glass -their types - industry - uses -	Direct lecture	Give abrupt questions to the students The classical discussion
12	4		Polymers - their properties, types and uses	Direct lecture	Give abrupt questions to the students The classical discussion
13	4		Composite materials - their properties, types and uses	Direct lecture	Give abrupt questions to the students The classical discussion
14	4		Powder metallurgy (methods of obtaining mineral powders - mechanical methods - physical and chemical methods - physical, mechanical and chemical properties of powders)	Direct lecture	Give abrupt questions to the students The classical discussion
15	4		Preparatory week before the final Exam	Direct lecture	Give abrupt questions to the students The classical discussion



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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any) Main references (sources)	<ul style="list-style-type: none">Engineering Materials An Introduction to their Properties and Applications. M.F.Ashby and D.R.H.Jones Translated by Dr.J.T.AL-Haidary"Materials science and engineering, an introduction " by Callister"Selection and use of engineering materials " by Charles&Cran
Main references (sources)	
Recommended books and references (scientific journals, reports,...)	
Electronic References, Websites	Google



Course Description Form

1. Course Name:	
Engineering Mechanics I	
2. Course Code:	
MET1102	
3. Semester / Year:	
4. Description Preparation Date:	
6/9/2025	
5. Available Attendance Forms:	
weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
63	
7. Course administrator's name (mention all, if more than one name)	
Name: Basem Mohysen Al-Zubaidy Email: Mat.basem.mahsn@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">1. Introduction to Engineering Mechanics: Provide an overview of the fundamental principles and concepts of engineering mechanics.2. Introduction to Statics: Understanding the fundamental concepts and principles of statics, including the definition of static equilibrium, forces, moments, and their vector representations.3. Force Vectors: Developing the ability to analyze forces acting on particles and rigid bodies in two and three dimensions, including the resolution of forces into their components.4. Equilibrium of Particles: Understanding the conditions for equilibrium of particles and applying them to solve problems involving forces acting on particles at rest.



	<ol style="list-style-type: none">5. Equilibrium of Rigid Bodies: Extending the concept of equilibrium to rigid bodies and analyzing the forces and moments acting on them.6. Friction: Understanding the basic principles of friction and its effects on the equilibrium of objects and surfaces. Study the effects of friction on bodies in motion and at rest. Cover topics such as static and kinetic friction, coefficient of friction, and the analysis of frictional forces in engineering systems.7. Center of Gravity and Centroids: Determining the center of gravity and centroids of various objects and using them to analyze equilibrium and stability. <p>Applications and Problem Solving: Applying the concepts and principles of statics to solve engineering problems related to metallurgical engineering, such as analyzing the stability of structures, calculating forces in materials, and determining the equilibrium conditions of mechanical systems.</p>
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9. Teaching and Learning Strategies

Strategy	<ol style="list-style-type: none">1. Lectures: The professor will conduct lectures to deliver the fundamental concepts, principles, and theories of engineering mechanics - statics. They will explain the key topics, equations, and calculations, providing examples and illustrations to enhance understanding.2. Interactive Discussions: In addition to lectures, there may be interactive discussions where students can ask questions, clarify doubts, and engage in group discussions. These sessions encourage active participation and foster a deeper understanding of the subject matter.3. Problem-Solving Sessions: Engineering mechanics - statics heavily relies on problem-solving skills. To enhance students' ability to apply theoretical concepts to practical problems, problem-solving sessions may be conducted. Students can solve numerical problems, analyze real-world scenarios, and learn to apply appropriate statics principles to find solutions.4. Laboratory Sessions: Depending on the availability of resources, laboratory sessions may be organized to provide hands-on experience with statics principles. Students may conduct experiments, use instruments to measure forces and moments, and analyze data to validate theoretical concepts learned in lectures.5. Visual Aids and Simulations: Visual aids such as charts, diagrams, and videos may be used to illustrate concepts, demonstrate physical phenomena, and enhance understanding. Computer simulations and virtual experiments can also be employed to provide students with a realistic and interactive learning experience.6. Assignments and Homework: Regular assignments and homework are typically given to students to practice and reinforce their understanding of the subject. These assignments may include numerical problems, theoretical questions, or analysis of real-world scenarios.7. Tutorials and Office Hours: Professors or teaching assistants may offer tutorial sessions or office hours where students can seek additional help, ask questions, and receive individualized guidance on specific topics or problems.8. Assessments: Periodic assessments such as quizzes, mid-term exams, and a final exam are conducted to evaluate students' comprehension of the subject. These assessments may include both theoretical and problem-solving components.
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10. Course Structure



Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
1	3		Fundamental concepts & principles, System of units	Direct lecture	Give abrupt questions to the students The classical discussion
2	3		Forces in a plane: Resultant of two forces, Resultant of several concurrent forces	Direct lecture	Give abrupt questions to the students The classical discussion
3	3		Resolution of a force, Addition of forces, Equilibrium of a particle	Direct lecture	Give abrupt questions to the students The classical discussion
4	3		Newton's first law of a motion, Free body diagram	Direct lecture	Give abrupt questions to the students The classical discussion
5	3		Forces in space: Rectangular component of a force in space, Addition of forces in space, Equilibrium of a particle in space	Direct lecture	Give abrupt questions to the students The classical discussion
6	3		Principle of transmissibility, Moment of a force, Varignon's theorem	Direct lecture	Give abrupt questions to the students The classical discussion
7	3		Moment of a couple, Equivalent couples, Addition of couples	Direct lecture	Give abrupt questions to the students The classical discussion
8	3		Equivalent systems of coplanar forces	Direct lecture	Give abrupt questions to the students The classical discussion
9	3		Equilibrium of rigid body in two dimensions	Direct lecture	Give abrupt questions to the students The classical discussion



10	3		Equilibrium of a two-force and of a three-force bodies	Direct lecture	Give abrupt questions to the students The classical discussion
11	3		Friction: the laws of dry friction; coefficient of friction, Angles of friction;	Direct lecture	Give abrupt questions to the students The classical discussion
12	3		Wedges, Square-threaded screw, Belt friction;	Direct lecture	Give abrupt questions to the students The classical discussion
13	3		Centroids of areas and lines, centers of gravity of a two-dimensional body	Direct lecture	Give abrupt questions to the students The classical discussion
14	3		Determination of centroids by integration	Direct lecture	Give abrupt questions to the students The classical discussion
15	3		Distributed loads on beams	Direct lecture	Give abrupt questions to the students The classical discussion

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any) Main references (sources)	• Vector Mechanics for Engineers Statics and Dynamics 10th c2013-Ferdinand P. Beer et.al., McGraw-Hill Education
Main references (sources)	
Recommended books and references (scientific journals, reports,...)	•Engineering Mechanics, Volume I, Statics, J.L. Meriam et.al., John Wiley and Sons, Inc.
Electronic References, Websites	https://www.coursera.org/learn/engineering-mechanics-statics



Course Description Form

1. Course Name:	
Engineering Drawing	
2. Course Code:	
MET1103	
3. Semester / Year:	
4. Description Preparation Date:	
3/9/2025	
5. Available Attendance Forms:	
weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
63	
7. Course administrator's name (mention all, if more than one name)	
Name: Shahad Ali Hammood	
Email: mat.shahad.ali@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	Drawing is said to be the language of engineers. All material objects have a shape and form, which can be represented by a combination of known geometrical figures. A thorough grounding in drawing to represent these objects on a plane is considered very essential The aims of the module are: (1) to develop a knowledge of manual generated engineering drawing. (2) to create a variety of technical.
9. Teaching and Learning Strategies	
Strategy	1. Set up the drawing environment with the correct units in order to start producing drawings. 2. Drawing types: differences between general arrangement, assembly and detail drawings. 3. Layout: paper sizes, borders, title block, parts list. 4. Projection systems: first and third angle projection, projection symbols. 5. Lines and linework: line types and applications, thickness, leader lines and arrow heads. 6. Lettering and symbols: style, height, direction and location. Common symbols and abbreviations.



7. Fits and tolerances: fits and tolerances for holes and shafts.
 8. Views: partial sections and rules associated with hatching.
 9. Principles of dimensioning: projection and dimension lines, dimensioning methods, tolerance dimensions.

10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
1	3		Introduction to Engineering Drawing <ul style="list-style-type: none"> • Overview of engineering drawing principles and importance. Link between engineering drawing and other subjects of study. • Introduction to different drawing instruments and their uses. Basic Tools- classification and brief description. • Care and maintenance of drawing material. • Necessity of dimensioning. Principles and method of dimensioning and dimensioning practice. Making of Centre Line, Section Line, Dimensioning Lines, etc.	Direct lecture	Give abrupt questions to the students The classical discussion
2	3		<ul style="list-style-type: none"> • Basic drawing techniques (lines, lettering, dimensioning). Types of lines, Selection of line thickness. Selection of Pencils. • Drawing sheets, different sheet sizes and standard layouts. 	Direct lecture	Give abrupt questions to the students The classical discussion
3	3		Geometric Construction <ul style="list-style-type: none"> • Construction of common geometric shapes (circles, polygons, ellipses) • Tangents, intersections, and perpendiculars • Use of construction techniques in engineering drawing Concept of Drawing and concept of conic section and its simple properties.	Direct lecture	Give abrupt questions to the students The classical discussion
4	3		Concept of ellipse and its construction by various methods. Drawing of tangent and normal on ellipse. Concept of parabola and its construction by various methods. Concept of hyperbola and its construction by various methods.	Direct lecture	Give abrupt questions to the students The classical discussion



5	3		Orthographic Projections • Introduction to orthographic projection system • Multiview projections: first angle and third angle projections	Direct lecture	Give abrupt questions to the students The classical discussion
6	3		• Principles of orthographic projection. Orthographic projection of simple objects.	Direct lecture	Give abrupt questions to the students The classical discussion
7	3		Projection of points on horizontal, vertical and auxiliary planes and its implication. Projection of lines on different planes, Length of line and its true inclination with different planes and its traces. Concept of orthographic projection of planes.	Direct lecture	Give abrupt questions to the students The classical discussion
8	3		Sectional Views • Introduction to sectional views • Types of sectional views (full section, half section, offset section)	Direct lecture	Give abrupt questions to the students The classical discussion
9	3		Sectioning techniques and conventions Concept of sectioning and drawing section lines, Need for drawing sectional views.	Direct lecture	Give abrupt questions to the students The classical discussion
10	3		Section of simple geometrical solids-cases involving different types of cutting planes. Conventional representation of materials.	Direct lecture	Give abrupt questions to the students The classical discussion
11	3		Auxiliary Views • Introduction to auxiliary views • Creating auxiliary views from given orthographic projections • Use of auxiliary views to represent inclined surfaces and true shapes	Direct lecture	Give abrupt questions to the students The classical discussion
12	3		Dimensioning and Tolerancing • Introduction to dimensioning principles • Different types of dimensions (linear, angular, radial) • Tolerances and geometric dimensioning and tolerancing (GD&T)	Direct lecture	Give abrupt questions to the students The classical discussion
13	3		Introduction to pictorial drawing. Brief description of different types of pictorial drawing viz Isometric, oblique and perspective and their applications. Concept of Isometric views. Isometric Projection and Isometric Scale.	Direct lecture	Give abrupt questions to the students The classical discussion



14	3		<ul style="list-style-type: none">• Introduction to isometric and oblique projections Isometric Projection of simple solids, frustum of solids, truncated solids and sets of simple solids. Concept of oblique and perspective views. Simple drawing of oblique views.	Direct lecture	Give abrupt questions to the students The classical discussion
15	3		<ul style="list-style-type: none">• Construction of isometric and oblique drawings• Use of isometric and oblique drawings to visualize objects in 3D	Direct lecture	Give abrupt questions to the students The classical discussion

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any)	• كراس الرسم الهندسي- عبد الرسول عبد الحسين
Main references (sources)	
Main references (sources)	
Recommended books and references (scientific journals, reports,...)	• كتاب الرسم الهندسي- عبد الرسول عبد الحسين
Electronic References, Websites	

Course Description Form

1. Course Name:	Mathmatics
2. Course Code:	MET1104
3. Semester / Year:	
4. Description Preparation Date:	3/9/2025
5. Available Attendance Forms:	



weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
45					
7. Course administrator's name (mention all, if more than one name)					
Name: Zaineb Fadhil Kadhim Email: mat.zainab.fadhil@uobabylon.edu.iq					
8. Course Objectives					
Course Objectives		•Knowing the vectors ,dot product and cross product, knowledge the partial derivatives and applications. Studying the polar coordinates and double integrals And triple integrals . Calculating the area, volume and moment. Knowing the cylindrical and spherical coordinates. How can solving the differential equations and knowing sequences , arithmetic and geometric series.			
9. Teaching and Learning Strategies					
Strategy		1- The lecture method 2- The discussion method			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	Knowing vectors	Knowing vectors and their quantities and directions	Direct lecture	Give abrupt questions to the students The classical discussion
3-4	6	Vectors product	Dot product and cross product	Direct lecture	Give abrupt questions to the students The classical discussion
5-6	6	Polar coordinates	Transformation from polar coordinates to Cartesian coordinates and vice versa	Direct lecture	Give abrupt questions to the students The classical discussion



7-8	6	Representation of polar coordinates	Drawing the polar functions	Direct lecture	Give abrupt questions to the students The classical discussion
9-10	6	Partial derivatives	How can calculate the slope and the chain rule	Direct lecture	Give abrupt questions to the students The classical discussion
11-12	6	Directional derivatives	Calculate the gradient and directional derivatives of function for more than one variable	Direct lecture	Give abrupt questions to the students The classical discussion
13-14-15	9	Applications of derivatives	Find the critical point and local maxima and local minima	Direct lecture	Give abrupt questions to the students The classical discussion

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any) Main references (sources)	1- principal texts 2-methodical books 3-other additional sources
Main references (sources)	Mathematics (Thomas)
Recommended books and references (scientific journals, reports,...)	Elementary differential equations(William F.Trench),
Electronic References, Websites	Google, Google Scholar

Module Information

معلومات المادة الدراسية

Module Title	Mathematics	Module Delivery
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كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



Module Type	Core	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code			
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UC	Semester of Delivery	1
Administering Department		College	
Module Leader	Zaineb Fadhil Kadhim	e-mail	mat.zainab.fadhil@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- Understand the concept of functions and different types of functions, such as linear, quadratic, exponential, and logarithmic functions. Identify the key properties and characteristics of each function type. Apply function notation and understand function transformations.
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- 2- Learn how to graph functions using plotting techniques and technology tools.
Understand the relationship between the graph of a function and its algebraic representation.
Interpret and analyze the behavior of functions based on their graphs.
- 3- Define the concepts of domain and range for functions.
Determine the domain and range of various types of functions, including those involving radicals, fractions, and piecewise-defined functions.
Identify restrictions and limitations on the domain of functions.
- 4- Understand the basic properties and operations of matrices, including addition, subtraction, multiplication, and transpose.
Solve systems of linear equations using matrix methods, such as Gaussian elimination and matrix inversion.
Apply matrices to solve real-world problems and perform transformations in geometric settings.
- 5- Define the derivative of a function and its interpretation as the rate of change or slope.
Apply various methods to find derivatives, including the power rule, chain rule, product rule, and quotient rule.
Use derivatives to analyze the behavior of functions, find critical points, and determine intervals of increase and decrease.
- 6- Understand the concept of inverse functions and their relationship to the original function.
Determine the inverse of a function algebraically and graphically.
Solve equations involving implicit functions and apply implicit differentiation.
- 7- Identify and classify conic sections, including circles, ellipses, parabolas, and hyperbolas.
Analyze the equations of conic sections and determine their key properties, such as foci, vertices, and asymptotes.
Graph conic sections and interpret their geometric significance.
- 8- Understand the concepts of the Rolle's Theorem and the Mean Value Theorem.
Apply these theorems to analyze functions, identify critical points, and determine the existence of specific values.
Use the Mean Value Theorem to relate the derivative of a function to its average rate of change.



- 9- Define definite and indefinite integrals and their interpretations as the area under a curve and antiderivatives, respectively.
Compute definite integrals using various techniques, such as the Fundamental Theorem of Calculus, substitution, and integration by parts.
Apply integration to solve problems involving area, displacement, and accumulation.
- 10- Understand the properties and graphs of trigonometric functions, including sine, cosine, tangent, secant, cosecant, and cotangent.
Explore the concepts of period, amplitude, phase shift, and frequency in trigonometric functions.
Determine the inverses of trigonometric functions and solve equations involving trigonometric identities.
- 11- Introduce complex numbers and their operations, including addition, subtraction, multiplication, and division.
Learn about complex integration techniques, such as contour integration, Cauchy's integral formula, and residues.
Apply complex integration methods to evaluate real and complex-valued integrals.
- 12- Utilize substitution techniques involving trigonometric functions to simplify integrals.
Apply the method of integration by parts to evaluate integrals of products of functions.
Solve integrals by combining both substitution and integration by parts methods when necessary.
- 13- Understand the process of integrating rational functions by partial fraction decomposition.
Decompose rational functions into partial fractions and evaluate integrals using this method.
Apply integration of rational functions to solve problems in various contexts, such as physics and engineering.
- 14- Explore practical applications of integration in areas such as physics, economics, and engineering.
Use integration to calculate areas, volumes, work, and other quantities of interest.
Apply integration techniques to solve real-world problems, including optimization and related rate problems

Module Learning Outcomes

- 1- Identify and classify different types of functions, including linear, quadratic, exponential, and logarithmic functions.
-Analyze the properties and characteristics of each function type.



مخرجات التعلم للمادة الدراسية

- Apply function notation and transformations to manipulate and graph functions effectively.
- 2- Demonstrate the ability to graph functions accurately using appropriate plotting techniques and technology tools.
 - Interpret the relationship between the graph of a function and its algebraic representation.
 - Analyze and interpret the behavior of functions based on their graphical representations.
- 3- Determine the domain and range of various functions, including those involving radicals, fractions, and piecewise-defined functions.
 - Recognize and address restrictions and limitations on the domain of functions.
 - Apply the concepts of domain and range to solve problems and make informed decisions.
- 4- Understand the fundamental properties and operations of matrices, such as addition, subtraction, multiplication, and transpose.
 - Solve systems of linear equations using matrix methods, including Gaussian elimination and matrix inversion.
 - Apply matrix operations and techniques to solve real-world problems and perform geometric transformations.
- 5- Calculate derivatives using various methods, such as the power rule, chain rule, product rule, and quotient rule.
 - Analyze and interpret the derivative of a function as the rate of change or slope.
 - Apply derivatives to analyze functions, determine critical points, and investigate intervals of increase and decrease.
- 6- Identify and determine the inverse of a function algebraically and graphically.
 - Solve equations involving implicit functions and apply implicit differentiation.
 - Understand the concept of inverse functions and their relationship to the original function.
- 7- Classify and identify conic sections, including circles, ellipses, parabolas, and hyperbolas.
 - Analyze and interpret the properties of conic sections, such as foci, vertices, and asymptotes.
 - Graph conic sections accurately and understand their geometric significance.
- 8- Apply the Rolle's Theorem and the Mean Value Theorem to analyze functions and identify critical points.



- Understand the relationship between the derivative of a function and its average rate of change.
- Use theorems to solve problems related to local extrema, concavity, and intervals of increasing and decreasing functions.

- 9- Evaluate definite and indefinite integrals using various techniques, including the Fundamental Theorem of Calculus, substitution, and integration by parts.
- Apply integration to calculate areas, displacement, accumulation, and solve related problems in various contexts.
- Understand the interpretation of definite integrals as the area under a curve and indefinite integrals as antiderivatives.

- 10- Analyze and understand the properties and graphs of trigonometric functions, including sine, cosine, tangent, secant, cosecant, and cotangent.
- Determine and apply the inverses of trigonometric functions and solve equations involving trigonometric identities.
- Interpret and evaluate trigonometric functions in various real-world contexts.

- 11- Understand and apply complex numbers and their operations, including addition, subtraction, multiplication, and division.
- Apply methods of complex integration, such as contour integration, Cauchy's integral formula, and residues, to evaluate real and complex-valued integrals.
- Solve problems involving complex integration in mathematics and other scientific disciplines.

- 13- Utilize substitution techniques involving trigonometric functions and the method of integration by parts to simplify and evaluate integrals.
- Solve integrals by combining both substitution and integration by parts methods when appropriate.
- Apply the method of substitution and integration by parts to solve complex integration problems.
- Integration of Rational Functions:

- 14- Decompose rational functions into partial fractions and integrate them using appropriate techniques.
- Solve integrals involving rational functions and apply the integration of rational functions to real-world problems.
- Interpret and analyze the results obtained through the integration of rational functions.

- 15- Apply integration techniques to solve practical problems in various fields, such as physics, economics, and engineering.
- Use integration to calculate areas, volumes, work, and other quantities of interest.



-Interpret and communicate the results obtained through the applications of integration in real-world contexts.

Indicative Contents:

1- Functions and Types:

- Introduction to functions and their importance in mathematics
- Different types of functions: linear, quadratic, exponential, logarithmic, etc.
- Function notation and evaluation
- Transformations of functions
- Properties and characteristics of each function type

2- Drawing Functions:

- Graphing techniques: plotting points, using intercepts, symmetry
- Introduction to graphing technology tools
- Relationship between graphs and algebraic representations
- Analyzing and interpreting functions based on their graphs

3- Domain and Range:

- Definition and concept of domain and range
- Determining the domain and range of various functions
- Restrictions and limitations on the domain
- Applications of domain and range in problem-solving

4- Matrices:

- Introduction to matrices: definition and basic properties
- Matrix operations: addition, subtraction, multiplication
- Solving systems of linear equations using matrices
- Matrix inversion and determinants
- Applications of matrices in transformations and real-world problems

5- Derivative and Methods:

- Concept of the derivative and its interpretation
- Differentiation rules: power rule, chain rule, product rule, quotient rule
- Applications of derivatives: rates of change, optimization

Indicative Contents

المحتويات الإرشادية



- Analysis of functions using derivatives: critical points, increasing/decreasing intervals

6- Inverse Function and Implicit Functions:

- Definition and properties of inverse functions
- Finding the inverse of a function algebraically and graphically
- Implicit differentiation and related rates
- Applications of inverse and implicit functions in various fields

7- Conic Sections:

- Introduction to conic sections: circles, ellipses, parabolas, hyperbolas
- Equations and properties of conic sections
- Graphing conic sections and identifying key elements
- Real-world applications of conic sections

8- Rolle Theorem and Mean Value Theorem:

- Statement and applications of the Rolle's Theorem
- Statement and applications of the Mean Value Theorem
- Using theorems to analyze functions: critical points, intervals of increase/decrease
- Applications of theorems in calculus and problem-solving

9- Definite and Indefinite Integration:

- Fundamental Theorem of Calculus: connection between derivatives and integrals
- Indefinite integrals and antiderivatives
- Definite integrals: interpretation as area under the curve
- Techniques for evaluating integrals: substitution, integration by parts

10- Trigonometric Functions and Their Inverse:

- Properties and graphs of trigonometric functions: sine, cosine, tangent, etc.
- Inverse trigonometric functions and their properties
- Solving trigonometric equations and identities
- Applications of trigonometric functions in real-world contexts



	<p style="text-align: right;">11- Methods of Complex Integration:</p> <ul style="list-style-type: none">• Introduction to complex numbers and operations• Contour integration and the Cauchy's integral formula• Residue theorem and applications in complex integration• Solving integrals with complex-valued functions <p>12- Method of Substitution by Trigonometric Functions and by Parts Method:</p> <ul style="list-style-type: none">• Techniques of substitution involving trigonometric functions• Integration by parts and its applications• Combining substitution and integration by parts for complex integrals <p style="text-align: right;">13- Integration of Rational Functions:</p> <ul style="list-style-type: none">• Decomposing rational functions into partial fractions• Integrating rational functions using partial fraction decomposition• Applications of integrating rational functions in various fields <p style="text-align: right;">14- Applications of Integration:</p> <ul style="list-style-type: none">• Calculating areas and volumes using integration• Work, displacement, and other physical applications of integration
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>1. Lecture Sessions: The professor will deliver comprehensive lectures to teach the fundamental principles, concepts, and theories of mathematics. They will cover essential topics, equations, and calculations, providing examples and illustrations to aid comprehension.</p> <p>2. Interactive Discourse: Apart from lectures, interactive discussions may be held, allowing students to ask questions, clarify doubts, and engage in group discussions. These sessions promote active participation and foster a deeper understanding of the subject matter.</p> <p>3. Problem-Solving Workshops: Given the emphasis on problem-solving in mathematics, dedicated problem-solving sessions may be arranged. These sessions aim to enhance students' ability to apply theoretical concepts to practical problems. Students will have the opportunity to solve numerical problems, analyze real-world scenarios, and apply appropriate statics principles to arrive at solutions.</p>
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4. Visual Aids and Simulations: Visual aids, such as charts, diagrams, and videos, will be utilized to illustrate concepts, demonstrate physical phenomena, and enhance understanding. Additionally, computer simulations and virtual experiments may be employed to offer students a realistic and interactive learning experience.
5. Assignments and Homework: Regular assignments and homework will be assigned to students to practice and reinforce their understanding of the subject. These assignments may include numerical problems, theoretical questions.
6. Tutorials and Office Hours: Professors or teaching assistants will be available for tutorial sessions or office hours, providing students with opportunities to seek additional help, ask questions, and receive personalized guidance on specific topics or problems.
7. Assessments: Periodic assessments, such as quizzes, mid-term exams, and a final exam, will be conducted to evaluate students' comprehension of the subject. These assessments will cover both theoretical concepts and problem-solving components.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)	93	Structured SWL (h/w)	6
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)		Unstructured SWL (h/w)	
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	150		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	20% (10)	5 and 10	LO #2, #3, #4 and #8, #9, #10	
	Student Interaction	10% (10)	Continuous	All	
	Projects / Lab.	-			
	Report (HWs)	10	10% (10)	Continuous	All
	Midterm Exam	2hr	10% (10)	7	LO #1 - #7



Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Functions and types, domain and range, rational functions, Inverse function and implicitly functions
Week 2	Drawing functions, inverse functions, limits and continuity
Week 3	Conic sections: circles, parabola, hyperbola, ellipse
Week 4	Derivative and method
Week 5	Trigonometric functions and Inverse Functions, hyperbola functions and inverse functions
Week 6	Logarithm and exponential functions and their derivatives
Week 7	Applications of derivatives
Week 8	Integrations, definite and indefinite integration
Week 9	Integration of trigonometric and inverse functions, integration of logarithm and exponential functions
Week 10	Integration techniques: substitution method, part method
Week 11	Integration of rational function, tabular method
Week 12	Integration of trigonometric functions with various angles
Week 13	Applications of integration: area
Week 14	Applications of integration: volume
Week 15	Matrices



Week 16

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mathematics (Thomas)	Yes
Recommended Texts	Calculus for engineering students [Jesus Martin]	No
Websites	https://www.coursera.org/learn/engineering-mechanics	

Grading Scheme

مخطط الدرجات

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



كلية هندسة المواد/قسم هندسة المعادن



الوصف الاكاديمي

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

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Course Description Form

1. Course Name:

Principle of production engineering



2. Course Code:					
MET1115					
3. Semester / Year:					
4. Description Preparation Date:					
7/9/2025					
5. Available Attendance Forms:					
weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
30					
7. Course administrator's name (mention all, if more than one name)					
Name: Wafa Mahdi Jodia Email: Mat.wafa.m@uobabylon.edu.iq					
8. Course Objectives					
Course Objectives		Introducing the student to the principles of production engineering. This course describes the principles and basics of some of the manufacturing processes for metals, which include some of the manual and mechanical operations and some issues related to these processes in addition to some of the formation processes and their laws. It also includes some traditional and unconventional casting and welding methods and the associated defects and methods of treatment. This course includes the practical aspect, as some of these processes are applied in the engineering workshops of the college.			
9. Teaching and Learning Strategies					
Strategy		1- Using the display screen 2- Discussion 3- Student groups 4- Experiential education 5- Interactive education			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	9	Learn about plumbing methods, how to prepare the model, prepare the mold, and cast the metal	Introduction to manufacturing processes and classification of each method	Direct lecture to students	surprise exams



4+5	6	Inspection of the product and detection of defects by combination and non-coalition methods	Examination of defects and knowledge of their types and methods of detection	Direct lecture to students	surprise exams
6-8	9	Learn about the welding process and its types	Learn about traditional and non-traditional welding types	Direct lecture to students	surprise exams
9+10	6	Learn about manual operations	Defining each operating tool, its features and where to use it	Direct lecture to students	surprise exams
11-13	9	Learn about mechanical operations and some of the machines for each process	The use of some laws of the main movements of lathe operation	Direct lecture to students	surprise exams
14+15	6	Identify the formation processes and the advantages and disadvantages of each method	Discussing some of the laws of rolling and drawing of metals	Direct lecture to students	surprise exams final examination

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any) Main references (sources)	1. Principles of Production Operations
Main references (sources)	1.Operation of engineering materials 2.introduction to basic manufacturing processes and workshop technology
Recommended books and references (scientific journals, reports,...)	
Electronic References, Websites	

Course Description Form

1. Course Name:



English language					
2. Course Code:					
UOBABb1101					
3. Semester / Year:					
4. Description Preparation Date:					
3/5/2025					
5. Available Attendance Forms:					
weekly					
6. Number of Credit Hours (Total) / Number of Units (Total)					
60					
7. Course administrator's name (mention all, if more than one name)					
Name: Zaineb Fadhil Kadhim Email: mat.zainab.fadhil@uobabylon.edu.iq					
8. Course Objectives					
Course Objectives		Knowing all tense in the English language, knowing the difference between the present perfect simple and the present perfect continuous. Knowing the main verbs and auxiliary verbs. Knowing the modal auxiliary verbs and using them in request, permission, refusal			
9. Teaching and Learning Strategies					
Strategy		1- Using the display screen 2- Discussion 3- Student groups 4- Experimental education 5- Interactive education			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method



1-2	4	Knowing the English tenses	Introduction and classification of tenses	Direct lecture	Give abrupt questions to the students The classical discussion
3-4	4	The main verbs and auxiliary verbs	how can use the main and auxiliary verbs	Direct lecture	Give abrupt questions to the students The classical discussion
5-6	4	Using the present perfect	Solving exercises about the difference between present perfect and continues	Direct lecture	Give abrupt questions to the students The classical discussion
7-8	4	Using Narrative tenses	Exercise about present simple and present perfect	Direct lecture	Give abrupt questions to the students The classical discussion
9-10	4	Using the simple past and continuous past	Exercises about the simple past and past perfect	Direct lecture	Give abrupt questions to the students The classical discussion
11-12	4	How can make questions	Negative question and Tail questions	Direct lecture	Give abrupt questions to the students The classical discussion
13-14-15	6	Using the future tenses	Exercises about the tenses in future	Direct lecture	Give abrupt questions to the students The classical discussion

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Main references (sources)	New headway plus(Liz and John Soars)-Oxford
Recommended books and references (scientific journals, reports,...)	New headway plus (Liz and John Soars)Work Book
Electronic References, Websites	Google, Google Scholar



Module Information

معلومات المادة الدراسية

Module Title	Engineering Mechanics II	Module Delivery	
Module Type	Core	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code			
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UC	Semester of Delivery	2
Administering Department		College	
Module Leader	Basem Mohysen Al-Zubaidy	e-mail	Mat.basem.mahsn@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the concept of moment of inertia, its calculation for different shapes, and its significance in rotational motion.2. Define and calculate the polar moment of inertia for various geometries and understand its role in torsional motion.3. Comprehend the concept of radius of gyration and its relation to the moment of inertia.4. Understand and apply the parallel-axis theorem to determine the moment of inertia of composite areas.5. Familiarize yourself with the basic principles and terminology of dynamics, including rectilinear motion of particles.6. Analyze the position, velocity, and acceleration of particles undergoing rectilinear motion, including uniform and uniformly accelerated motion.7. Study the motion of multiple particles and analyze their relative motion.8. Explore the components of motion in curvilinear paths, including tangential and normal components, as well as radial and transverse components.9. Apply Newton's second law of motion to analyze the relationship between force, mass, and acceleration. Understand dynamic equilibrium.10. Calculate the work done by a force, understand the concept of kinetic energy, potential energy, and conservation of energy. Study power and efficiency.11. Analyze the principle of impulse and momentum, study impulsive motion, and understand the conservation of momentum.12. Examine direct and oblique impacts, and understand the principles governing the transfer of momentum and energy during collisions.13. Define angular momentum and explore its role in rotational motion.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the concepts of moment of inertia, polar moment of inertia, radius of gyration, and their applications in analyzing rotational motion.2. Apply the parallel-axis theorem to determine the moment of inertia of composite areas.3. Describe and analyze rectilinear motion of particles, including position, velocity, acceleration, uniform rectilinear motion, and uniformly accelerated rectilinear motion.4. Analyze curvilinear motion of particles by considering component motions, relative motion, tangential and normal components, and radial and transverse components.5. Apply Newton's second law of motion and understand the relationship between force, mass, and acceleration.



	<p>Understand dynamic equilibrium and analyze systems. .6</p> <p>Understand the concept of work and energy, calculate the work done by a .7 force, and analyze kinetic and potential energy of particles.</p> <p>Understand the principle of impulse and momentum and apply it to analyze .8 impulsive motion.</p> <p>Understand the conservation of momentum and apply it to analyze collisions .9 and impacts, including direct and oblique impacts.</p> <p>Understand the concept of angular momentum and its applications in .10 analyzing rotational motion.</p> <p>Introduction to kinematics and kinetics of rigid bodies. .11</p> <p>12. Understand and apply the basic principles and concepts related to dynamics in engineering applications.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Moment of inertia Polar moment of inertia, Radius of gyration; Parallel-axis theorem, of composite areas [15 hrs]</p> <p>Introduction to Dynamics: Rectilinear Motion of Particles: Position, velocity, acceleration, uniform rectilinear motion, uniformly accelerated rectilinear motion, Motion of several particles [10]</p> <p>Curvilinear Motion of Particles: component motions, relative motion, Tangential and normal component, radial and transverse component [10]</p> <p>Force, Mass, Acceleration: Newton's second law of motion, [5] Dynamic equilibrium [5]</p> <p>Work and Energy: work of a force , kinetic energy of a particle , potential energy, conservation of energy, power and efficiency [10]</p> <p>Impulse and momentum: principle of impulse and momentum, Impulsive motion, Conservation of momentum [5]</p> <p>Impact, direct and oblique impact [5] Angular momentum [3] Kinematics and Kinetics of rigid bodies: only introduction [3]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<p>Strategies</p>	<p>Lectures: The professor will conduct lectures to deliver the fundamental concepts, .8 principles, and theories of engineering mechanics - statics. They will explain the key topics, equations, and calculations, providing examples and illustrations to</p>
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- enhance understanding.
- .9 Interactive Discussions: In addition to lectures, there may be interactive discussions where students can ask questions, clarify doubts, and engage in group discussions. These sessions encourage active participation and foster a deeper understanding of the subject matter.
- .10 Problem-Solving Sessions: Engineering mechanics - statics heavily relies on problem-solving skills. To enhance students' ability to apply theoretical concepts to practical problems, problem-solving sessions may be conducted. Students can solve numerical problems, analyze real-world scenarios, and learn to apply appropriate statics principles to find solutions.
- .11 Laboratory Sessions: Depending on the availability of resources, laboratory sessions may be organized to provide hands-on experience with statics principles. Students may conduct experiments, use instruments to measure forces and moments, and analyze data to validate theoretical concepts learned in lectures.
- .12 Visual Aids and Simulations: Visual aids such as charts, diagrams, and videos may be used to illustrate concepts, demonstrate physical phenomena, and enhance understanding. Computer simulations and virtual experiments can also be employed to provide students with a realistic and interactive learning experience.
- .13 Assignments and Homework: Regular assignments and homework are typically given to students to practice and reinforce their understanding of the subject. These assignments may include numerical problems, theoretical questions, or analysis of real-world scenarios.
- .14 Tutorials and Office Hours: Professors or teaching assistants may offer tutorial sessions or office hours where students can seek additional help, ask questions, and receive individualized guidance on specific topics or problems.
- .15 Assessments: Periodic assessments such as quizzes, mid-term exams, and a final exam are conducted to evaluate students' comprehension of the subject. These assessments may include both theoretical and problem-solving components.

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5 and 10	LO #2, #3, #4 and #8, #9, #10
	Student Interaction	2	10% (10)	Continuous	All
	Projects / Lab.	-			
	Report (HWs)	10	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Moment of inertia Polar moment of inertia, Radius of gyration;
Week 2	Parallel-axis theorem, of composite areas
Week 3	Introduction to Dynamics: Rectilinear Motion of Particles: Position, velocity, acceleration, uniform rectilinear motion, uniformly accelerated rectilinear motion
Week 4	Motion of several particles
Week 5	Curvilinear Motion of Particles: component motions, relative motion
Week 6	Tangential and normal component, radial and transverse component
Week 7	Force, Mass, Acceleration: Newton's second law of motion, Dynamic equilibrium
Week 8	Work and Energy: work of a force , kinetic energy of a particle , potential energy
Week 9	conservation of energy, power and efficiency
Week 10	Impulse and momentum: principle of impulse and momentum,
Week 11	Impulsive motion
Week 12	Conservation of momentum



Week 13	Impact, direct and oblique impact
Week 14	Angular momentum
Week 15	Kinematics and Kinetics of rigid bodies: only introduction
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Vector Mechanics for Engineers Statics and Dynamics 10th c2013-Ferdinand P. Beer et.al., McGraw-Hill Education	Yes
Recommended Texts	Engineering Mechanics 3, Dynamics, 2nd Edition, Dietmar Gross · Werner Hauger, Jörg Schröder · Wolfgang A. Wall, Sanjay Govindjee, Springer-Textbook	No
Websites	https://www.coursera.org/learn/engineering-mechanics	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors



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

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

Course Description Form

1. Course Name:	Extraction Metallurgy
2. Course Code:	MET1201
3. Semester / Year:		
4. Description Preparation Date:	3/9/2025	
5. Available Attendance Forms:	weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	45	
7. Course administrator's name (mention all, if more than one name)		
	Name: <u>Nabaa Sattar Radhi</u>	
	Email: mat.nabaa.satter@uobabylon.edu.iq	
8. Course Objectives		



Course Objectives	Introduce students to everything related to the principles of metal extraction, general methods of extraction, general methods of purification, extracting metals from their oxide sources, extracting metals from sulfide ores, extracting metals from halides, and methods for extracting precious metals.
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9. Teaching and Learning Strategies

Strategy	3- The lecture method 4- The discussion method
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the principles of extraction	Principles of extraction	Direct lecture	Give abrupt questions to the students The classical discussion
2	2	Understanding the principles of extraction	Principles of extraction	Direct lecture	Give abrupt questions to the students The classical discussion
3	2	Familiarity with the general methods of extraction	General methods of extraction	Direct lecture	Give abrupt questions to the students The classical discussion
4	2	Familiarity with the general methods of extraction	General methods of extraction	Direct lecture	Give abrupt questions to the students The classical discussion
5	2	Familiarity with the General methods of refining	General methods of refining	Direct lecture	Give abrupt questions to the students The classical discussion
6	2	Familiarity with the General methods of refining	Extraction of metals from oxide sources	Direct lecture	Give abrupt questions to the students The classical discussion
7	2	Student understanding of Extraction of metals from oxide sources	Extraction of metals from oxide sources	Direct lecture	Give abrupt questions to the students The classical discussion



8	2	Student understanding of Extraction of metals from oxide sources	Extraction of metals from oxide sources	Direct lecture	Give abrupt questions to the students The classical discussion
9	2	The student is familiar Extraction of metals from sulphide ores	Extraction of metals from sulphide ores	Direct lecture	Give abrupt questions to the students The classical discussion
10	2	The student is familiar Extraction of metals from sulphide ores	Extraction of metals from sulphide ores	Direct lecture	Give abrupt questions to the students The classical discussion
11	2	Understanding students of Extraction of metals from halides	Extraction of metals from halides	Direct lecture	Give abrupt questions to the students The classical discussion
12	2	Understanding students of Extraction of metals from halides	Extraction of metals from halides	Direct lecture	Give abrupt questions to the students The classical discussion
13	2	The student is familiar with Extraction of precious metals	Extraction of precious metals	Direct lecture	Give abrupt questions to the students The classical discussion
14	2	The student is familiar with Extraction of precious metals	Extraction of precious metals	Direct lecture	Give abrupt questions to the students The classical discussion
15	2	A review to warn the paragraphs that were explained in the previous lectures	Extraction review	Direct lecture	Give abrupt questions to the students The classical discussion

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any) Main references (sources)	Extraction of nonferrous metals, H.S. Ray, R.Sridhar and K.P. Abraham Affiliated East West Press Pvt Ltd., New Delhi (2007).
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Main references (sources)	1. H.S. Ray and A. Ghosh, Principles of extractive metallurgy, Wiley Eastern Ltd., New Delhi (1991) REFERENCE BOOKS: 1. W.H. Dennis, Extractive Metallurgy, Philosophical Library, New York (1965) 2. F. Habashi, Principles of Extractive Metallurgy, Vol.1, Gordon and Breach, New York (1969). 3. T. Rosenqvist, Principles of Extractive Metallurgy, McGraw Hill, New York (1983). 4. J.L. Bray, Nonferrous production metallurgy, Wiley, New York (1954).
Recommended books and references (scientific journals, reports,...)	
Electronic References, Websites	Google, Google Scholar

Course Description Form

1. Course Name:	Human rights and Freedom & Democracy
2. Course Code:	UOBAB1104
3. Semester / Year:	
4. Description Preparation Date:	3/5/2025
5. Available Attendance Forms:	weekly
6. Number of Credit Hours (Total) / Number of Units (Total)	63
7. Course administrator's name (mention all, if more than one name)	Name: Mustafa Akeel Hammed Email: Mat.mustafa.akeel@uobabylon.edu.iq
8. Course Objectives	



Course Objectives	<ol style="list-style-type: none">1. تعليم الطلاب والطالبات مبادئ حقوق الانسان والديمقراطية .2. التنمية القانونية والفكرية من مبادئ حقوق الانسان والديمقراطية .3. التعرف على الحقوق والحريات التي نصوص الدستور العراقي .النافذ لسنة 2005 .4. صقل الموهبة الفكرية والقانونية للطلبة .5. التعرف على المبادئ العامة لحقوق الانسان والديمقراطية .وتطورها .
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9. Teaching and Learning Strategies

Strategy	<p>طرائق التعليم والتعلم</p> <ul style="list-style-type: none">• العصف الذهني• التكليف بالواجبات الدراسية الخاصة بالمادة <p>طرائق التقييم</p> <ol style="list-style-type: none">1. أسئلة واجوبة2. امتحانات شهرية3. اعداد الامتحانات المفاجئة المسماة بـGuizes4. الإجابة على الأسئلة5. الامتحانات الشفهية والشهرية6. لقاء المحاضرة
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		مفاهيم أساسية في حقوق الإنسان	لقاء	واجوبة أسئلة
2	2		التطور التاريخي لحقوق الانسان	لقاء	واجوبة أسئلة
3	2		المصادر القانونية لحقوق الانسان	لقاء	واجوبة أسئلة
4	2		الحقوق المدنية والشخصية للإنسان	لقاء	واجوبة أسئلة



5	2		الحقوق السياسية للإنسان	DATA SHOW -القاء	واجوبة أسئلة
6	2		الحقوق الاقتصادية والاجتماعية للإنسان	القاء	Guizes
7	2		الحقوق والحريات الثقافية والفكرية	القاء	Guizes
8	2		ضمانات حماية حقوق الانسان	القاء	Guizes
9	2		مفهوم الديمقراطية وتطورها التاريخي	DATA SHOW -القاء	واجوبة أسئلة
10	2		اشكال الديمقراطية		واجوبة أسئلة
11	2		اركان أو عناصر النظام الديمقراطي وشروط نجاحه	DATA SHOW -القاء	واجوبة أسئلة
12	2		تقييم النظام الديمقراطي	DATA SHOW -القاء	واجوبة أسئلة
13	2		مفهوم الحرية	DATA SHOW -القاء	Guizes
14	2		تنظيم الحريات العامة من قبل السلطات العامة	DATA SHOW -القاء	Guizes
15	2		أنواع الحريات	DATA SHOW -القاء	واجوبة أسئلة

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any)
Main references (sources)

اد.عمار عباس الحسيني: حقوق الانسان
اد.حميد حنون : مبادئ حقوق الانسان
أ.م.فيل شلال عباس : حقوق الانسان والديمقراطية والحريه
صبري سعيد : الديمقراطية

Main references (sources)

محاضرات أساتذة القانون حول حقوق الانسان والديمقراطية

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

Electronic References, Websites

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.....
.....

Course Description Form

1. Course Name:

Computer Aided Engineering Drawing/ Auto CAD

2. Course Code:

MET1204

3. Semester / Year:

4. Description Preparation Date:

3/9/2025

5. Available Attendance Forms:

weekly



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

63

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

Name: Haydar Hassan Jaber Jamal Al Deen
Email:

8. Course Objectives

Course Objectives

1. Learn sketching and taking field dimensions.
2. Take data and transform it into graphic drawings.
3. Learn basic engineering drawing formats.
4. Learn basic AutoCad skills.
5. Learn who draw 2D drawings in AutoCad.
6. Learn who draw 3D drawings in AutoCad.

9. Teaching and Learning Strategies

Strategy

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

10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
1	3		Introduction to AutoCAD	Direct lecture	Give abrupt questions to the students The classical discussion
2	3		Starting with Sketching	Direct lecture	Give abrupt questions to the students The classical discussion
3	3		Working with Drawing Aids	Direct lecture	Give abrupt questions to the students The classical discussion



4	3		Editing Sketched Objects	Direct lecture	Give abrupt questions to the students The classical discussion
5	3		Layers, Working with Layers, Layer Tools	Direct lecture	Give abrupt questions to the students The classical discussion
6	3		Editing Sketched Objects II	Direct lecture	Give abrupt questions to the students The classical discussion
7	3		Creating Text and Tables	Direct lecture	Give abrupt questions to the students The classical discussion
8	3		Dimensioning and Detailing Your Drawings	Direct lecture	Give abrupt questions to the students The classical discussion
9	3		Editing Dimensions	Direct lecture	Give abrupt questions to the students The classical discussion
10	3		Dimension Styles	Direct lecture	Give abrupt questions to the students The classical discussion
11	3		Adding Constraints to Sketches	Direct lecture	Give abrupt questions to the students The classical discussion
12	3		Hatching Drawings	Direct lecture	Give abrupt questions to the students The classical discussion
13	3		Plotting Drawings In AutoCAD	Direct lecture	Give abrupt questions to the students The classical discussion



14	3		Template Drawings	Direct lecture	Give abrupt questions to the students The classical discussion
15	3		Working with Blocks	Direct lecture	Give abrupt questions to the students The classical discussion

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, reportsetc

12. Learning and Teaching resources

Required textbooks (curricular books, if any) Main references (sources)	•AutoCAD program
Main references (sources)	
Recommended books and references (scientific journals, reports,...)	
Electronic References, Websites	

Module Information

معلومات المادة الدراسية

Module Title	Computer Programming	Module Delivery
Module Type	Basic	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UoB12348	
ECTS Credits	5	
SWL (hr/sem)	125	



كلية هندسة المواد/قسم هندسة المعادن
الوصف الاكاديمي



Module Level	UGx	Semester of Delivery	second
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Hussein Mohammed Salman	e-mail	Hus12ms@uobabylon.edu.iq
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Noora Kadhim Khudier	e-mail	Mat.noorakadhim@uobabylon.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	<p>1. To develop students skills in the software of computer through training on the operating system and office application system.</p> <p>2. Understand how to deal with the scientific and engineering problems, and how convert these problems into programs.</p> <p>3. This course deals with the basic concept of programming language in the computers.</p> <p>4. Teach the students all the editor of the programming language Quick Basic.</p> <p>5. Train the student write the codes and programs.</p> <p>6. Understand the sentences of the data input and output in the specific language.</p>
Module Learning Outcomes	<p>1. Recognize how algorithms and flowcharts written to solve any problem.</p>



<p>مخرجات التعلم للمادة الدراسية</p>	<p>2. Explain and discuss main the elements of the language editor.</p> <p>3. Understand the variables and the constants and main differences between them .</p> <p>4. Discuss and describe main programming sentences used in the check and decision making in a particular language.</p> <p>5. Solve some examples and problems with the conditional statements.</p> <p>6. Discuss the repetition statements especially "FOR---NEXT" statement.</p> <p>7. Training to solve some sequences and engineering series using For---Next statement.</p> <p>8. Study and understand the vectors (one dimension arrays) and two-dimension arrays (matrices).</p> <p>9. Discuss how solve matrices problems .</p> <p>10. Explain the types of files in the programming language .</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <ul style="list-style-type: none">-The algorithms and flowcharts are very important for any student want to study any programming language. These important to understand how write codes and programs for any problem.-Quick Basic programming language is one of the structural programming languages in computer science and information technology.-Although the QB language is under DOS operating system, but it very important to teach how write codes and programs to solve most scientific and engineering problems.-In this module, the student teach the structural methodology of any computer language program.-The students have been teaching the general form of any engine in the any programming language as the decision making and/or repetition structure.-In this module, the student will obtain a lot of skills in the programming help him in other fields and other scientific areas.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies



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

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem)	63	Structured SWL (h/w)	4
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.14
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعياً	
Total SWL (h/sem)			125
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	2	10% (10)	4, 10	LO #1, 2, 8 and 10
	Assignments	1	10% (10)	3, 9	LO # 3, 4, 6 and 7
	Projects / Lab.	2	15% (15)	Continuous	
	Report	1	5% (5)	12	LO # 5, 8 and 9
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1-10
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – algorithms and flowcharts
Week 2	Main elements of the editor of programming language Quick Basic , variables and constants
Week 3	Input statements and output statements in Quick Basic programming language
Week 4	Mathematical operation, comparison operation, and logical operations
Week 5	Conditional , and decision making statements
Week 6	Conditional repetition and non-condition repetition statements
Week 7	Conditional repetition and non-condition repetition statements
Week 8	Solve scientific and engineering problems as sequences and series using repetition statements.
Week 9	One-Dimension arrays (vectors)
Week 10	Multi-Dimension arrays (Matrices), Two-Dimension Arrays
Week 11	Multi-Dimension arrays (Matrices), Two-Dimension Arrays
Week 12	Square Matrices, and main operations within and between the square matrices
Week 13	Multiplication between two and/or more matrices
Week 14	String manipulation
Week 15	The files manipulation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Theoretical Only
Week 2	Introduction to Quick Basic editor



Week 3	Input and Output statements
Week 4	If-condition statements and its forms
Week 5	If-condition statements and its forms
Week 6	Test "If-Statement", and solve some problems
Week 7	Repetition statements as FOR---NEXT statement
Week 8	Solve and test some problems as sequences and series with "For-Next" statement
Week 9	Arrays (one-dimension and two-dimensions)
Week 10	Arrays (one-dimension and two-dimensions)
Week 11	Solve and test some examples and problems by arrays
Week 12	Arithmetic operations between matrices (two-dimension arrays)
Week 13	multiplication matrices
Week 14	String manipulation
Week 15	Solve some examples and problems about string manipulation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	البرمجة بلغة كوك بيسك ، أ.د.تحسين الخطاب ، الطبعة الاولى ، 2012	Yes
Recommended Texts	None	No
Websites		Google Scholar

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria



Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

1. Course Name:	
Strength of Materials I	
2. Course Code:	
MET2302	
3. Semester / Year:	
4. Description Preparation Date:	
07/09/2025	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total):	
72	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Haydar Al-Ethari	
Email: Dr.eng.alethari@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	The syllabus of the course is aimed not only at giving the students the ability to solve the problems of the strength of materials but to prepare them to deal with and understand other subjects related to this subject such as: design and selection of engineering materials, forming processes, mechanical metallurgy, mechanical behavior of materials, stress analyses and so on.



9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in introducing this unit is to work on increasing students' knowledge of everything related to the strength of materials and to encourage students to participate in the discussion, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are related to the items of the subject and the manner must be interested to the students.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1		Simple Stress, Analysis of internal force, Normal stress,			
Week 2		Shearing Stress, Bearing Stress			
Week 3		Thin-Walled cylinder			
Week 4		Simple Strain, Stress-strain diagram, Hooke's law			
Week 5		Poisson's ratio			
Week 6		statically indeterminate member			
Week 7		Thermal stresses			
Week 8		Torsion, Derivation of torsion formula			
Week 9		longitudinal shearing stress			
Week 10		Helical compression springs.			
Week 11		Beams, Shearing force diagram			
Week 12		Bending moment diagram			
Week 13		Stresses in beams, Location of the Neutral axis			



Week 14		Bending stress in the beams			
Week 15		Economic sections			
Week 16		Preparatory week before the final Exam			
11. Course Evaluation					
Quizzes 10% (10), Assignments 10% (10), Projects / Lab. 10% (10), Report 10% (10), Midterm Exam 10% (10), Final Exam 50% (50),					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)	Ferdinand L.S., Andrew P., 1980, Strength of Materials, 3rd edition, Harper& Row, Publishers, New York.				
Main references (sources)					
Recommended books and references (scientific journals, reports....)	1- Haydar Al-Ethari, 2022, Strength of materials, 1 st edition, Dar Al-Sadiq cultural foundation, Hilla, Babylon, Iraq. 2- Hearn E.j., 1977, Mechanics of Materials, Vol.1&2., Pergamon Press, London. 3- James M.G., Timoshenko S.P., 1994, Mechanics of Materials, 3 rd edition, Chapman&Hall. 4-Hibbeler R. C.,1997, Mechanics of Materials, Prentice Hall Inc., New Jersey.				
Electronic References, websites	https://www.youtube.com/channel/UCuDw1wG1MD6DRdLVrKxzDgA				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية



Module Information

معلومات المادة الدراسية

Module Title	Strength of Materials II			Module Delivery
Module Type	Core			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code				
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UC	Semester of Delivery	3	
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Prof. Dr. Haydar Al-Ethari		e-mail	Dr.eng.alethari@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	07/06/2023	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Engineering mechanics Strength of Materials I	Semester	1 & 2 3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The syllabus of the course is aimed not only at giving the students the ability to solve the problems of the strength of materials but to prepare them to deal with and understand other subjects related to this subject such as: design and selection of
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	engineering materials, forming processes, mechanical metallurgy, mechanical behavior of materials, stress analyses and so on.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>At the end of the course the students should be able to:</p> <ol style="list-style-type: none">1- Clarify the stress computation in beams (shearing stresses).2- Discuss the economic sections for the beams.3- Define the composite beams and solve different exercises related to them.4- Discuss the beam's deflection and its determination.5- Calculate the beam's deflection using the double integration method.6- Discuss the stress analyses methods.7- Clarify the stress analyses for in-plane stress state/analytical method.8- Clarify the stress analyses for in-plane stress state/graphical method.9- Clarify the strain analyses for in-plane strain state/ analytical method.10- Clarify the strain analyses for in-plane strain state/graphical method.11- Explain what the strain energy is.12- Use the energy method (tension, torsion, bending) in different engineering applications.13- Clarify the column and its difference from other similar members and use Euler's equation to design the columns.14- Explain the reasons of stress concentration and its calculation.
Indicative Contents المحتويات الإرشادية	<p>The course is consisted of theoretical and experimental parts. The theoretical part will cover all the facts, theories, and analytical methods related to the strength of materials at the level of bachelor engineering. Laboratory (experimental part) provides the opportunity to explore the concepts through hand-on experiments including some mechanical testing. Therefore, the indicative content includes the following.</p> <p><u>Part A –Basic concepts for the strength of materials:</u></p> <ul style="list-style-type: none">- Stresses in beams: bending and shearing, effects of the beams section, design of the beam for bending and shearing stresses, beams deflection (14 hrs).- Tutorial (4hrs)- Laboratory experiments (12hrs) <p><u>Part B – Combined stresses and strains (Graphical and analytical method):</u></p> <ul style="list-style-type: none">- Direct normal and bending, Two mutual stresses, Pure shear, Normal and shearing stresses (14hrs)- Strain analyses (Graphical and analytical method) (4hrs)- Tutorial (4hrs)- Laboratory experiments (8hrs) <p><u>Part C –Special topics:</u></p> <ul style="list-style-type: none">- The strain energy (4hrs)- Euler's equation to design the columns (4hrs)- Stress concentration and its calculation (4hrs)- Tutorial (4hrs)- Laboratory experiments (10 hrs)

**Learning and Teaching Strategies**

استراتيجيات التعلم والتعليم

Strategies

The main strategy that will be adopted in introducing this unit is to work on increasing students' knowledge of everything related to the strength of materials and to encourage students to participate in the discussion, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are related to the items of the subject and the manner must be interested to the students. In addition there will be a special canal on the YouTube to illustrate all the items of the syllabus.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)	93	Structured SWL (h/w)	6
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	32	Unstructured SWL (h/w)	3
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	125		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6 and 14	LO #1-7 and #8-14
	Assignments	2	10% (10)	3and 13	LO #8, and #13
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #10
	Midterm Exam	1hr	10% (10)	7	LO #1 - 10



Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Economic and Unsymmetrical Sections
Week 2	Shearing Stresses in Beams
Week 3	Deflection of beams, Double integration method
Week 4	Deflection of beams, Double integration method
Week 5	Combined stresses.
Week 6	Combined axial & flexural stress
Week 7	Stress at a point
Week 8	Variation of stress at a point (Analytical derivation)
Week 9	Variation of stress at a point (Analytical derivation)
Week 10	Mohr's circle for plain stress
Week 11	Variation of strain at a point (Analytical derivation)
Week 12	Mohr's circle for plain strain.
Week 13	Stress concentration
Week 14	Strain Energy: Axial loading, Torsional loading, Flexural loading,
Week 15	Columns: Critical load, Long column by Euler's formula, Limitation of Euler's formula
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر



	Material Covered
Week 1	Lab 1: Flexural stress
Week 2	Lab 2: Deflection of the beams
Week 3	Lab 3: Critical load for Long column
Week 4	Exam
Week 5	Lab 4: Measurement of the elastic modulus
Week 6	Lab 5: Impact test
Week 7	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Ferdinand L.S., Andrew P., 1980, Strength of Materials, 3 rd edition, Harper& Row, Publishers, New York.	Yes
Recommended Texts	1- Haydar Al-Ethari, 2022, Strength of materials, 1 st edition, Dar Al-Sadiq cultural foundation, Hilla, Babylon, Iraq. 2- Hearn E.j., 1977, Mechanics of Materials, Vol.1&2., Pergamon Press, London. 3- James M.G., Timoshenko S.P., 1994, Mechanics of Materials, 3 rd edition, Chapman&Hall. 4-Hibbeler R. C.,1997, Mechanics of Materials, Prentice Hall Inc., New Jersey.	Yes
Websites	https://www.youtube.com/channel/UCuDw1wG1MD6DRdLVrKxzDgA	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings



	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	Metallurgical Engineering 1		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UoB12345			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UC	Semester of Delivery		
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Jassim Mohammed Salman Al-Murshdy		e-mail	mat.jassim.mohammed@uobabylon.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail



Scientific Committee Approval Date	09/06/2023	Version Number	1.0
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Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Materials Science	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none">1. To understand the structure, background and nature of metals and alloys as well as the effect properties on microstructure.2. To acquire theoretical understanding of different types of phase diagram.3. To learn the method of drawing phase diagram of Fe- C.4. To understand the types of cast iron and applications and another types of steels.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <p>Upon completion of the course, students will</p> <ol style="list-style-type: none">1. Have a working knowledge of metals and alloys, including theory and experiment.2. Be able to know on Colling curve of different types of phase diagram.3. Propose potential projects in metals and alloys.4. Potentially be able to join a engineer research group in metals and alloys as a student researcher.
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A -</u> What is structure & properties? The importance of metals And alloys. Why you should know about solid solutions, space lattice in metals, diffusion in metals , types of diffusion, crystal structure Mechanical Properties of metals and relation in microstructure</p> <p><u>Part B -</u> Approaches to metallurgy</p>



	<p>Know draw cooling curve of two metals completely soluble in the liquid and solid state and</p> <p>Two metals completely soluble in the liquid state and completely in soluble in the solid state and</p> <p>Two metals completely soluble in the liquid state but only partly soluble in the solid state and finally</p> <p>The congruent – melting intermediate phase.</p> <p><u>Part C -</u></p> <p>Applications and types of carbon steels , alloy steel , tool steel ,die steel, heat resistance steel and also cast iron</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل			150



Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Structure of metals, Space lattice of metals and alloys, Crystal's system and diffusion also properties.
Week 2	Thermal equilibrium diagrams, coordinates of phase diagrams, theoretical and experimental method.
Week 3	Types of thermal phase diagrams
Week 4	Type one: Two metals completely soluble in the liquid and solid state.
Week 5	Type two: Two metals completely soluble in the liquid state and completely in soluble in the solid state.
Week 6	Type three: Two metals completely soluble in the liquid state but only partly soluble in the solid state.
Week 7	Type four: The congruent – melting intermediate phase.
Week 8	Another types of phase diagram, peritectic reaction, monotectic reaction, eutectoid reaction, peritectoid reaction.
Week 9	Two metals insoluble in the liquid and solid state.
Week 10	Fe-C phase diagram -1
Week 11	Fe-C phase diagram --2



Week 12	Carbon steel, types, microstructure and applications.
Week 13	Alloy steel, properties, types and applications.
Week 14	Heat resistance steel, maraging steel and magnetic steel, tool steel and die steel.
Week 15	Cast iron, types. Microstructure and application.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر لايوجد

	Material Covered
Week 1	Preparation of sample for microstructure test
Week 2	Hardness test
Week 3	Solidification of metals
Week 4	Microstructure of carbon steel types
Week 5	Microstructure of alloy steels
Week 6	Know the Microstructure of cast iron
Week 7	Know the Microstructure of stainless steel

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to physical metallurgical by H.A. avner	Yes
Recommended Texts	Engineering metallurgy by Higgness	No
Websites		



Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	Metallurgical Engineering 11	Module Delivery
Module Type	Core	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UoB12345	
ECTS Credits	6	
SWL (hr/sem)	200	



Module Level	UC	Semester of Delivery	4
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Jassim Mohammed Salman Al-Murshdy	e-mail	mat.jassim.mohammed@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	09/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Materials Science	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none">1. To understand the structure, types and properties of stainless steel and as well as the effect properties on microstructure.2. To acquire theoretical understanding of non - ferrous metals and alloys.3. To learn the know light metals, heavy metals and Refractory metals.4. To understand the types of Al alloys, cu alloys, Ti alloys, Ni alloys and white metals and applications and another non -ferrous - metals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <p>Upon completion of the course, students will</p> <p>Have a working knowledge of non -ferrous metals and alloys, including .5 theory and experiment.</p> <p>Be able to know on light metals, heavy metals and alloys. .6</p> <p>Propose potential projects in non- ferrous metals and alloys and applications. .7</p> <p>Potentially be able to join a special engineer research group in non -ferrous .8</p>



	metals and alloys as a student researcher.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A -</u> What is non-ferrous metals & properties? The importance of metals And alloys. Why you should know about non-ferrous metals, The arbitrary classification of non-ferrous metals. Stainless steel, types of stainless steel, properties and applications and relation in microstructure <u>Part B -</u> Approaches to know Light metals: Aluminum, Magnesium, Titanium, And Beryllium, and so on Heavy metals: Copper, Zinc, Lead, Tin, and so on. Refractory metals: Tungsten, Nickel, Molybdenum, and so on. <u>Part C -</u> Applications and types of Al alloys, Cu alloys, Ti Alloys, Ni alloys and white and less common metals.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
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Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Stainless steel, types of stainless steel, properties and applications.
Week 2	Introduction to non-ferrous metals and alloys.
Week 3	The arbitrary classification of non-ferrous metals.
Week 4	Light metals: Aluminum, Magnesium, Titanium, Beryllium, and so on
Week 5	Heavy metals: Copper, Zinc, Lead, Tin, and so on.
Week 6	Refractory metals: Tungsten, Nickel, Molybdenum, and so on.
Week 7	Precious metals: Gold, Silver, Platinum, and Chromium, and so on.
Week 8	Al alloys, types, phase diagram, properties of alloys, microstructure and applications -1.
Week 9	Al alloys, types, phase diagram, properties of alloys, microstructure and applications -2.



Week 10	Cu alloys , types, phase diagram , properties of alloys , microstructure and applications
Week 11	Ni alloys , types, phase diagram , properties of alloys , microstructure and applications
Week 12	Ti alloys , types, phase diagram , properties of alloys , microstructure and applications
Week 13	Zn, properties, microstructure and applications.
Week 14	White metals, properties, types and applications
Week 15	Less common metals.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر لايوجد

	Material Covered
Week 1	Preparation of non-ferrous metals for microstructure test.
Week 2	Microstructure of cast non- ferrous alloys.
Week 3	Microstructure of wrought non- ferrous alloys.
Week 4	Microstructure of Al alloys.
Week 5	Microstructure of Cu alloys.
Week 6	Know the microstructure of brass alloys.
Week 7	Know the Microstructure of bronze alloys.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to physical metallurgical by H.A. avner	Yes
Recommended Texts	Engineering metallurgy by Higgness	No
Websites		



Grading Scheme

مخطط الدرجات

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

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

Module Information

معلومات المادة الدراسية

Module Title	Chemical Metallurgy II	Module Delivery	
Module Type	Core	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code			
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGx1		Semester of Delivery



Administering Department	Metallurgy engineering	College	Materials engineering
Module Leader	Baraa Hassan hadi alkhaqani	e-mail	Mat.baraa.hassan@uobabylon.eq.iq
Module Leader's Acad. Title	Assist Prof.	Module Leader's Qualification	MSC
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	31/05/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none">1. Introducing the student to thermodynamics and its first and second laws.2. Identify the most important thermodynamic properties such as entropy, enthalpy, free energy, and heat capacity.3. Knowledge of the reaction kinetics and the degree and order of the reaction.4. Acquisition of the skill of recognizing the voltages of standard electrodes.5. Learn about surface tension, adsorption, diffusion, and catalysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>A- Knowledge and understanding</p> <p>A1- Full knowledge of heat capacity and Kirchhoff's law.</p> <p>A2- Conclusion of methods for calculating entropy, enthalpy and free energy based on heat capacity.</p>



	<p>A3- Complete knowledge of thermochemistry and enthalpy types.</p> <p>A4- Understand how corrosion and coatings occur to protect metals from weathering.</p> <p>A5- Understanding diffusion in the solid state and the mechanics of diffusion.</p> <p>A6- To know the methods of stimulation and its applications.</p> <p>B- Subject-specific skills</p> <p>B1 - Acquire skill in deriving laws related to thermodynamic properties.</p> <p>B2- Acquisition of skill in solving problems related to reaction kinetics.</p> <p>B3- Acquiring the skill in solving all problems that fall within electrochemistry.</p> <p>B4- Acquisition of the skill in knowing adsorption and its forms.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Electrochemistry [2 hr]</p> <p>Introduction ,electrolytes ,conduction in electrolytes [2 hr]</p> <p>Types of electrolytes [2 hr]</p> <p>The thermodynamics of the reaction at an electrode galvanic cell, junction potential between toe electrolytes. [2 hr]</p> <p>The measurement of cell EMF and electrode potential ,reduction and oxidation potentials. [8 hr]</p> <p>Concentration cell.[2 hr]</p> <p>Polarization.[6 hr]</p> <p>Interfacial phenomena introduction, surface energy and surface tension.[6 hr]</p> <p>Interfacial energy of other gas /liquid interfaces.[4 hr]</p> <p>Adsorption, nucleation. [4 hr]</p> <p>Corrosion and types. [8 hr]</p> <p>The rusting of iron. [4 hr]</p> <p>Factors affecting corrosion. [6 hr]</p> <p>The prevention of corrosion. [6 hr]</p>

**Learning and Teaching Strategies**

استراتيجيات التعلم والتعليم

Strategies

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

Module Information

معلومات المادة الدراسية

Module Title	Mathematics	Module Delivery	
Module Type	Support	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UoB12345		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGx		Semester of Delivery
Administering Department		College	
Module Leader	Hussein Fawzy Mahdy AL-Bermany	e-mail	mat.hrbermany@uobabylon.edu.ig
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MS.c.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematics I .	Semester	
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Co-requisites module	Engineering and Numerical Analysis.	Semester
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none">1. Introduction to Vectors and their user.2. Understanding the principles of Polar coordinates.3. Knowledge the Partial derivatives.4. Studying all methods of solving Double and Triples integrals.5. Developing the ability to solve Differential equations.6. Complete knowledge of all methods for Sequences and series.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1. Develop skills : Dot product and Cross product.2. Recognize Applications of vectors for engineering quantity.3. Acquire skill in using the mathematics solution for Partial derivatives.4. Find (Velocity, Direction, speed and Acceleration) Motion in Space.5. Develop skills in Calculating : Unit Tangent Vector, Curvature and the Unite Normal Vector.6. Understanding the Polar coordinates and their Relation to the Cartesian coordinates .7. Gain expertise with respect to the Partial derivatives and the chain rule .8. Understand the concepts Directional derivatives and Gradient vectors and calculate them using Partial derivatives.9. Apply Partial derivatives critical point .10. Drawing functions and finding (areas , volumes)using Double integrals and Triples integral.11. Acquisition of skills in reversing Double integrals from Cartesian coordinates to Polar coordinates and vice versa.12. The Ability Solve Differential equations (First order, Second order) .13. Acquire expertise in solving sequences and series.
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <ul style="list-style-type: none">- Introduction to Vectors : Component form and length of a vector, Vector algebra operations, Unit Vector, Angle Between Vector, Vector Projection and Cross Product, Triple scalar or Box Product, Lines and Planes in Space Vector Functions, Unit Tangent Vector, Curvature, Unite Normal Vector, . [15 hrs]- Polar Coordinates: Definition of Polar coordinates, Polar Eq. and Graphs, Relating Polar and Cartesian coordinates, Graphs in Polar coordinates, Areas Polar coordinates . [10 hrs]



- Partial Derivatives: Partial Derivatives of Functions of Two Variables, Function of More than Two Variables, Second Order Partial Derivatives, Partial Derivatives of still Higher Order, The Chain Rule, Directional derivatives in Plane, Gradient Vector, The Critical Point and local maxima and local minima. [10 hrs]
- Multiple Integrals: Double integrals over Rectangles, Double integrals as Volume, Fubini's theorem (first form), Double integrals over Bounded Nonrectangular Regions, Fubini's theorem (second form), Finding Limits of Integration, Mass and Moment in the Plane, Centroids, Moment of Inertia(2D), Double integrals in Polar Coordinates, Triple Integrals, Volume of Region in Space, Centroids and Moment of Inertia(3D), Substitutions in Double integrals. [12 hrs]
- Differential Equations : First Order (Separable of Variables, Homogeneous Equation, Exact, Non-exact and Linear), Second Order Homogeneous, Second Order Non-Homogeneous Linear Equations(Variation of Parameters, Undetermined Coefficients). [10 hrs]
- Infinite Sequences and series. [8 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

1. Class Lectures : The professor will conduct lectures to deliver the fundamental concepts, principles and theories of Mathematics . they will explain the key topics equations and calculation , providing , and examples and illustrations to enhance understanding .
2. Using the display screen: using visual aids to display charts, diagrams and videos to illustrate concepts , and enhance understanding.
3. Interactive Discussions: students can ask questions, clarify doubts, and engage in group discussions. These sessions encourage active participation and foster a deeper understanding of the subject matter.
4. direct and abrupt questions.
5. Encouragement of right answers & discussion of wrong answers.
6. large competition inside the class between students for more inducing them on thinking.
7. Assignments and Homework.
8. Assessments: The classical discussion during the lecture, Quizzes, Oral examinations, Mid-term exams, and final exam are conducted to evaluate students' comprehension of the subject.

Student Workload (SWL)



الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	2	26% (26)	5 and 10	LO #1, #6 and #10, #11
	Assignments	5	5% (5)	2-12	LO #3, #4, #6, #9 and #12
	Onsite H.W	1-15	5% (5)	Continuous	All
	Reports	1	4% (4)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Vectors and their quantities and directions
Week 2	Vectors product (Dot product and cross product)
Week 3	Vectors Valued Functions and Motion in Space
Week 4	Polar coordinates (Transformation from polar coordinates to Cartesian coordinates and vice versa)
Week 5	Representation of polar coordinates, Drawing the polar functions, Areas and lengths in polar coordinates.
Week 6	Introduction- Partial derivatives and the chain rule.
Week 7	Directional derivatives and Gradient vectors of function for more than one variable.



Week 8	Tangent planes , Find the critical point and local maxima and local minima.
Week 9	Double integrals- Calculate the area of rectangle regions and non-rectangle region,
Week 10	Double integrals in polar coordinates
Week 11	Triples integral- Calculate the volume, applications for calculate the moment of inertia (2D, 3D)
Week 12	Solving triple integration by using cylindrical and spherical coordinates
Week 13	Solving Differential equations (First order)
Week 14	Solving Differential equations (Second order)
Week 15	Infinite Sequences and series
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mathematics (Thomas)	Yes
Recommended Texts	Elementary differential equations(William F.Trench)	No
Websites	https://www.coursera.org/learn/mathematical-thinking	

Grading Scheme

مخطط الدرجات

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



(0 – 49)	F – Fail	راسب	(0-44)	Considerable amount of work required
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

جدول الساعات المجدولة والغير مجدولة لمسار بولونيا

مادة الرياضيات المرحلة الثانية

العيب الكلي للنشاط	ساعة لكل اسبوع	عدد الاسبوع	الساعات الغير المجدولة USSWL	الساعات المجدولة SSWL	نوع النشاط
45	3	15		محاضرات في القاعات الدراسية	محاضرات
-	-	-		دوام المختبر	المختبر
30	2	15		المناقشات	المناقشات
-	-	-		مشروع عملي	مشروع عملي *
-	-	-	التهيئة للمشروع		
15	1	15	تحضير الدروس اليومي		حضير الدروس اليومي
-	-	-		الغاء العرض التقديمي	العروض التقديمية *
-	-	-	التهيئة للعرض التقديمي		
12	6	2	التهيئة لامتحانات اليومية		الامتحانات اليومية
-	-	-		الامتحان	تجان نصف الفصل *
7	7	1	التهيئة لامتحان		
3	3	1		الامتحان	امتحان نهاية الفصل
13	13	1	التهيئة لامتحان		
125	العيب الكلي للمادة خلال الفصل				
5	عدد الوحدات				

• لا توجد ساعات مجدولة لهذه النشاطات كون تم استيفاؤها ضمن الصفوف الدراسية

**Student Workload (SWL)**

الحمل الدراسي للطالب

Structured SWL (h/sem)	63	Structured SWL (h/w)	4.2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)			125
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Electrochemistry
Week 2	Introduction ,electrolytes ,conduction in electrolytes
Week 3	Types of electrolytes
Week 4	The thermodynamics of the reaction at an electrode galvanic cell ,junction potential between toe electrolytes



Week 5	The measurement of cell EMF and electrode potential ,reduction and oxidation potentials
Week 6	Concentration cell
Week 7	Mid-term Exam
Week 8	Polarization
Week 9	Interfacial phenomena introduction, surface energy and surface tension
Week 10	Interfacial energy of other gas /liquid interfaces
Week 11	Adsorption ,nucleation
Week 12	Corrosion and types
Week 13	The rusting of iron
Week 14	Factors affecting corrosion
Week 15	The prevention of corrosion
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Measuring the electrical conductivity of electrolytes solutions
Week 2	Lab 2: laws of electrical dissolved
Week 3	Lab 3: protective metals by electro coating
Week 4	Lab 4: measurement of PH solution
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Chemical metallurgy", practice and principles ,Kumar Chiranjib Gupta, Weinheim, Wiley Vch,2003.	Yes
Recommended Texts	"Chemistry for Engineers",Ambasta B.K., New Delhi ,Laxmi Publications Pvt.Ltd., 2009.	No
Websites	https://web.vscht.cz/~vun/metallurgy.pdf	

Grading Scheme

مخطط الدرجات

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

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

Module Information

معلومات المادة الدراسية



كلية هندسة المواد/قسم هندسة المعادن
الوصف الأكاديمي



Module Title	Programming in Visual Basic			Module Delivery
Module Type	Basic			<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UoB12345			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGx1	Semester of Delivery	Three	
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Rula Sami Aleesa		e-mail Mat.rula.sami@uobabylon.edu.iq	
Module Leader's Acad. Title	Teacher	Module Leader's Qualification	Ph.D.	
Module Tutor		e-mail		
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Programming in Quick Basic	Semester	Second
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	To develop students skills in the software of computer through training on .7 the visual languages.
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	<p>Understand how to deal with the scientific and engineering problems, and .8 how convert these problems into programs.</p> <p>This course deals with the Integrated Developing Environment of the visual .9 basic programming language.</p> <p>Teach the students how to build an integrated project to solve any scientific .10 and engineering problems .</p> <p>Discuss and explain all tools in the IDE of the language. .11</p> <p>Understand the methods, tools and functions of the data input and output. .12</p> <p>Develop skills of the student to improve their projects to adaptive it with any .13 change in the problem.</p> <p>Teaching new skills in other technical language as MATLAB technical and .14 simulation language.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>The students will know all concepts and aspects of the visual programming .11 languages.</p> <p>Explain and discuss main the elements of the language environment. .12</p> <p>Understand all tools in the tool box and how used it to build and modify any .13 project to solve any problem .</p> <p>Discuss and describe main stages for create new project. .14</p> <p>Applying number of examples about the tools in the IDE of the language. .15</p> <p>Solve some examples and problems with the conditional statements. .16</p> <p>Discuss the repetition statements especially "FOR---NEXT" statement. .17</p> <p>Training to solve some sequences and engineering series using For---Next .18 statement.</p> <p>Study and understand the vectors (one dimension arrays) and two-dimension .19 arrays (matrices).</p> <p>Discuss how apply and solve arithmetic operations between matrices . .20</p> <p>New skills in the MATLAB technical and simulation language .21</p>
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>-Very important for any engineering college student, teaching a language under windows operating system as Microsoft Visual Basic, and employing it to solve scientific and engineering problems.</p> <p>-Microsoft Visual Basic programming language is one of the object-oriented programming languages in computer science and information technology, where this language extreme support to the user-interfaces for any application.</p>



- The Visual Basic language present a lot of utilities in many scientific areas especially with the engineering application that need familiar and interactive interfaces.
- In this module, the student teach the structural methodology of visual language projects for any problem .
- The students have been teaching the general form of any engine in the any programming language as the decision making and/or repetition structure.
- In this module, the student will obtain a lot of skills in the programming help him in other fields and other scientific areas.
- This module support student's abilities to increase skills them in other language as MATLAB technical and simulation language.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

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

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem)	60	Structured SWL (h/w)	4
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	90	Unstructured SWL (h/w)	6



الحمل الدراسي غير المنتظم للطالب خلال الفصل	الحمل الدراسي غير المنتظم للطالب أسبوعيا
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2,5, 8 and 10
	Assignments	2	10% (10)	3, 9	LO #2, 3, 4, 6 and 9
	Projects / Lab.	1	15% (15)	Continuous	LO # 1-11
	Report	1	5% (5)	12	LO # 9, 10 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1-11
	Final Exam	2hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – visual languages structures and concepts
Week 2	Main elements of the integrated development environment of visual basic programming language
Week 3	Create new project
Week 4	Studying tools in tool-box part1
Week 5	Studying tools in tool-box part2
Week 6	Conditional statement and decision making statement
Week 7	Conditional repetition and non-condition repetition statements
Week 8	Solve scientific and engineering problems as sequences and series using repetition statements.



Week 9	One-Dimension arrays (vectors), Control Arrays
Week 10	Multi-Dimension arrays (Matrices), Two-Dimension Arrays
Week 11	Square Matrices, and main operations within and between the square matrices
Week 12	Input and output methods, tools, and functions
Week 13	String operations
Week 14	Menus building and the graphs in Visual Basic
Week 15	Review MATLAB technical and simulation language
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Theoretical Only
Week 2	Understand "Integrated Development Environment" of the Visual Basic Language
Week 3	Tools and Properties – part1
Week 4	Tools and Properties – part2
Week 5	Create new project in Visual Basic Language
Week 6	Test "If-Statement", and solve some problems
Week 7	Repetition statements as FOR---NEXT statement
Week 8	Solve and test some problems as sequences and series with "For-Next" statement
Week 9	Arrays (one-dimension and two-dimensions)
Week 10	Solve and test some examples and problems by arrays
Week 11	Arithmetic operations between matrices (two-dimension arrays)
Week 12	Control arrays
Week 13	Menus
Week 14	Improve students skills in maintain and develop existing projects in Visual Basic
Week 15	some programming skills in MATLAB technical and Simulation language



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	البرمجة بلغة فيجوال بيسك ، د.حسين محمد سلمان ، الطبعة الاولى 2020 الناشر: دار الصادق للطباعة والنشر والتوزيع	No (Available in the Publisher)
Recommended Texts	Visual Basic 6 Black Book Publisher: The Coriolis Group) Author(s): Steven Holzner ISBN: 1576102831	No (Available in the Internet)
Websites		Google Scholar

Grading Scheme

مخطط الدرجات

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

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



Module Information

معلومات المادة الدراسية

Module Title	Programming in Visual Basic		Module Delivery	
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UoB12345			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGx1	Semester of Delivery		
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Rula Sami Aleesa		e-mail	Mat.rula.sami@uobabylon.edu.iq
Module Leader's Acad. Title	Teacher	Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	01/06/2025	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Programming in Quick Basic	Semester	Second
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	
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<p>أهداف المادة الدراسية</p>	<p>To develop students skills in the software of computer through training on .15 the visual languages. Understand how to deal with the scientific and engineering problems, and .16 how convert these problems into programs. This course deals with the Integrated Developing Environment of the visual .17 basic programming language. Teach the students how to build an integrated project to solve any scientific .18 and engineering problems . Discuss and explain all tools in the IDE of the language. .19 Understand the methods, tools and functions of the data input and output. .20 Develop skills of the student to improve their projects to adaptive it with any .21 change in the problem. Teaching new skills in other technical language as MATLAB technical and .22 simulation language.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>The students will know all concepts and aspects of the visual programming .22 languages. Explain and discuss main the elements of the language environment. .23 Understand all tools in the tool box and how used it to build and modify any .24 project to solve any problem . Discuss and describe main stages for create new project. .25 Applying number of examples about the tools in the IDE of the language. .26 Solve some examples and problems with the conditional statements. .27 Discuss the repetition statements especially "FOR---NEXT" statement. .28 Training to solve some sequences and engineering series using For---Next .29 statement. Study and understand the vectors (one dimension arrays) and two-dimension .30 arrays (matrices). Discuss how apply and solve arithmetic operations between matrices . .31 New skills in the MATLAB technical and simulation language .32</p>
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>-Very important for any engineering college student, teaching a language under windows operating system as Microsoft Visual Basic, and employing it to solve scientific and engineering problems.</p>



- Microsoft Visual Basic programming language is one of the object-oriented programming languages in computer science and information technology, where this language extreme support to the user-interfaces for any application.
- The Visual Basic language present a lot of utilities in many scientific areas especially with the engineering application that need familiar and interactive interfaces.
- In this module, the student teach the structural methodology of visual language projects for any problem .
- The students have been teaching the general form of any engine in the any programming language as the decision making and/or repetition structure.
- In this module, the student will obtain a lot of skills in the programming help him in other fields and other scientific areas.
- This module support student's abilities to increase skills them in other language as MATLAB technical and simulation language.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

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

Student Workload (SWL)

الحمل الدراسي للطالب



Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			150

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2,5, 8 and 10
	Assignments	2	10% (10)	3, 9	LO #2, 3, 4, 6 and 9
	Projects / Lab.	1	15% (15)	Continuous	LO # 1-11
	Report	1	5% (5)	12	LO # 9, 10 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1-11
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – visual languages structures and concepts
Week 2	Main elements of the integrated development environment of visual basic programming language
Week 3	Create new project
Week 4	Studying tools in tool-box part1
Week 5	Studying tools in tool-box part2
Week 6	Conditional statement and decision making statement
Week 7	Conditional repetition and non-condition repetition statements



Week 8	Solve scientific and engineering problems as sequences and series using repetition statements.
Week 9	One-Dimension arrays (vectors), Control Arrays
Week 10	Multi-Dimension arrays (Matrices), Two-Dimension Arrays
Week 11	Square Matrices, and main operations within and between the square matrices
Week 12	Input and output methods, tools, and functions
Week 13	String operations
Week 14	Menus building and the graphs in Visual Basic
Week 15	Review MATLAB technical and simulation language
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Theoretical Only
Week 2	Understand “Integrated Development Environment” of the Visual Basic Language
Week 3	Tools and Properties – part1
Week 4	Tools and Properties – part2
Week 5	Create new project in Visual Basic Language
Week 6	Test “If-Statement”, and solve some problems
Week 7	Repetition statements as FOR---NEXT statement
Week 8	Solve and test some problems as sequences and series with “For-Next” statement
Week 9	Arrays (one-dimension and two-dimensions)
Week 10	Solve and test some examples and problems by arrays
Week 11	Arithmetic operations between matrices (two-dimension arrays)
Week 12	Control arrays
Week 13	Menus
Week 14	Improve students skills in maintain and develop existing projects in Visual Basic



Week 15	some programming skills in MATLAB technical and Simulation language
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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	البرمجة بلغة فيجوال بيسك ، د.حسين محمد سلمان ، الطبعة الاولى 2020 الناشر: دار الصادق للطباعة والنشر والتوزيع	No (Available in the Publisher)
Recommended Texts	Visual Basic 6 Black Book Publisher: The Coriolis Group) Author(s): Steven Holzner ISBN: 1576102831	No (Available in the Internet)
Websites		Google Scholar

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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Module Information			
معلومات المادة الدراسية			
Module Title	جرائم نظام البعث في العراق	Module Delivery	
Module Type	B	<ul style="list-style-type: none"><input checked="" type="checkbox"/> TheoryLectureLabTutorialPracticalSeminar	
Module Code	UoB12345		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGII		
Administering Department	هندسة السيراميك قسم ومواد البناء	College	المواد هندسة كلية
Module Leader	Mustafa Akeel Hammed	e-mail	mat.mustafa.akeel@uobabylon.ed u.iq
Module Leader's Acad. Title	assistant lecturer	Module Leader's Qualification	مساعد مدرس
Module Tutor	لا يوجد	e-mail	لا يوجد
Peer Reviewer Name	لا يوجد	e-mail	لا يوجد
Scientific Committee Approval Date	25/10/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	المادة تتعلق ببيان جرائم نظام البعث في العراق وما ترتب عليها من آثار.	Semester	None
Co-requisites module	None	Semester	None

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	تُبصِرَ هذا الجيل بفتح فكري يكشف له عن شيء من جرائم هذا النظام التي لا يجوز شرعاً ، ولا قانوناً أن تبقى حبيسة الأقبية عن العراقيين الأحرار.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	الارتقاء بالمستوى العلمي والمعرفي لدى الطالب فيما يتعلق بجرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005, وكذلك الاحاطة بالجرائم النفسية والاجتماعية والجرائم البيئية, فضلاً عن جرائم المقابر الجماعية.
Indicative Contents المحتويات الإرشادية	1- عدم الخوض بأمور لا تتعلق بصلب المادة الدراسية. 2- عدم الانجراف وراء العاطفة فيما يتعلق بجرائم نظام البعث. 3- ضرورة الرجوع الى قانون المحكمة الجنائية العراقية العليا. 4- ضرورة الرجوع الى نظا روما الاساسي للمحكمة الجنائية الدولية



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	طرائق التعليم والتعلم
	<ul style="list-style-type: none">• العصف الذهني• التكليف بالواجبات الدراسية الخاصة بالمادة
	طرائق التقييم
	<ol style="list-style-type: none">1. أسئلة واجوبة2. امتحانات شهرية3. اعداد الامتحانات المفاجئة المسماة بـ Guizes4. الإجابة على الأسئلة5. الامتحانات الشفهية والشهرية6. لقاء المحاضرة

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem)	33	Structured SWL (h/w)	2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)			50
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

الدراسية المادة تقييم



		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5,9,13	1-5
	Online Assignments	4	10% (10)	3,4,6 ,10	1-5
	onsite Assignments.	2	10% (10)	8,12	3-4
	Report	1	10% (10)	14	1-5
Summative assessment	Midterm Exam	1	10% (10)	7	1-3
	Final Exam	1	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Material Covered	
Week	
Week	الأسبوع الموضوع
Week	1 مفهوم الجرائم واقسامها
Week	2 جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا 2005
Week	3 انواع الجرائم الدولية
Week	4 القرارات الصادرة من المحكمة الجنائية العليا
Week	5 الجرائم النفسية واثارها
Week	6 الجرائم الاجتماعية
Week	7 ابرز انتهاكات النظام البعثي في العراق
Week	8 الجرائم البيئية لنظام البعث في العراق
week	9 التلوث الحربي والإشعاعي وانفجار الالغام
Week	10 سياسة الارض المحروقة
Week	11 تجفيف الاهوار
Week	12 تجريف بساتين النخيل والاشجار والمزروعات



Week	13	جرائم المقابر الجماعية
Week	14	احداث مقابر الابداء الجماعية المرتكبة من النظام البعثي في العراق
Week	15	التصنيف الزمني لمقابر الابداء الجماعية في العراق للمدة 1963-2003.

Learning and Teaching Resources

مصادر التعلم والتدريس

جرائم نظام البعث في العراق	1- الكتب المقررة المطلوبة
خطة تطوير المقرر الدراسي	
اعداد طلاب اكفاء من الناحية العلمية والقانونية في كلية هندسة المواد.	

Grading Scheme

مخطط الدرجات

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

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

Module Information

معلومات المادة الدراسية



Module Title	Nonmetallic Materials		Module Delivery	
Module Type	Support		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar	
Module Code	2344S			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	Semester of Delivery	3	
Administering Department			College	Materials Engineering
Module Leader	Nabaa Sattar Radhi		e-mail	mat.nabaa.sattar@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Professor		Module Leader's Qualification	Ph.D.
Module Tutor			e-mail	E-mail
Peer Reviewer Name			e-mail	E-mail
Scientific Committee Approval Date	/06/2023		Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	(Materials Science)	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none">1. Understand the significance of non-metallic materials in the field of metallurgical engineering and their applications in various industries.2. Classify and identify different types of non-metallic materials such as ceramics, polymers, composites, glasses, and glass-ceramics.
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	<ol style="list-style-type: none">3. Describe the structure and bonding in non-metallic materials, including crystallography and defects in ceramics, as well as polymer structure and properties.4. Comprehend the processing techniques for ceramics, polymers, and composites, including powder synthesis, shaping, sintering, extrusion, injection molding, and composite manufacturing methods.5. Analyze the mechanical, thermal, electrical, and optical properties of non-metallic materials, and understand how these properties affect their performance in engineering applications.6. Examine the environmental aspects and sustainability of non-metallic materials, including recycling and waste management practices.7. Explore the industrial applications of non-metallic materials in sectors such as aerospace, automotive, biomedical, and others through case studies.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Knowledge and Understanding:<ol style="list-style-type: none">a. Demonstrate a comprehensive understanding of the classification, properties, and significance of non-metallic materials in the field of metallurgical engineering.b. Explain the structure, bonding, and crystallography of ceramics, polymers, and composites.c. Identify the processing techniques involved in the synthesis, shaping, and sintering of ceramics, as well as the manufacturing methods for polymers and composites.d. Analyze the mechanical, thermal, electrical, and optical properties of non-metallic materials.2. Application and Analysis:<ol style="list-style-type: none">a. Apply the acquired knowledge to evaluate and select suitable non-metallic materials for specific engineering applications.b. Analyze the mechanical behavior of ceramics, polymers, and composites, including their strengths, weaknesses, and failure mechanisms.c. Apply non-destructive testing techniques, such as ultrasonic testing and X-ray radiography, to evaluate the integrity of non-metallic materials.3. Synthesis and Evaluation:<ol style="list-style-type: none">a. Synthesize knowledge of non-metallic materials to design and optimize processing methods for ceramics, polymers, and composites.b. Evaluate the environmental impact of non-metallic materials and propose sustainable practices for their use, recycling, and waste management.c. Assess the suitability of non-metallic materials for various industrial applications, considering factors such as cost, performance, and safety.4. Communication and Teamwork:



	<p>a. Effectively communicate concepts related to non-metallic materials, both orally and in written form.</p> <p>b. Collaborate with peers in group activities, such as case studies and project work, to solve problems and make informed decisions regarding non-metallic materials.</p> <p>5. Lifelong Learning and Professional Development:</p> <p>a. Recognize the importance of staying updated with advancements in non-metallic materials and related technologies.</p> <p>b. Engage in self-directed learning and seek opportunities for professional development in the field of non-metallic materials for metallurgical engineering.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<ol style="list-style-type: none">1. Introduction to non-metallic materials and their significance in metallurgical engineering (2 hours)<ul style="list-style-type: none">• Definition and importance of non-metallic materials in the field of metallurgical engineering2. Classification and properties of non-metallic materials (4 hours)<ul style="list-style-type: none">• Overview of ceramics, polymers, and composites• Key properties and characteristics of each material class3. Structure and bonding in non-metallic materials (4 hours)<ul style="list-style-type: none">• Crystallography and defects in ceramics• Molecular structure and polymerization in polymers4. Processing of ceramics (6 hours)<ul style="list-style-type: none">• Powder synthesis techniques• Shaping methods (e.g., pressing, extrusion)• Sintering and post-processing techniques5. Properties of ceramics (8 hours)<ul style="list-style-type: none">• Mechanical properties: strength, hardness, toughness• Thermal properties: thermal conductivity, coefficient of expansion• Electrical properties: conductivity, dielectric properties6. Introduction to polymers (4 hours)<ul style="list-style-type: none">• Types of polymers: thermoplastics, thermosets, elastomers• Polymerization techniques: addition and condensation polymerization7. Polymer properties (8 hours)<ul style="list-style-type: none">• Mechanical properties: tensile strength, elasticity, impact resistance• Thermal properties: melting point, glass transition temperature• Electrical properties: conductivity, dielectric properties• Optical properties: transparency, refractive index8. Polymer processing (6 hours)<ul style="list-style-type: none">• Extrusion, injection molding, and blow molding processes• Additive manufacturing techniques for polymers9. Polymer composites (8 hours)<ul style="list-style-type: none">• Types of reinforcements: fibers, nanoparticles, fillers



	<ul style="list-style-type: none">• Manufacturing methods: lay-up, filament winding, resin transfer molding• Mechanical behavior and properties of polymer composites10. Introduction to composites (4 hours)• Classification of composites: particle-reinforced, fiber-reinforced, laminates• Constituents of composites: matrix and reinforcement materials11. Properties of composites (8 hours)• Mechanical properties: stiffness, strength, toughness• Thermal properties: thermal conductivity, coefficient of expansion• Electrical properties: conductivity, dielectric properties12. Glasses and glass-ceramics (4 hours)• Formation and structure of glasses• Processing and properties of glass-ceramics13. Electrical properties and applications of non-metallic materials (4 hours)• Conducting polymers and their applications• Dielectric materials and their role in electronic devices14. Environmental aspects and sustainability of non-metallic materials (4 hours)• Life cycle assessment of non-metallic materials• Recycling and waste management practices15. Non-destructive testing techniques for non-metallic materials (6 hours)• Ultrasonic testing, X-ray radiography, and thermography• Evaluation of defects and quality assessment16. Case studies and industrial applications (6 hours)• Applications of non-metallic materials in aerospace, automotive, and biomedical industries• Case studies highlighting the use and performance of non-metallic materials
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ol style="list-style-type: none">1. Lectures: Traditional lectures will be conducted to provide students with foundational knowledge and theoretical concepts related to non-metallic materials. The lectures will cover topics such as classification, properties, processing techniques, and applications of ceramics, polymers, composites, glasses, and glass-ceramics. Lectures can also incorporate multimedia resources, visual aids, and real-life examples to enhance understanding.2. Laboratory Sessions: Practical laboratory sessions will be organized to provide hands-on experience with non-metallic materials. Students will have the opportunity to observe and analyze the properties, behavior, and processing of
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ceramics, polymers, and composites through experiments and demonstrations. This will help them develop skills in material characterization, sample preparation, and testing techniques.

3. **Group Discussions:** Group discussions and problem-solving activities will be encouraged to foster critical thinking and collaborative learning. Students can analyze case studies, research papers, or industrial scenarios related to non-metallic materials. These discussions will help students apply their knowledge to real-world situations, identify challenges, and propose solutions.
4. **Workshops and Seminars:** Guest lectures, workshops, and seminars by industry experts, researchers, or professionals working in the field of non-metallic materials will be organized. These sessions will provide insights into the latest advancements, emerging trends, and practical applications of non-metallic materials. Students will have the opportunity to interact with experts, ask questions, and gain a broader perspective on the subject.
5. **Assignments and Projects:** Assignments and projects will be assigned to students to promote deeper understanding and independent learning. Students can be tasked with conducting literature reviews, analyzing specific materials or applications, designing experiments, or developing innovative solutions. These assignments will encourage research skills, critical analysis, and creativity.
6. **Field Visits and Industrial Training:** Field visits to manufacturing facilities, research laboratories, or industrial sites related to non-metallic materials can be arranged. This will provide students with practical exposure to industrial processes, quality control measures, and real-world challenges faced in the industry. Industrial training opportunities can also be provided to students to gain hands-on experience and practical skills.
7. **Online Resources and Technology:** Online resources, such as e-books, journal articles, and interactive learning platforms, will be recommended to students for self-study and additional reading. The use of technology, such as virtual simulations, multimedia presentations, and online collaboration tools, can enhance the learning experience and engagement of students.
8. **Assessment Methods:** Various assessment methods will be employed to evaluate students' understanding and progress. These can include quizzes, exams, laboratory reports, group projects, presentations, and research papers. Assessments should align with the learning outcomes and provide constructive feedback to students for their continuous improvement.
9. **Individual Support and Office Hours:** Instructors should be available for individual support and clarification of doubts. Regular office hours can be scheduled to provide students with opportunities to seek guidance, discuss their progress, and receive personalized feedback on their learning journey.
10. **Continuous Feedback and Evaluation:** Regular feedback and evaluation should be provided to students to monitor their progress and address any learning gaps. This can be done through in-class discussions, formative assessments, and periodic reviews of assignments and projects. Feedback should be constructive, specific, and focused on areas of improvement.



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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #2, #3, #4 and #8, #9, #10
	Assignments	2	10% (10)	2 and 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<ul style="list-style-type: none">• Introduction to non-metallic materials and their significance in metallurgical engineering• Classification and properties of non-metallic materials• Overview of ceramics, polymers, and composites



Week 2	<ul style="list-style-type: none">• Structure and bonding in non-metallic materials• Crystallography and defects in ceramics• Polymer structure and properties
Week 3	<ul style="list-style-type: none">• Processing of ceramics: powder synthesis, shaping, and sintering• Ceramic properties: mechanical, thermal, and electrical
Week 4	<ul style="list-style-type: none">• Introduction to polymers: types, synthesis, and polymerization techniques• Polymer properties: mechanical, thermal, electrical, and optical
Week 5	<ul style="list-style-type: none">• Introduction to polymers: types, synthesis, and polymerization techniques• Polymer properties: mechanical, thermal, electrical, and optical
Week 6	<ul style="list-style-type: none">• Introduction to composites: types, constituents, and properties• Reinforcement materials: fibers, whiskers, and nanoparticles
Week 7	<ul style="list-style-type: none">• Processing techniques for composites: lay-up, filament winding, and resin transfer molding• Mechanical behavior and testing of composites
Week 8	<ul style="list-style-type: none">• Introduction to glasses and glass-ceramics• Glass formation and properties• Applications of glasses and glass-ceramics in metallurgical engineering
Week 9	<ul style="list-style-type: none">• Thermal behavior and thermal analysis of non-metallic materials• Thermal properties and applications of ceramics and polymers
Week 10	<ul style="list-style-type: none">• Electrical properties and applications of non-metallic materials• Dielectric materials and their role in metallurgical engineering
Week 11	<ul style="list-style-type: none">• Corrosion of non-metallic materials and their protection• Corrosion testing techniques for ceramics, polymers, and composites
Week 12	<ul style="list-style-type: none">• Environmental aspects and sustainability of non-metallic materials• Recycling and waste management of non-metallic materials
Week 13	<ul style="list-style-type: none">• Non-destructive testing techniques for non-metallic materials• Ultrasonic testing, X-ray radiography, and thermography
Week 14	<ul style="list-style-type: none">• Case studies and industrial applications of non-metallic materials• Overview of the use of non-metallic materials in aerospace, automotive, and biomedical industries
Week 15	<ul style="list-style-type: none">• Review and revision session• Assessment and feedback on non-metallic materials module
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	<ul style="list-style-type: none">• Lab safety procedures and introduction to laboratory equipment



	<ul style="list-style-type: none">Handling and preparation of ceramic samplesKnowledge to ceramic materials, traditional and modern ceramics.
Week 2	<ul style="list-style-type: none">Ceramic powder synthesis: preparation and characterization of Kaolinite and feldspars.Shaping techniques: pressing, slip casting, and tape castingDrying and firing of ceramic samples
Week 3	<ul style="list-style-type: none">Ceramic microstructure analysis: optical microscopy and image analysisMechanical testing of ceramics: hardness and flexural strength measurements
Week 4	<ul style="list-style-type: none">Glass.
Week 5	<ul style="list-style-type: none">Knowledge to polymerization process.
Week 6	<ul style="list-style-type: none">Knowledge to polymer materials, thermoplastic and thermoset.Polymer synthesis: preparation of polymer samplesPolymer characterization techniques: molecular weight determination, thermal analysis
Week 7	<ul style="list-style-type: none">Polymer processing techniques: extrusion and injection moldingMechanical testing of polymers: tensile testing and impact testing

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Materials Science and Engineering, An introduction, Edited by William D. Callister, Jr.	Yes (electronic copy)
Recommended Texts	The Science and Engineering of Materials, Donald R. Askeland	Yes (electronic copy)
Websites		

Grading Scheme

مخطط الدرجات

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



	F – Fail	راسب	(0-44)	Considerable amount of work required
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information

معلومات المادة الدراسية

Module Title	English language		Module Delivery	
Module Type			<input checked="" type="checkbox"/> Theory	
Module Code			<input type="checkbox"/> Lecture	
ECTS Credits	4		<input type="checkbox"/> Lab	
SWL (hr/sem)	100		<input type="checkbox"/> Tutorial	
			<input type="checkbox"/> Practical	
			<input type="checkbox"/> Seminar	
Module Level	UO	Semester of Delivery	2	
Administering Department		College		
Module Leader	Khalidun Aldawoudi		e-mail	mat.khalidun.aldawoudi@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Lecturer		Module Leader's Qualification	MSc
Module Tutor	/		e-mail	/
Peer Reviewer Name	/		e-mail	/
Scientific Committee Approval Date		Version Number		

Relation with other Modules



العلاقة مع المواد الدراسية الأخرى

Prerequisite module	English language (Semester - 1)	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<p>1. Language Proficiency: This course aims to help learners improve their overall English language proficiency, including grammar, vocabulary, pronunciation, and communicative skills.</p> <p>2. Communication Skills: The course focuses on developing learners' ability to communicate effectively in English, both in spoken and written form. It provides ample opportunities for students to practice speaking, listening, reading, and writing in various contexts.</p> <p>3. Grammar and Vocabulary: The course systematically presents and practices grammar structures and vocabulary items appropriate for the intermediate level. It aims to enhance learners' understanding and usage of grammar rules and expand their vocabulary range.</p> <p>4. Reading and Listening Comprehension: The course includes authentic texts and audio materials that expose learners to different types of English texts and accents. It aims to improve their reading and listening comprehension skills, as well as their ability to extract information, infer meaning, and engage with the content.</p> <p>5. Writing Skills: The course provides guidance and practice for different types of writing tasks, such as emails, letters, reports, and essays. It helps learners develop their writing skills by focusing on organization, coherence, grammar accuracy, and vocabulary usage.</p> <p>6. Cultural Awareness: The course often includes topics and texts that expose learners to different cultural aspects of English-speaking countries. It aims to broaden their understanding of different cultures and promote intercultural competence.</p> <p>7. Self-Study and Independent Learning: The course often includes self-study sections and activities that encourage learners to study and practice English outside the classroom. It aims to foster learner autonomy and provide resources for independent learning.</p>
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<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>Language Proficiency: Developing overall proficiency in the English language, including the ability to understand, speak, read, and write English effectively. .1</p> <p>Communication Skills: Improving the ability to communicate fluently and accurately in various contexts, such as conversations, presentations, and written communication. .2</p> <p>Grammar and Vocabulary: Enhancing knowledge and understanding of grammar rules and vocabulary, enabling learners to express themselves accurately and appropriately. .3</p> <p>Reading Comprehension: Developing the ability to understand and interpret different types of texts, such as articles, stories, and academic materials. .4</p> <p>Listening Comprehension: Improving the ability to understand spoken English in different situations, including conversations, lectures, and audio materials. .5</p> <p>Writing Skills: Acquiring the skills necessary to produce well-structured and coherent written texts, including essays, reports, emails, and formal letters. .6</p> <p>Speaking Skills: Developing oral communication skills, including pronunciation, fluency, and the ability to engage in conversations, discussions, and presentations. .7</p> <p>Critical Thinking: Fostering the ability to analyze and evaluate information, express opinions, and support arguments effectively. .8</p> <p>Cultural Awareness: Enhancing understanding of different cultures and developing intercultural competence, allowing learners to navigate diverse cultural contexts and communicate respectfully. .9</p> <p>Independent Learning: Encouraging self-directed learning skills, including the ability to set goals, manage time, and utilize resources for ongoing language development outside the classroom. .10</p>
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A</u></p> <p>Tenses, Auxiliary verbs, Everyday situation, Make a small Talk, Past Tense, spelling and Pronunciation, Giving opinions, Modal and related verbs, Polite request and offers Future forms, may-might-could, Arranging to meet [20 hrs]</p> <p><u>Part B</u></p> <p>Information questions, Adjectives and adverbs, Present simple, Present perfect – continuous – passive, Verb patterns, body language, travel and numbers [20 hrs]</p> <p><u>Part C</u></p> <p>Conditionals, word with similar meaning, dealing with money, Noun phrases, compound nouns, Modal of probability, Expressing attitude, Reported speech ,ways of speaking [20 hrs]</p>



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

- 1- Communicative Approach: Emphasize meaningful communication by providing authentic and interactive activities that simulate real-life situations. Encourage students to actively engage in conversations and use English for practical purposes.
- 2- Task-Based Learning: Design learning tasks that require students to complete a specific goal or outcome using English. These tasks should be challenging, engaging, and relevant to real-world contexts, encouraging students to use their language skills in a purposeful way.
- 3- Cooperative Learning: Promote collaboration and peer interaction by organizing activities that require students to work together in pairs or small groups. This encourages communication, cooperation, and the exchange of ideas and knowledge.
- 4- Technology Integration: Incorporate technology tools and resources, such as online language learning platforms, interactive whiteboards, language learning apps, and multimedia content, to enhance engagement, provide additional practice opportunities, and offer personalized learning experiences.
- 5- Error Correction: Provide constructive feedback on students' errors and help them identify and correct mistakes. Focus on meaningful communication first, but also address accuracy and provide targeted practice for specific language points.
- 6- Contextualized Learning: Relate language learning to real-life situations and learners' interests. Connect language use to relevant topics, themes, and cultural contexts that resonate with students, making the learning experience more meaningful and engaging.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)	63	Structured SWL (h/w)	4
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	2
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	100		



الحمل الدراسي الكلي للطالب خلال الفصل

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (10)	5 and 10	All
	Assignments	2	15% (10)	Continuous	All
	Projects / Lab.	-			
	Report	10	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Tenses, Auxiliary verbs,
Week 2	Everyday situation, Make a small Talk
Week 3	Past Tense, spelling and Pronunciation, Giving opinions
Week 4	Modal and related verbs, Polite request and offers
Week 5	Future forms, may-might-could, Arranging to meet
Week 6	Information questions
Week 7	Adjectives and adverbs
Week 8	Present simple
Week 9	Present perfect – continuous – passive
Week 10	Verb patterns, body language, travel and numbers
Week 11	Conditionals, word with similar meaning, dealing with money
Week 12	Noun phrases, compound nouns



Week 13	Modal of probability, Expressing attitude
Week 14	Reported speech
Week 15	ways of speaking
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New Headway Intermediate. Student's book_2012, 4th	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

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

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



Course Description Form

1. Course Name:	
Chemical Metallurgy II	
2. Course Code:	
MET2414	
3. Semester / Year:	
4. Description Preparation Date:	
3/09/2025	
5. Available Attendance Forms:	
Weekly
6. Number of Credit Hours (Total) / Number of Units (Total):	
125
7. Course administrator's name (mention all, if more than one name)	
Name: Baraa Hassan hadi alkhaqani	
Email: Mat.baraa.hassan@uobabylon.eq.iq	
8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">6. Introducing the student to thermodynamics and its first and second laws.7. Identify the most important thermodynamic properties such as entropy, enthalpy, free energy, and heat capacity.8. Knowledge of the reaction kinetics and the degree and order of the reaction.9. Acquisition of the skill of recognizing the voltages of standard electrodes.10. Learn about surface tension, adsorption, diffusion, and catalysis.
9. Teaching and Learning Strategies	



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

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1		Electrochemistry			
Week 2		Introduction ,electrolytes ,conduction in electrolytes			
Week 3		Types of electrolytes			
Week 4		The thermodynamics of the reaction at an electrode galvanic cell ,junction potential between toe electrolytes			
Week 5		The measurement of cell EMF and electrode potential ,reduction and oxidation potentials			
Week 6		Concentration cell			
Week 7		Mid-term Exam			
Week 8		Polarization			
Week 9		Interfacial phenomena introduction, surface energy and surface tension			
Week 10		Interfacial energy of other gas /liquid interfaces			



Week 11		Adsorption ,nucleation			
Week 12		Corrosion and types			
Week 13		The rusting of iron			
Week 14		Factors affecting corrosion			
Week 15		The prevention of corrosion			
Week 16		Preparatory week before the final Exam			

11. Course Evaluation

Quizzes 10% (10), Assignments 10% (10), Lab 10% (10), Report 10% (10), Midterm Exam 10% (10), Final Exam 50% (50),

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Chemical metallurgy", practice and principles,Kumar Chiranjib Gupta, Weinheim,Wiley Vch,2003.
Main references (sources)	
Recommended books and references (scientific journals, reports....)	"Chemistry for Engineers",Ambasta B.K., New Delhi ,Laxmi Publications Pvt.Ltd., 2009.
Electronic References, websites	https://web.vscht.cz/~vun/metallurgy.pdf

Course Description Form

1. Course Name:						
Mathematics						
2. Course Code:						
ME2313						
3. Semester / Year:						
4. Description Preparation Date:						
15/9/2025						
5. Available Attendance Forms:						
Weekly						
6. Number of Credit Hours (Total) / Number of Units (Total):						
90						
7. Course administrator's name (mention all, if more than one name)						
Name: Hussein Fawzy Mahdy Email: mat.hrbermany@uobabylon.edu.iq						
8. Course Objectives						
Course Objectives	 Knowing the vectors ,dot product and cross product, knowledge the partial derivat applications. Studying the polar coordinates and double integrals And triple integrals . Calculating the area; volume and moment. Knowing the cylindrical and spherical coordinates. How can solving the differenti knowing sequences , arithmetic and geometric series.				
9. Teaching and Learning Strategies						
Strategy	1- Using the display screen 2- Discussion 3- Student groups 4- Experimental education 5- Interactive education					
10. Course Structure						
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	

1-2	6	Knowing vectors	Knowing vectors and their quantities and directions	Direct lecture	Give abrupt questions to the students the classical discussion
3-4	6	Vectors product	Dot product and cross product	Direct lecture	Give abrupt questions to the students the classical discussion
5-6	6	Polar coordinates	Transformation from polar coordinates to Cartesian coordinates and vice versa	Direct lecture	Give abrupt questions to the students the classical discussion
7-8	6	Representation of polar coordinates	Drawing the polar functions	Direct lecture	Give abrupt questions to the students the classical discussion
9-10	6	Partial derivatives	How can calculate the slope and the chain rule	Direct lecture	Give abrupt questions to the students the classical discussion
11-12	6	Directional derivatives	Calculate the gradient and directional derivatives of function for more than one variable	Direct lecture	Give abrupt questions to the students the classical discussion
13-14-15	9	Applications of derivatives	Find the critical point and local maxima and local minima	Direct lecture	Give abrupt questions to the students the classical discussion
16-17-18	9	Double integrals	Solving double integrals	Direct lecture	Give abrupt questions to the students the classical discussion
19-20	6	Calculate the area	Calculate the area of rectangle regions and non-rectangle region	Direct lecture	Give abrupt questions to the students the classical discussion
21-22	6	Find the volume	Calculate the volume	Direct lecture	Give abrupt questions to the students the classical discussion
23-24	6	Triples integral	Knowing the triple integrals and applications for calculate the moment of inertia	Direct lecture	Give abrupt questions to the students the classical discussion
25-26	6	Cylindrical and spherical coordinates	Solving triple integration by using cylindrical and spherical coordinates	Direct lecture	Give abrupt questions to the students the classical discussion
27-28	6	Differential equations	Different methods to solve differential equations	Direct lecture	Give abrupt questions to the students the classical discussion
29-30	6	Sequences and series	The difference between the sequence and series	Direct lecture	Give abrupt questions to the students the classical discussion

11. Course Evaluation

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1-principal texts 2-methodical books 3-other additional sources
Main references (sources)	Mathematics (Thomas)
Recommended books and references (scientific journals, reports....)	Elementary differential equations(William F.Trench),
Electronic References, websites	Google, Google Scholar

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Welding Technology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB0201045		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	01	College	02
Module Leader	Abdulsameea Jasim Alkilabi	e-mail	mat.abualsamaa.jasim@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D

Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	UOBAB0201011, UOBAB0201015	Semester	01
Co-requisites module	UOBAB0201031	Semester	03

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<p>The module aims of a welding technology course typically include:</p> <ol style="list-style-type: none"> 1. Understanding Welding Processes: The aim is to provide students with a comprehensive understanding of various welding processes, including their principles, equipment, techniques, advantages, disadvantages and applications. This includes both traditional processes like Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW/MIG), and Gas Tungsten Arc Welding (GTAW/TIG), as well as advanced techniques such as Flux-Cored Arc Welding (FCAW), Submerged Arc Welding (SAW), and Laser Beam Welding (LBW). 2. Developing Practical Skills: The aim is to equip students with hands-on practical skills in welding. This includes proficiency in operating welding equipment, electrode selection, weld joint preparation, welding techniques, and the ability to produce quality welds in different positions and materials. 3. Considering Welding in Specialized Industries: The aim is to provide insights into the applications of welding in specialized industries such as automotive, aerospace, construction, and oil and gas. Students learn about industry-specific welding requirements, materials, and techniques used in these sectors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>The learning outcomes for a welding technology module typically include:</p> <ol style="list-style-type: none"> 1. Knowledge and Understanding: Upon completing the module, students should be able to demonstrate knowledge and understanding of different welding processes, including their principles, equipment, techniques, and applications. 2. Practical Skills: Students should develop practical skills in operating welding equipment and

	<p>performing various welding techniques. They should be able to select appropriate welding electrodes, prepare weld joints, and perform quality welds in different positions and materials.</p> <p>3. Industry Awareness: Students should gain an understanding of the applications of welding in specialized industries, such as automotive, aerospace, construction, and oil and gas. They should be aware of industry-specific welding requirements, materials, and techniques used in these sectors.</p> <p>4. Communication and Collaboration: Students should be able to communicate effectively about welding-related topics, both orally and in written form. They should be able to collaborate with others in welding projects, working as part of a team and demonstrating effective communication and interpersonal skills.</p> <p>These learning outcomes reflect the knowledge, skills, and competencies that students are expected to achieve upon completing a welding technology module successfully.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of a welding technology course typically cover a range of topics related to welding processes, techniques and equipment. Here are some indicative contents that may be included in a welding technology course:</p> <ol style="list-style-type: none"> 1. Introduction to Welding Technology: <ul style="list-style-type: none"> Overview of welding processes and their applications History and evolution of welding 2. Welding Processes: <ul style="list-style-type: none"> Shielded Metal Arc Welding (SMAW) Gas Metal Arc Welding (GMAW/MIG) Gas Tungsten Arc Welding (GTAW/TIG) Flux-Cored Arc Welding (FCAW) Submerged Arc Welding (SAW) Laser Beam Welding (LBW) Electron Beam Welding (EBW) Resistance Spot Welding (RSW) Other specialized welding processes (e.g., friction stir welding, plasma arc welding) 3. Welding Equipment and Tools: <ul style="list-style-type: none"> Welding machines and power sources Welding electrodes, wires, and shielding gases Welding torches and guns Welding consumables and accessories Welding fixtures and jigs 4. Welding in automotive manufacturing and repair <ul style="list-style-type: none"> Welding in aerospace and aviation industries Welding in construction and infrastructure projects

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

In a welding technology course, several strategies can be employed to enhance learning and skill development. Here are some common strategies used in welding technology education:

- 1. Hands-on Practical Training:** Emphasize hands-on training to provide students with ample opportunities to practice welding techniques using different processes and materials. This includes supervised practice sessions in a welding lab or workshop where students can apply theoretical knowledge to real-world welding scenarios.
- 2. Demonstration and Observation:** Conduct live demonstrations of welding techniques by the instructor or experienced welders. This allows students to observe proper welding procedures, including electrode manipulation, travel speed, arc control, and joint preparation.
- 3. Industry Partnerships and Site Visits:** Collaborate with local welding industries. Arrange site visits to welding fabrication shops, manufacturing facilities, or construction sites to expose students to real-world welding applications and practices.
- 4. Assessment and Feedback:** Utilize a variety of assessment methods, including practical welding tests, written exams and welding project evaluations. Provide timely and constructive feedback to help students identify areas for improvement and track their progress throughout the course.

These strategies aim to create an engaging and comprehensive learning environment that combines theoretical knowledge, practical skills development, safety consciousness, and industry relevance in welding technology education.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #2, #3, #4 and #8, #9, #10
	Assignments	2	10% (10)	2 and 12	All
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
1	Introduction to Welding Technology Overview of Welding Processes and their applications History and evolution of welding.
2	Welding in Comparison with the other Joining Processes Welding Classifications
3	Gas Welding: Flame Types, Chemistry of the Flame, Oxy-acetylene Welding, Oxy-fuel Welding, Air-acetylene Welding
4	Shielded Metal Arc Welding (SMAW) Electrode Classification and Selection
5	Weaving and Stringer Beads, Flux Functions, Welding Positions
Week 6	Welding Current Types, Polarity SMAW Techniques, Advantages, Limitations and Applications
Week 7	Gas Metal Arc Welding (GMAW/MIG)
Week 8	GMAW Wire Selection and Shielding Gases GMAW Techniques, Advantages, Limitations and Applications
Week 9	Gas Tungsten Arc Welding (GTAW/TIG)
Week 10	Tungsten Selection and Shielding Gases GTAW Techniques, Advantages, Limitations and Applications
Week 11	Flux-Cored Arc Welding (FCAW) FCAW Wire Selection and Shielding Gases FCAW Techniques and Positions
Week 12	Submerged Arc Welding

	Applications and Advantages of Advanced Techniques
Week 13	Electrical Resistance Welding Processes
Week 14	Solid State Welding Processes
Week 15	Advanced Welding Processes: Laser Beam Welding, Ultrasonic Welding. Welding in Specialized Industries (e.g., Automotive, Aerospace, Construction) Please note that the specific topics covered and their order may vary based on the course duration, instructor's preferences, and the depth of coverage for each topic. This syllabus provides a general framework for structuring a welding technology course.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ASM: Welding, brazing and soldering	No
Recommended Texts	Welding Technology: Handbook O.P.Khanna	No
Websites	Google	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية				
Module Title	Recycle of Metals		Module Delivery	
Module Type	Elective		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UOBAB0201043			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	2	Semester of Delivery		04
Administering Department	01	College	02	
Module Leader	Khalidun Aldawoudi		e-mail	mat.khalidun.aldawoudi@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Lecturer		Module Leader's Qualification	MSc
Module Tutor	/		e-mail	/
Peer Reviewer Name	/		e-mail	/
Scientific Committee Approval Date			Version Number	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	UOBAB0201011, UOBAB0201015, UOBAB0201021		Semester	01, 02
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	The main objectives of metals recycling include:
أهداف المادة الدراسية	8. Conservation of Resources: Metals recycling aims to conserve natural resources by reducing the need for primary metal extraction. By recycling metals, valuable resources are preserved, and the demand for mining and extraction is minimized.

	<ol style="list-style-type: none"> 9. Energy Savings: Recycling metals generally requires less energy compared to extracting metals from raw materials. The objective is to reduce energy consumption and associated greenhouse gas emissions by utilizing recycled metals as a more energy-efficient alternative. 10. Waste Reduction: Recycling metals helps divert scrap metal from landfills and reduces the amount of waste generated. This objective promotes sustainable waste management practices and minimizes the environmental impact of metal disposal. 11. Environmental Protection: Metals recycling contributes to environmental protection by reducing pollution associated with mining activities, such as soil erosion, water contamination, and deforestation. It helps mitigate the negative ecological impacts caused by metal extraction and processing. 12. Economic Benefits: Recycling metals offers economic advantages by creating jobs in the recycling industry, supporting local economies, and providing a sustainable source of raw materials. It contributes to the circular economy, where materials are reused, and value is retained within the economy. 13. Reduction of Greenhouse Gas Emissions: Metal recycling plays a role in mitigating climate change by reducing the emissions of greenhouse gases associated with metal production. Recycling requires fewer energy-intensive processes, resulting in lower carbon dioxide emissions and a smaller carbon footprint. 14. Promoting Sustainability: The objective of metals recycling is to foster sustainable practices and promote a more sustainable society. By extending the lifespan of metals through recycling, the overall sustainability of resource use and consumption patterns is improved.
<p style="text-align: center;">Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 11. Knowledge of Metal Recycling Processes: Students will acquire a deep understanding of the various processes involved in metals recycling, including collection, sorting, shredding, separation, smelting, and refining. 12. Understanding of Metal Properties and Identification: Students will gain knowledge about different types of metals, their properties, and their identification. 13. Recycling Methodologies and Best Practices: Students will learn about the most effective and efficient methodologies for recycling different types of metals. 14. Environmental and Sustainability Considerations: Students will develop an awareness of the environmental impact of metals extraction and the significance of recycling in reducing environmental harm. 15. Regulations and Compliance: Students will become familiar with local, national, and international regulations and standards governing metals recycling. 16. Economic and Market Dynamics: Students will gain insights into the economic aspects of metals recycling, including market trends, pricing, and supply chain dynamics. 17. Communication and Collaboration Skills: Students will develop effective communication skills to convey technical information related to metals recycling. 18. Critical Thinking and Problem-Solving: Students will enhance their critical thinking skills to analyze complex problems and make informed decisions related to metals recycling.

	19. Occupational Health and Safety: Students will gain an understanding of the occupational health and safety considerations specific to metals recycling.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Introduction to Metals recycling</u></p> <p>Introduction to Metals Recycling, The Importance of Metals Recycling, Sustainable Practices in Metals Recycling, Metal Recovery Techniques and Technologies, Economic and Environmental Benefits of Metals Recycling, Challenges and Opportunities in Metals Recycling, Legislation and Regulations for Metals Recycling [15 hrs]</p> <p><u>Part B – Ferrous and non-Ferrous Metals recycling</u></p> <p>Sorting and Separation Methods in Metals Recycling, Ferrous Metals Recycling: Processes and Applications, Non-Ferrous Metals Recycling: Processes and Applications</p> <p>Precious Metals Recycling: Methods and Market Trends, E-waste Recycling and Metal Recovery [15 hrs]</p> <p><u>Part C – Industry, Economy, and Marketing in metals recycling</u></p> <p>Industrial and Automotive Metal Recycling, Urban Mining: Extracting Metals from Municipal Waste, Advances in Metal Recycling Technologies, Circular Economy and Metals Recycling, Metal Scrap Trading and Market Analysis, Innovations in Metal Recycling Equipment, Education and Awareness for Promoting Metals Recycling [15 hrs]</p>

<p>Learning and Teaching Strategies</p> <p>استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>When teaching a metals recycling course, here are some effective strategies that can be utilized:</p> <p>7- Hands-on Practical Demonstrations: Incorporate hands-on practical demonstrations to provide students with real-life experiences in metals recycling.</p> <p>8- Case Studies and Real-World Examples: Use case studies and real-world examples to illustrate the practical applications of metals recycling.</p>

	<p>9- Guest Speakers and Industry Experts: Invite guest speakers from the metals recycling industry, recycling centers, or regulatory agencies to share their expertise and experiences.</p> <p>10- Field Trips and Site Visits: Organize field trips to recycling facilities, scrap yards, or metal processing plants.</p> <p>11- Group Projects and Collaborative Learning: Assign group projects that involve researching and analyzing specific aspects of metals recycling.</p> <p>12- Technology Integration: Incorporate technology tools such as computer simulations, virtual labs, or interactive multimedia presentations to enhance the learning experience.</p> <p>13- Current Research and Trends: Stay updated with the latest research, advancements, and trends in metals recycling.</p> <p>14- Continuous Learning and Professional Development: Encourage students to pursue continuous learning and professional development opportunities in metals recycling.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.				
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction to Metals Recycling
Week 2	The Importance of Metals Recycling
Week 3	Sustainable Practices in Metals Recycling
Week 4	Metal Recovery Techniques and Technologies, Economic and Environmental Benefits of Metals Recycling
Week 5	Challenges and Opportunities in Metals Recycling, Legislation and Regulations for Metals Recycling
Week 6	Sorting and Separation Methods in Metals Recycling
Week 7	Ferrous Metals Recycling: Processes and Applications
Week 8	Non-Ferrous Metals Recycling: Processes and Applications
Week 9	Precious Metals Recycling: Methods and Market Trends
Week 10	E-waste Recycling and Metal Recovery
Week 11	Industrial and Automotive Metal Recycling

Week 12	Urban Mining: Extracting Metals from Municipal Waste, Advances in Metal Recycling Technologies
Week 13	Circular Economy and Metals Recycling
Week 14	Metal Scrap Trading and Market Analysis
Week 15	Innovations in Metal Recycling Equipment, Education and Awareness for Promoting Metals Recycling
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- ASM International: Metals Handbook Desk Edition (2nd Edition)- Recycling Chapter - RECYCLING OF METALS AND ENGINEERED MATERIALS	Yes
Recommended Texts	Principal of Metals refining and recycling	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

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

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Third Stages: First Semester

Description of Corrosion Engineering I:

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Name	Ali Hubi Haleem
2. University Department/Centre	Scientific Department / Department of Metallurgical Engineering
3. Course title/code	Corrosion Engineering
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2025
8. Aims of the Course	

Introduce the student to the basic principles of corrosion engineering. Where the concepts and basics of corrosion are studied and the basic theories of corrosion are identified with a touch on the negative and positive aspects of the corrosion as well as the classification of corrosion depending on its causes and appearance with the division of the types of corrosion into pure chemical corrosion, electrochemical corrosion and polarization phenomena and its three types: activation, concentration and mixed. Its importance and determinants, as well as methods for calculating corrosion rates and types of corroding cells and also the types of corrosion, which include general uniform corrosion, localized corrosion, which includes intergranular corrosion, stress cracking, galvanic corrosion, erosion corrosion, stress corrosion, pitting corrosion, fissure erosion, scaling corrosion, selective leaching, atmospheric corrosion and biological corrosion with the identification of the methods used in the diagnosis Flour for the type of corrosion and its reduction

9. Learning Outcomes, Teaching, Learning and Assessment Method

A- Cognitive goals.

A1- Building integrated projects in terms of interfaces and properties and writing equations related to corrosion engineering and its basics. .

A2 - How to deal with engineering problems related to corrosion engineering and how to address them to reduce corrosion rates

B. The skills goals special to the course.

Design and deal with engineering problems related to corrosion engineering such as macroscopic examination and laboratory tests to accurately determine the type of corrosion, its causes, find effective solutions and treatments to reduce corrosion rates and in proportion to the specialization of students in the Department of Metallurgical Engineering

Teaching and Learning Methods

1- Using the display screen

2- Discussion

3- Student groups

4- Experiential education

5- Interactive education

Assessment methods

- 1- Using the display screen
- 2- Discussion
- 3- In-class effectiveness
- 4- Daily exams
- 5- Semester exams
- 6- Final exam

C. Affective and value goals

- C1- Written exams
- C2- Semester exams
- C3 - Final exams
- C4- Daily assessment

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1 Verbal communication (the ability to express thinking clearly and confidently in speech)
- D2 Teamwork (working with confidence within the group)
- D3 Written communication (the ability to express yourself clearly in writing)
- D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	6	Recognition the Principles and the main equations	The concept of corrosion - its damages - its classifications - resistance to corrosion - expression of the rate of corrosion - chemical manifestations of corrosion	Direct lecture to students	surprise exams
4+5	4	Deals with theories and drive relations with many engineering examples	Electrochemical reactions, polarization, passivity	Direct lecture to students	surprise exams
6-8	6	Study the relations and cases studies	Effects of environment variables on corrosion rate	Direct lecture to students	surprise exams
9+10	4	Using industrial and experimental examples	The effect of metallurgical factors on the rate of corrosion	Direct lecture to students	surprise exams
11-13	6	Diagnose the types of corrosion of real examples in industrial structures and determine the type of failure	Corrosion Types	Direct lecture to students	surprise exams
14+15	4	Determine effective design methods in reducing corrosion rates	Corrosion reduction	Direct lecture to students	surprise exams final examination

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	

A- Recommended books and references (scientific journals, reports...).	<ol style="list-style-type: none"> 1. Zaki Ahmad, Principles of Corrosion Engineering and Corrosion Control, Butterworth-Heinemann, 1st August 2006. 2. Pedefferri, Pietro, Corrosion Science and Engineering, Springer International Publishing, 2018. 3. Dr. Volkan Cicek , Corrosion Engineering, Wiley, April 2014. 4. <u>Sohan L. Chawla</u> and <u>R. K. Gupta</u>, Materials Selection for Corrosion Control, Amazon, 2016
B-Electronic references, Internet sites...	

12. The development of the curriculum plan:

- 1- Work in conformity with the existing curricula in international universities.
- 2- Follow up on scientific developments within the global education sector.
- 3- Scientific communication with the latest scientific developments within the scientific specialization.
- 4- Using the latest versions of specialized software deals with corrosion engineering.
- 5- Going towards the latest publications from international scientific sources.

1. Description of Machining of Metals:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmer specification.

1. Name	Saad Hameed Al-Shafie
2. University Department/Centre	Scientific Department / Department of Metallic Materials Engineering
3. Course title/code	Machining of Metals
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	15
7. Date of production/revision of this specification	20/9/2025
8. Aims of the Course	

Introducing the student to the basic principles of machining metals with various applications. Where the types of number of pieces are studied along with how their angles are measured. Then studying the types of operation in general and emphasizing the traditional operation and how to measure the cutting forces by mathematical and graphic methods and the effect of these forces on the cutting tool, the cutting machine and the workpiece, in addition to identifying the heat generated during the cutting process, the cutting fluids used, and the surface finished after the cutting process.

9. Learning Outcomes, Teaching, Learning and Assessment Methode

B- Building integrated projects in terms of interfaces and characteristics and writing equations related to metalworking.

C- How to choose the appropriate cutting tool for metal cutting.

D- B. The skills goals special to the course.

Design the appropriate number and measure cutting speed and cutting forces by mathematical and graphic methods

Teaching and Learning Methods

1- Using the display screen

2- Discussion

3- Student groups

4- Experiential education

5- Interactive education

Assessment methods

1- Using the display screen

2- Discussion

3- In-class effectiveness

4- Daily exams

5- Semester exams

6- Final exam

C. Affective and value goals

C1- Written exams

C2- Semester exams

C3 - Final exams

C4- Daily assessment

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1 Verbal communication (the ability to express thinking clearly and confidently in speech)

D2 Teamwork (working with confidence within the group)

D3 Written communication (the ability to express yourself clearly in writing)

D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	9	Learn how to get the final product and focus on the product that comes out of the operation process	Introduction and classification of the machining process and classification of the number of pieces, the hexagonal shape of the cutting tool and the angles of the cutting tool	Direct lecture to Equilibrium of A Fluid Element Hydrostatic Pressure students	surprise exams
4+5	4	Distinguish between different speeds such as cutting speed, sculpting flow speed, and shear speed, and the relationship between them	Handling of graphs	Direct lecture to students	surprise exams
6-8	6	Learn how to form a sculptor and the types and forms of a sculptor	Dealing with theorems and deriving relationships with many engineering examples	Direct lecture to students	surprise exams
9+10	4	Learn how to measure different cutting forces	Using the Mathematical Method and the Merchant Method	Direct lecture to students	surprise exams
11-13	6	Knowing the emotion during the cutting process and how to form and remove the emerging categorical limit	Study of the type of metal cut and the effect of cutting conditions on it	Direct lecture to students	surprise exams
14+15	4	Heat in the cutting process and its effect on the workpiece after cutting (product) and how heat is distributed in the cutting process	Study of different minerals in addition to the types of number of pieces used	Direct lecture to students	surprise exams final examination

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	<p>1-K.P.Sinha & S.C.Prasad, "Theory of Metal Forming and Metal Cutting"1979.</p> <p>2-Trent E.M., "Metal Cutting"1984.</p> <p>3-B.L.Juneja & G.S.Sekhon, "Fundamentals of Metal Cutting and Machine Tools"1987.</p> <p>4- Sandvik Coromant "Modern Metal Cutting – a practice handbook"1994.</p>
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	
<p>1- Work in conformity with the existing curricula in international universities.</p> <p>2- Follow up on scientific developments within the global education sector.</p> <p>3- Scientific communication with the latest scientific developments within the scientific specialization.</p> <p>4- Using the latest versions of specialized software deals with fluid flow like Ansys.</p> <p>5- Going towards the latest publications from international scientific sources.</p>	

Description for English language:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Name	Khaldun Emad Fadhel Aldawoudi
2. University Department/Centre	Scientific Department / Metallurgical Engineering Department
3. Course title/code	English Language
4. Modes of Attendance offered	Weekly
5. Semester/Year	Third Year (5 th & 6 th semester)
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	20/9/2025

8. Aims of the Course

Introduce the student to the rules of the English language, which includes verb tenses and how to solve exercises for each tense. Also, learn how to choose the appropriate verb in formulating sentences in direct and indirect transmitted speech, as well as using some social expressions, as well as reading the pieces and solving their exercises with the help of verb patterns and following the rule for that, as well as using the audio recording of some pieces and enabling the student to use his skill by listening and answering questions. Enable the student to test his skill in solving exercises using the exercise book as well as external duties.

9- Learning Outcomes, Teaching, Learning and Assessment Methods

- A- Language Proficiency: Developing overall proficiency in the English language, including the ability to understand, speak, read, and write English effectively.
- B- Communication Skills: Improving the ability to communicate fluently and accurately in various contexts, such as conversations, presentations, and written communication.
- C- Grammar and Vocabulary: Enhancing knowledge and understanding of grammar rules and vocabulary, enabling learners to express themselves accurately and appropriately.
- D- Reading Comprehension: Developing the ability to understand and interpret different types of texts, such as articles, stories, and academic materials.

- E- Listening Comprehension: Improving the ability to understand spoken English in different situations, including conversations, lectures, and audio materials.
- F- Writing Skills: Acquiring the skills necessary to produce well-structured and coherent written texts, including essays, reports, emails, and formal letters.
- G- Speaking Skills: Developing oral communication skills, including pronunciation, fluency, and the ability to engage in conversations, discussions, and presentations.
- H- Critical Thinking: Fostering the ability to analyze and evaluate information, express opinions, and support arguments effectively.
- I- Cultural Awareness: Enhancing understanding of different cultures and developing intercultural competence, allowing learners to navigate diverse cultural contexts and communicate respectfully.

Independent Learning: Encouraging self-directed learning skills, including the ability to set goals, manage time, and utilize resources for ongoing language development outside the classroom.

Teaching and Learning Methods

- 1- Using the display screen
- 2- Discussion
- 3- Student groups
- 4- Experiential education
- 5- Interactive education

Assessment methods

- 1- In-class effectiveness
- 2- Daily exams
- 3- Semester exams
- 4- Final exam

C. Affective and value goals

- C1- Written exams
- C2- Semester exams
- C3 - Final exams
- C4- Daily assessment

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1 Verbal communication (the ability to express thinking clearly and confidently in speech)
- D2 Teamwork (working with confidence within the group)
- D3 Written communication (the ability to express yourself clearly in writing)
- D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	6	Tenses, Auxiliary verbs, Everyday situation, Make a small Talk. Past Tense, spelling, and Pronunciation, Giving opinions	Units 1-2	Direct lecture to students	surprise exams
4-6	6	Modal and related verbs, Polite request and offers.	Units 3-4	Direct lecture to students	surprise exams
7-9	6	Future forms, may-might-could, Arranging to meet	Unit 5	Direct lecture to students	surprise exams
10-12	6	Information questions	Unit 6	Direct lecture to students	surprise exams
13-15	6	Adjectives and adverbs	Unit 7	Direct lecture to students	surprise exams

11. Infrastructure	
1. Books Required reading:	New Headway Intermediate. Student's book_2012, 4th
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	
B-Electronic references, Internet sites...	Google, Youtube
12. The development of the curriculum plan	

Heat transfer I:

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides an overview of the concepts of heat transfer. This may be useful in engineering. Also it gives an introduction of the most important methods of heat transfer by conduction, convection and radiation. This enhance student idea to recognize, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

1. Name	Nagham Yass Khudair
2. University Department/Centre	Scientific Department / Department of Metallic Materials Engineering
3. Course title/code	Heat Transfer
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	60
7. Date of production/revision of this specification	15/9/2025
8. Aims of the Course	
Introducing the student to the basic principles of heat transfer with its various applications. Where different methods of heat transfer are studied that enable the student how to properly used to calculate and solving the problems. Then studying the types of heat exchangers and their importance in the different industrial applications. This will enhance the ability of students to deal with different types of heat flows and calculate the heat transfer rate . in addition to identifying the heat transfer through the fins.	

9. Learning Outcomes, Teaching ,Learning and Assessment Method

1. Understand the general form of the heat transfer methods and identify their equation.
2. Learn how to identify and apply charts and table of heat transfer to be able to solve the problems.
3. Introduce different types of heat exchangers and their practical applications.

Teaching and Learning Methods

- 1- Discussion
- 2- Using the display screen
- 3- Student groups
- 4- Experiential education
- 5- Interactive education

Assessment methods

- 1- Using the display screen
- 2- Discussion
- 3- In-class effectiveness
- 4- Daily exams
- 5- Semester exams
- 6- Final exam

- C. Affective and value goals
- C1- Written exams
 - C2- Semester exams
 - C3 - Final exams
 - C4- Daily assessment

- D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
- D1 Verbal communication
 - D2 Teamwork groups
 - D 3 Written communication
 - D 4 Planning and Organizing

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Learn how to get the knowledge and idea in heat transfer science	Introduction	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
2	4	Learn how to get the knowledge and idea in heat transfer science	physics principles	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
3	4	Learn how to get the knowledge and idea in heat transfer science	conduction	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
4	4	Learn how to get the knowledge and idea in heat transfer science	Steady heat transfer	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
5	4	Learn how to get the knowledge and idea in heat transfer science	Extended surfaces	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
6	4	Learn how to get the knowledge and idea in heat transfer science	Lumped system	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab,

					questions and answer in class
7	4	Learn how to get the knowledge and idea in heat transfer science	Numerical solution	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
8	4	Learn how to get the knowledge and idea in heat transfer science	convection	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
9	4	Learn how to get the knowledge and idea in heat transfer science	Internal flow	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
10	4	Learn how to get the knowledge and idea in heat transfer science	External flow	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
11	4	Learn how to get the knowledge and idea in heat transfer science	Free convection	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
12	4	Learn how to get the knowledge and idea in heat transfer science	Heat exchanger	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in

					class
13	4	Learn how to get the knowledge and idea in heat transfer science	Radiation	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
14	4	Learn how to get the knowledge and idea in heat transfer science	applications	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class
15	4	Learn how to get the knowledge and idea in heat transfer science	applications	Direct lecture to students & solve a problems	surprise exams and home works , experimental lab, questions and answer in class

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	Basic texts * Heat Transfer bt Holman 7 edition Yunus A Cengel; Heat Transfer, A Practical Approach • Any modern source about the course can be used
B-Electronic references, Internet sites...	Google
12. The development of the curriculum plan	
1- Work in conformity with the existing curricula in international universities. 2- Follow up on scientific developments within the global education sector. 3- Scientific communication with the latest scientific developments within the scientific specialization.	

Description for Powder Metallurgy:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Name	Nawal Mohammed Dawood
2. University Department/Centre	Scientific Department / Department of Metallurgical Engineering
3. Course title/code	Powder technology
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2024

Aims of the Course: This course aims to study the powder technology process based on its basic sequential steps, which include mixing, pressing and sintering processes. The course also aims to study the factors affecting the manufacture of a mineral substance by powder technology. The course also includes an overview of the basic methods of producing mineral powders and characterizing the shape of mineral powders depending on the method of production. Finally, in this course, the advantages and disadvantages of this technology and the most important modern applications of powder metallurgy products are introduced, and examples of each application are taken.

9- Learning Outcomes, Teaching, Learning and Assessment Method

A- Cognitive goals .

A1- Building integrated projects in terms of interfaces and properties and writing equations related to powder technology and its basics. .

A2 - How to deal with engineering problems related to metal matrix composite and how to address them to improve its properties.

B. Cognitive goals .

1- Building integrated projects in terms of interfaces and properties and writing equations related to powder technology and its basics. .

2 - How to deal with engineering problems related to metal matrix composite and how to address them to improve its properties.

C. The skills goals special to the course.

Constructive dealing with engineering specifications related to the manufacture and examination of a metallic powder samples and with high-quality engineering and physical specifications such as density and porosity tests, elastic modulus, compression strength, wear and fatigue, and in

accordance with the specialization of students in the Department of Metallurgical Engineering

Teaching and Learning Methods

- 1- Using the display screen
- 2- Discussion
- 3- Student groups
- 4- Experiential education
- 5- Interactive education

Assessment methods

- 1- Using the display screen
- 2- Discussion
- 3- In-class effectiveness
- 4- Daily exams
- 5- Semester exams
- 6- Final exam

C. Affective and value goals

- C1- Written exams
- C2- Semester exams
- C3 - Final exams
- C4- Daily assessment

- D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)
- D1 Verbal communication (the ability to express thinking clearly and confidently in speech)
 - D2 Teamwork (working with confidence within the group)
 - D3 Written communication (the ability to express yourself clearly in writing)
 - D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Introductions to powder metallurgy	principle of powder metallurgy	Direct lecture to students	surprise exams
2	2	Study of physical properties powder size, volumetric analysis, powder shape, surface area, composition, microscopic hardness .	Basic properties of powder	Direct lecture to students	surprise exams
3	2	To know the apparent density, compressibility of powder, flowability, total volume, true density, compressibility, sintering ability.	Technological properties of powder	Direct lecture to students	surprise exams
4	2	Powder production methods	Basics of powder production methods	Direct lecture to students	surprise exams
5	2	Mechanical methods for producing crushing and grinding powder	The main properties of powders produced in this way	Direct lecture to students	surprise exams
6	2	Physical methods of powder production such as atomization	The main properties of the powders produced in this way, the advantages and disadvantages	Direct lecture to students	surprise exams
7	2	Chemical methods for the production of powder such as reduction	Manufacture of iron and tungsten powder by reduction method and specifications of the resulting powder	Direct lecture to students	surprise exams

8	2	Powder storage, powder treatment, powder mixing and merging, evaluation of mixing operations, powder pelletizing	Powder consolidations and heat treatment		
9+10+11	6	Definition of pressing processes and their basics, types of pressing processes, briquetting processes, the behavior of powder in briquetting processes, manufacturing and squeezing complex powders, other unconventional methods of pressing, hot pressing, extrusion pressing, rolling pressing, equidirectional pressing, blast pressing, hot pressing, cold pressing, injection molding, forming and pressing without pressing, sliding casting	The basics of shaping and pressing of powder	Direct lecture to students	surprise exams
12	2	Mass transfer, viscous flow, evaporation and condensation, diffusion on crystal boundaries, plastic flow	The basics of sintering processes	Direct lecture to students	surprise exams
13	2	sintering in liquid state, sintering in solid state, activated sintering	Types of sintering process	Direct lecture to students	surprise exams
14	2	Protected atmosphere, types of sintering furnaces	The equipment used and the atmosphere during the sintering process	Direct lecture to students	surprise exams
15	2	Iron-based products,	powder	Direct lecture to	surprise exams

	piece number products, porous products, non-ferrous metal products, bearing and lubricating materials, abrasives	technology products	students	final examination
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11. Infrastructure

1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	<ul style="list-style-type: none"> • Kateřina Skotnicová, Miroslav Kursá, " POWDER METALLURGY". Ostrava 2014 • THUMMLER. "An Introduction to Powder Metallurgy" Series Editors LJENKINS, 2006. • Verlinden, L. Froyen, , Belgium. "Aluminium Powder Metallurgy" (2012). • Katsuyoshi Kondoh " POWDER METALLURGY" seventh edition, Copyright ©John Wiley & Sons, Inc 2012.
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

- 1- Work in conformity with the existing curricula in international universities.
- 2- Follow up on scientific developments within the global education sector.
- 3- Scientific communication with the latest scientific developments within scientific specialization.
- 4- Using the latest versions of specialized software deals with metal matrix composite.
- 5- Going towards the latest publications from international scientific sources.

13. Course Development Plan

- 1- Work in conformity with the existing curricula in international universities.
- 2- Follow up on scientific developments within the global education sector.
- 3- Scientific communication with the latest scientific developments within scientific specialization.
- 4- Orientation towards the latest publications from international scientific sources

14. Acceptance

Prerequisites	Central
Less number of students	20

The largest number of students	40

Description for Engineering Analysis:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Name	Ruaa Hatem Kadhim
2. University Department/Centre	Scientific Department / Department of Metallic Materials Engineering
3. Course title/code	Engineering Analysis
4. Modes of Attendance offered	Weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	45
7. Date of production/revision of this specification	20/9/2025

8. Aims of the Course

Providing students with the basics of scientific knowledge and improving their professional abilities in the direction of analytical and creative thinking through the use of information technologies, data analysis and modern experimental methods in formulating and solving problems and preparing well-qualified engineers to improve engineering activities and the ability to manage dealing with them in all aspects of life.

9- Learning Outcomes, Teaching, Learning and Assessment Methode

A- Cognitive goals.

A1- Broad-based education to understand the impact of engineering solutions globally and economically.

A2- Ability to work in multidisciplinary teams.

A3 - The possibility of designing and implementing experiments, analyzing the results and translating them into reality.

A4- The ability to design systems to meet the required needs within realistic economic determinants.

B. The skills goals special to the course.

B1 - Using the least teaching methods in line with the level of the students and allowing the students to discuss.

B 2- Using modern and advanced means to deliver the largest amount of knowledge to the student.

B 3- Activating the role of educational guidance in the matter.

Teaching and Learning Methods

1- Using the display screen

2- Discussion

3- Student groups

4- Experiential education

5- Interactive education

Assessment methods

1- Using the display screen

2- Discussion

3- In-class effectiveness

4- Daily exams

5- Semester exams

6- Final exam

C. Affective and value goals

C1- Written exams

C2- Semester exams

C3 - Final exams

C4- Daily assessment

- D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)
- 1 Develop the student's ability and ability to use computer programs in the field of specialization.
 - 2 Develop the student's ability and ability to deal with modern technologies related to the course vocabulary.
 - 3 Develop and develop the student's ability and ability to face problems and dilemmas and find appropriate solutions.
 - 4 Develop the student's ability and ability to translate academic information into practical reality.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	9	Properties of Laplace transformation & Laplace inverse	The Concept of A Fluid (Newtonian and Non-Newtonian Fluid) Element Viscosity, Units of Viscosity, Dynamic Viscosity, Kinematic Viscosity Measurements Equilibrium of A Fluid Element Hydrostatic Pressure	Direct lecture to students	surprise exams
4+5	6	Laplace transformation to solve O.D.E.	Equations of Motion and Potential Flow Conservation of Mass, Conservation of Momentum, Conservation of Energy, Differential Relations for Fluid Motion, Analysis of Rate	Direct lecture to students	surprise exams

			of Deformation		
6-8	9	Power series	The Concept of Laminar Fluid Flow The Concept of Turbulent Fluid Flow	Direct lecture to students	surprise exams
9+10	6	Fourier transformation	Hydraulics of Pipe Systems, Basic Computations, Fluid Friction, Pipe Design and Pipe Materials	Direct lecture to students	surprise exams
11-13	9	Study the relations and derive the boundary layers equations	Similitude: Dimensional Analysis and Data Correlation And Boundary layer	Direct lecture to students	surprise exams
14+15	6	Theories and procedures	Non-Newtonian Fluids Classification of Non-Newtonian Fluids Apparent Viscosity Constitutive Equations Rheological Property Measurements Fully Developed Laminar Pressure Drops for Non-Newtonian Fluids Fully Developed Turbulent Flow Pressure Drops	Direct lecture to students	surprise exams final examination

1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	<p>Basic texts</p> <p>* Kreith, F.; Berger, S.A.; et. al. "Fluid Mechanics" <i>Mechanical Engineering Handbook</i> Ed. Frank Kreith Boca Raton: CRC Press LLC, 1999</p> <p>Verbeeten, Wilco M.H. "Computational Polymer Melt Rheology" Technische Universiteit Eindhoven, 2001.</p> <p>Ron darby "Chemical Engineering Fluid Mechanics", second edition, Marcel Dekker, Inc. 2001.</p> <p>Bruce E. Larock, Roland W. Jeppson, Gary Z. Watters, "Hydraulics of Pipeline systems" CRC Press LLC, 2000.</p> <p>M. Doi and S. F. Edwards "The Theory of Polymer Dynamics" 1994</p> <ul style="list-style-type: none"> • Any modern source about the course can be used
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	
<p>1- Work in conformity with the existing curricula in international universities.</p> <p>2- Follow up on scientific developments within the global education sector.</p> <p>3- Scientific communication with the latest scientific developments within the scientific specialization.</p> <p>4- Using the latest versions of specialized software deals with fluid flow like Ansys.</p> <p>5- Going towards the latest publications from international scientific sources.</p>	

Description of Corrosion Engineering II:

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Name	Ali Hubi Haleem
2. University Department/Centre	Scientific Department / Department of Metallurgical Engineering
3. Course title/code	Corrosion Engineering
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	15/ 9/ 2025
8. Aims of the Course	<p>Introduce the student to the basic principles of Bacterial Corrosion, What causes bacterial corrosion? What are the examples of corrosion bacteria? What is the mechanism of microbial corrosion? What is biological corrosion with examples? What is corrosion in biology? What is biochemical corrosion? What are the main types of biological corrosion? Definition of Tafel Extrapolation, Linear Polarization, High Temperature Corrosion, Mechanisms and Kinetics, Electrochemical and Morphology Aspects of Oxidation, Mechanisms of Oxidation, Oxide Defect Structure, Oxidation Kinetics, Oxidation Growth Laws, Breakaway Oxidation, Nature of Protective Oxide Scale, Effect of Alloying, Catastrophic Oxidation, Internal and Outward Oxidation.</p>

9. Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals .

A1- Building integrated projects in terms of interfaces and properties and writing equations related to corrosion engineering and its basics. .

A2 - How to deal with engineering problems related to corrosion engineering and how to address them to reduce corrosion rates

B. The skills goals special to the course.

Design and deal with engineering problems related to corrosion engineering such as macroscopic examination and laboratory tests in order to accurately determine the type of corrosion ,its causes, find effective solutions and treatments to reduce corrosion rates and in proportion to the specialization of students in the Department of Metallurgical Engineering

Teaching and Learning Methods

- 1- Using the display screen
- 2- Discussion
- 3- Student groups
- 4- Experiential education
- 5- Interactive education

Assessment methods

- 1- Using the display screen
- 2- Discussion
- 3- In-class effectiveness
- 4- Daily exams
- 5- Semester exams
- 6- Final exam

C. Affective and value goals

- C1- Written exams
- C2- Semester exams
- C3 - Final exams
- C4- Daily assessment

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1 Verbal communication (the ability to express thinking clearly and confidently in speech)

D2 Teamwork (working with confidence within the group)

D3 Written communication (the ability to express yourself clearly in writing)

D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	6	What causes bacterial corrosion? What are the examples of corrosion bacteria? What is the mechanism of microbial corrosion?	Bacterial Corrosion	Direct lecture to students	surprise exams
4+5	4	What is biological corrosion? What is biological corrosion with example? What is corrosion in biology? What is biochemical corrosion? What are the main types of biological corrosion?	Biological Corrosion	Direct lecture to students	surprise exams
6-8	6	Definition of Tafel Extrapolation, Linear Polarization	Corrosion Rate Measurements	Direct lecture to students	surprise exams
9+10	4	Mechanisms and Kinetics of hot corrosion, Chemical and Morphology of hot corrosion	High Temperature Corrosion	Direct lecture to students	surprise exams
11-13	6	Aspects of Oxidation, Mechanisms of Oxidation, Oxide Defect Structure, Oxidation Kinetics, Oxidation Growth Laws, Breakaway Oxidation,	Oxidation at high temperature	Direct lecture to students	surprise exams
14+15	4	Characterization of protective oxide, effects of alloying elements, Inward and outward oxidation.	Oxide layer test	Direct lecture to students	surprise exams final examination

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	<ol style="list-style-type: none"> 1. Zaki Ahmad, Principles of Corrosion Engineering and Corrosion Control, Butterworth-Heinemann, 1st August 2006. 2. Pedferri, Pietro, Corrosion Science and Engineering, Springer International Publishing, 2018. 3. Dr. Volkan Cicek, Corrosion Engineering, Wiley, April 2014. 4. Sohan L. Chawla and R. K. Gupta, Materials Selection for Corrosion Control, Amazon, 2016
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	
<ol style="list-style-type: none"> 1- Work in conformity with the existing curricula in international universities. 2- Follow up on scientific developments within the global education sector. 3- Scientific communication with the latest scientific developments within the scientific specialization. 4- Using the latest versions of specialized software deals with corrosion engineering. 5- Going towards the latest publications from international scientific sources. 	

Description of Numerical Engineering:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Name	Ruaa Hatem Kadhim
2. University Department/Centre	Scientific Department / Department of Metallic Materials Engineering
3. Course title/code	Numerical Analysis
4. Modes of Attendance offered	Weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2025
8. Aims of the Course	
Providing students with the basics of scientific knowledge and improving their professional abilities in the direction of analytical and creative thinking through the use of information technologies, data analysis and modern experimental methods in formulating and solving problems and preparing well-qualified engineers to improve engineering activities and the ability to manage dealing with them in all aspects of life.	

9. Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- Broad-based education to understand the impact of engineering solutions globally and economically.

A2- Ability to work in multidisciplinary teams.

A3 - The possibility of designing and implementing experiments, analyzing the results and translating them into reality.

A4- The ability to design systems to meet the required needs within realistic economic determinants.

B. The skills goals special to the course.

B1 - Using the least teaching methods in line with the level of the students and allowing the students to discuss.

B 2- Using modern and advanced means to deliver the largest amount of knowledge to the student.

B 3- Activating the role of educational guidance in the matter.

Teaching and Learning Methods

1- Using the display screen

2- Discussion

3- Student groups

4- Experiential education

5- Interactive education

Assessment methods

1- Using the display screen

2- Discussion

3- In-class effectiveness

4- Daily exams

5- Semester exams

6- Final exam

C. Affective and value goals

C1- Written exams

C2- Semester exams

C3 - Final exams

C4- Daily assessment

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

1 Develop the student's ability and ability to use computer programs in the field of specialization.

2 Develop the student's ability and ability to deal with modern technologies related to the course vocabulary.

3 Develop and develop the student's ability and ability to face problems and dilemmas and find appropriate solutions.

4 Develop the student's ability and ability to translate academic information into practical reality.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Introduction to numerical method		Direct lecture to students	surprise exams
2	2	Errors and measurement		Direct lecture to students	surprise exams
3	2	Solution of Algebraic and Transcendental Equations • Locate of the root • Method of Bisection • Secant Method • False position method		Direct lecture to students	surprise exams
4+5	4	Solution of Algebraic and Transcendental Equations • Newton Raphson for Two Equations • Iterative Method for Two Equations		Direct lecture to students	surprise exams
6+7	4	Operations with Matrices Addition/Subtraction Scalar Multiplication Matrix Multiplication Identity Matrix		Direct lecture to students	surprise exams final examination
8	2	Gauss Seidel		Direct lecture to students	surprise exams
9	2	Direct Method of Interpolation		Direct lecture to students	surprise exams
10	2	Lagrangian Interpolation		Direct lecture to students	surprise exams
11+12+13	6	Numerical Differentiation		Direct lecture to students	surprise exams
14+15	4	Numerical Differentiation and Integration		Direct lecture to students	surprise exams final examination

11. Infrastructure	
1. Books Required reading:	1-Numerical Methods for Engineers, Steven C. Chapral
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	
B-Electronic references, Internet sites...	Numerical Methods for Engineers, Steven C. Chapra L Shampine, L. F. (1994). Numerical solution of ordinary differential equations (Vol. 4): CRC Press.
12. The development of the curriculum plan	
<p>1- Work in conformity with the existing curricula in international universities.</p> <p>2- Follow up on scientific developments within the global education sector.</p> <p>3- Scientific communication with the latest scientific developments within the scientific specialization.</p> <p>4- Using the latest versions of specialized software deals with fluid flow like Ansys.</p> <p>5- Going towards the latest publications from international scientific sources.</p>	

Description of Electrical and Magnetic Materials:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Name	Qabas Khalid Naji
2. University Department/Centre	Scientific Department / Department of Metallic Materials Engineering
3. Course title/code	Electronic and Magnetic Materials
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	15
7. Date of production/revision of this specification	20/9/2025
8. Aims of the Course	
Introducing the student to the basic principles of electronic and magnetic materials with its various applications. Knowing electrical conductivity ,semiconductor materials and application .Knowing of super conductivity .Studying magnetic and origin of magnetic .Studying types of magnetic materials and laws.	
9. Learning Outcomes, Teaching ,Learning and Assessment Methode	
A- The student recognizes of materials and relationship of electrons.	
B- How to reasons happening of electrical and magnetic.	
The skills goals special to the course.	
How electrical conductivity ,semiconductor and how happens break down of dielectric. Origin of magnetic.	
Teaching and Learning Methods	
1- Using the display screen	
2- Discussion	
3- Student groups	
4- Experiential education	
5- Interactive education	
Assessment methods	
1- Using the display screen	
2- Discussion	
3- In-class effectiveness	

4- Daily exams

5- Semester exams

6- Final exam.

C. Affective and value goals

C1- Written exams

C2- Semester exams

C3 - Final exams

C4- Daily assessment

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1 Verbal communication (the ability to express thinking clearly and confidently in speech)

D2 Teamwork (working with confidence within the group)

D3 Written communication (the ability to express yourself clearly in writing)

D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	6	Electrical conductivity, semiconductor and band of energy	Introduction and studying laws.	Direct lecture to Equilibrium of A Fluid Element Hydrostatic Pressure students	surprise exams
4+5	4	Concept of Fermi level and Solar cell and manufacture photo-resistance	Knowing concept of Fermi, functions Fermi and photo-resistance	Direct lecture to students	surprise exams
6-8	6	Diode and transistor .Dielectric materials. Principles of dielectric polarization	How is manufacture diode and types of dielectric	Direct lecture to students	surprise exams
9+10	4	Dielectric breakdown, Superconductive materials and Mazner effect	How happens breakdowns and Mazner effect	Direct lecture to students	surprise exams
11-13	6	Magnetic materials, origin of magnetic and ferromagnetic	Studying magnetic materials	Direct lecture to students	surprise exams
14+15	4	Paramagnetic and Diamagnetic materials	Study of different between of materials	Direct lecture to students	surprise exams final examination

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	

A- Recommended books and references (scientific journals, reports...).	1-Materials science structure and characterization of polycrystalline materials ,Vadimir vovilov .2003. 2-Intrent. 3-Phasicalmatallurgy.Robertw.catn and peter Haasan Fourth edition .
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

- 1- Work in conformity with the existing curricula in international universities.
- 2- Follow up on scientific developments within the global education sector.
- 3- Scientific communication with the latest scientific developments within the scientific specialization.

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Description of Composite Material:

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Name	Nawal Mohammed Dawood
2. University Department/Centre	Scientific Department / Department of Metallurgical Engineering
3. Course title/code	Metal Matrix Composite
4. Modes of Attendance offered	weekly
5. Semester/Year	Semester
6. Number of hours tuition (total)	30
7. Date of production/revision of this specification	20/9/2025
8. Aims of the Course	
<p>The course aims to study composite materials, their history and types, depending on the classification of reinforcing materials (particle reinforcement, dispersion reinforcement and fiber reinforcement) or depending on the type of base material, studying the law of mixtures and how to use it in calculating resistance, density, electrical and thermal conductivity. The course also aims to study the factors affecting the manufacture of an efficient composite material. Also learn about the uses of composite materials, traditional and advanced manufacturing methods, and modern applications of composite materials.</p>	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
C- Cognitive goals .	
A1- Building integrated projects in terms of interfaces and properties and writing equations related to metal matrix composite and its basics. .	
A2 - How to deal with engineering problems related to metal matrix composite and how to address them to improve its properties.	
B. The skills goals special to the course.	
Constructive dealing with engineering specifications related to the manufacture and examination of a composite material with a metal basis and with high-quality engineering and physical specifications such as density and porosity tests, elastic modulus, tensile strength, wear and fatigue, and in accordance with the specialization of students in the Department of Metallurgical Engineering	
Teaching and Learning Methods	

- 1- Using the display screen
- 2- Discussion
- 3- Student groups
- 4- Experiential education
- 5- Interactive education

Assessment methods

- 1- Using the display screen
- 2- Discussion
- 3- In-class effectiveness
- 4- Daily exams
- 5- Semester exams
- 6- Final exam

C. Affective and value goals

- C1- Written exams
- C2- Semester exams
- C3 - Final exams
- C4- Daily assessment

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1 Verbal communication (the ability to express thinking clearly and confidently in speech)

D2 Teamwork (working with confidence within the group)

D3 Written communication (the ability to express yourself clearly in writing)

D4 Planning and Organizing (the ability to plan and implement activities effectively)

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	6	To describe types of matrix and reinforcement phases	Define principle of composite materials	Direct lecture to students	surprise exams
4+5	4	Particulate and Dispersion-Strengthened Composites, Cite the difference in strengthening mechanism for large-particle and dispersion-strengthened particle-reinforced composites.	physical and metallurgical parameters of composite materials	Direct lecture to students	surprise exams
6-8	6	Characteristics of Fiber-Reinforced Composites, Calculate longitudinal modulus and longitudinal strength for an aligned and continuous fiber-reinforced composite	Fiber-Reinforced Composites	Direct lecture to students	surprise exams
9+10	4	several techniques (pultrusion, filament winding, and prepregs production processes) by which useful products of these materials are manufactured will be discussed	Manufacturing Fibers and Composite	Direct lecture to students	surprise exams
11-13	6	Composites used for many structural applications are commonly prepared using a lay-up operation (either hand or	Fiber-Reinforced Systems and Applications	Direct lecture to students	surprise exams

		automated), wherein prepregs tape plies are laid down on a tooled surface and are subsequently fully cured by the simultaneous application of heat and pressure composites in sport applications			
14+15	4	Composite in space applications and sport applications Laminar composites are built of layers of deferent materials. These layers may be sheets of deferent metals, with one metal providing strength, and the other providing hardness or corrosion resistance. Sandwich materials, including honeycombs, are exceptionally lightweight laminar composites, with solid facings joined to an almost hollow core	Advanced composite	Direct lecture to students	surprise exams final examination

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports...).	<ol style="list-style-type: none"> 1. Peters, Stanley T., ed. Handbook of composites. Springer Science & Business Media, 2013. 2. Kainer, Karl Ulrich. Basics of metal matrix composites. Wiley-VCH GmbH & Co. KGaA, Weinheim, Germany, 2006.

	<p>3. Askeland, Donald R., Pradeep P. Fulay, and Wendelin J. Wright. "The Science and Engineering of Materials,—6th ed., Cengage Learning." (2010): 06-21.</p> <p>4. Dieter, George Ellwood, and David J. Bacon. Mechanical metallurgy. Vol. 3. New York: McGraw-hill, 1986.</p> <p>5. W. D. Callister, Jr."Materials Science and Engineering An Introduction" seventh edition, Copyright © 2007 John Wiley & Sons, Inc.</p>
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	
<p>1- Work in conformity with the existing curricula in international universities.</p> <p>2- Follow up on scientific developments within the global education sector.</p> <p>3- Scientific communication with the latest scientific developments within the scientific specialization.</p> <p>4- Using the latest versions of specialized software deals with metal matrix composite.</p> <p>5- Going towards the latest publications from international scientific sources.</p>	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanical Metallurgy II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code			
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Department	Metallurgical Engineering	College	University of Babylon
Module Leader	Dr. Ruaa Hatem Kadhim	e-mail	Ruaa.hatem@uobabylon.edu.iq

Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ruaa Hatem Kadhim	e-mail	Ruaa.hatem@uobabylon.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	0/ /2025	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Engineering Mechanics	Semester	1 & 2
	Strength of Materials		3 & 4
	Mechanical Metallurgy I		5
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The syllabus of the course is aimed not only at giving the students the ability to solve the problems of the strength of materials but to prepare them to deal with and understand other subjects related to this subject such as: design and selection of engineering materials, forming processes, mechanical metallurgy, mechanical behavior of materials, stress analyses and so on.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of the course the students should be able to: 1- Define the internal forces. 2- Explain the internal forces and all types of simple stresses (tension, compression, shear, and bearing) and solve different exercises related to them.

	<p>3- Clarify a case study related to the simple stresses/thin-walled cylinders.</p> <p>4- Define the strain in materials and describe the stress-strain diagram and the mechanical properties that can be determined through this diagram.</p> <p>5- Discuss the lateral strain in materials and Poisson's ratio.</p> <p>6- Solve different exercises related to statically indeterminate loading.</p> <p>7- Discuss the thermal stresses and their analyses.</p> <p>8- Clarify the torsion stress and its analyses.</p> <p>9- Solve different exercises related to the torsion stress.</p> <p>10- Clarify a case study related to the torsion stress/ helical compression spring.</p> <p>11- Explain what the beam is, shear force and bending moment in beams.</p> <p>12- Discuss the shear force and bending moment diagrams for beams.</p> <p>13- Draw shear force and bending moment diagrams for beams at different loading conditions.</p> <p>14- Clarify the stress computation in beams (bending stresses).</p>
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>The course is consisted of theoretical and experimental parts. The theoretical part will cover all the facts, theories, and analytical methods related to the strength of materials at the level of bachelor engineering. Laboratory (experimental part) provides the opportunity to explore the concepts through hand-on experiments including some mechanical testing. Therefore, the indicative content includes the following.</p> <p><u>Part A –Basic concepts for the strength of materials:</u></p> <ul style="list-style-type: none"> - Simple stresses and strains: direct normal stress, direct shearing stress, crushing stress, relation between the stress and the strain (18 hrs). - Thermal stresses (4hrs) - Tutorial (6hrs) - Laboratory experiments (12hrs) <p><u>Part B –Indirect stresses:</u></p> <ul style="list-style-type: none"> - Torsional shearing stress, bending stress (12 hrs) - Tutorial (4hrs) - Laboratory experiments (8hrs)

	<p>Part C –Cases of applications:</p> <ul style="list-style-type: none"> - Stresses and strains in thin- walled cylinder (6hrs) - Stress and deformation in helical compression spring (6hrs) - Tutorial (4hrs) - Laboratory experiments (10 hrs)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in introducing this unit is to work on increasing students' knowledge of everything related to the strength of materials and to encourage students to participate in the discussion, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are related to the items of the subject and the manner must be interested to the students.</p>

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 12	LO #1-7 and #8-14
	Assignments & H.W	2	10% (10)	3 and 10	LO #8, and #13
	Projects / Lab.	1	10% (10)	Continuous	All
	Discussion During Lectures	1	10% (10)	Continuous	All
Summative assessment	Midterm Exam	1hr	10% (10)	8	LO #1 - 10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Review to plane stress and strain, factor of softy, stress concentration
Week 2	Stresses in 3 D and stress tensor, invariants of stresses
Week 3	Mohr's stress circle in 3D, description of strain at a point and in 3D, invariants of strains
Week 4	Elastic stress-strain relations, octahedral shear stress and shear strain
Week 5	Stress-strain curves, plastic deformation, criteria for necking, strain energy

Week 6	Yielding criteria for ductile metals
Week 7	Experimental stress analysis, strain gauge
Week 8	Theoretical strength of solids, lattice defects
Week 9	Deformation by slip, slip in a perfect lattice
Week 10	Slip by dislocations movement
Week 11	Critical resolved shear stress for slip Deformation of single crystal
Week 12	Deformation by twining, stacking faults, Deformation bands and kink bands
Week 13	Observation of dislocations, Burgers vector and dislocations loop
Week 14	Energies of dislocations
Week 15	Intersection of dislocations, jogs and kinks
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Shear test
Week 2	Lab 2: Tensile test
Week 3	Lab 3: Compression Test
Week 4	Lab 4: Torsion test
Week 5	Lab 5: Poisson's ratio test
Week 6	Lab6: Thermal stresses test
Week 7	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	-Dieter, G.E., Mechanical metallurgy, 1988.	Yes
Recommended Texts	1- Callister, Fundamental of materials science and engineering, 2001. 2- Reed-Hill & Abbaschian, Physical metallurgy principles,2005 3- Meyers & Chawla, The behaviors of engineering materials,2005	
Websites	https://share.google/J4QdQlCNy5EtiCfdC	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanical Metallurgy I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code			
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Department	Metallurgical Engineering	College	University of Babylon
Module Leader	Dr. Ruaa Hatem Kadhim	e-mail	Ruaa.hatem@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ruaa Hatem Kadhim	e-mail	Ruaa.hatem@uobabylon.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	0/ /2025	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Strength of Materials	Semester	1 & 2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The syllabus of the course is aimed not only at giving the students the ability to solve the problems of the strength of materials but to prepare them to deal with and understand other subjects related to this subject such as: design and selection of engineering materials, forming processes, mechanical metallurgy, mechanical behavior of materials, stress analyses and so on.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>At the end of the course the students should be able to:</p> <ol style="list-style-type: none">1- Define the internal forces.2- Explain the internal forces and all types of simple stresses (tension, compression, shear, and bearing) and solve different exercises related to them.3- Clarify a case study related to the simple stresses/thin-walled cylinders.4- Define the strain in materials and describe the stress-strain diagram and the mechanical properties that can be determined through this diagram.5- Discuss the lateral strain in materials and Poisson's ratio.6- Solve different exercises related to statically indeterminate loading.7- Discuss the thermal stresses and their analyses.8- Clarify the torsion stress and its analyses.9- Solve different exercises related to the torsion stress.10- Clarify a case study related to the torsion stress/ helical compression spring.11- Explain what the beam is, shear force and bending moment in beams.

	<p>12- Discuss the shear force and bending moment diagrams for beams.</p> <p>13- Draw shear force and bending moment diagrams for beams at different loading conditions.</p> <p>14- Clarify the stress computation in beams (bending stresses).</p>
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>The course is consisted of theoretical and experimental parts. The theoretical part will cover all the facts, theories, and analytical methods related to the strength of materials at the level of bachelor engineering. Laboratory (experimental part) provides the opportunity to explore the concepts through hand-on experiments including some mechanical testing. Therefore, the indicative content includes the following.</p> <p><u>Part A –Basic concepts for the strength of materials:</u></p> <ul style="list-style-type: none"> - Simple stresses and strains: direct normal stress, direct shearing stress, crushing stress, relation between the stress and the strain (18 hrs). - Thermal stresses (4hrs) - Tutorial (6hrs) - Laboratory experiments (12hrs) <p><u>Part B –Indirect stresses:</u></p> <ul style="list-style-type: none"> - Torsional shearing stress, bending stress (12 hrs) - Tutorial (4hrs) - Laboratory experiments (8hrs) <p><u>Part C –Cases of applications:</u></p> <ul style="list-style-type: none"> - Stresses and strains in thin- walled cylinder (6hrs) - Stress and deformation in helical compression spring (6hrs) - Tutorial (4hrs) - Laboratory experiments (10 hrs)

<p>Learning and Teaching Strategies</p> <p>استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	

The main strategy that will be adopted in introducing this unit is to work on increasing students' knowledge of everything related to the strength of materials and to encourage students to participate in the discussion, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that include some sampling activities that are related to the items of the subject and the manner must be interested to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 12	LO #1-7 and #8-14
	Assignments & H.W	2	10% (10)	3 and 10	LO #8, and #13
	Projects / Lab.	1	10% (10)	Continuous	All
	Discussion During Lectures	1	10% (10)	Continuous	All

Summative assessment	Midterm Exam	1hr	10% (10)	8	LO #1 - 10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Review to plane stress and strain, factor of softy, stress concentration
Week 2	Stresses in 3 D and stress tensor, invariants of stresses
Week 3	Mohr's stress circle in 3D, description of strain at a point and in 3D, invariants of strains
Week 4	Elastic stress-strain relations, octahedral shear stress and shear strain
Week 5	Stress-strain curves, plastic deformation, criteria for necking, strain energy
Week 6	Yielding criteria for ductile metals
Week 7	Experimental stress analysis, strain gauge
Week 8	Theoretical strength of solids, lattice defects
Week 9	Deformation by slip, slip in a perfect lattice
Week 10	Slip by dislocations movement
Week 11	Critical resolved shear stress for slip Deformation of single crystal
Week 12	Deformation by twining, stacking faults, Deformation bands and kink bands
Week 13	Observation of dislocations, Burgers vector and dislocations loop
Week 14	Energies of dislocations

Week 15	Intersection of dislocations, jogs and kinks
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Shear test
Week 2	Lab 2: Tensile test
Week 3	Lab 3: Compression Test
Week 4	Lab 4: Torsion test
Week 5	Lab 5: Poisson's ratio test
Week 6	Lab6: Thermal stresses test
Week 7	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	-Dieter, G.E., Mechanical metallurgy, 1988.	Yes
Recommended Texts	1- Callister, Fundamental of materials science and engineering, 2001. 2- Reed-Hill & Abbaschian, Physical metallurgy principles,2005	

	3- Meyers & Chawla, The behaviors of engineering materials,2005	
Websites	https://share.google/J4QdQlCNy5EtiCfdC	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Heat treatment		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB0201061		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	06
Administering Department	01	College	02
Module Leader	Ekbal Mohammed Saeed Salih		e-mail ekbalseed@gmail.com
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	23/05/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The students should know the intial principles of heat treatments and how it effects on microstructure , properties on engineering materials , also the types of heat treatment , mechanism , perpose and when uses in case of ferrous and non ferrous metals
Module Learning Outcomes	1- basic rolus of heat treatment and its effect . 2- types of heat treatment

مخرجات التعلم للمادة الدراسية	3- study the effects of heat treatment on microstructure , properties of engineering materials 4- study types of heat treatment on ferrous and non-ferrous metals
Indicative Contents المحتويات الإرشادية	1- basic or principles of mechanism of heat treatment 2- types of heat treatment and its effect on microstructure speseacilly on steels and its alloys 3- cast iron heat treatment 4- non-ferrous heat treatment

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. استخدام السبورة التقليدية في الشرح والايضاح. 2. المناقشة 0 3. طرح اسئلة والاجابة عليها مباشرة 4. تكليف الطلاب بسمنر عن بعض المواد

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب اسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب اسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Midterm Exam		2hr	10% (10)	7	LO #1 - #7

Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Heat treatment principles of ferrous and non-ferrous
Week 2	Types of heat treatments and its effect on microstructure , properties of steel
Week 3	Types of heat treatment (annealing , full annealing)
Week 4	Recavary , recrestailization , grain growth
Week 5	Normalizing , quenching , tempering , secondary hardening
Week 6	Thermo mechanical treatments , types
Week 7	Examin
Week 8	Hardenability , parameters
Week 9	Heat treatment of cast iron
Week 10	Types Heat treatment of cast iron
Week 11	Types Heat treatment of cast iron
Week 12	Types Heat treatment of cast iron
Week 13	Heat treatment of cu base alloys
Week 14	Heat treatment of Cu base alloys
Week 15	Heat treatment of Al base alloys
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Heat treatments , properties , principles , mechanism , effects
Week 2	Anneling
Week 3	Normalizing
Week 4	Quenching
Week 5	Tempring
Week 6	Solution treatment

Week 7	
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Metalurgical engineering and advanced materials , principles , properties , treated , applications , part 4 2- Metalurgical engineering and advanced materials , principles , properties , treated , applications , part 2	Yes
Recommended Texts	Heat treatment of metals and alloys by thron	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	Phase transformation	Module Delivery

Module Type	Core	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UOBAB0201051		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	05
Administering Department	01	College	02
Module Leader	Ekbal mohammed saeed salih	e-mail	ekbalseed@gmail.com
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	23/05/2025	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The students should know the intial principles of phase transformation and how it effects on microstructure , properties on engineering materials , also the types of phase transformation , mechanism , perpose and when, types of phase transformation , cooling curves , casting
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- basic rolus of phase transformation and its effect . 2- types of phase transformation 3- study the effects of types of phase transformation on free energy , idial solution , activity solution , gipps phase role 4- study types of phase transformation on ferrous and non-ferrous metals

Indicative Contents المحتويات الإرشادية	1- basic or principles of mechanism of phase transformation 2- types of phase transformation , homogenous , heterogenous and its effect on microstructure speseacilly on steels and its alloys 3- solubility , driving force for solidification , transformation in solids 4- non-ferrous phase transformation
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- using black bord in explanation 2- discussion 3- homework 4- direct question and answers 5- simeners

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Principles of phase transformation
Week 2	Equilibrium`
Week 3	Gibbs free energy
Week 4	Binary systems
Week 5	Liquid / vapour interfaces
Week 6	Homogenization nucleation
Week 7	Exam
Week 8	Heterogeneous transformation
Week 9	Cooling curve , solidification from liquid to solid
Week 10	Parameters affected on transformation
Week 11	Transformation in solids
Week 12	Transformation in solids
Week 13	C curve
Week 14	Interfaces
Week 15	Final exam
Week 16	

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Specimen preparation for microstructure
Week 2	Cooling curve of different materials
Week 3	Study the effect of parameters on casting
Week 4	Crystal structure

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Phase transformation for metal and alloy by Dr/ abd al wahid . 2- Phase transformation for metal and alloy by porter	Yes
Recommended Texts	3- Metalurgical engineering and advanced materials , principles , properties , treated , applications , part 4	No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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