

Academic Program Description Form

University Name: Diyala

Faculty/Institute: Engineering

Scientific Department: Materials engineering

Academic or Professional Program Name: Bachelor of Materials engineering

Final Certificate Name: Bachelor of Materials engineering

Academic System: course

Description Preparation Date: 24-6-2024

File Completion Date: 24-6-2024

Signature:

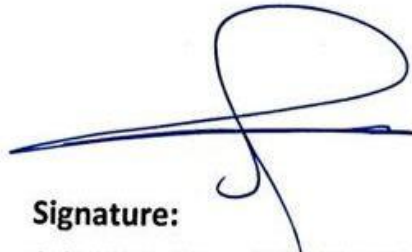


Head of Department Name:

Suha K. Shihab

Date: 25/6/2024

Signature:



Scientific Associate Name:

Jabbar Galtman

Date: 25/6/2024

The file is checked by:

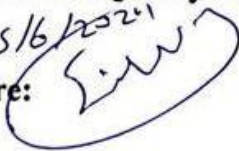
Salah N. Farhan

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 25/6/2024

Signature:



Approval of the Dean



Prof. Dr. Anees A. Khadim

1. Program Vision

.Preparing and qualifying engineers specialized in materials engineering sciences through diversification in learning and teaching methods and training students to apply the acquired knowledge and skills to solve real-life problems.

.The department seeks to provide distinguished academic programs in the field of materials engineering sciences in both theoretical and applied aspects that comply with international standards of academic quality.

.Encouraging and developing scientific research in the fields of materials engineering in terms of design, manufacturing and selection of materials, which include metal, ceramic, polymeric, composite materials, in addition to recycling and manufacturing materials .

Providing a stimulating environment for faculty members to develop their educational and research capabilities and skills.

The department strives to improve the teaching staff by sending the department's affiliates for postgraduate studies inside and outside the country and creating the appropriate conditions for scientific research in order to obtain the required degrees. Providing students with the ability to learn, develop personally and work in the field

In groups

2. Program Mission

3. Program Objectives

- ✓ Building the student scientifically and qualifying him to work in the field of engineering techniques.
- ✓ Building and preparing the student psychologically to play his role as a reliable engineer in this field.
- ✓ Building students who are able to compete with other engineers for job opportunities and obtain the required seats in completing graduate studies.
- ✓ The ability to take external tests by local, regional or international bodies for the purpose of completing the study or appointment.
- ✓ Urging the student to be creative and think about specialization projects and keep pace with the development in this field.
- ✓ Providing students with scientific, practical and self-skills that enable them to solve practical problems and deal with them with scientific concepts.

4. Program Accreditation

5. Other external influences

6. Program				
ملاحظات *	النسبة المئوية	وحدة دراسية	عدد المقررات	هيكل البرنامج
	4.24 %	6	5	متطلبات المؤسسة
	14.20 %	20	9	متطلبات الكلية
				متطلبات القسم
Graduation Requirements	-	-	-	التدريب الصيفي
				أخرى

7. Program Description				
Credit Hours		Course Name	Course Code	Year/Level
	<i>theoretical</i>	Phase transformation	MAE	Third

8. Expected Learning Outcomes of the Program	
	Knowledge
<p>A- Cognitive Objectives</p> <p>A1- Understanding and teaching the student the concepts of general phase transformations.</p> <p>A2- Enabling students to obtain knowledge and understanding of the fields of phase transformations.</p> <p>A3- Understanding the student of the methods of phase transformations, as well as enabling students to obtain knowledge and understanding of the practical framework in the field of phase transitions.</p> <p>A4- Enabling students to obtain knowledge and understanding of phased transformation systems.</p> <p>A5- Enabling students to obtain knowledge and understanding on the diagnosis of types of phase shifts.</p> <p>A6- Understanding the student the foundations of the science of phase transformations.</p>	<p><i>Learning outcomes 1, 2 and 3</i></p>
<p>B- Program Skills Objectives</p> <p>B1 – Explanation of the topics of the science of phase transformations by specialists in the subject with an emphasis on the use of mathematics as a basis for understanding and learning.</p> <p>B2 – Equips them with practical problem-solving skills related to phase shift systems.</p> <p>B3 – The topics of phase transitions are presented.</p>	
	Values
<p><input type="checkbox"/> Provide students with the basics and additional topics related to the pre-skills learning outcomes to solve practical problems.</p> <p><input type="checkbox"/> Solving a set of practical examples by the academic staff.</p>	<p><i>Learning Outcomes 4</i></p>

- ✓ Daily exams with practical and scientific questions.
- ✓ Participation grades for difficult competition questions among students.
- ✓ Develop grades for homework assignments and reports assigned to them.
- ✓ Semester exams for the curriculum in addition to the mid-year exam and the final exam.

- Students are involved during the lecture by solving some practical problems.
- The scientific laboratories of the department are followed up by the academic staff.

Evaluation methods

- Daily exams with practical and scientific questions.
- Participation grades for difficult competition questions among students.
- Develop grades for homework assignments and reports assigned to them.
- Semester exams for the curriculum in addition to the mid-year exam and the final exam.

- ✓ Assessment methods Provide students with the basics, additional topics and field experiences related to the outcomes of thinking and analysis.
- ✓ Forming seminars during or outside lectures to discuss scientific engineering topics that require thinking and analysis.
- ✓ Ask students a set of thinking questions during lectures such as (what, how, when, why) for specific topics.

Giving students homework and periodic reports.

Learning Outcomes 5

9. Teaching and learning strategies

10. Evaluation methods

11. Faculty

Faculty Members

Preparation of the teaching staff		Special requirements/skills if any	Specialization		Academic Rank
lecturer	angel		special	year	

	angel			year	Assistant Professor Doctor
--	--------------	--	--	-------------	---------------------------------------

Professional Development

Orientation of new faculty members

In addition to passing the courses of teaching methods and language safety, the department works on development courses and workshops to prepare and guide new teaching members

Professional development for faculty members

Using learning platforms and electronic methods to display lectures, seminars and reports, display educational videos and conduct lectures accompanied by practical application.
--

12. Acceptance Criterion

13. The most important sources of information about the program

14. Program Development Plan

مخطط مهارات البرنامج

Learning outcomes required from the program												المعرفة	اساسي أم اختياري	Course Name	Course Code	Year/Level
القيم				المهارات				A4	A3	A2	A1					
4C	3C	2c	1C	4b	3b	2b	1b									
	√	√	√		√	√	√		√	√	√	Essential	Pase transformation	MAE	Third	

- Please tick the boxes corresponding to the individual learning outcomes from the program subject to evaluation



Course Description Form

1. Course Name	
Phase transitions	
2. Course Code	
MAE	
3. Semester / Year	
First	
4. Date of preparation of the description	
7/8/2024	
5. Available attendance formats	
Came	
6. Number of Hours (Total) / Number of Units (Total)	
3	
7. Name of the course administrator (if more than one name is mentioned)	
Name : Assoc. Prof. Dr. Abdul-Jabbar Saad Juma Email: Abdaljabar.saad@uodiyala.edu.iq	
8. Course Objectives	
<ul style="list-style-type: none"> • A- Cognitive Objectives • A1- Understanding and teaching the student the concepts of general phase transformations. • A2- Enabling students to obtain knowledge and understanding of the fields of phase transformations. • A3- Understanding the student of the methods of phase transformations, as well as enabling students to obtain knowledge and understanding of the practical framework in the field of phase transitions. • A4- Enabling students to obtain knowledge and understanding of phased transformation systems. • A5- Enabling students to obtain knowledge and understanding on the diagnosis of types of phase shifts. • A6- Understanding the student the foundations of the science of phase transformations. • B- Program Skills Objectives • B1 – Explanation of the topics of the science of phase transformations by specialists in the subject with an emphasis on the use of mathematics as a basis for understanding and learning. • B2 – Equips them with practical problem-solving skills related to phase shift systems. • B3 – The topics of phase transitions are presented. • 	<p>Course Objectives</p>
9. Teaching and Learning Strategies	
<p><i>The usual theoretical presentation method using the writing board and depending on the method (how and why) of the subject and according to the teaching curriculum of the material. • The method of theoretical presentation using the (data show) device and depending on the method (how and why) of the subject and according to the teaching curriculum of the material. • The method of laboratory</i></p>	<p>Strategy</p>

<i>presentation using special devices to measure the different properties of the subject under experiment</i>					
10. Course Structure					
Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Daily exams + practical experiences + monthly exams	Lectures displayed in Power Point format	Principle and theory of phase transformation	The teacher demonstrates the principle and theory of phase shifts	3	First
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Principle properties of phase transformation	recognize the main principles of phase transitions,	3	Second
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Thermodynamics & Kinetics	recognize thermodynamic and the potential energy of matter	3	Third
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Diffusion	identify the diffusion between atoms of substances,	3	Fourth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Interfaces in Materials	Recognize the boundaries between materials	3	V
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Crystallization	Recognition of freezing of materials	3	Sixth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Phase transformations	Recognize transformations after deployment	3	Seventh

Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Diffusionless Transformations	recognize the properties of materials after phase transitions without diffusion,	3	Eighth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Recovery Recrystallization and Grain Growth	Recognize recrystallization and growth	3	Ninth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Hardening of material	Identify hardening of materials after phase transitions	3	X
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Massive Transformation	recognize mass shifts,	3	Eleven
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Characteristics of martensitic transformation	recognize the characteristics of martensitic transformations	3	Twelfth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Driving force for martensitic transformation	recognize the driving force of martensitic transformations,	3	Thirteenth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Recovery, Recrystallization & Grain Growth	Recognize recovery, crystallization, and growth	3	Fourteenth
Daily exams + practical experiences + monthly exams	Lectures displayed in PowerPoint format	Heterogeneous Nucleation	Recognize heterogeneous nucleation	3	Fifteenth

11. Course Evaluation	
Daily preparation score and attendance 5% Daily exam score 10% Monthly exam score 20% Seminar and reporting score 5% editorial and reports etc	
12. Learning and Teaching Resources	
1- Phase Transformations in Metals and Alloys (This is the major reference for this course) D.A.Porter, K.E. Easterling, and M.Y. Sharif CRC Press , Taylor & Francis Group 2- Diffusion in solids Prof. Alok Paul , IISC Bangalore NPTEL Web course 3- Phase Transformations Prof. Anandh Subramaniam IIT Kanpu	Required textbooks (methodology, if any)
1- Phase Transformations & Heat Treatment Prof. M.P.Gururajan NPTEL web course 2- Phase Transformations in Materials Romesh C. Sharma CBS Publishers & Distributors 3- Introduction to Physical Metallurgy Sidney H. Avner McGraw Hill Education (India) Pvt Ltd	Main references (sources)
1- Phase Transformations & Heat Treatment Prof. M.P.Gururajan NPTEL web course 2- Phase Transformations in Materials Romesh C. Sharma CBS Publishers & Distributors 3- Introduction to Physical Metallurgy Sidney H. Avner McGraw Hill Education (India) Pvt Ltd	Recommended supporting books and references (journals, reports..)
	Electronic References, Websites