



BENHA UNIVERSITY



FACULTY OF ENGINEERING AT SHOUBRA

COURSE SPECIFICATIONS (2014-2015)

Model No.12

Course Specifications: Physical Metallurgy

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

1- Course Data

Course Code: MDP356

Course Title: Physical Metallurgy

Specialization: Mechanical Production Engineering

Course Type: Elective

Study Year: Third Year

Teaching Hours: Lecture: 4 Tutorial:2 Practical: 0 Total: 6

2- Course Aim

For students undertaking this course, the aims are to:

1. Understand basics of thermodynamic aspects of metals processing.
2. Understand transport phenomena and metals properties.
3. Learn how to measure and estimation of physical properties of metals at high temperatures.

3- Intended Learning Outcomes of Course (ILOS)

- a. Knowledge and Understanding:** On completing this course, students will be able to demonstrate the knowledge and understanding of:
 - a.1) The physical metallurgy fundamentals. (A3)
 - a.2) Principles of measurements related to physical properties of metals. (A4)
 - a.3) Engineering technologies that used for the metals processing. (A8)
 - a.4) Materials design principles and techniques. (A19)
- b. Intellectual Skills**
 - b.1) Choose suitable solutions for engineering materials problems. (B2)
 - b.2) Assess materials processing techniques and properties. (B15)
 - b.3) Choose manufacturing method considering materials requirements. (B18)
- c. Professional and Practical Skills**
 - c.1) Apply knowledge of materials science to solve engineering problems. (C1)
 - c.2) Combine engineering knowledge materials science improve the performance of material. (C2)
 - c.3) Apply numerical modeling methods to engineering problems. (C7)
- d. General and Transferable Skills**
 - d.1) Effectively manage tasks, time, and resources. (D6)
 - d.2) Search for information and engage in life-long self-learning discipline. (D7)
 - d.3) Refer to important literatures. (D9)

**COURSE SPECIFICATIONS (2014-2015)****4- Course Contents**

No.	Topics
1	Descriptions of high-temperature metallurgical processes
2	Descriptions of high-temperature metallurgical processes
3	Thermodynamic aspects of metals processing
4	Thermodynamic aspects of metals processing
5	Thermodynamic aspects of metals processing
6	Phase diagrams, phase transformations, and the prediction of metal properties
7	Phase diagrams, phase transformations, and the prediction of metal properties
8	Measurement and estimation of physical properties of metals at high temperatures
9	Measurement and estimation of physical properties of metals at high temperatures
10	Transport phenomena and metals properties
11	Transport phenomena and metals properties
12	Interfacial phenomena, metals processing and Properties
13	Interfacial phenomena, metals processing and properties

5- Teaching and Learning Methods

- 5.1 Lectures
- 5.2 Tutorial
- 5.3 Class activity
- 5.4 Case study

6- Teaching and Learning Methods of Disables

- Nothing.

7- Student Assessment**a- Student Assessment Methods**

1. Five Assignments to assess knowledge and intellectual skills.
2. Two Quizzes to assess knowledge, intellectual and professional skills.
3. Midterm exam to assess knowledge, intellectual, professional and general skills.
4. Final exam to assess knowledge, intellectual, professional and general skills.

b- Assessment Schedule

NO.	Assessment	Week
1	Assignments	3, 5, 7, 10, 11
2	Quiz	4, 9
3	Midterm exam	8
4	Oral exam	-
5	Final exam	15

c- Weighting of Assessments

Assessment	Weight (%)
Midterm Examination	20
Final Term Examination	67
Oral Examination	0
Semester Work	8
Other Types of Assessment	5
Total	100



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COURSE SPECIFICATIONS (2014-2015)

8- List of References

a- Course Notes: Course notes prepared by instructor.

b- Recommended Books

1. Seshadri Seetharaman, "Fundamentals of metallurgy", Woodhead Publishing and Maney Publishing, 2005.
2. Raymond A. Higgins, "Engineering Metallurgy: part1 Applied Physical Metallurgy", 6th Edition, Ardold Press: A member of the Hodder Headline Group, 1999.

Course Coordinator: Assoc. Prof. Dr. Hamdi Kandil

Head of Department: Prof. Dr. Osama Ezzat Abdelatif



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FACULTY OF ENGINEERING AT SHOUBRA

COURSE SPECIFICATIONS (2014-2015)

Model No.11A

Course Specifications: Physical Metallurgy

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Matrix of Knowledge and Skills of the course

NO	Topics	week	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
1	Descriptions of high-temperature metallurgical processes	1	a1	b1		d3
2	Descriptions of high-temperature metallurgical processes	1	a1	b1		
3	Thermodynamic aspects of metals processing	1	a2		c1	
4	Thermodynamic aspects of metals processing	1		b2		d1
5	Thermodynamic aspects of metals processing	1		b2		d2
6	Phase diagrams, phase transformations, and the prediction of metal properties	1	a3			d3 d1
7	Phase diagrams, phase transformations, and the prediction of metal properties	1		b2	c1	
8	Measurement and estimation of physical properties of metals at high temperatures	1	a4		c2	d2
9	Measurement and estimation of physical properties of metals at high temperatures	1		b2		d1
10	Transport phenomena and metals properties	1	a 4			d1 d2
11	Transport phenomena and metals properties	1	a4		c 2	
12	Interfacial phenomena, metals processing and Properties	1		b 3	c3	d2
13	Interfacial phenomena, metals processing and properties	1		b3	c2	

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COURSE SPECIFICATIONS (2014-2015)

Matrix of Course Aims and ILO's

Course Title: Physical Metallurgy

Course Code: MDP356

Teaching Hours: Lecture: 4 Tutorial: 2 Total: 6

Major or minor element of program: Major

Program on which the course is given: B.Sc. Mechanical Production Engineering

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Academic year / level: 2014-2015 Third Year / Second semester

Date of specifications approval: 2014

Course aims	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
1. Understand basics of thermodynamic aspects of metals processing.	a1, a3, a4		c3	
2. Understand transport phenomena and metals properties.	a1, a3	b1, b3	c1, c3	d1
3. Learn how to measure and estimation of physical properties of metals at high temperatures.	a2	b2	c1, c2	d2, d3

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