

Course Specifications : Engineering Chemistry

University : Benha university

Faculty : Faculty of Engineering

Department industrial engineering department

1- Course Data

Course Code :	Course Title :	Study Year :
EMP105	Engineering Chemistry	preparatory
Specialization :		
Teaching Hours:		
Lecture : 2	Tutorial : 0	Practical : 2

2- Over all aim of Course

For students undertaking this course, the aims are to:

2.1-To acquire the student with the essential knowledge to understand the basic principles, laws and theories of physical chemistry which are necessary for engineering students.

2.2- To understand Theory of Equations and to solve problems on liquids, Thermo chemistry and electrochemistry equations

2.3-To study the properties and structure of matter and their relation to interaction of matter with energy

2.4-To recognize the basic tools necessary to obtain Water treatments and Building materials.

2.5-To describe the concept phase diagrams of the chemical compounds and it is mixture.

2.6-To understand some aspects on chemical industries.

2.7-To provide the students with the necessary practical skills concerning the quantitative and qualitative chemical analysis

3- Intended Learning Outcomes of Course (ILOS)

a- Knowledge and Understanding

By the end of this course the students :

a₁ - Recognize concepts and theories of chemistry and sciences, appropriate to the discipline.

a₂ - Recognize methodologies of solving engineering problems and data collection interpretation.

a₃-Know that ,a good understanding of chemistry is essential in all engineering activities.

b- Intellectual Skills

By the end of this course, the students will be able to:

b₁ - learn to apply mathematics in chemistry in such a way that the equations paint a clear picture of the physical phenomena being studied .

b₂ - Select appropriate solutions for engineering problems based on analytical thinking.

b₃.knowing the physical behavior of solid , liquid ,gas and mixed phase

b₄-knowing where energy goes or comes from and if process actually occurs or not

c- Professional and practical Skills

On completing this course, the students are expected to be able to:

C₁. Determine the concentration of different species in solution

C₂.Identify the unknown samples and use the Lab equipments carefully

C₃- Apply safe systems at work and observe the appropriate steps to manage risk

d- General and practical Skills

by the end of this course, the students will be able to:

d₁-Manage the time effectively

d₂ - use different resources to get the required knowledge and information.

d₃-Collaborat effectively within multidisciplinary team.

d₄-Develop the ethical behaviors between students and staff members as well as among the students themselves.

d₅- write a scientific report .

4- Course Contents

No.	Topics	No of hours	Lecture	Practical
1	Introduction to the properties of materials	2	√	
2	Solutions	4	√	
3	Change in type and chemical balance	2	√	
4	Kinematics of Chemical reactions	4	√	
5	Electrical Chemistry	4	√	
6	Corrosion	2	√	
7	Introduction to chemical thermodynamics	2	√	
8	Material and heat balance in combustion process	2	√	
9	Fuel technology	2	√	
10	Industrial chemistry: Cement-Fertilizer- plastic	2	√	
11	Water Pollution and Water treatment-Air pollution	-	-	
12	Determination of concentration of base using titration methods	4		√
13	Analyzing salts to investigate their acidic radicals	4		√

5-Teaching and learning method

5₁- Lectures

5₂- Practical sessions

5₃- some part of lecture for discussion and problems solving

5₄-writing a report

6- Teaching and Learning Methods of Disables: Non

7-Student Assessment

a-Student Assessment Methods

1	Experimental write up to assess a1,a3 - b1 - c1 - d1,d5
2	Two Mid-term exams to assess the progress of the students along the mid semester
3	Practical exam to assess the practical skills
4	Assignments and solving problems
5	Final exam to assess the ability of understanding, remembering and assessing.

b-Assessment Schedule

No.	Assessment	Week
1	Experimental write up	All
2	Mid-term exams	7,12
3	Practical exam	13
4	Assignments	9,11
5	Final exam	As the final exam schedule

C- Weighting of Assessments

Assessment	Weight
Mid-term Examination	40 %
Final Term Examination	40 %
Assignments	5 %
Practical Examination	10 %
Semester work	5 %
Other types of assessment	0 %
Total	100 %

8- List of text book & References

a-Course note

b- Text books

1-Athkins&Depoula,J,physical chemistry 8th edition

2-Ira Levine, physical Chemistry 5th edition

3-General Chemistry Principle and structures by James Brady &G.Humiston

Course contents-ILOs Matrix

Content	Total hours	Hours / lecture	K &U (a)	.S(b)	P.S(c)	G.S (d)
Introduction to the properties of materials	2	2	a ₁	b ₁ ,b ₂ , b ₃		d ₁ ,d ₂ ,c
Solutions	4	2	a ₁ ,a ₂	b ₁ ,b ₂		d ₁ ,d ₂ ,c
Change in type and chemical balance	2	2	a ₁ ,a ₃	b ₁ ,b ₂		d ₁ ,d ₂ ,c
Kinematics of Chemical reactions	4	2	a ₂	b ₁ ,b ₂ , b ₄		d ₁ ,d ₂ ,c
Electrical Chemistry	4	2	a ₁ ,a ₂ , a ₃	b ₁ , b ₂ , b ₄		d ₁ ,d ₂ ,c
Corrosion	2	2	a ₃	b ₂ ,		d ₁ ,d ₂ ,d ₃
Introduction to chemical thermodynamics	2	2	a ₁ ,a ₂ ,	b ₁ ,b ₂ , b ₄		d ₁ ,d ₂ ,c
Material and heat balance in combustion process	2	2	a ₁ ,a ₂	b ₁ ,b ₂ , b ₄		d ₁ ,d ₂ ,c
Fuel technology	2	2	a ₁ ,a ₂	b ₁ ,b ₂		d ₁ ,d ₂ ,c
Industrial chemistry: Cement- Fertilizer- plastic	2	2	a ₁ , a ₃	b ₁ ,b ₂		d ₁ ,d ₂ ,c
Water Pollution and Water treatment-Air pollution	-	-	-	-		d ₁ ,d ₂ ,c
Determination of concentration of base using titration methods	4	2	a ₁ , a ₂ , a ₃	b ₁ , b ₂	C ₁ , C ₂ , C ₃	d ₁ ,d ₂ ,c
Analyzing salts to investigate their acidic radicals	4	2	a ₁ , a ₂ , a ₃	b ₃	C ₁ , C ₂ , C ₃	d ₁ ,d ₂ ,c

Learning Method / ILOs Matrix

Learning method	a ₁	a ₂	a ₃	b ₁	b ₂	b ₃	b ₄	c ₁	c ₂	c ₃	d ₁	d ₂	d ₃	d ₄
Lecture	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Practical session	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Discussion problem solving	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Writing report	√	√	√	√	√	√	√	√	√	√	√	√	√	√

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