



Course Specification

Uni 115: English Language (1)

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Language department- Faculty of Arts
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Dr. Ghada El-Sadek

B - Basic information

Title:	Code: Uni 115	Year/level: First level
English Language (1)		
Teaching Hours:	Lectures: 2 h/week	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enhance the students' capabilities on English Language in both writing and speaking. The courses focus on using appropriate grammatical structures and verb tenses. They present an integrated programmer of speaking and writing in English for students of Faculty of Science. They also help the student to understand terminology and provide the correct spelling and words most commonly used in scientific writing.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should be able to:

- a1- Know new scientific vocabulary
- a2- Identify English grammar
- a3- Know how to translate from English into Arabic and vice versa as well as to know writing skills.

b - Intellectual skills:



On successful completion of the course, the student should be able to:

- b1- Construct the scientific sentences
- b2- Interpret the scientific paragraph
- b3- Apply on grammatical rule
- b4 - Develop students' proficiency of English and terminology

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1 – Collect the new vocabulary
- c2- Summarize the equivalents, opposites adjectives and nouns of the new words

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Communicate with others
- d2- Work in group

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Reading comprehension part (1)	2	0	0	7.14%
2. Reading comprehension part (2)	2	0	0	7.14%
3. Reading comprehension part (3)	2	0	0	7.14%
4. Grammar part (1)	2	0	0	7.14%
5. Grammar part (2)	2	0	0	7.14%
6. Grammar part (3)	2	0	0	7.14%
7. Mid-term exam	2	0	0	7.14%
8. Grammar part (4)	2	0	0	7.14%
9. Grammar part (5)	2	0	0	7.14%
10. Translation part (1)	2	0	0	7.14%
11. Translation part (2)	2	0	0	7.14%
12. Writing skills part (1)	2	0	0	7.14%
13. Writing skills part (2)	2	0	0	7.14%
14. Revision	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Problem solving	Brain storming
Knowledge & Understanding	a1	Know new scientific vocabulary	X	X	X	0	0
	a2	Identify English grammar	X	X	X	0	0
	a3	Know how to translate from English into Arabic and vice versa	X	X	X	x	0
	a4	Know writing skill	x	X	X	X	x
Intellectual Skills	b1	Construct the scientific sentences	X	X	X	0	0
	b2	Interpret the Scientific paragraph	X	0	X	x	x
	b3	Apply on grammatical rule.	X	0	X	X	x
	b4	Develop student's proficiency of English and terminology.	X	X	X	0	0
Practical and professional skills	c1	Collect the new vocabulary	0	0	0	x	x
	c2	Summarize the equivalents, opposites adjectives and nouns of the new words	X	X	X	x	x
General Skills	d1	Communicate with others	0	0	X	x	0
	d2	Work in group.	0	0	X	x	0

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Mid-Term Exam	a1, a2, b1 to b4, c1 and c2	Seventh week	10 %
Oral exam	a1 to a4, b1 to b4, c1, c2 and d1	Fifteenth week	10 %
Written exam	a1 to a4 and b1 to b4	Sixteenth week	80 %
Total			100 %

6- Course matrix												
Topic	Knowledge and understanding			Intellectual skills				Practical and professional skills			General Skills	
	a1	a2	a3	a4	b1	b2	b3	b4	c1	c2	d1	d2
1. Reading comprehension part (1)	x								x	x	x	
2. Reading comprehension part (2)	x								x			x
3. Reading comprehension part (3)	x					x		x	x			
4. Grammar part (1)		x					x			x	x	
5. Grammar part (2)		x					x	x				x
6. Grammar part (3)		x					x	x				
7. Mid-term exam	x	x			x			x	x	x		
8. Grammar part (4)		x				x					x	
9. Grammar part (5)		x								x		x
10. Translation part (1)			X			x		x			x	
11. Translation part (2)			X							x		x
12. Writing skills part (1)				x	X	x				X		X
13. Writing skills part (2)				x	X			x		X	x	X
14. Revision	x	x		x	X		x	x	x			



7- List of references:

7-1 Course notes

Manual notes handle of University textbook

7-2 Required books

-English Grammar in Use by Raymond Murphy

7-3 Recommended books

- Longman (2003): Active Study Dictionary

- A practical English Grammar by A.J. Thomson and A.V. Martinent

7-4 Periodicals, Web sites, etc.

www.google.com

8- Facilities required for teaching and learning:

- Data show
- Using a black board

Course coordinator:

Dr. Ghada ElSadek

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023



Course Specification

Chm 100: General Chemistry (1)

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Chemistry Department
Department offering the course:	Department of Chemistry
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohamed Heikal Prof. Dr. Maher Elnaggar

B - Basic information

Title: General Chemistry (1)	Code: 100 Chm	Year/level: First level
Teaching Hours:	Lectures: 2	Tutorial: 1
	Practical: 2	Total: 3 h/week
	Course marks:	
	100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to study the atomic structures, gases laws, Chemical bonding, geometrical configuration, and state of matter. Also to enable the differentiate between acidic and basic radicals.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Identify chemical formulae of inorganic and units of some parameters.
- a.2- Describe characteristics of different states of the matter and practical elements including trends within the periodic table and related theories.
- a.3- Define the chemical concepts of inorganic and physical chemistry .
- a.4- Know theories of chemical bonding and molecular orbital diagram for diatomic molecules.
- a.5- State the principles of thermochemistry.

b - Intellectual skills:

On successful completion of the course, the student should be able to.



- b.1- Differentiate between the different states of the matter, elements and compounds based on the recognition and quantification of the properties.
- b.2- Solve chemical problems using computational.
- b.3- Analyze collected chemical data using some data processing skills.
- b.4- Point out different concepts in inorganic and physical chemistry.
- b.5- Analyze chemical data to identify the compositions and chemical structures of inorganic and organic compounds.
- b.6- Determine the properties of different states of matter (gases, liquids and solids).
- b.7- predict the different shapes of different inorganic materials.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Determine the chemical formulae and geometrical shapes of organic and inorganic molecules.
- c2- Apply the knowledge that the student studied to propose the molecular Structures of the molecules.
- c3- Investigate and identify the acidic and basic radicals.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively related to uses of this instruments.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
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1	Introduction to General Chemistry and the Units	2	1	3	17.4%
2	Identify chemical formulae of inorganic	2	1	2	17.4%
3	Characteristics of different states of the matter and elements including trends within the	2	1	2	17.4%
4	Study the chemical bonding	2	1	2	17.4%
5	State the principles of electrochemistry.	2	1	2	17.4%
6	Study the molecular orbital diagram for diatomic molecules.	2	1	2	17.4%
7	Mid Term Exam.	2	1	2	17.4%
8	Molecular structure	2	1	2	17.4%
9	Study the state of matter	2	1	2	17.4%
10	Thermochemistry study	2	1	2	17.4%
11	Stoichiometric study.	2	1	2	17.4%
12	Atomic structure	2	1	2	17.4%
13	Hybridization	2	1	2	17.4%
14	Revision	2	1	2	17.4%
Total hours		28	14	28	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes	Lecture	Presentations & Movies	Discussions & Seminars	Tutorial Practical	Problem solving	Brain storming

Knowledge & Understanding	a1	Identify chemical formulae of inorganic and units of some parameters.	x	0	x	0	0	x
	a2	Describe characteristics of different states of the matter and practical elements including trends within the periodic table and related theories.	x	0	0	0	x	0
	a3	Define the chemical concepts of inorganic and physical chemistry.	x	x	x	0	X	x
	a4	Recognize theories of chemical bonding and molecular orbital diagram for diatomic molecules.	x	x	x	0	X	x
	a5	State the principles of thermochemistry.	x	0	0	0	0	x
Intellectual Skills	b1	Differentiate between the different states of the matter, elements and compounds based on the recognition and quantification of the properties.	x	x	x	0	X	x
	b2	Solve chemical problems using computational.	x	0	x	0	X	x
	b3	Explain the bond lengths, geometries, magnetism, and color of the transition metal complexes depending on understanding of their bonding theories.	x	x	x	0	X	x
Practical and professional	c1	Determine the chemical formulae and geometrical shapes of organic and inorganic molecules.	x	0	x	0	X	x
	c2	Apply the knowledge that the student studied to propose the molecular structures of the molecules.	x	0	x	0	X	x
General Skills	d1	Use computers and internet for information and communication technology effectively related to uses of these instruments.	x	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	x	x	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, and b2	seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c2 and d4	Fifteenth week	10 %
Written exam	a1 to a5, b1, b2 and b3.	Sixteenth week	80 %
Total			100 %

6- Course matrix



Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	d1	d2	d3	d4
1. Introduction to general Chemistry and the Units	x										x		X	x
2. Identify chemical formulae of inorganic		x				x	X			X		x		
3. Characteristics of different states of the matter and elements including trends within the periodic table and related theories.		x						x			x		X	
4. Study the chemical bonding				x		x			x					
5. State the principles of electrochemistry.			x											x
6. Study the molecular orbital diagram for diatomic molecules.				x				x	x		x		X	
7. Mid Term Exam.	x	x	x	x			X							
8. Molecular structure				x		x	X	x	x	X		x		
9. Study the state of matter			x			x								
10. Thermochemistry study					x						x		X	
11. Stoichiometric study.			x			x		x		X		x		
12. Atomic structure			x			x					x			
13. Hybridization			x						x			x		x
14. Revision	x	x	x		x		X	x						

7- List of references:

7-1 Course notes

Lecture notes approved by Chemistry Department.

7-2 Required books

Peter Atkin, Loretta Jones, Leroy Laverman, Chemical Principle, Sixth Edition, W.H. Freeman, 2012.

7-3 Recommended books

- 1- J.D. Lee, Concise Inorganic Chemistry, 5th Edn. Blackwell Science, Australia, 1996.
- 2- N.N. Greenwood, A. Earnshaw, Chemistry of Elements, 2nd Edn, Butterworth Heinemann, USA 1997.

7-4 Periodicals, Web sites, etc

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>



<http://www.docbrown.info/page07/appendixtrans11.htm>

8- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Heikal

Prof. Dr. Maher Elnaggar

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification

Chm 105: General Chemistry (2)

A- Affiliation

Relevant program: Chemistry B.Sc. Program

Department offering the program: Department of Chemistry

Department offering the course: Department of Chemistry

Academic year/level: First level

Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. Wagdy El-Dougdoug
Dr. Shwekar Tawfik



B - Basic information

Title: General Chemistry (2)	Code: 105 Chm	Year/level: First level
Teaching Hours:	Lectures: 2	Tutorial: 1
	Practical: 2	Total: 3 h/week
	Course marks: 100marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand Chemical equilibrium, ionic equilibrium, solution, introduction to qualitative and quantitative analyses. Introduction to organic chemistry, chemical bonding in organic chemistry, hybridization in carbon atom, nomenclature of organic compounds, reactions and physical properties of alkanes, alkenes and alkynes.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1-Identify the general properties of solutions.
- a2-Define concepts as chemical equilibrium and ionic equilibrium.
- a3-Memorize the principle of qualitative and quantitative analysis
- a4-Name of different organic compounds.
- a5-Describe theories of chemical bonding and hybridization in carbon atom
- a6-Identify physical and chemical properties of alkanes, alkenes and alkynes.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Illustrate the features of solution.
- b2- Differentiate between different types of hybridization in carbon atom.
- b3- Predict the names of different alkanes, alkenes and alkynes.
- b4-Distinguish between chemical and physical properties of alkanes, alkenes and alkynes.
- b5- Explain chemical equilibrium and ionic equilibrium.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Apply techniques of qualitative and quantitative analysis.
- c2- Identify the different liquid organic compounds.
- c3- Solve problems to learn the structure of organic compounds.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

d3- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Chemical equilibrium.	2	1	2	17.4%
2. Ionic equilibrium.	2	1	2	17.4%
3. Solution.	2	1	2	17.4%
4. The chemical and physical properties of solution	2	1	2	17.4%
5. Introduction to qualitative and quantitative analysis.	2	1	2	17.4%
6. Introduction to organic chemistry and chemical bonding in organic chemistry.	2	1	2	17.4%
7. Mid-Term Exam	2	1	2	17.4%
8. Hybridization in carbon atom (sp ³ , sp ² , sp)	2	1	2	17.4%
9. Nomenclature of organic compounds	2	1	2	17.4%
10. Physical and chemical properties of alkanes	2	1	2	17.4%
11. Physical and chemical properties of cycloalkanes	2	1	2	17.4%
12. Physical and chemical properties of alkenes	2	1	2	17.4%
13. Physical and chemical properties of alkynes	2	1	2	17.4%
14. Revision	2	1	2	17.4%
Total hours	28	14	28	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Identify the general properties of solutions.	x	0	x	0	0	x
	a2	Define concepts as chemical equilibrium and ionic equilibrium.	x	0	0	0	0	x
	a3	Memorize the principle of qualitative and quantitative analysis	x	X	0	0	x	x
	a4	Name of different organic compounds.	x	X	0	0	x	0
	a5	Describe theories of chemical bonding and hybridization in carbon atom	x	0	0	0	x	x
	a6	Identify physical and chemical properties of alkanes, alkenes and alkynes.	x	0	0	0	0	x
Intellectual Skills	b1	Illustrate the features of solution.	x	X	0	X	0	x
	b2	Differentiate between different types of hybridization in carbon atom.	x	X	x	0	x	x
		Predict the names of different alkanes,	x	0	x	0	x	x

	b3	alkenes and alkynes						
	b4	Distinguish between chemical and physical properties of alkanes, alkenes and alkynes.	x	0	x	0	x	x
	b5	Explain chemical equilibrium and ionic equilibrium.	x	0	0	0	x	x
Practical and professional skills	c1	Apply techniques of qualitative analysis to identify the liquid compounds	x	0	x	0	x	x
	c2	Identify the different liquid organic compounds.	x	0	x	0	0	x
	c3	Solve problems to learn the structure of organic compounds	x	0	x	0	0	x
General Skills	d1	Solve problems on the scientific basis taught in this course.	x	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	0	X	x	x
	d3	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individual's communities.	x	0	x	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, c2, c3 and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b1, b2,b3, c1, and c2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5,b1, b2, b3, b4, b5, c5 and d3	Thirteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, b5.	Fourteenth week	80 %
Total			100 %

6- Course matrix

Topic	Knowledge and understanding						Intellectual skills					Practical and professional skills			General Skills		
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	b5	c1	c2	c3	d1	d2	d3
1. Chemical equilibrium.		x									x				x	x	
2. Ionic equilibrium.		x								x					x		
3. Solution.	x						x								x		
4. Introduction to qualitative analysis.			x									x	x			x	
5. Introduction to organic chemistry.																	x



6. Chemical bonding in organic chemistry.					X													X				
7. Mid-Term Exam	x	x	x	X			x	x	x				x	x								
8. Hybridization in carbon atom (sp ³ , sp ² , sp)					X			x										X			x	x
9. Nomenclature of organic compounds					X				x									X	x			
10. Physical and chemical properties of alkanes							x					x									x	x
11. Physical and chemical properties of cycloalkanes							x					x										
12. Physical and chemical properties of alkenes							x					x										
13. Physical and chemical properties of alkynes							x					x										
14. Revision	x	x	x	X	X				x	x		x										

7- List of references:

7-1 Course notes

Lecture notes approved by the Department of Chemistry.

7-2 Required books

Koltz & Treichel, Chemistry and Chemical Reactivity 6th Ed.

7-3 Recommended books

Martin S. Silberberg *Chemistry: The Molecular Nature of Matter and Change* 6th Ed.

7-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Analytical Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

8- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Prof. Dr. Wagdy El-Dougdoug

Program coordinator:

Dr. Shwekar Tawfik

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-Dougdoug

Date:

2022-2023



Course Specification

180 Ch: Practical Chemistry (1)

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. Mahmoud Mousa
Prof. Gamal Owes

B - Basic information

Title: Qualitative analysis for acidic and basic radicals of inorganic salts	Code: 180 Ch	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 0
	Practical: 3	Total: 1 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the classification of different groups of acidic and basic radicals of inorganic salts. Also, teach students how to identify unknown inorganic salts and how to separate between mixed basic radicals.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and

understanding of:

- a.1- Investigate the qualitative analytical method for identifying different unknown salts.
- a.2- explain different classification of analytical chemistry.
- a.3- Name different inorganic salts (acid and base radicals).

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Interpret the given chemical data to identify the unknown inorganic salts.
- b2- Differentiate between different types of acidic and basic radicals.
- b3- Apply the qualitative analytical procedures to identify acidic and basic radicals of unknown salts .

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- investigate the acidic and basic radicals of unknown inorganic salts.
- c2- identify and distinguish between different mixed basic radicals.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1 Introduction to qualitative analysis and the classification of different groups of acidic and basic radicals.	0	0	3	17.4%
2 Qualitative analysis for gp (I) of acidic radicals.	0	0	3	17.4%
3 Qualitative analysis for gp (II) of acidic radicals.	0	0	3	17.4%
4 Qualitative analysis for gp (III) of acidic radicals.	0	0	3	17.4%
5 Qualitative analysis for gp (I) of basic radical	0	0	3	17.4%
6 Midterm exam	0	0	3	17.4%
7 Introduction for basic radicals	0	0	3	17.4%
8 Qualitative analysis for gp (I) of basic radicals.	0	0	3	17.4%
9 Qualitative analysis for gp (II) of basic radicals.	0	0	3	17.4%
10 Qualitative analysis for gp (III) of basic radicals.	0	0	3	17.4%
11 Qualitative analysis for gp (IV) of basic radicals.	0	0	3	17.4%
12 Qualitative analysis for gp (V) of basic radicals.	0	0	3	17.4%
13 Qualitative analysis for gp (VI) of basic radicals.	0	0	3	17.4%
14 Revision	0	0	3	17.4%

Total hours	0	0	42	100%
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4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Investigate the qualitative analytical method for identifying different unknown salts.	x	0	x	x	0	X
	a2	Explain different classification of analytical chemistry.	x	0	0	x	0	0
	a3	Name different inorganic salts (acid and base radicals).	x	0	x	x	x	X
Intellectual Skills	b1	Interpret the given chemical data to identify the unknown inorganic salts.	x	0	x	x	x	X
	b2	Differentiate between different types of acidic and basic radicals.	x	0	x	x	x	X
	b3	Apply the qualitative analytical procedures to identify acidic and basic radicals of unknown salts.	x	0	x	x	x	X
Practical and professional skills	c1	Investigate the acidic and basic radicals of unknown inorganic salts.	x	0	x	x	x	X
	c2	Identify and distinguish between different mixed basic radicals.	x	0	x	x	x	X
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	x	0	X
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	x	x	X
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	x	x	0	X

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1 and d3	Fifth week	20 %
Midterm exam	a2, a3, b1, b2 and c1	Seventh week	
Oral exam	a1, a2, a3, b2, d1, and d2	Thirteenth	20%
Practical exam	a1, a2, a3, b1, b2, b3, c1, and c2	Fourteenth	60 %
Total			100 %

6- Course matrix

Topic	Knowledge and understanding			Intellectual skills			Practical and professional skills		General Skills		
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
1. Introduction to qualitative analysis and the classification of different groups of acidic and basic radicals.	x	x			x	x	x		x		
2. Qualitative analysis for gp (I) of acidic radicals.			x	x	x		x		x	x	x
3. Qualitative analysis for gp (II) of acidic radicals.			x	x			x				x
4. Qualitative analysis for gp (III) of acidic radicals.			x	x			x				x
5. Qualitative analysis for gp (I) of basic radical			x	x			x				x
6. Midterm exam		x	x	x	x		x				
7. Introduction for basic radicals	x				x	x	x		x	x	
8. Qualitative analysis for gp (I) of basic radicals.			x	x				x	x		x
9. Qualitative analysis for gp (II) of basic radicals.			x	x				x			x
10. Qualitative analysis for gp (III) of basic radicals.			x	x				x			x
11. Qualitative analysis for gp (IV) of basic radicals.			x	x				x			x
12. Qualitative analysis for gp (V) of basic radicals.			x	x				x			x
13. Qualitative analysis for gp (VI) of basic radicals.			x	x				x			x
14. Revision	x	x	x		x	x	x				



7- List of references:

7-1 Course notes

Lecture note approved by Department of Chemistry

7-2 Required books

Zumdahl, S. S. *Chemical Principles*, 4th Ed.; Houghton-Mifflin: New York, 2002, chapter 8.

7-3 Recommended books

1- Wismer, Robert K. *Qualitative Analysis with Ionic Equilibrium*; Macmillan Publishing Company: New York, 1991.

7-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

8- Facilities required for teaching and learning:

- Using a microphone in lectures
- Using of slit overhead projector
- Using a black board
- Group Discussions
- Data show

Course coordinator: Prof. Dr. Mahmoud Mousa
Prof. Gamal Owes

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



181 Ch: Practical Chemistry (2)

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator:	Dr. Hesham El-feky Mrs. Nada Ashraf
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B - Basic information

Title: practical Chemistry (2)	Code: 181 Ch	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 0
	Practical: 3	Total: 1 h/week
	Course marks: 100marks	

C - Professional information

1 – Overall aim of the course:

This course aims to study the different types of neutralization reaction in analytical chemistry (as volumetric analysis). Students also learn the various methods to express the concentration of solution and he can prepare standard solution and its requirements. They also learn the determination of unknown concentration using acid-base titration or/and oxidation – reduction titration. Students also learn the physical properties of the unknown organic liquid such as color, odor and miscibility with water and identify the type of simple liquid organic compounds such as aromatic hydrocarbons and carboxylic acids and others by general, distinction and confirmation experiments. Also, students can state the chemical composition of organic compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Explain the different types of neutralization reaction in analytical chemistry.
- a.2- Describe the different units of concentration and requirement of primary standard solution.
- a.3- Explain the different types of volumetric analysis and standardization the second standard solution
- a.4- To know the different types of indicators in neutralization reaction.
- a.5- Identify physical and chemical properties of aromatic liquid organic compounds.
- a.6- Describe physical and chemical properties of aliphatic liquid organic compounds

b - Intellectual skills:

On successful completion of the course, the student should be able to.



- b1- Analyze collected chemical data using some data processing skills.
- b2- Point out different concepts of neutralization reaction in analytical chemistry.
- b3- Analyze chemical data to determine the concentration of unknown
- b4- Differentiate between the different compounds based on the recognition of the properties.
- b5- Identify the compositions and chemical structures of organic compounds

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Perform standard laboratory procedures in neutralization reaction in analytical chemistry.
- c2- Assess risk in laboratory work taking into consideration the specific hazards associated with the use of chemical materials as well as the safe and proper operation of the organic and inorganic laboratory techniques.
- c3- Report observations and measurements of change of color of indicator in neutralization titration to determine the concentration of unknown.
- c4- Perform standard laboratory procedures in organic chemistry.
- c5- Report observations and results of different physical and chemical properties to identify the organic liquid unknown.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for communication, data handling and word processing.
- d2- Effectively manage tasks, time and resources.
- d.3- Solve problems on the scientific basis taught in this course.
- d.4- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to neutralization reactions, unit of concentration, standard solution, types of indicators and titration curves.	0	0	3	17.4%
2. Standardization the second standard solution. and titration of strong acid with strong base	0	0	3	17.4%

3. Titration of strong acid with weak base and weak acid with strong base and determination the simple unknown concentration	0	0	3	17.4%
4. Titration of mixture (sodium carbonate and sodium hydroxide) with hydrochloric acid and determination the mixture unknown concentration	0	0	3	17.4%
5. Titration of mixture (sodium carbonate and sodium bicarbonate) with hydrochloric acid and determination the mixture unknown concentration	0	0	3	17.4%
6. Titration of mixture (hydrochloric acid and phosphoric acid) with sodium hydroxide and determination the mixture unknown concentration	0	0	3	17.4%
7. Mid-term exam.	0	0	3	17.4%
8. Aromatic hydrocarbons "benzene and toluene".	0	0	3	17.4%
9. Alcohols "methanol, ethanol and glycerol".	0	0	3	17.4%
10. Aldehydes and ketones "formaldehyde, acetaldehyde, benzaldehyde and acetone"	0	0	3	17.4%
11. Carboxylic acids "formic acid, acetic acid".	0	0	3	17.4%
12. Aromatic amines "aniline".	0	0	3	17.4%
13. General scheme for identification of simple liquid organic compounds	0	0	3	17.4%
14. Revision.	0	0	3	17.4%
Total hours	0	0	42	100%

4 - Teaching and Learning methods against ILOS :

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Explain the different types of neutralization reaction in analytical chemistry.	x	x	x	x	0	x
	a2	Describe the different units of concentration and requirement of primary standard solution.	x	x	x	x	x	x
	a3	Explain the different types of volumetric analysis and standardization the second standard solution	x	x	x	x	0	x
	a4	To know the different types of indicators in neutralization	x	x	x	0	0	x

		reaction.							
	a5	Identify physical and chemical properties of aromatic liquid organic compounds.	0	0	x	x	0	x	
	a6	Describe physical and chemical properties of aliphatic liquid organic compounds	0	0	x	x	0	x	
Intellectual Skills	b1	Analyze collected chemical data using some data processing skills.	0	x	x	x	x	x	
	b2	Point out different concepts of neutralization reaction in analytical chemistry.	x	x	x	x	x	x	
	b3	Analyze chemical data to determine the concentration of unknown	0	x	x	x	x	x	
	b4	Differentiate between the different compounds based on the recognition of the properties.	0	0	x	x	x	x	
	b5	Identify the compositions and chemical structures of organic compounds	0	0	x	x	x	x	
Practical and professional skills	c1	Perform standard laboratory procedures in neutralization reaction in analytical chemistry.	0	x	x	x	0	x	
	c2	Assess risk in laboratory work taking into consideration the specific hazards associated with the use of chemical materials as well as the safe and proper operation of the organic and inorganic laboratory techniques.	0	x	x	x	0	x	
	c3	Report observations and measurements of change of color of indicator in neutralization titration to determine the concentration of unknown.	0	0	x	x	x	x	
	c4	Perform standard laboratory procedures in organic chemistry.	0	0	x	x	x	x	
	c5	Report observations and results of different physical and chemical properties to identify the organic liquid unknown.	0	0	x	x	x	x	
General Skills	d1	Use computers and internet for communication, data handling and word processing.	0	x	x	x	0	x	
	d2	Effectively manage tasks, time and resources.	0	0	0	x	0	x	
	d3	Solve problems on the scientific basis taught in this course.	0	0	x	x	x	x	
	d4	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	x	0	x	

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, a5, a6, b2, b3, b5, d1 and d2	Fifth week	10 %
Mid-Term Exam	a1 to a4, b2, and b5	Seventh week	10 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, b4 and d4	Fifteenth week	20 %
Practical hours	c1 to c5	Sixteenth week	60%
Total			100 %

6- Course matrix

Topic	Knowledge and understanding						Intellectual skills					Practical and professional skills					General Skills			
	a 1	a 2	a 3	a 4	a 5	a 6	b 1	b 2	b 3	b 4	b 5	c 1	c 2	c 3	c 4	c 5	d 1	d 2	d 3	d 4
1. Introduction to neutralization reactions, unit of concentration, standard solution, types of indicators and titration curves.	x	x	x	X			x	x	x			x	x	x						x
2. Standardization the second standard solution. and titration of strong acid with strong base	x								x			x		x						x
3. Titration of strong acid with weak base and weak acid with strong base and determination the simple unknown concentration	x								x											
4. Titration of mixture (sodium carbonate and sodium hydroxide) with hydrochloric acid and determination the mixture unknown concentration	x								x											
5. Titration of mixture (sodium carbonate and sodium bicarbonate) with hydrochloric acid and determination the mixture unknown concentration	x								x											
6. Titration of mixture (hydrochloric acid and phosphoric acid) with sodium hydroxide and determination the mixture unknown concentration	x								x											
7. Mid-term exam.	x	x	x	X			x			x										
8. Aromatic hydrocarbons "benzene and toluene".					x				x					x			x		x	
9. Alcohols "methanol, ethanol and glycerol".						x			x						x	x	x			
10. Aldehydes and ketones "formaldehyde, acetaldehyde, benzaldehyde and acetone"									x	x					x	x	x			
11. Carboxylic acids "formic acid, acetic acid".									x	x					x	x	x			
12. Aromatic amines "aniline".									x					x		x	x			
13. General scheme for identification of simple liquid organic compounds							x		x		x	x		x	x	x	X	x		
14. Revision.	x	x	x				x	x	x											

7- List of references:



7-1 Course notes

Lecture notes prepared by the course instructor(s).

7-2 Required books

J.D. Lee, Concise Inorganic Chemistry, 5th Edn. Blackwell Science, Australia, 1996.

7-3 Recommended books

1-F.A. Cotton, G. Wilkinson, C.A.Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th Edn, John Wiley&Sons, Inc., New York, 1999.

2- N.N. Greenwood, A. Earnshaw, Chemistry of Elements, 2nd Edn, Butterworth Heinemann, USA 1997.

7-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

8- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Dr. Hesham El-feky

Mrs. Nada Ashraf

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-Dougdoug

Date:

2022-2023

Course Specification

183 Ch: Applied Inorganic chemistry (1)

A- Affiliation

Relevant program:

Chemistry B.Sc Program

Department offering the program:

Department of Chemistry

Department offering the course:

Department of Chemistry

Academic year/level:

First level



Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator: Dr. Sahar M. Ibrahim

B - Basic information

Title: Applied Inorganic chemistry	Code: 183 Ch	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 2
	Practical: 0	Total: 1 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to learn and study the general properties for inorganic materials and the difference between organic and inorganic compounds. Students study the properties of some inorganic compounds (such as water, sodium hydroxide, metals, etc). Students also study the preparation of inorganic compounds and their application in various industries such as metals sodium hydroxide, ammonia, sulphuric acid, fertilizers and other.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define chemical concepts of inorganic chemistry.
- a.2- Identify the chemical formula of inorganic materials
- a.3- knows the various inorganic compounds that used in different applications.
- a.4- Describe the preparation of inorganic materials which used in different industries.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Compare between the physical and chemical properties of inorganic materials.
- b2- Modify the method for extraction metal from its ores.
- b3- Report the different inorganic compounds and their applications.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Collect the knowledge about various inorganic material in different applications
- c2- Prepare the different inorganic materials

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively

d2- Effectively manage tasks, time, and resources.

d3- Cooperate and communicate with others members of teamwork positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to inorganic chemistry	0	2	0	17.4%
2. Classify inorganic compounds and their applications	0	2	0	17.4%
3. Extractive of copper metal from its ores	0	2	0	17.4%
4. Refine copper metal and its applications	0	2	0	17.4%
5. Manufacture of Sodium Hydroxide and chlorine using chlor-alkali and their applications	0	2	0	17.4%
6. Manufacture of Sodium Hydroxide and chlorine using diaphragm and membrane cells	0	2	0	17.4%
7. Mid-term exam	0	2	0	17.4%
8. Raw Materials, nitrogen fixation and application of ammonia	0	2	0	17.4%
9. Manufacture of ammonia using Haber and Carl Bosch process	0	2	0	17.4%
10. Raw Materials, production of sulphur trioxide and application of sulphuric acid	0	2	0	17.4%
11. Manufacture of sulphuric acid using lead-chamber process	0	2	0	17.4%
12. Manufacture of sulphuric acid using contact process	0	2	0	17.4%
13. Manufacture of nitrogen, potassium, phosphate, and NPK Fertilizers	0	2	0	17.4%
14. Reversion	0	2	0	17.4%
Total hours	0	28	0	100%

4 - Teaching and Learning methods against course ILOs:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Practical	Problem solving	Brain storming	
Knowledge & Understanding	a1	Define chemical concepts of inorganic chemistry.	x	0	x	0	0	X
	a2	Identify the chemical formula of inorganic materials	x	x	x	0	0	0
	a3	Know the various inorganic compounds which used in different applications.	x	x	x	0	0	X
	a4	Describe the preparation of inorganic materials which used in different industries	x	x	x	0	X	X
Intellectual Skills	b1	Compare between the physical and chemical properties of inorganic materials.	x	x	0	0	X	X

	b2	Modify the method for extraction metal from its ores	x	0	x	0	X	X
	b3	Report the different inorganic compounds and their applications.	x	x	x	0	X	X
Practical and professional skills	c1	Collect the knowledge about various inorganic material in different applications	x	0	x	0	X	X
	c2	Prepare the different inorganic materials	x	0	x	0	X	X
General Skills	d1	Use computers and internet for information and communication technology effectively	x	0	0	x	0	X
	d2	Effectively manage tasks, time, and resources.	x	0	x	x	X	X
	d3	Cooperate and communicate with others members of teamwork positively.	x	0	x	0	0	X

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time	Grading
Semester Work	a1, a2, a3, b2, c1, d1, d2 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2,c1, and c2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, and b2	Fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2 and b3	Sixteenth	80 %
Total			100 %

6- Course matrix

Topic	Knowledge and understanding				Intellectual skills			Practical and professional skills		General Skills		
	a1	a2	a3	a4	b1	b2	b3	c1	c2	d1	d2	d3
1. Introduction to inorganic chemistry	x		x		x	x		x		x		x
2. Classify inorganic compounds and their applications		x	x					x			X	
3. Extractive of copper metal from its ores				x					x			
4. Refine copper metal and its applications				x				x	x	x		x
5. Manufacture of Sodium Hydroxide and chlorine using chlor-alkali and their applications				x				x	x			
6. Manufacture of Sodium Hydroxide and chlorine using diaphragm and membrane cells				x					x	x		x
7. Mid-term exam	x	x	x	x		x		x	x			
8. Raw Materials, nitrogen fixation and application of ammonia				x				x			X	



9. Manufacture of ammonia using Haber and Carl Bosch process				x					x			
10. Raw Materials, production of sulphur trioxide and application of sulphuric acid				x				x		x		x
11. Manufacture of sulphuric acid using lead-chamber process				x					x		X	
12. Manufacture of sulphuric acid using contact process				x				x	x			
13. Manufacture of nitrogen, potassium, phosphate, and NPK Fertilizers				x				x	x	x	X	
14. Revision	x	x	x		x	x	x	x	x			

7- List of references:

7-1 Course notes

Lecture notes prepared by the course instructor(s).

7-2 Required books

J.D. Lee, Concise Inorganic Chemistry, 5th Edn. Blackwell Science, Australia, 1996.

7-3 Recommended books

1-F.A. Cotton, G. Wilkinson, C.A.Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th Edn, John Wiley&Sons, Inc., New York, 1999.

2- N.N. Greenwood, A. Earnshaw, Chemistry of Elements, 2nd Edn, Butterworth Heinemann, USA 1997.

7-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

8- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Dr. Sahar M. Ibrahim

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

185 Ch: Applied organic chemistry (2)

A- Affiliation

Relevant program:	Applied Chemistry B.Sc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Enas Abdelaleem

B - Basic information

Title: Applied Inorganic chemistry	Code: 185 Ch	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 2
	Practical: 0	Total: 1 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to learn the importance of organic chemistry in our life. Students study different types of organic chemistry application such as surfactants, polymers, cosmetics and drugs. Students also study some carbohydrates, vitamins and some compounds used in medicine.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Know some important organic compounds used in cosmetics and drug industry.
- a.2- Identify the chemical formula of carbohydrates and vitamins.
- a.3- Discover the polymer structure and its applications.
- a.4- Describe the preparation of some compounds used in drug industries.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Differentiate between different types of organic compounds which have an industrial application..
- b2- Distinguish between the different types of industrial products and its uses..
- b3- Point out different organic compounds and their applications.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Investigate the organic compounds in different applications.
- c2- Identify the methods to prepare the different types of industrial products
- c3- Improve the research techniques by using different ways.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively
- d2- Solve problems on the scientific basis taught in this course.
- d3- Cooperate and communicate with other members of teamwork positively.
- d4- Search for new information about the new techniques.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to the application of organic chemistry	0	2	0	17.4%
2. Classify organic compounds and their applications	0	2	0	17.4%
3. Cosmetics preparation and uses	0	2	0	17.4%
4. Types of soap and detergents	0	2	0	17.4%
5. Chemistry in foods and its application	0	2	0	17.4%
6. Types and preparation of some insecticide and repellents.	0	2	0	17.4%
7. Mid-term exam	0	2	0	17.4%
8. Types and uses of Carbohydrates	0	2	0	17.4%
9. Structure and difference between carbohydrates	0	2	0	17.4%
10. Vitamins and its importance.	0	2	0	17.4%
11. Drugs: Its uses and some simple synthetic compounds.	0	2	0	17.4%
12. Introduction to polymer science.	0	2	0	17.4%
13. Polymers types and synthesis	0	2	0	17.4%
14. Some application on polymer compounds	0	2	0	17.4%
Total hours	0	28	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Recognize some important organic compounds used in cosmetics and drug industry.	x	0	x	0	0	X
	a2	Identify the chemical formula of carbohydrates and vitamins.	x	x	0	0	0	0
	a3	Discover the polymer structure and its applications.	x	x	x	0	0	X
	a4	Describe the preparation of some compounds used in drug industries.	x	x	0	0	X	X
Intellectual Skills	b1	Differentiate between different types of organic compounds which have an industrial application.	x	x	x	0	0	X
	b2	Distinguish between the different types of industrial products and its uses.	x	0	x	0	X	X
	b3	Point out different organic compounds and their applications.	x	x	x	0	X	X
Practical and professional skills	c1	Investigate the organic compounds in different applications.	x	0	x	0	0	X
	c2	Identify the methods to prepare the different types of industrial products	x	0	x	0	X	X
	c3	Improve the research techniques by using different ways.	x	x	0	0	X	X
General Skills	d1	Use computers and internet for information and communication technology effectively	x	0	0	x	0	X
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	x	X	X
	d3	Cooperate and communicate with other members of teamwork positively.	x	0	x	0	0	X
	d4	Search for new information about the new techniques.	x	0	0	x	0	X

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, c1, d1 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2,c2, and c3	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2 and d4	Fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2 and b3	Sixteenth week	80 %
Total			100 %

6- Course matrix

Topic	Knowledge and understanding				Intellectual skills			Practical and professional skills			General Skills			
	a 1	a 2	a 3	a 4	b 1	b 2	b 3	c1	c2	c3	d 1	d 2	d 3	d 4
1. Introduction to the application of organic chemistry	x				x			x						
2. Classify organic compounds and their applications					x		x	x			x	x	x	
3. Cosmetics preparation and uses	x						x		x	x				
4. Types of soap and detergents									x			x		
5. Chemistry in foods and its application						x		x	x	x	x		x	x
6. Types and preparation of some insecticide and repellents.						x						x		
7. Mid-term exam	x	x	X	x					x	x				
8. Types and uses of Carbohydrates		x							x				x	x
9. Structure and difference between carbohydrates		x									x			
10. Vitamins and its importance.		x							x				x	
11. Drugs: Its uses and some simple synthetic compounds.	x			x					x				x	x
12. Introduction to polymer science.			x								x	x		
13. Polymers types and synthesis			x									x		x
14. Some application on polymer compounds			x					x	x	x			x	



7- List of references:

7-1 Course notes

Lecture notes prepared by the course instructor(s).

7-2 Required books

Organic Chemistry, 4 th Edition by Robert Wlorrison and Robert Boyd, Allyn and Bacon, Ir.c., Boston, London , Sydney, Toronto, 1983

7-3 Recommended books

Organic Chemistry, 6 th Edition by I. L. Finar, Longmann Group Limited, volume I and II 1975.

7-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Organic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

8- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:	Dr. Enas Abdelaleem
Program coordinator:	Prof. Dr. Safinaz M. Reda
Head of the Department:	Prof. Dr. Wagdy El-DougDoug
Date:	2022-2023



Course Specification

Mat 101: Algebra and Geometry

A- Affiliation

Relevant program:	Chemistry B.Sc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Mathematics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Salah Gomah

B - Basic information

Title:	Code:	Year/level:
Algebra and Geometry	Mat 101	First level / First Semester
Teaching Hours:	Lectures: 1 h/week	Tutorial: 2 h/week
	Practical:0	Total: 2 h/week

C - Professional information

1 – Course Learning Objectives:

At the end of this course, the students must be able to:

Postulate concepts and choose appropriate solutions to solve problems on scientific basis, apply mathematical knowledge and skills to the solution of real life problems.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

At the end of this course, the students must be able to:

- a 1- Know Mathematical knowledge in solving different problems.
- a 2-Determine knowledge of the principles of mathematical modeling and applications.
- a 3-State and explain the meaning of complicated statements using mathematical notations and language.

b - Intellectual skills:

At the end of this course, the students must be able to:

- b1- Apply the knowledge of the mathematical processes for modeling of real-world problems.
- b2--Develop appropriate knowledge and awareness of the importance and applications of mathematical assumption.
- b3-Deal wide background knowledge related to the different branches of Mathematics.

c - Practical and professional skills:



At the end of this course, the students must be able to:

- c1- Analyze the concepts and methods of mathematics to the solution of the real problems in professional practice.
- c2- Examine competence in the use of mathematical methods in problem solving.
- c3- Investigate confidence in their abilities to use mathematics.

d - General skills:

At the end of this course, the students must be able to:

- d1- Think independently and solve problems on scientific basis.
- d2- Work in a team effectively; manage time, collaborate and communicate with others positively.
- d3- Deal with property rights legally and ethically.

3 – Contents				
Topic	Lecture hours	Tutorial hours	Practical hours	% of total
Mathematical induction	1	2	-	17.4%
partial fractions	1	2	-	17.4%
Polynomials	1	2	-	17.4%
Determinants	1	2		17.4%
Matrices	1	2	-	17.4%
Linear systems	1	2	-	17.4%
Mid Term Exam and Series	1	2	-	17.4%
Taylor series	1	2		17.4%
Limits	1	2		17.4%
Continuity	1	2	-	17.4%
Differentiation of Real valued functions	1	2	-	17.4%
Applications on Differentiation	1	2	-	17.4%
Integration	1	2	-	17.4%
Finite integral	1	2	-	17.4%
Total hours	14	28	-	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Tutorial	Problem solving	Brain storming
Knowledge & Understanding	a1-	Know Mathematical knowledge in solving different problems.	✓			✓	
	a2-	Determine knowledge of the principles of mathematical modeling and applications.	✓			✓	
	a3-	State and explain the meaning of complicated statements using mathematical notations and language.	✓			✓	
	a4-	Deal wide background knowledge related to the different branches of Mathematics.	✓			✓	
Intellectual Skills	b1	Apply the knowledge of the mathematical processes for modeling of real-world problems.		✓			✓
	b2	Develop appropriate knowledge and awareness of the importance and applications of mathematical assumption.		✓			✓
Practical and professional skills	c1-	Analyze the concepts and methods of mathematics to the solution of the real problems in professional practice.	✓			✓	
	c2-	Examine competence in the use of mathematical methods in problem solving.	✓		✓	✓	
	c3-	Investigate confidence in their abilities to use mathematics.	✓			✓	
General Skills	d1-	Think independently and solve problems on scientific basis.		✓	✓	✓	
	d2-	Work in a team effectively; manage time, collaborate and communicate with others positively.		✓	✓		
	d3-	Deal with property rights legally and ethically.		✓	✓		

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1, a2	Week 7	10 %
Oral exam	a1, a2, c1, c2	Week 15	10 %
Practical exams			
Written exam	a1, a2, c1, c2, d1	Start of the sixteenth week	80 %
Total			100 %

6- Course Matrix

Topic	Knowledge and understanding			Intellectual skills			Practical and professional skills			General Skills		
	a1	a2	a3	b1	b2	b3	c1	c2	c3	d1	d2	d3
Some prequist matrial	x			x				x		x		x
Completeness and extension of linear operators		x	x	x		x		x		x		x
The Closed-Graaph Theorem, and the principle of uniform Boundedness.	x					x						x
Banch space			x							x		
Hilbert's Space		x			X			x				
Zorn's Lemma and the Hahn Banch Theorem	x						x					x
Linear functional and conjugate spaces		x		x	X					x		
Some types of convergence for a sequence of bounded linear operators (T_n) between normed spaces	x		x	x					x			x
Topological Vector Spaces		x		x		x	x		x		X	
The Krein- Milman Theorem	x		x	x							X	
The Spectrum and Resolvent		x			X			x		x		
The Gelfand Mazur Theorem	x		x		X	x	x		x		X	x
The Spectral-Radius Formula	x	x				x		x		x		
Revision	x			x	X				x		X	



7- List of references:

7-1 Course notes

-Notes approved by Math. Department.

7-2 Required books.

- Virgil Snyder, Elementary textbook on the calculus. New York, (1912).

7-3 Recommended books.

- WWL Chen, Notes on first-year calculus, (web edition, 2008).

7-4 Periodicals, Web sites, etc.

https://cims.nyu.edu/~kiry1/Calculus/Section_5.3--Evaluating_Definite_Integrals/RSimpson-Lecture24.pdf

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.368.2271&rep=rep1&type=pdf>

http://www.maths.manchester.ac.uk/~bespalov/teaching/2E1_LA_notes_1.pdf

<https://people.richland.edu/james/lecture/m116/matrices/>

8- Facilities required for teaching and learning:

Black board and white board

Course coordinator: Dr. Salah Gomah

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

Mat 102: Statistics

A- Affiliation

Relevant program:	Chemistry B.Sc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Mathematics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Ahmed Abdel Khaleh

B - Basic information

Title:	Code:	Year/level:
Statistics	Mat 102	First level / Second Semester
Teaching Hours:	Lectures: 1 h/week	Tutorial: 2 h/week
	Practical: —	Total: 2 h/week

C - Professional information

1 – Course Learning Objectives:

At the end of this course, the students must be able to:

Postulate concepts and choose appropriate solutions to solve problems on scientific basis, apply mathematical knowledge and skills to the solution of real life problems, complementing to course 100 M.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

At the end of this course, the students must be able to:

- a 1- Know Mathematical knowledge in solving different problems.
- a 2- Determine knowledge of the principles of mathematical modeling and applications.
- a 3- State and explain the meaning of complicated statements using mathematical notations and language.

b - Intellectual skills:

At the end of this course, the students must be able to:

- b1- Apply the knowledge of the mathematical processes for modeling of real-world problems.
- b2- Develop appropriate knowledge and awareness of the importance and applications of mathematical assumption.
- b3- Deal wide background knowledge related to the different branches of Mathematics.

c - Practical and professional skills:



At the end of this course, the students must be able to:

c1- Analyze the concepts and methods of mathematics to the solution of the real problems in professional practice.

c2- Examine competence in the use of mathematical methods in problem solving.

c3- Deal wide background knowledge related to the different branches of Mathematics.

d - General skills:

At the end of this course, the students must be able to:

d1- Think independently and solve problems on scientific basis.

d2- Work in a team effectively; manage time, collaborate and communicate with others positively.

d3- Deal with property rights legally and ethically.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
Integration	1	2	-	17.4%
Finite Integration	1	2	-	17.4%
Integration Methods (1)	1	2	-	17.4%
Integration Methods (2)	1	2	-	17.4%
Integration Methods (3)	1	2	-	17.4%
Applications of Finite Integration.	1	2	-	17.4%
Mid-Term Exam, Introduction in Plan geometry	1	2	-	17.4%
Straight Line	1	2	-	17.4%
Circle	1	2	-	17.4%
Conic sections (1)	1	2	-	17.4%
Conic sections (2)	1	2	-	17.4%
Space geometry	1	2	-	17.4%
Geometric transformations	1	2	-	17.4%
Surfaces	1	2	-	17.4%
Total hours	14	28	-	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Tutorial	Problem solving	Brain storming
Knowledge & Understanding	a1-	Know Mathematical knowledge in solving different problems.	✓			✓	
	a2-	Determine knowledge of the principles of mathematical modeling and applications.	✓			✓	
	a3-	State and explain the meaning of complicated statements using mathematical notations and language.	✓			✓	
Intellectual Skills	b1	Apply the knowledge of the mathematical processes for modeling of real-world problems.		✓	✓		✓
	b2	Develop appropriate knowledge and awareness of the importance and applications of mathematical assumption.		✓			✓
	b3	Deal wide background knowledge related .to the different branches of Mathematics					
Practical and professional skills	c1-	Analyze the concepts and methods of mathematics to the solution of the real problems in professional practice.	✓			✓	
	c2-	Examine competence in the use of mathematical methods in problem solving.	✓		✓	✓	
	C3	Deal wide background knowledge related to the different branches of Mathematics.					
General Skills	d1-	Think independently and solve problems on scientific basis.		✓	✓	✓	
	d2-	Work in a team effectively; manage time, collaborate and communicate with others positively.		✓	✓		
	d3-	Deal with property rights legally and ethically.		✓	✓		

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1, a2	Week 7	10 %

Oral exam	a1, a4, c1, c2	Week 15	10 %
Practical exams			
Written exam	a1, a2, c1, c2, d1	Start of the sixteenth week	80 %
Total			100 %

6- Course Matrix												
Topic	Knowledge and understanding			Intellectual skills			Practical and professional skills			General Skills		
	a1	a2	a3	b1	b2	b3	c1	c2	c3	d1	d2	d3
Integration	X			x				x		x		x
Finite Integration		x	X	x		x		x		x		x
Integration Methods (1)	X					x						x
Integration Methods (2)			X							x		
Integration Methods (3)		x			x			x				
Applications of Finite Integration.	X						x					x
Mid-Term Exam, Introduction in Plan geometry		x		x	x					x		
Straight Line	X		X	x					x			x
Circle		x		x		x	x		x		x	
Conic sections (1)	X		X	x							x	
Conic sections (2)		x			x			x		x		
Space geometry	X		X		x	x	x		x		x	x
Geometric transformations	X	x				x		x		x		
Surfaces	X			x	x				x		x	



7- List of references:

7-1 Course notes

-Notes approved by Math. Department.

7-2 Required books.

- Virgil Snyder, Elementary textbook on the calculus. New York, (1912).

7-3 Recommended books.

- WWL Chen, Notes on first-year calculus, (web edition, 2008).

-George R., The Elements of Plane Analytic Geometry, BiblioBazaar (2008).

7-4 Periodicals, Web sites, etc.

https://en.wikipedia.org/wiki/Conic_section

<http://www.stewartcalculus.com/data/ESSENTIAL%20CALCULUS%20Early%20Transcendentals/upfiles/ess-reviewofconics.pdf>

<http://www.intmath.com/methods-integration/methods-integration-intro.php>

<http://www.intmath.com/methods-integration/7-integration-by-parts.php>

[https://en.wikipedia.org/wiki/Line_\(geometry\)](https://en.wikipedia.org/wiki/Line_(geometry))

<http://www.mathsisfun.com/geometry/circle.html>

8- Facilities required for teaching and learning:

Black board and white board

Course coordinator: Dr. Ahmed Abdel Khaleh

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

Com 101: Introduction to Computer Science

A- Affiliation

Relevant program:	Chemistry B.Sc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Mathematics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Mosab Hassan Dr. Gamal Mousa

B - Basic information

Title:	Code:	Year/level:
Introduction to Computer Science	Com 101	First level / First Semester
	Lectures: 1 h/week	Tutorial: —
	Practical: 2 h/week	Total C. Hrs.: 2 h/week

C - Professional information

1 – Course Learning Objectives:

At the end of this course, the students must be able to:
Reveal wide background knowledge related to different branches of computer science. Use such knowledge and understanding in the modeling and design of computer-based systems in a way that demonstrate comprehension of tradeoff involved in design choices.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

At the end of this course, the students must be able to:

- a 1- Identify how the hardware and software are integrated to create computer systems and distinguish between selected forms of computer hardware architecture and operating system technology.
- a 2- Explain the definitions and the relation between the distinct numerical systems.
- a 3- Memories the programming concepts and the types of variables.
- a 4- Write a program using a selected language for solving a mathematical problem.

b - Intellectual skills:

At the end of this course, the students must be able to:

- b1-- Apply the knowledge and understanding of the Computer-Science processes for modeling of real-world problems.
- b2-- Construct and solve abstract and mathematical models of computer and communications systems.



c - Practical and professional skills:

At the end of this course, the students must be able to:

c1 – Prepare a program using a programming language for solving a real problem in professional practice.

c2- Demonstrate competence in the use of programming in problem solving.

d - General skills:

At the end of this course, the students must be able to:

d1- Think independently and solve problems on scientific basis.

d2- Work in a team effectively; manage time, collaborate and communicate with others positively.

d3- Deal with property rights legally and ethically.

3 – Contents				
Topic	Lecture hours	Tutorial hours	Practical hours	% of total
Fundamentals of programming and computer languages (1)	1	-	2	17.4%
Fundamentals of programming and computer languages (2)	1	-	2	17.4%
Fundamentals of programming and computer languages (3)	1	-	2	17.4%
Algorithm and Flowcharts (1)	1	-	2	17.4%
Algorithm and Flowcharts (2)	1	-	2	17.4%
Elements of Language under case	1	-	2	17.4%
Revision and Mid-Term Exam	1	-	2	17.4%
Basic Instructions in Language under case (1)	1	-	2	17.4%
Basic Instructions in Language under case (2)	1	-	2	17.4%
Control Instructions (1)	1	-	2	17.4%
Control Instructions (2)	1	-	2	17.4%
Functions and Some applications	1	-	2	17.4%
Subprograms	1	-	2	17.4%
Applications	1	-	2	17.4%
Total hours	14	-	28	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1-	Identify how the hardware and software are integrated to create computer systems and distinguish between selected forms of computer hardware architecture and operating system technology.	✓				✓	
	a2-	Explain the definitions and the relation between the distinct numerical systems.		✓			✓	
	a3-	Memories the programming concepts and the types of variables.	✓				✓	
	a4-	Write a program using a selected language for solving a mathematical problem	✓				✓	
Intellectual Skills	b1	Apply the knowledge and understanding of the Computer-Science processes for modeling of real-world problems.				✓		✓
	b2	Construct and solve abstract and mathematical models of computer and communications systems.				✓		✓
Practical and professional	c1-	Prepare a program using a programming language for solving a real problems in professional practice.	✓				✓	
	c2-	Demonstrate competence in the use of programming in problem solving.	✓				✓	
General Skills	d1-	Think independently and solve problems on scientific basis..		✓	✓			
	d2-	Work in a team effectively; manage time, collaborate and communicate with others positively.		✓	✓			
	d3-	Deal with property rights legally and ethically.		✓	✓			

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1, a2, b1	Week 7	14%
Oral exam	a1, a2, a3	Week 15	14 %
Practical exams	c1, c2	Week 15	14 %



Written exam	a1,a2,a3,a4, b1, b2	Start of the sixteenth week	48 %
Total			100 %

6 – Course Matrix											
Topic	Knowledge & Understanding				Intellectual Skills		Practical and professional skills		General Skills		
	a1	a2	a3	a4	b1	b2	c1	c2	d1	d2	d3
Fundamentals of programming and computer languages (1)	x				x		x		x	x	x
Fundamentals of programming and computer languages (2)	x	x			x			x	x		
Fundamentals of programming and computer languages (3)		x	x	x	x			x	x		
Algorithm and Flowcharts (1)			x	x		x			x		
Algorithm and Flowcharts (2)			x	x		x	x		x		
Elements of Language under case		x				x		x	x		
Revision and Mid-Term Exam	x	x	x	x	x	x	x	x	x		x
Basic Instructions in Language under case (1)		x	x			x	x			x	
Basic Instructions in Language under case (2)			x	x		x	x			x	
Control Instructions (1)		x		x		x	x			x	
Control Instructions (2)		x		x		x	x			x	
Functions and Some applications		x		x		x	x			x	
Subprograms				x		x	x		x	x	x
Applications		x	x	x		x	x		x	x	x



7- List of references:

7-1 Course notes

-Notes approved by Math. Department

7-2 Required books.

J. Glenn Brookshear, D. Smith and D. Brylow, *Computer Science: An Overview, 11th Edition*, Marquette University Faculty, 2012.

7-3 Recommended books.

Paul Deitel, Harvey M. Deitel, *C++ How to Program (7th Edition)*, 2010.

7-4 Periodicals, Web sites, etc.

https://en.wikiversity.org/wiki/Introduction_to_Computer_Science

8- Facilities required for teaching and learning:

Black board, white board and data show.

Course coordinator:	Dr. Mosab Hassan Dr. Gamal Mousa
Program coordinator:	Prof. Dr. Safinaz M. Reda
Head of the Department:	Prof. Dr. Wagdy El-DougDoug
Date:	2022-2023

Course Specification

Com 102: Introduction to Computer Programming



A- Affiliation

Relevant program:	Chemistry B.Sc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Mathematics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Reda Gamal Dr. Iman Ibrahim

B - Basic information

Title:	Code:	Year/level:
Introduction to Computer Programming	Com 102	First level /Second Semester
	Lectures: 1 h/week	Tutorial: –
	Practical: 2 h/week	Total: 2 h/week

C - Professional information

1 – Course Learning Objectives:

At the end of this course, the students must be able to:
This subject is aimed at students with little programming experience. It aims to provide students with an understanding of the role computation can play in solving problems. It also aims to help students, regardless of their major, to feel justifiably confident of their ability to write small programs that allow them to accomplish useful goals. The class will use a programming language, complementing to course 30 U.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

At the end of this course, the students must be able to:

- a1- Outline the computer terms from the textbook, lecture, and readings
- a2- Explain the fundamental programming concepts such as variables , functions , loops and subroutines in a programming language
- a3 - Identify application algorithm and use programming language
- a 4 –Write programs of real world applications

b - Intellectual skills:

At the end of this course, the students must be able to:

- b1- Construct programming in a selected programming language.
- b2- Develop code in programming language and adapt other people's code.
- b3- Organize a detailed algorithmic solution to a well defined problem.
- b4- Design program to solve application problem.



c - Practical and professional skills:

At the end of this course, the students must be able to:

c1 – Show the language syntax in programming problems.

c2- Recommended programming language to develop more reliable programs.

d - General skills:

At the end of this course, the students must be able to:

d1- Work effectively both in a team and independently.

d2- Learning information and communication technology effectively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
Basics of programming.	1	-	2	17.4%
Algorithms and flowcharts.	1	-	2	17.4%
Basics of the programming language	1	-	2	17.4%
Types of variables	1	-	2	17.4%
Control statements (1)	1	-	2	17.4%
Control statements (2)	1	-	2	17.4%
Revision and mid-term exam	1	-	2	17.4%
Loop statements (1)	1	-	2	17.4%
Loop statements (2)	1	-	2	17.4%
Array (1)	1	-	2	17.4%
Array (1)	1	-	2	17.4%
Functions (1)	1	-	2	17.4%
Functions (2)	1	-	2	17.4%
Some Applications.	1	-	2	17.4%
Total hours	14	-	28	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes	Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming

Knowledge & Understanding	a1-	Outline the computer terms from the textbook, lecture, and readings	✓					✓
	a2-	Explain the fundamental programming concepts such as variables , functions , loops and subroutines in a programming language	✓					✓
	a3-	Identify application algorithm and use programming language	✓				✓	
	a4-	Write programs of real world applications	✓			✓		
Intellectual Skills	b1	Construct programming in a selected programming language.	✓			✓		✓
	b2	Develop code in programming language and adapt other people's code.	✓			✓		✓
	b3	Organize a detailed algorithmic solution to a well defined problem.	✓			✓		✓
	b4	Design program to solve application problem.	✓			✓		✓
Practical and professional skills	c1-	Show the language syntax in programming problems.				✓		✓
	c2-	Recommended programming language to develop more reliable programs.				✓		✓
General Skills	d1-	Work effectively both in a team and independently..	✓			✓		✓
	d2-	Learning information and communication technology effectively	✓			✓		✓

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1, b1, b2	Week 7	14%
Oral exam	a1, a2, a3	Week 15	14 %
Practical exams	c1, c2,c3	Week 15	14 %
Written exam	a1,a2,a3,a4, b1, b2,b3,b4	Start of the sixteenth week	48 %
Total			100 %

6 – Course Matrix

Topic	Knowledge & Understanding				Intellectual Skills				Practical and professional skills		General Skills	
	a1	a2	a3	a4	b1	b2	b3	b4	c1	c2	d1	d2
Basics of programming.	x	x			x				X			x
Algorithms and flowcharts.		x			x		x	x	X	x	X	x
Basics of the programming		x	x						X			x

language												
Types of variables		x			x	x			X			x
Control statements (1)		x		x	x		x	x	X			x
Control statements (2)			x	x		x	x	x		x	X	
Revision and mid-term exam	x	x	x	x	x	x	x	x		x		x
Loop statements (1)			x	x	x		x	x	X			x
Loop statements (2)			x	x		x		x		x	X	x
Array (1)			x	x	x		x	x	X			x
Array (1)			x	x		x		x		x	X	x
Functions (1)			x		x		x		X			x
Functions (2)				x		x	x	x		x	X	x
Some Applications.		x	x	x	x	x	x	x		x	X	x

7- List of references:

7-1 Course notes

-Notes approved by Math. Department.

7-2 Required books.

B. H. Flowers, *An Introduction to Numerical Methods in C++*, Oxford, 2000.

7-3 Recommended books.

Paul Deitel, Harvey M. Deitel, *C++ How to Program (7th Edition)*, 2010.

7-4 Periodicals, Web sites, etc.

<http://www.cplusplus.com/doc/tutorial/>



8- Facilities required for teaching and learning:

Black board, white board and data show.

Course coordinator: Prof. Dr. Reda Gamal
Dr. Iman Ibrahim
Program coordinator: Prof. Dr. Safinaz M. Reda
Head of the Department: Prof. Dr. Wagdy El-Dougdoug
Date: 2022-2023

Course Specification **Phy 101: Heat and Properties of Matter**

A- Affiliation

Relevant program: Chemistry B.Sc Program
Department offering the program: Department of Chemistry
Department offering the course: Department of Physics
Academic year/level: First level
Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number,



419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Dr. Salah Hamza
Prof. Dr. Mahmoud H. Makled

B - Basic information

Title: Heat and Properties of Matter

Code: Phy 101

Year/level: First level

Teaching Hours:

Lectures: 2

Tutorial: 1

Practical:2

Total: 3 h/week

C - Professional information

1 – Course Learning Objectives:

The objective of this course enable the student to collect and recognize a lot of knowledge about the main topics of the Properties of Matter and Heat, such as the elasticity and plasticity of material, the different types of stresses and strains , moment of inertia , simple harmonic motion in addition to the different types of wave equation and interference of waves and some basics of fluid dynamics. Study Unary phase digrame of matter, types of thermometers and temprature scales, heat conduction and radiation, methods of specific heat measurments and Gas laws and thermodynamics . This will supported by some applications in each field .

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should be able to:

- a.1- Identify the concept of matter, Heate , Simple harmonic motion , fluid dynamics , types of heat counductions and thermodynamics.
- a.2- Describe the moment of inertia of rigid body and phase digram.
- a.3- Describe the different types of wave motion such as simple pindulumn,oscillating spring and ,wave equation and interference of waves.
- a.4- Memorize the different types of stresses – strains of matter, thermometers and temperature scales.

b - Intellectual skills:

On successful completion of the course, the student should be able to:

- b.1- Create over view about the dimension theory, waves nature, heat transform and thermodynamics.
- b.2- deduce some models to exam the validity of physical low.
- b.3- develop appropriate judgment in accordance with physical meaning of course topics.
- b.4- Differentiate between the physical properties for different types of materials.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1- Sketch the phase diagram stress- strain curve for different types of materials.
- c.2- Analyze the output data from each technique.



c.3- Extract physical properties from tables and graphs.

d - General skills:

On **successful** completion of the course, the student should be able to:

d.1- Work in **team** to synthesis and studying some physical properties of some materials.

d.2- Apply **scientific** models to solve physical problems.

d.3- **Collect** data from internet and writing reports in the application of some topics.

3- Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1	Physical quantity	2	1	2	17.4%
2	Dimension theory	2	1	2	17.4%
3	Units	2	1	2	17.4%
4	balance equation	2	1	2	17.4%
5	Types of motion	2	1	2	17.4%
6	Motion in different directions	2	1	2	17.4%
7	Mid- Term Exam & review	2	1	2	17.4%
8	Second newton low of motion	2	1	2	17.4%
9	Work and energy	2	1	2	17.4%
10	Introduction in heat	2	1	2	17.4%
11	Heat and heat transfer	2	1	2	17.4%
12	Kinetic theory of gases	2	1	2	17.4%

13	Specific heat of gases	2	1	2	17.4%
14	First law of thermodynamics	2	1	2	17.4%
Total hours		28	14	28	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Tutorial	Problem solving	Brain storming
Knowledge & Understanding	a.1	Identify the concept of matter, Heat, Simple harmonic motion, fluid dynamics, types of heat conductions and thermodynamics	x	0	0	x	x	0
	a.2	Describe the moment of inertia of rigid body and phase diagram	x	0	0	x	0	x
	a.3	Describe the different types of wave motion such as simple pendulum, oscillating spring, wave equation and interference of waves	x	x	0	x	x	0
	a.4	Memorize the different types of stresses – strains of matter, thermometers and temperature scales	x	0	0	x	x	0
Intellectual Skill	b.1	Create overview about the dimension theory, waves nature, heat transform and	x	0	0	x	0	0

		thermodynamics						
	b.2	Deduce some models to exam the validity of physical law	x	x	0	x	0	x
	b.3	Develop appropriate judgment in accordance with physical meaning of course topics	x	0	0	x	x	0
	b.4	Differentiate between the physical properties for different types of materials	x	0	0	x	0	0
Practical and professional skills	c.1	Sketch the phase diagram stress- strain curve for different types of materials and	x	0	0	x	x	0
	c.2	Analyze the out put data from each technique.	x	x	0	x	x	0
	c.3	Extract physical properties from tables and graphs	x	0	0	x	0	0
General Skills	d.1	Work in team to synthesis and studying some physical properties of some materials .	x	0	0	x	x	x
	d.2	Apply scientific models to solve physical problems	x	0	0	x	0	0
	d.3	Collect data from internet and wrighting reports in the application of some topics	x	0	0	x	x	x

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Semester Work	a.1, a.2, a.4, b.1, b.2, c.1, c.2, d.2, d.2 and d.3.	Fifth week	5%
Mid-Term Exam	a.1, a.3, a.4, b.3, b.4, d.2, c.3 and d.3.	Seventh week	5%
Oral exam	a.1, a.3, a.4, b.3, b.4, c.3, and d.3.	Fifteenth week	10%
Written exam	a.1 to a.4, b.1 to b.4, c.1 to c.3 and d.2.	sixteenth week	80%
Total			100 %



6- List of references:

6-1 Course notes

Lecture notes approved by Physics department.

6-2 Required books.

1. Fundamentals of Physics Extended, 9th Edition, David Halliday, Robert Resnick, Jearl Walker (2011).
2. Physics for Scientists and Engineers 9th Edition by Raymond A. Serway.

6-3 Recommended books.

1. General Physics and heat (G.A. Grant) Published by Edward Arnold, 1977
ISBN 10: 071312623X / ISBN 13: 9780713126235.

6-4 Periodicals, Web sites, etc.

1. https://www.amazon.com/Physics-Scientists-Eng.../ref=sr_1_5...
2. <http://www.Physics2000>.
3. <http://www.Physics today>.

7- Facilities required for teaching and learning:

1. Using a microphone in lectures.
2. Using a black board.
3. Group Discussions.
4. Data show.

Course coordinator:

Prof. Dr. Salah Hamza
Prof. Dr. Mahmoud H. Makled

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023

Course Specification

Phy 102: Optics, Electricity and Magnetism

A- Affiliation

Relevant program:

Chemistry B.Sc. Program.

Department offering the program:

Department of Chemistry

Department offering the course:

Department of Physics

Academic year/level:

First level

Date of specifications approval:

9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Saed Abed Elghany.



B - Basic information

Title: Phy 102: Optics, Electricity and Magnetism

Code: Phy 102

Year/level: First level

Teaching Hours:

Lectures: 2

Tutorial: 1

Practical: 2

Total: 3 h/week

C - Professional information

1 – Course Learning Objectives:

By Finishing of this course the graduate will able to collect a lot of scientific information about theories of light and their applications in optical instruments. Study some of the the physical properties for mirrors and lenses . Tell about the eye and farsightedness and nearsightedness. Discover the different types of optical instruments. Understanding the electric and magnetic forces and differentiate among field ,potential and electromagnetic force . memorize the types of capacitors and dielectric materials . sketch some of the electric circuits

2 - Intended Learning Outcomes (ILOS)

a- Knowledge and understanding:

On successful completion of the course, the student should be able to:

- a.1 Memorise a lot of scientific information about theories of light and electromagnetic field and the applications of each other.
- a.2- Understand magnetic and electric field nature in addition to mirror and lenses equations.
- a.3- Talk about the function of eye, electric circuits and capacitors.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Interpret data from each optical or electromagnetic systems.
- b.2- Assess according to beam reflection what is nature of surface and wave, and according to Electromagnetic induction what is the nature of source.
- b.3- Design optical and electromagnetic system by logic way.
- b.4- Compare between the use of microscope, telescope, lenses, mirrors and their applications.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1- Conduct some experiments using lenses in addition to mirrors and electric circuits.
- c.2- Analyze the output data from optical and electromagnetic techniques.
- c.3- Apply the optical and electromagnetic phenomena in modern area applications.

d - General skills:

On successful completion of the course, the student should be able to:

- d.1- Solve problems concerning to the course topics.
- d.2- Communicate to work efficiently in a team or separately.



4 - Teaching and Learning methods:

d.3- Collect data and writing reports in the different model and fields.

3- Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1	The nature and propagation of light	2	1	2	7.14%
2	Reflection and refraction of spherical wave at plane and spherical surfaces	2	1	2	7.14%
3	Mirrors and Lenses	2	1	2	7.14%
4	Mirrors and Lenses	2	1	2	7.14%
5	Cameras, microscopes and Telescopes	2	1	2	7.14%
6	Colom's Low and continuity of Colom's low.	2	1	2	7.14%
7	Mid-Term Exam	2	1	2	7.14%
8	Electrostatic field and potential	2	1	2	7.14%
9	Capacitors	2	1	2	7.14%
10	Dielectric materials	2	1	2	7.14%
11	Electric Current and DC Circuits	2	1	2	7.14%
12	Kirchhoff Low and electric circuit analysis	2	1	2	7.14%
13	Magnetic field and forces	2	1	2	7.14%
14	Electromagnetic induction	2	1	2	7.14%
	Total hours	28	14	28	100 %

Intended Learning Outcomes	Lecture	Presentations & Movies	Discussions & Seminars	Tutorial	Problem solving	Brain storming

5- Students' Assessment Methods and Grading:

Knowledge & Understanding	a.1	Memorise a lot of scientific information about theories of light and electromagnetic field and the applications of each other.	x	0	0	x	x	0
	a.2	Understanding magnetic and electric field nature in addition to mirror and lenses equations.	x	0	0	x	0	X
	a.3	Tell about the function of eye, electric circuits and capacitors.	x	x	0	x	0	X
Intellectual Skills	b1	Interpret data from each optical or electromagnetic systems.	x	0	0	x	0	0
	b.2	Assess according to beam reflection what is nature of surface and wave, and according to Electromagnetic induction what is the nature of source.	x	x	0	x	0	X
	b.3	Design optical and electromagnetic system by logic way.	x	0	0	x	0	X
	b.4	Compare between the use of microscope and telescope and lenses and mirrors and application.	x	x	0	x	0	X
Practical and professional skills	c.1	Conduct some experiments using lenses in addition to mirrors and electric circuits.	x	0	0	x	0	0
	c.2	Analyze the output data from optical and electromagnetic techniques.	x	0	0	x	x	0
	c.3	Apply the optical and electromagnetic phenomena in modern area applications.	x	0	0	x	0	X
General Skills	d.1	Solve problems concerning to the course topics.	x	x	0	x	x	X
	d.2	Communicate to work efficiently in a team or separately.	x	0	0	x	0	0
	d.3	Collect data and writing reports in the different model and fields.	x	0	0	x	0	X



Tools	To Measure	Time schedule	Grading
Semester Work	a.1, a.2, b.1, b.2, c.1, c.2, d.1, and d.2.	Fifth week	5 %
Mid-Term Exam	a.1, a.3, b.3, b.4, d.2, c.3, and d.3.	Seventh week	5 %
Oral exam	a.1, a.3, b.2, b.3, b.4, c.3, and d.3.	Fifteenth week	10 %
Written exam	a.1 to a.3, b.1 to b.4, c.1 to c.3 and d1.	Sixteenth week	80 %
Total			100 %

6- List of references:

6-1 Course notes

Lecture notes approved by Physics department.

6-2 Required books.

- 1- Fundamentals of Physics Extended, 9th Edition, David Halliday, Robert Resnick, Jearl Walker (2011)

6-5 Recommended books.

1. General Physics, 2nd Edition by Morton M. Sternheim and Joseph W. Kane , John Willy and sons. Inc., (1991).
2. Physics for Engineers and Scientists 3rd ed by Hans C. Ohanian and John T. Markert.

6-4 Periodicals, Web sites, etc.

1. [http://www. Physics2000](http://www.Physics2000).
2. <http://www. Physics today>.
3. https://www.amazon.com/.../.../0393930033/ref=la_B0011QW79W_1_2...

7- Facilities required for teaching and learning:

1. Using a microphone in lectures.
2. Using a black board.
3. Group Discussions.
4. Data show.

Course coordinator: Prof. Dr. Saeed Abd Elghany

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023

Course Specification Practical physics (1): 180 Ph



A- Affiliation

Relevant program:	Chemistry B. Sc. Program.
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Physics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Ibrahim El-mashad Mr. Mohamed Sobhi

B - Basic information

Title: Practical Physics (1)	Code: 180 Ph	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 0
	Practical: 3	Total: 1 h/week

C - Professional information

1 – Course Learning Objectives:

By Finishing of this course the graduate will able to understand the experimental method to identify and measure some physical quantity related to the properties of material and heat. Able to verify the physical lows. How to calculate the mathematical errors and use the suitable units. Work in teem to collect data and writing an essay. knows some applications of physics in the industry.

2 - Intended Learning Outcomes (ILOS)

a- Knowledge and understanding:

On successful completion of the course, the student should be able to:

- a.1- Know the concept of physical quantity and physical phenomena
- a.2- Investigate some physical laws
- a.3- outline the physical principles and experiments

b - Intellectual skills:

On successful completion of the course, the student should be able to:

- b.1- Compare between the applications of each physical apparatus.
- b.2- Interpret the output data from experimental systems.
- b.3- Construct simple systems to verify the physical laws.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1- Sketch the practical data.
- c.2- Use the laboratory equipment and instruments



c.3- Analyze data form each techniques and tools considering scientific ethics

d - General skills:

On successful completion of the course, the student should be able to.

d.1- Solve problems and bulding experimental physical system.

d.2- Communicate to work efficiently in a team or separately.

d.3- Collect data and wrighting reports in the different physical topics

3 – Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1	Introduction in the units, tools, errors and precise measurements.	0	0	3	7.14%
2	Archimedes experiment.	0	0	3	7.14%
3	Newton law of cooling.	0	0	3	7.14%
4	Specific heat of solid materials.	0	0	3	7.14%
5	simple pendulum.	0	0	3	7.14%
6	Viscosity of liquid.	0	0	3	7.14%
7	Mid-Term Exam	0	0	3	7.14%
8	Melting point.	0	0	3	7.14%
9	Surface tension.	0	0	3	7.14%
10	Hook law.	0	0	3	7.14%
11	Velocity of sound.	0	0	3	7.14%
12	Joule experiment.	0	0	3	7.14%
13	Linear expansion.	0	0	3	7.14%
14	Review and summary	0	0	3	7.14%
	Total hours	0	0	42	100 %

4- Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a.1	Know the concept of physical quantity and physical phenomena	0	0	0	x	x	0
	a.2	Investigate some physical laws	0	x	0	x	0	x
	a.3	outline the physical principles and experiments	0	0	x	x	x	0
Intellectual Skills	b1	Compare between the applications of each physical apparatus.	0	x	0	x	0	0
	b.2	Interpret the output data from experimental systems.	0	0	x	x	x	x
	b.3	Construct simple systems to verify the physical laws.	0	0	x	x	0	0
Practical and professional skills	c.1	Sketch the practical data.	0	0	0	x	x	0
	c.2	Use the laboratory equipment and instruments.	0	0	0	x	x	0
	c.3	Analyze data form each technique and tools considering scientific ethics.	0	x	x	x	0	0
General Skills	d.1	Solve problems and bulding experimental physical system.	0	0	0	x	x	x
	d.2	Communicate to work efficiently in a team or separately.	0	0	x	x	0	0
	d.3	Collect data and wrihting reports in the different physical topics.	0	x	0	x	x	x

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
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Semester Work	a.1, a.2, a.3, b.1, b.2, c.1, c.2, d.1 and d.2.	Fifth week	5%
Mid-Term Exam	a.1, a.3, b.2, b.3, d.2, c.3, and d.3.	Seventh week	5%
Oral exam	a.2, a.3, b.2, b.3, c.3, and d.3.	Fifteenth week	10%
Final exam	a.1 to a.3, b.1 to b.3, c.1 to c.3 and d.1.	Sixteenth week	80%
Total			100 %

6- List of references:

6-1 Course notes

Practical notes approved by Physics department.

6-2 Required books.

1- The concepts and theories of modern physics by John Bernhard Stallo, BiblioBazaar (2009).

6-6 Recommended books.

1. Ancient and Modern Physics by Thomas E. Willson HardPress Publishing (2010).
2. Physics: for Scientists and Engineers with Modern Physics, 3rd Ed by Paul M. Fishbane and Stephen Gasiorowicz.

6-4 Periodicals, Web sites, etc.

1. https://www.amazon.com/Physics-Scientists-En.../.../ref=sr_1_12...
2. [http://www. Physics2000](http://www.Physics2000).
3. [http://www. Physics today](http://www.Physics today).

7- Facilities required for teaching and learning:

1. Using a black board.
2. Group Discussions.
3. Data show.
4. Equipements.

Course coordinator:

Dr. Ibrahim El-mashad
Prof. Dr. Safinaz M. Reda

Program coordinator:

Head of the Department:

Prof. Dr. Wagdy El-Dougdoug

Date:

2022-2023

Course Specification 181 Ph: Practical physics (2)

A- Affiliation

Relevant program:

Chemistry B.Sc. Program

Department offering the program:

Chemistry Department



Department offering the course:	Department of Physics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Mohamed abed Elmenem

B - Basic information

Title: Practical physics (2)	Code: 181 Ph	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 0
	Practical: 3	Total: 1 h/week
	Course marks: 100marks	

C - Professional information

1 – Course Learning Objectives:

This course aims to enable the graduate to understand the experimental method to identify and measure some physical quantity related to the electricity-magnetism and optics. Able to verify the physical laws. How to calculate the mathematical errors and use the suitable units. Work in team to collect data and writing an essay. knows some applications of physics in the industry

2 - Intended Learning Outcomes (ILOS)

a- Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Recognize the concept of physical Quantity and physical phenomena
- a.2- memorize some physical laws
- a.3- talk about the physical principles and experiments

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Compare between the applications of each physical apparatus
- b.2- Analyze the output data from experimental systems
- b.3 Construct simple systems to verify the physical law

c - Practical and professional skills:

On successful completion of the course, the student should be able to.

- c.1 – Sketch the practical data
- c.2- Identify the measuring method and system
- c.3- Apply techniques and tools considering scientific ethics

d - General skills:

- On successful completion of the course, the student should be able to.
- d.1- Solve problems and building experimental physical system.
 - d.2- Communicate to work efficiently in a team or separately
 - d.3- Collect data and writing reports in the different physical topics

3 – Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1.	Introduction in the unites , tools , Errors and Precise measurements	0	0	3	17.4%
2.	Ohm,s Law	0	0	3	17.4%
3.	The Metric Bridge	0	0	3	17.4%
4.	The tangent galvanometer	0	0	3	17.4%
5.	Meld,s experiment	0	0	3	17.4%
6	Comparison of magnetic moment	0	0	3	17.4%
7	Mid-Term Exam	0	0	3	17.4%
8.	Concave Mirror	0	0	3	17.4%
9.	Convex Lens	0	0	3	17.4%
10	Concave Mirror	0	0	3	17.4%
11	Convex Lens	0	0	3	17.4%
12	Newton,s formula of the lenses	0	0	3	17.4%
13	Verification of Kirchoff,s law	0	0	3	17.4%
14	Review and summary	0	0	3	17.4%
	Total hours	0	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming	
ge & Und erst	a.1	Recognize the concept of physical Quantity and physical phenomena	0	0	0	x	x	0

	a.2	memorize some physical laws	0	0	0	x	0	x
	a.3	tell about the physical principles and experiments	0	0	x	x	x	0
Intellectual Skills	b.1	Compare between the applications of each physical apparatus	0	0	0	0	0	0
	b.2	Analyze the output data from experimental systems	0	0	x	x	x	x
	b.3	Construct simple systems to verify the physical laws	0	0	0	0	0	0
Practical and professional skills	c.1	Sketch the practical data	0	0	0	x	x	0
	c.2	Identify the measuring method and system	0	0	x	x	x	0
	c.3	Apply techniques and tools considering scientific ethics	0	0	x	x	0	0
General Skills	d.1	Solve problems and building experimental physical system.	0	0	0	x	x	x
	d.2	Communicate to work efficiently in a team or separately	0	0	x	x	0	0
	d.3	Collect data and writing reports in the different physical topics	0	0	x	x	x	x

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Semester Work	a.1, a.2,a.3 , b.1,b.2,c.1,c.2, d.1 and d.2	Fifth week	10%
Mid-Term Exam	a.1, a.3, b.2, b.3, d.2 and d.3	Fifteenth week	10%
Oral exam	a.2,a.3 , b.2, b.3, c.2and d.3	sixteenth week	20%
Final practical exam	C1 to C3	seventeenth week	60%
Total			100 %



6- List of references:

6-1 Course notes

Practical note approved by Physics department.

6-2 Required books.

Fundamentals of Physics Extended, 9th Edition, David Halliday, Robert Resnick, Jearl Walker (2011)

6-7 Recommended books.

6-4 Periodicals, Web sites, etc.

[http://www. Physics2000](http://www.Physics2000)

<http://www. Physics today>

7- Facilities required for teaching and learning:

Using a microphone in Lab

Using a black board

Group Discussions

Equipments

Course coordinator: Prof. Mohamed Abdel monem

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification

Applied Physics (1): 183 Ph

A- Affiliation

Relevant program:	Chemistry B. Sc. Program.
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Physics
Academic year/level:	First level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Reda Khalil



B - Basic information

Title: applied Physics (1)	Code: 183 Ph	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 2
	Practical: 0	Total: 1 h/week

C - Professional information

1 – Course Learning Objectives:

The objective of this course enable the student to collect and recognize a lot of knowledge about the main topics of the Properties of Matter and Heat, such as the elasticity and plasticity of material, the different types of stresses and strains, moment of inertia, simple harmonic motion in addition to the different types of wave equation and interference of waves and some basics of fluid dynamics. Study Unary phase digrame of matter, types of thermometers and temprature scales, heat conduction and radiation, methods of specific heat measurments and Gas laws and thermodynamics. This will supported by some applications in each field.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Identify the concept of matter, Heat, Simple harmonic motion, fluid dynamics, types of heat counductions and thermodynamics.
- a.2- Describe the moment of inertia of rigid body and phase digram.
- a.3- Describe the different types of wave motion such as simple pindulumn, oscillating spring, and wave equation and interference of waves.
- a.4- Memorize the different types of stresses – strains of matter, thermometers and temperature scales.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Create over view about the dimension theory, waves nature, heat transform and thermodynamics.
- b.2- Deduce some models to exam the validity of physical low.
- b.3- Develop appropriate judgment in accordance with physical meaning of course topics.
- b.4- Differentiate between the physical properties for different types of materials.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1- Sketch the phase diagram stress- strain curve for different types of materials.
- c.2- Analyze the output data from each technique.
- c.3- Extract physical properties from tables and graphs.

d - General skills:

On successful completion of the course, the student should be able to:

- d.1- Work in team to synthesis and studying some physical properties of some materials.
- d.2- Apply scientific models to solve physical problems.
- d.3- Collect data from internet and wrighting reports in the application of some topics.

3- Contents

No .	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1	Application on Physical quantity.	0	2	0	7.14%
2	Application on Dimension theory.	0	2	0	7.14%
3	Application on Unites.	0	2	0	7.14%
4	Application on balance equation.	0	2	0	7.14%
5	Application on Types of motion.	0	2	0	7.14%
6	Application on Motion in different directions.	0	2	0	7.14%
7	Mid- Term Exam & review	0	2	0	7.14%
8	Application on second Newton low of motion.	0	2	0	7.14%
9	Application on Work and energy.	0	2	0	7.14%
10	Application on Introduction in heat.	0	2	0	7.14%
11	Application on Heat and heat transfer.	0	2	0	7.14%
12	Application on Kinetic theory of gases.	0	2	0	7.14%

13	Application on Specific heat of gases.	0	2	0	7.14%
14	Application on First law of thermodynamics.	0	2	0	7.14%
Total hours		0	28	0	100 %

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Tutorial	Problem solving	Brain storming
Knowledge & Understanding	a.1	Identify the concept of matter, Heat, Simple harmonic motion, fluid dynamics, types of heat conductions and thermodynamics.	X	0	0	x	x	0
	a.2	Describe the moment of inertia of rigid body and phase digram.	0	0	0	x	0	x
	a.3	Describe the different types of wave motion such as simple pindulmn, oscillating spring, and wave equation and interference of waves.	0	x	0	x	x	0
	a.4	Memorize the different types of stresses – strains of matter, thermometers and temperature scales.	X	0	0	x	x	0
Intellectual Skills	b.1	Create over view about the dimension theory, waves nature, heat transform and thermodynamics.	0	0	0	x	0	0
	b.2	Deduce some models to exam the validity of physical low.	0	x	0	x	0	x
	b.3	Develop appropriate judgment in accordance with physical meaning of course topics.	0	0	0	x	x	0
	b.4	Differentiate between the physical properties for different types of materials.	0	0	0	x	0	0
and prof essi	c.1	Sketch the phase diagram stress- strain curve for different types of materials.	0	0	0	x	x	0

	c.2	Analyze the out put data from each technique.	0	x	0	x	x	0
	c.3	Extract physical properties from tables and graphs.	0	0	0	x	0	0
General Skills	d.1	Work in team to synthesis and studying some physical properties of some materials. .	0	0	0	x	x	x
	d.2	Apply scientific models to solve physical problems.	0	0	0	x	0	0
	d.3	Collect data from internet and wrihting reports in the application of some topics.	0	0	0	x	x	x

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Semester Work	a.1, a.2, a.4, b.1, b.2, c.1, c.2, d.2, d.2 and d.3.	Fifth week	5%
Mid-Term Exam	a.1, a.3, a.4, b.3, b.4, d.2, c.3 and d.3.	Seventh week	5%
Oral exam	a.1, a.3, a.4, b.3, b.4, c.3, and d.3.	Fifteenth week	10%
Written exam	a.1 to a.4, b.1 to b.4, c.1 to c.3 and d2.	sixteenth week	80%
Total			100 %

6- List of references:

6-1 Course notes

Lecture notes approved by Physics department.

6-2 Required books.

1- Fundamentals of Physics Extended, 9th Edition, David Halliday, Robert Resnick, Jearl Walker (2011).

6-8 Recommended books.

1. General Physics and heat (G.A. Grant) Published by Edward Arnold, 1977
ISBN 10: [071312623X](#) / ISBN 13: [9780713126235](#).

2. Physics for Engineers and Scientists 3rd ed by Hans C. Ohanian and John T. Markert.

6-9 Periodicals, Web sites, etc.

- https://www.amazon.com/.../.../0393930033/ref=la_B001IQW79W_1_2...
- [http://www. Physics2000](http://www.Physics2000).
- [http://www. Physics today](http://www.Physics today).

7- Facilities required for teaching and learning:



Course coordinator: Dr. Reda Khalil
Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug
Date: 2022-2023

Course Specification

185 Ph: Applied Physics (2)

A- Affiliation

Relevant program: Applied Chemistry B.Sc. Program
Department offering the program: Department of Chemistry
Department offering the course: Department of Physics
Academic year/level: First level
Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. Mohamed Ali

B - Basic information

Title: Applied Physics (2)	Code: 185 Ph	Year/level: First level
Teaching Hours:	Lectures: 0	Tutorial: 2 h
	Practical: 0	Total 1h/week
	Course marks: 100 marks	

C - Professional information

1 – Course Learning Objectives:

This course aims to enable the graduate to collect a lot of scientific information about theories of light and their applications in optical instruments. Study some of the the physical properties for mirrors and lenses . Tell about the eye and farsightedness and nearsightedness. Discover the different types of optical instruments. Understanding the electric and magnetic forces and diffrentiate among field ,potential and electromagnetic force . memorize the types of capacitores and dielectric materials . skach some of the electric circuites

2 - Intended Learning Outcomes (ILOS)

a- Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1 Memorise a lot of scientific information about theories of light and electromagnetic field and the applications of each other
- a.2- understanding magnetic and electric field nature in addition to mirror and lenses equations
- a.3- tell about the function of eye , electric circuits and capacitors

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Interpret data from each optical or electromagnetic systems
- b.2- Assess according to beam reflection what is nature of surface and wave , and according to Electromagnetic induction what is the nature of source
- b.3 Design optical and electromagnetic system by logic way
- b.4- compare between the use of microscope and telescope and lenses and mirrors and application of

c - Practical and professional skills:

On successful completion of the course, the student should be able to.

- c.1 – conduct some experiments using lenses in addition to mirrors and electric circuits.
- C.2-. Analyze the out pout data from optical and electromagnetic techniques.
- c.3- Apply the optical and electromagnetic phenomena in modern area applications

d - General skills:

On successful completion of the course, the student should be able to.

- d.1- Solve problems concerning to the course topics
- d.2- Communicate to work efficiently in a team or separately
- d.3- Collect data and wrihting reports in the different model and fields

3 – Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1	Application on The nature and propagation of	0	1	0	17.4%
2	Application on Reflection and refraction of	0	1	0	17.4%
3	Mirrors and Lenses Application on	0	1	0	17.4%
4	Application on the structure of the eye	0	1	0	17.4%
5	Application on Cameras, microscopes and	0	1	0	17.4%
6	Colom's Low	0	1	0	17.4%
7	Med-Term Exam & continuity of Colom's low	0	1	0	17.4%
8	Application on Electrostatic field and	0	1	0	17.4%
9	Application on Capacitors	0	1	0	17.4%
10	Application on Dielectric materials	0	1	0	17.4%
11	Application on Electric Current and DC	0	1	0	17.4%

12	Application on Kirchhoff Low and	0	1	0	17.4%
13	Application on Magnetic field and forces	0	1	0	17.4%
14	Application on Electromagnetic induction	0	1	0	17.4%
Total hours		0	14	0	100%

4 - Teaching and Learning methods against ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Tutorial	Problem solving	Brain storming
Knowledge & Understanding	a.1	Memorise a lot of scientific information about theories of light and electromagnetic field and the applications of each other	x	0	0	x	x	0
	a.2	understanding magnetic and electric field nature in addition to mirror and lenses equations	x	0	0	x	0	x
	a.3	Tell about the function of eye , electric circuits and capacitors	x	x	0	x	0	x
Intellectual Skills	b1	Interpret data from each optical or electromagnetic systems	x	0	0	x	0	0
	b.2	Assess according to beam reflection what is nature of surface and wave , and according to Electromagnetic induction what is the nature of source	x	x	0	x	0	x
	b.3	Design optical and electromagnetic system by logic way	x	0	0	x	0	x
	b.4	compare between the use of microscope and telescope and lenses and mirrors and application	x	x	0	x	0	x
Practical and professional skills	c.1	Conduct some experiments using lenses in addition to mirrors and electric circuits.	x	0	0	0	0	0
	c.2	Analyze the out pout data from optical and electromagnetic techniques	x	0	0	0	x	0
	c.3	Apply the optical and electromagnetic phenomena in modern area applications	x	0	0	0	0	x
General Skills	d.1	Solve problems concerning to the course topics	x	x	0	x	x	x
	d.2	Communicate to work efficiently in a team or separately	x	0	0	x	0	0
	d.3	Collect data and wrighting reports in the different model and fields	x	0	0	x	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a.1, a.2, b.1, b.2,c.1,c.2, d.1 and d.2	Fifth week	5 %
Mid-Term Exam	a.1, a.3, b.3, b.4, d.2,c.3 ,and d.3	Seventh week	5 %
Oral exam	a.1, a.3, b.2, b.3, b.4,,and d.3	Fifteenth week	10 %
Written exam	a.1 to a.3, b.1 tob4.	Sixteenth week	80 %
Total			100 %

6- List of references:

6-1 Course notes

Lecture notes approved by Physics department.

6-2 Required books.

1- Fundamentals of Physics Extended, 9th Edition, David Halliday, Robert Resnick, Jearl Walker (2011)

6-10 Recommended books.

2- General Physics, 2nd Edition by Morton M. Sternheim and Joseph W. Kane , John Willy and sons. Inc., (1991)

6-4 Periodicals, Web sites, etc.

[http://www. Physics today](http://www.Physics today)

[http://www. Physics2000](http://www.Physics2000)

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Ali

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Uni 151: Human Rights and Anticorruption

A- Affiliation

Relevant program:	Chemistry B.Sc program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Geology
Academic year/level:	First Year
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Mohamed Afifi

B - Basic information

Title: Human Rights and Anticorruption **Code:** Uni 151 **Year/level:** First

Teaching Hours: Lectures: 1 Tutorial: 0
Practical: 0 Total: 1 h/week

C - Professional information

1 - Course Learning Objectives:

The objective of this course is to enable the student to learn the Rights law Human Medicine dementia and sources. Also, study of international law, which aims to protect the individual

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1- Deals with human rights.
- a2- Explains the nature of the restrictions.
- a3- Describes what the collective rights

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Analyzes of human rights.



- b2- Assesses the extent of the exercise of human rights in his social life.
- b3- Issued the provisions of a window on the importance of human rights

c - Practical and professional skills:

On successful completion of the course, the student should be able to.

- c1- Compares the application of human rights in Egypt in various fields.
- c2- Analyzes the social factors that stand in the way, without the actual application of human rights in our society.
- c3- Puts imagine the implications of the application of human rights to professional practices in the future

d - General skills:

On successful completion of the course, the student should be able to.

- d1- Deal with a computer and technology information in the field of specialization and view and search for information
- d2- Think and proficient in team work.
- d3- Mastered deductive reasoning

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	
Introduction	1	-	0	7.14 %

The concept of human rights	1	-	0	7.14 %
The origins and evolution of human rights part1	1	-	0	7.14 %
The origins and evolution of human rights part2	1	-	0	7.14 %
The importance of human rights and the philosophical framework	1	-	0	7.14 %
Sources of human rights law part1	1	-	0	7.14 %
Sources of human rights law part2	1	-	0	7.14 %
Types of Human Rights medication and meals part1	1	-	0	7.14 %
Types of Human Rights medication and meals part2	1	-	0	7.14 %
The rights of women and children special needs Own	1	-	0	7.14 %
The human right to a healthy environment	1	-	0	7.14 %
Human Rights and Ethics part1	1	-	0	7.14 %
Human Rights and Ethics part1	1	-	0	7.14 %
Revision	1	-	0	7.14 %
Total hours	14	-	0	100 %

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Deals with human rights.	X		x			
	a2	Explains the nature of the restrictions	X		x			x
	a3	Describes what the collective rights	X					x
Intellectual Skills	b1	Analyzes of human rights.	X					
	b2	Assesses the extent of the exercise of human rights in his social life.	X					
	b3	Issued the provisions of a window on the importance of human rights	X	x				
Practical and professional skills	c1	Compares the application of human rights in Egypt in various fields.	X	x	x		x	x
	c2	Analyzes the social factors that stand in the way, without the actual application of human rights in our society.	X	x				

	c3	Puts imagine the implications of the application of human rights to professional practices in the future	X	x			x	
	d1	Deal with a computer and technology information in the field of specialization and view and search for information				x		
General Skills	d2	Think and proficient in team work.	X					x
	d3	Mastered deductive reasoning	X					x

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1 to a4, b1 to b2	Seventh week	20
Oral exam	a2, b2, d1 to d3	Thirteenth week	20
Written exam	a1 to a3, b1 to b3, c1 to c3	Fourteenth week	60
Total			100 %

6- List of references:

6-1 Course notes:

* non

6-2 Required books:

* 1989- (:) ن. د. م. د. الأساسية وحرياته الإنسان حقوق - ميشال محمد لغريب، *

* Michael Boylan (2013). Natural Human Rights: A Theory



6-3 Recommended books:

1989-1985 القانونية، والدراسات للبحوث العرب المحامين اتحاد مركز ، 1989العربي، الوطن في الإنسان حقوق أزمة

* David Jason Karp (2012). Responsibility for Human Rights

6-4 Periodicals, Web sites, etc

منطقتي في والتنمية والمجتمع قضايا المرأة حول والمعلومات للوصول المشروع الاقليمي عن تصدر شهرية : "الراصد"
على والفرنسية باللغتين الانكليزية موجودة أخرى أعداد). المشرق والمغرب

2002 أيار عدد. "الراصد". الكمبيوتر

* Journal of Human Rights Practice: Oxford Journals

* Human Rights Law Review

* Journal of Human Rights at the University of Connecticut

* Canadian Journal of Human Rights

* <http://www.humanrights.com/>

* <http://www.hrw.org/>

7- Facilities required for teaching and learning:

* Lecture, Questions and discussion, Library and Self-Education

Course coordinator: Dr. Mohamed Afifi
Program coordinator: Prof. Dr. Safinaz M. Reda
Head of the Department: Prof. Dr. Wagdy El-DougDoug
Date: 2022-2023

Course Specification

Uni 142: History of Science

A- Affiliation

Relevant program: Chemistry, B.Sc program
Department offering the program: Chemistry Department
Department offering the course: Chemistry Department
Academic year/level: First Level
Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).
Course Coordinator: Prof. Dr. Lotfi Abo-salem

B - Basic information



Title: History of Science
Teaching Hours: 24

Code: Uni 142 **Year/level:** First
Lectures: 2 **Tutorial:** 0
Practical: 0 **Total:** 2 h/week

C - Professional information

1 - Course Learning Objectives:

The objective of this course is to enable the student to learn the history of science.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1: يتعرف الطالب علي العلم ومناهج العلوم والبحث العلمي
a2: يدرس الطالب مراحل تطور العلوم

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1: يفهم الطالب تطور العلوم عبر الحضارات

c - Practical and professional skills:

On successful completion of the course, the student should be able to.

- c1: يدرس الطالب نماذج من علماء العصر الاغريقي والعرب والنهضة الاوربية

d - General skills:

On successful completion of the course, the student should be able to.

- d1: القدرة علي البحث من خلال الشبكة العنكبوتية

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours
مقدمة عن العلم ومناهج البحث العلمي	2	-	0
تطور البحث العلمي	2	-	0
تطور العلوم عبر الحضارات	2	-	0
الحضارة الاغريقية	2	-	0
الحضارة الاسلامية	2	-	0
الحضارة الاوربية	2	-	0
تطور العلوم من العصور الاوربية الحديثة	2	-	0
نماذج من علماء العصر الاغريقي	2	-	0
نماذج من علماء العصر العرب (1)	2	-	0
نماذج من علماء العصر العرب (2)	2	-	0
نماذج من علماء عصر النهضة الاوربية (1)	2	-	0
نماذج من علماء عصر النهضة الاوربية (2)	2	-	0
Total hours	24	-	0

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	يتعرف الطالب علي العلم ومناهج العلوم والبحث العلمي	x		x	x		
	a2	يدرس الطالب مراحل تطور العلوم	x	X	x			x
Intellectual Skills	b1	يفهم الطالب تطور العلوم عبر الحضارات	x	X		x		
Practical and professional Skills	c1	يدرس الطالب نماذج من علماء العصر الاغريقي والعرب والنهضة الاوربية	x		x	x		x
General Skills	d1	القدرة علي البحث من خلال الشبكة العنكبوتية	x	X				x

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1,b1	Seventh week	16
Practical exams	c1	Twelfth week	24
Oral exam	a2, b1, d1	Thirteenth week	12
Written exam	a1,a2,b1,c1 and d1	Fourteenth week	48
Total			100 %

6- List of references:

6-1 Course notes:

تاريخ العلم 1543-2001 محور العدد الجديد من سلسلة عالم المعرفة تأليف : جون غريبين وترجمة شوقي جلال

6-2 Required books:

تاريخ العلوم اختراعات واكتشافات و علماء تأليف كلود بريزنسكي

الطبعة الاولى 2015

رقم الايداع 2013/14537



6-3 Recommended books:

*

6-4 Periodicals, Web sites, etc

7- Facilities required for teaching and learning:

- * Annotation and drawing on the blackboard.
- PowerPoint presentation for each lecture.
- Scientific films and documentaries in some lessons.

Course coordinator: Prof. Dr. Lotfi Abo-salem
Program coordinator: Prof. Dr. Safinaz M. Reda
Head of the Department: Prof. Dr. Wagdy El-DougDoug
Date: 2022-2023

توصيف مقرر دراسي

Uni 152: Healthy Nutrition

أ-إنتماء البرنامج

البرنامج المعنى: برنامج الكيمياء التطبيقية

القسم الذي يقدم البرنامج: قسم الكيمياء

القسم الذي يقدم المقرر: قسم علم الحيوان

الفرقة / المستوى: المستوى الأول

تاريخ الاعتماد في مجلس الكلية:

9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), updated 8/ 3/2023 (Faculty council; meeting number, 484).

منسق المنهج:

أ.د. ماجدة محمد العزبي

أ.د. مشيرة محمد عزت سليم

ب-معلومات أساسية

العنوان:	Healthy Nutrition	Uni 152 الرمز الكودي:	الفرقة / المستوى: المستوى الأول
عدد الوحدات الدراسية:	2	النظري:	العملي: 0
التمارين:	0	الكلي:	ساعتان / الأسبوع
مجموع المادة:	100 درجة		

ج-معلومات متخصصة

1-هدف المقرر:

الهدف من المقرر هو تعريف الطالب علي مكونات الوجبة الصحية وما يسببه نقص أي نوع من أنواع الوجبات الصحية. كما يهدف أيضا لتعليمه مفهوم التغذية العلاجية وأهدافها الأنظمة الغذائية وطرق إطعام المريض التغذية العلاجية لمرضى البول السكري والكبد والكلية وحوصلات الجهاز البولي والمرارة وفقر الدم الناجم عن نقص الغذاء

2-نواتج التعلم المستهدفة:

أ-المعلومات والمفاهيم:

- 1- يدرس العلاقة بين الغذاء و المغذيات ووظائف المغذيات الأساسية في الجسم و احتياجات الجسم للطاقة.
- 2- يتعرف علي أنواع و هضم و إمتصاص كل من الكربوهيدرات والبروتين والدهون.
- 3- يدرس أنواع الفيتامينات و الأملاح المعدنية و أهميتها بالنسبة للجسم.
- 4- يتعرف علي ما يسببه نقص أي نوع من أنواع الوجبة و الأمراض التي يسببها.
- 5- يتعرف على مفهوم التغذية العلاجية وأهدافها والأنظمة الغذائية وطرق إطعام المريض.
- 6- يدرس أعراض وأسباب والتغذية العلاجية لمرضى السكري.
- 7- يتعرف على أعراض وأسباب والتغذية العلاجية لمرضى الكلى.
- 8- يدرس أعراض وأسباب والتغذية العلاجية لمرضى حوصلات الجهاز البولي.
- 9- يدرس أعراض وأسباب والتغذية العلاجية لمرضى الكبد والمرارة.
- 10- يتعرف على أنواع وأعراض وأسباب والتغذية العلاجية لامراض سوء التغذية الناجمة عن نقص الغذاء(فقر الدم).

ب-المهارات الذهنية:

- 1-يربط بين وظائف المغذيات الأساسية واحتياجات الجسم لها.
- 2-يدرك العلاقة بين أنواع المغذيات و تأثير كل منهما علي الآخر.
- 3-يستنتج الأمراض التي تحدث نتيجة النقص او الإفراط في تناول اي من الفيتامينات و الأملاح المعدنية.
- 4-يستنتج انواع الغذاء المناسبة لمرضى السكري والكلى والكبد والمرارة.
- 5-يستنتج انواع الغذاء التي يجب أن يتجنبها مرضى السكري والكلى والكبد والمرارة.
- 6- يقارن بين أنواع حصيات الجهاز البولي.

ب.7- يجمع بين أعراض وأسباب والتغذية العلاجية لأمراض الكبد والكلية.

ب.8- يقارن بين أنواع سوء التغذية الناجمة عن نقص الغذاء (فقر الدم).

ج-المهارات المهنية:

ج.1- يحدد الأضرار التي تنتج عن نقص نوع معين من الغذاء.

ج.2- وصف غذاء علاجي لبعض الأمراض.

ج.3- يحدد الغذاء الصحي في ضوء ما درسة عن انواع الغذاء.

د-المهارات العامة

د.1- بحث عن المعلومات والتعلم الذاتي .

د.2- استخدام الكمبيوتر والانترنت

3- محتوى المقرر

من % الكلية	ساعات			الموضوع
	التمارين	العملية	النظري	
17.4%	0	0	2	1 أساسيات التغذية والعلاقة بين الغذاء والمغذيات..
17.4%	0	0	2	2 انواع الكربوهيدرات و هضمها .
17.4%	0	0	2	3 أيض الكربوهيدرات و فوائدها.
17.4%	0	0	2	4 الكلية ووظائفها والتغذية العلاجية لمرضى المتلازمة الكلوية.
17.4%	0	0	2	5 التغذية العلاجية لمرضى الالتهاب الكلوى الحاد والفشل الكلوى الحاد
17.4%	0	0	2	6 امتحان منتصف الترم
17.4%	0	0	2	7 التغذية العلاجية لمرضى التهاب الكبد الحاد وتشمع الكبد (1)
17.4%	0	0	2	8 التغذية العلاجية لمرضى التهاب الكبد الحاد وتشمع الكبد (2)
17.4%	0	0	2	9 الماء وأنواع الفيتامينات و خصائصها العامة.
17.4%	0	0	2	10 التغذية العلاجية لمرضى التهاب المرارة
17.4%	0	0	2	11 . أمراض سوء التغذية الناجمة عن نقص الغذاء (فقر الدم) أنواعها وأسبابها وأعراضها
17.4%	0	0	2	12 الأملاح المعدنية كبيرة المقدار.

%17.4	0	0	2	13 فقر الدم الناجم عن نقص والفولات وفيتامين B12
%17.4	0	0	2	14 مراجعة
%100	0	0	28	عدد الساعات

4- أساليب التعليم والتعلم:

العصف الذهني	حل المشاكل	المناقشات والدورات	عروض وأفلام	المحاضرة	نواتج التعلم المستهدفة	
x	0	x	x	x	1. أ. يدرس العلاقة بين الغذاء و المغذيات ووظائف المغذيات الأساسية في الجسم و احتياجات الجسم للطاقة	المعلومات والمفاهيم:
x	x	x	x	x	2. أ. يتعرف علي أنواع و هضم و إمتصاص كل من الكربوهيدرات والبروتين والدهون.	
x	x	x	x	x	3. أ. يدرس أنواع الفينامينات و الأملاح المعدنية و أهميتها بالنسبة للجسم	
x	x	x	x	x	4. أ. يتعرف علي ما يسببه نقص أي نوع من أنواع الوجبة و الأمراض التي يسببها	
0	0	x	x	x	5. أ. يتعرف على مفهوم التغذية العلاجية وأهدافها والأنظمة الغذائية وطرق إطعام المريض	
x	x	x	x	x	6. أ. يدرس أعراض وأسباب و التغذية العلاجية لمرضى السكري.	
x	x	x	x	x	7. أ. يتعرف على أعراض وأسباب و التغذية العلاجية لمرضى الكلى.	
x	x	x	x	x	8. أ. يدرس أعراض وأسباب و التغذية العلاجية لمرضى حويصلات الجهاز البولي	
x	x	x	x	x	9. أ. يدرس أعراض وأسباب و التغذية العلاجية لمرضى الكبد والمرارة.	
x	x	x	x	x	10. أ. يتعرف على أنواع وأعراض واسباب و التغذية العلاجية لأمراض سوء التغذية الناجمة عن نقص الغذاء(فقر الدم).	
x	x	0	x	x	1. ب. يربط بين وظائف المغذيات الأساسية و احتياجات الجسم لها.	المهارات الذهنية
x	0	x	x	x	2. ب. يدرك العلاقة بين أنواع المغذيات وتأثير كل منهما على الآخر	
X	x	x	x	x	3. ب. يستنتج الأمراض التي تحدث نتيجة النقص او الإفراط في تناول .اي من الفينامينات و الأملاح المعدنية	
X	x	x	0	x	4. ب. يستنتج انواع الغذاء المناسبة لمرضى السكري و الكلى و الكبد والمرارة	
X	x	x	0	x	5. ب. يستنتج انواع الغذاء التي يجب أن يتجنبها مرضى السكري	

					والكلية والكبد والمرارة	
X	x	x	x	x	ب.6 يقارن بين أنواع حصيات الجهاز البولي	
X	x	x	x	x	ب.7 يجمع بين أعراض وأسباب والتغذية العلاجية لأمراض الكبد والكلية.	
X	x	x	x	x	ب.8 يقارن بين أنواع سوء التغذية الناجمة عن نقص الغذاء (فقر الدم).	
X	x	x	x	x	ج.1 يحدد الأضرار التي تنتج عن نقص نوع معين من الغذاء.	ب.ج.د
X	x	0	x	x	ج.2 وصف غذاء علاجي لبعض الامراض	
X	x	x	0	x	ج.3 يحدد على نوع الغذاء الصحي في ضوء ما درسة عن انواع الغذاء.	
X	x	0	0	0	د.1 بحث عن المعلومات والتعلم الذاتي .	ب.د.هـ
X	x	0	0	0	د.2 استخدام الكمبيوتر والانترنت.	

5 - تقويم الطلاب:

10 %	الاسبوع السابع	امتحان منتصف الفصل
10 %	الاسبوع الخامس عشر	امتحان الشفهي
80 %	الاسبوع السادس عشر	امتحان نهاية الفصل
100 %		المجموع

6- قائمة الكتب الدراسية والمراجع:

أ- مذكرات

مذكرة التغذية الصحية معتمدة من القسم

ب- كتب ملزمة

د. منى خليل عبد القادر. كتاب التغذية العلاجية . الناشر: مجموعة النيل العربية. 2013.

ج- كتب مقترحة

أ.د حسين رزق . كتاب أسس التغذية الصحية للبالغين. مصر. 2002.

د- دوريات علمية أو نشرات

<http://www.bu.edu.eg/staff/daoamohamed7-courses>

<http://www.bu.edu.eg/staff/marwaabdelmaksoud7-courses>

7- الأدوات المستخدمة في التعليم والتعلم:

جهاز كمبيوتر - ميكروفون - جهاز عرض ضوئي - شاشة عرض.

منسق المقرر:

أ.د. ماجدة محمد العزبي

أ.د. مشيرة محمد عزت سليم

منسق البرنامج:

أ.د. صافيناز محمد رضا

أ.د. وجدي إبراهيم الدجج

رئيس القسم:

2023-2022

التاريخ:



Course Specification

Chm 211: Aliphatic Organic Chemistry

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390) , updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Wagdy El-DougDoug Prof. Dr. Aly Abdelmaboud

B - Basic information

Title: Aliphatic Organic Chemistry	Code: Chm 211	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand halogenic derivatives of hydrocarbons, alcohols, ethers, sulphur compounds of alcohols and ethers, aliphatic aldehydes and ketones, amines, monocarboxylic acids, esters, amides and anhydrides.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- State halogenic derivatives of hydrocarbons
- a.2- List the different alcohols.
- a.3- Describe the different types of ethers.
- a.4- Illustrate the sulphur compounds of alcohols and ethers
- a.5- Recognize the Aliphatic aldehydes and ketones
- a.6- Recite Monocarboxylic acids, esters, amines, amides and anhydrides



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Explain compounds of alcohols and ethers
- b2- Differentiate between sulphur compounds of alcohols and ethers
- b3- Compare monocarboxylic acids, esters, amides and anhydrides
- b4- Distinguish halogenic derivatives of hydrocarbons

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Investigate different solid organic compounds.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Halogenic derivatives of hydrocarbons - Identification of non-reducing sugar	2	0	3	17.4%
2. Alcohols - Identification of metallic salt of aliphatic acids	2	0	3	17.4%
3. Ethers - Identification of disaccharides	2	0	3	17.4%
4. Sulphur compounds of alcohols - Identification of mono hydric phenols	2	0	3	17.4%
5. Sulphur compounds of ethers - Identification of di hydric phenols	2	0	3	17.4%
6. Aldehydes - Identification of tri hydric phenols	2	0	3	17.4%
7. Mid-term exam	2	0	3	17.4%
8. Ketones - Identification of monosaccharides	2	0	3	17.4%
9. Monocarboxylic acids - Identification of aliphatic acids	2	0	3	17.4%
10. Esters - Identification of reducing sugar	2	0	3	17.4%
11. Amides - Identification of ammonium salt of aliphatic acids and urea	2	0	3	17.4%
12. Amines - Identification of aniline salts	2	0	3	17.4%
13. Anhydrides - Identification of polysaccharides	2	0	3	17.4%
14. Revision	2	0	3	17.4%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming	
Knowledge & Understanding	a1	State halogenic derivatives of hydrocarbons	X	0	0	0	0	x
	a2	Write the different alcohols.	X	0	0	0	x	0
	a3	Describe the different types of ethers.	X	0	0	0	x	x
	a4	Explain the sulphur compounds of alcohols and ethers	X	x	0	0	x	x
	a5	Recognize the Aliphatic aldehydes and ketones	X	0	0	0	x	x
	a6	State Monocarboxylic acids, esters, amines, amides and anhydrides	X	0	0	0	x	x
Intellectual Skills	b1	Construct compounds of alcohols and ethers	X	0	x	0	0	x
	b2	Compare between sulphur compounds of alcohols and ethers	X	x	0	0	x	x
	b3	Compare monocarboxylic acids, esters, amides and anhydrides	X	0	0	0	0	x
	b4	Compare between halogenic derivatives of hydrocarbons	X	0	0	0	0	x
Practical and professional	c1	Investigate different solid organic compounds	X	x	x	0	x	x
General Skills	d1	Community linked thinking on the scientific basis taught in this course.	X	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with	X	x	0	0	x	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
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Semester Work	a1, a2, a4, b1, b2 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a5, b1, b2, d1, d2 and c1	Seventh week	3 %
Oral exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, and d2	Fifteenth week	6 %
Practical exam	c1	Sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3.	Seventeenth week	48 %
Total			100 %

Course matrix

Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills	General Skills	
	a 1	a 2	a 3	a 4	a 5	a 6	b 1	b 2	b 3	b 4	C 1	d 1	d 2
1. Halogenic derivatives of hydrocarbons - Identification of non-reducing sugar	x										x		
2. Alcohols - Identification of metallic salt of aliphatic acids		x					x				x		
3. Ethers - Identification of disaccharides			x				x				x		
4. Sulphur compounds of alcohols - Identification of monohydric phenols				x				x			x		
5. Sulphur compounds of ethers - Identification of dihydric phenols				x				x			x		
6. Aldehydes - Identification of trihydric phenols					x						x		
7. Mid-term exam	x	x	x		x		x	x			x	x	x
8. Ketones - Identification of monosaccharides					x						x		
9. Monocarboxylic acids - Identification of aliphatic acids						x			x		x	x	x
10. Esters - Identification of reducing sugar						x			x		x		



11. Amides - Identification of ammonium salt of aliphatic acids and urea						X			x		X	x	x
12. Amines - Identification of aniline salts						X			x		X		
13. Anhydrides - Identification of polysaccharides						X			x		X	x	x
14. Revision	x	x	x	x	x	X		x	x		X		

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructors and proved by chemistry department.

6-2 Required books

"Organic Chemistry for competitive examinations", Arun Bahl, Punjab University, INDIA, 2009

6-3 Recommended books

6-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Microphone, Black/white board, Group Discussions , Data show

Course coordinator:

Prof. Dr. Wagdy El-DougDoug

Prof. Dr. Aly Abdelmaboud

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023



Course Specification

213Ch: Aliphatic Organic Chemistry (2)

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Amaal Younes Dr. Enas Abdelaleem

B - Basic information

Title: Aliphatic Organic Chemistry (2)	Code: 213 Ch	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand and identify the different types of organic compounds such as cycloalkanes (naphthenes), dienophiles, unsaturated; polyhydric alcohols; polycarboxylic acids; carboxylic derivatives and the chemistry of active methylene compounds with their applications.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Classify the different types of organic compounds.
- a.2- Name the different types of organic compounds.
- a.3- Describe the difference between the saturated and unsaturated organic compounds.
- a.4- Discover the importance of active methylene compounds and their applications.
- a.5- Recognize polyhydric alcohols and polycarboxylic acids.
- a.6- Tell the most applications for the studied topics

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Explain the possible conversions in organic compounds.
- b2- Differentiate between saturated and unsaturated compounds.
- b3- Compare between monocarboxylic acids and polycarboxylic
- b4- Distinguish the different types of organic compounds with active methylene group.



c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Select the suitable methods for preparation of organic compounds.
- c2- Modify the conditions for synthesis of organic compounds.
- c3- Predict whether the organic reaction will complete or not.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction	2	0	0	17.4%
2. Aliphatic cycloalkanes	2	0	0	17.4%
3. Dienophiles and their applications	2	0	0	17.4%
4. Unsaturated alcohols (synthesis and applications)	2	0	0	17.4%
5. Polyhydric alcohols (Di & Trihydric alcohols)	2	0	0	17.4%
6. Polyhydric alcohols in industrial field	2	0	0	17.4%
7. Mid-term exam	2	0	0	17.4%
8. Polycarboxylic acids	2	0	0	17.4%
9. Hydroxy acids	2	0	0	17.4%
10. Unsaturated organic acids	2	0	0	17.4%
11. Organic compounds with active methylene group	2	0	0	17.4%
12. Synthesis and of active methylene compounds	2	0	0	17.4%
13. Applications of naphthenes in industrial field	2	0	0	17.4%
14. Revision	2	0	0	17.4%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define the different types of organic compounds.	X	0	0	0	0	0
	a2	Name the different types of organic compounds.	X	x	0	0	X	0
	a3	Explain the difference between the saturated and unsaturated organic compounds.	X	0	0	0	X	X
	a4	Outline the importance of active methylene compounds and their applications.	X	x	0	0	X	X
	a5	Recognize the polyhydric alcohols and polycarboxylic acids.	X	0	X	0	X	X
	a6	State the most applications for the studied topics	X	0	0	x	0	X
Intellectual Skills	b1	Construct the possible conversions in organic compounds.	X	0	0	0	0	X
	b2	Compare between saturated and unsaturated compounds.	X	x	0	0	X	X
	b3	Compare between monocarboxylic acids and polycarboxylic	X	0	0	0	0	X
	b4	Compare the different types of organic compounds with active methylene group	X	x	X	0	0	X
Practical and professional skills	c1	Analyze the suitable methods for preparation of organic compounds.	X	x	X	0	X	X
	c2	Investigate the conditions for synthesis of organic compounds.	0	0	0	0	0	X
	c3	Show the organic reaction will complete or not.	X	0	0	0	0	X
General Skills	d1	Community linked thinking on the scientific basis taught in this course.	X	0	0	0	0	X
	d2	Work in a team effectively, manage time, collaborate and communicate with	X	x	0	0	X	X

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2 and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a5, a6, b2, b3, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, d1 and d2	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills			General Skills	
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	C1	C2	c3	d1	d2
1. Introduction	x	x													
2. Aliphatic cycloalkanes	x	x								x	x				x
3. Dienophiles and their applications						x	x				x	x	x		
4. Unsaturated alcohols (synthesis and applications)			x			x		x			x	x	x	x	x
5. Polyhydric alcohols (Di & Trihydric alcohols)															
6. Polyhydric alcohols in industrial field		x			x						x			x	x
7. Mid-term exam	x	x	x		x	x		x	x					x	x
8. Polycarboxylic acids					x				x		x				
9. Hydroxy acids									x						
10. Unsaturated organic acids			x					x							
11. Organic compounds with active methylene group				x						x	x	x	x	x	x
12. Synthesis and of active methylene compounds				x							x	x	x		
13. Applications of naphthenes in industrial field						x							x	x	x
14. Revision	x	x	x	x	x	x		x	X	x			x		

6- List of references:



6-1 Course notes

Lecture notes prepared by the course instructors proved by chemistry department

6-2 Required books

"*Organic Chemistry for competitive examinations*", Arun Bahl, Penjab University, INDIA, 2009

6-3 Recommended books

6-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Dr. Amaal Younes

Dr. Enas Abdelaleem

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023



Course Specification

Chm 213: Petroleum and Petrochemicals

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Chemistry Department
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohamed Hussein Dr. Amr Feteha

B - Basic information

Title: Petroleum and Petrochemicals	Code: Chm 213	Year/level: second level
Teaching Hours:	Lectures: 2 Practical: 0 Course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general properties of the petrochemical and petroleum additives such as principals of petroleum chemistry, uses of petroleum compounds in industrial fields as rubbers, fibers, industrial detergents, Pesticides. Also, teach students the components of petroleum, properties and uses of these compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the principals properties of petroleum chemistry.
- a.2- Describe the uses petroleum compounds.
- a.3- understand the petrochemical products from petroleum compounds.
- a.4- To know the petroleum additives and it properties.
- a.5- Mention some of the important role of petroleum additives for lubricating oils, gasoline, fuels.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Interpret the given chemical data to identify the components of petroleum crude oils.
- b2- Modify the petrochemical uses for components of petroleum.
- b3- Explain the properties of petroleum additives in different fields such as lubricating



oils, fuels and gasoline.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Analyze the uses of petroleum products in industry of rubbers, plastics, pesticides and industrial detergents.

c2-Apply the knowledge that the student studied to propose the petrochemical industries and petroleum additives.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and the internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to the principals of petroleum chemistry	2	0	0	17.4%
2. General uses of petroleum compounds in different fields	2	0	0	17.4%
3. Application of the petroleum products in rubbers, and fibers industries	2	0	0	17.4%
4. Application of the petroleum products in industrial detergents.	2	0	0	17.4%
5. Application of the petroleum products in Pesticides and other industries	2	0	0	17.4%
6. Short notes about petroleum additives and their properties.	2	0	0	17.4%
7. Mid-Term Exam.	2	0	0	17.4%
8. Preparation of Lubricating oils from of crude oils by refining and properties of Lub. Oils	2	0	0	17.4%
9. Lubricating oils additives	2	0	0	17.4%
10. Fuels additives	2	0	0	17.4%
11. What is the gasoline?	2	0	0	17.4%
12. General properties of gasoline additives	2	0	0	17.4%
13. General properties of fuel additives	2	0	0	17.4%
14. Revision	2	0	0	17.4%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Problem solving	Brain storming	
Knowledge & Understanding	a1	Define the principal's properties of petroleum chemistry.	x	0	x	0	X
	a2	Describe the uses petroleum compounds.	x	0	0	0	0
	a3	Understand the petrochemical products from petroleum compounds.	x	x	x	X	X
	a4	To know the petroleum additives and it properties.	x	x	x	X	X
	a5	State some of the important role of petroleum additives for lubricating oils, gasoline, fuels.	x	0	0	0	X
Intellectual Skills	b1	Interpret the given chemical data to identify the components of petroleum crude oils	x	x	x	X	X
	b2	Modify the petrochemical uses for components of petroleum.	x	0	x	X	X
	b3	Construct the properties of petroleum additives in different fields as lubricating oils, fuels and gasoline.	x	x	x	X	X
Practical and professional	c1	Analyze the uses of petroleum products in industry of rubbers, plastics, pesticides and industrial detergents.	x	0	x	0	X
	c2	Investigate the knowledge that the student studied to propose the petrochemical industries and petroleum additives.	x	0	x	X	X
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	0	X
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	X	X
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	x	0	X
	d4	Life- long learning the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	X

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c1, c2, and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	d1	d2	d3	d4
1. Introduction to the principals of petroleum chemistry	x													
2. General uses of petroleum compounds in different fields		X									x			
3. Application of the petroleum products in rubbers, and fibers industries			x						x	X	x			
4. Application of the petroleum products in industrial detergents.			x						x	X	x			
5. Application of the petroleum products in Pesticides and other industries			x											
6. Short notes about petroleum additives and their properties.				x	x							x		x
7. Mid-Term Exam.	x	X	x	X			x				x	x		
8. Preparation of Lubricating oils from of crude oils by refining and properties of Lub. Oils			x			x		x	x			x		
9. Lubricating oils additives					x		x	x	x					
10. Fuels additives					x		x	x					x	x
11. What is the gasoline?					x			x					x	x
12. General properties of gasoline additives				X	x									x
13. General properties of fuel additives				X	x			x					x	
14. Revision	x	X	x	X	x		x	x	X	X				



6- List of references:

6-1 Course notes

Lecture note approved by Department of Chemistry.

6-2 Required books

- ❖ William L. Leffler, Richard Patazzi, Gorgon Sterling; Deep water petroleum 2nd, 2011.
- ❖ William L. Leffler; Petroleum Refining in Nontechnical Language 4th, 2008.
- ❖ Jon Gluyas, Richard Swarbrick; Petroleum Geoscience, 2008.
- ❖ Saeid Mokhatab , John Y. Mak , Jaleel V. Valappil , David A. Wood; Handbook of Liquefied Natural Gas, 2013.

6-3 Recommended books

- 1- David S. G. Gones, Peters R. Dugado; Handbook of petroleum processing, 2006.
- 2- Games H. Gary, Galenn E. Handwerk; Petroleum refining 5th, 2001.

6-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Petroleum Chemistry (ACS)

<http://www.springer.com/us/book/9783319145280>

http://www.petrochemistry.eu/about-petrochemistry/products.html?filter_id=15

https://en.wikipedia.org/wiki/Oil_additive

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Hussein

Dr. Amr Feteha

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Chm 231: Chemical Thermodynamics

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Asmaa Abo El-soud

B - Basic information

Title: Chemical Thermodynamics	Code: Chm 231	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the relation between heat and energy and work. Give explanation of macroscopic variables (such as temperature, internal energy, entropy, and pressure) that characterize materials and radiation, and explains how they are related and by what laws they change with time. Give explanation of the four laws of thermodynamics, Thermodynamics applies to a wide variety of topics in science and engineering—such as engines, phase transitions, chemical reactions.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate the relation between the energy and work.
- a.2- Define some general concepts of chemical thermodynamics.
- a.3- Recognize the different laws of thermodynamics.
- a.4- Investigate the direction of physical and chemical processes
- a.5- Investigate the equilibrium state and spontaneity of chemical reactions.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Analyze the given chemical data to identify the physical and chemical reactions are Spontaneous or non-spontaneous processes.
- b2- Explain the different forms of energies and their transferring them to another forms.
- b3. Explain the different laws of chemical thermodynamics



- b4. Explain different thermodynamics functions and their relation with the direction of the physical and chemical reactions.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Calculate the different state thermodynamic functions such as Enthalpy and free energies.
c2- Apply the knowledge that the student studied to propose the direction of Chemical and physical processes.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and the internet for information and communication technology effectively.
d2- Solve problems on the scientific basis taught in this course.
d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to chemical thermodynamics concepts (System, Types of process, functions, equilibrium state).	2	0	0	17.4%
2. Reversible and irreversible process, work and types of energies	2	0	0	17.4%
3. Zero law and first law of thermodynamic(statements and mathematical expressions)	2	0	0	17.4%
4. Internal energy, enthalpy and heat capacity	2	0	0	17.4%
5. Applications of first law of thermodynamics and calculations of different thermodynamic functions	2	0	0	17.4%
6. Carnot cycle and the efficiency of heat engine	2	0	0	17.4%
7. Mid-Term Exam.	2	0	0	17.4%
8. Second law of thermodynamic (statements and mathematical expressions)	2	0	0	17.4%
9. Entropy concept, microstates and its calculations	2	0	0	17.4%
10. Free energies and the direction of physical and chemical reactions	2	0	0	17.4%
11. Chemical potential and thermodynamics of solutions	2	0	0	17.4%
12. Chemical equilibrium and equilibrium constant and its relation with the free energy and its dependence on pressure and temperature part (1).	2	0	0	17.4%
13. Chemical equilibrium and equilibrium constant and its relation with the free energy and its dependence on pressure and temperature part (2).	2	0	0	17.4%
14. Revision	2	2	0	17.4%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Recognize the relation between the energy and work.	x	0	X	0	0	x
	a2	Define some general concepts of chemical thermodynamics.	x	0	X	0	0	x
	a3	Recognize the different laws of thermodynamics.	x	0	X	0	X	x
	a4	Recognize the direction of physical and chemical processes	x	0	X	0	X	x
	a5	Recognize the equilibrium state and spontaneity of chemical reactions.	x	0	X	0	X	x
Intellectual Skills	b1	Organize the given chemical data to identify the physical and chemical reactions are Spontaneous or non-spontaneous processes.	x	0	X	x	X	x
	b2	Construct the different forms of energies and their transferring them to other forms.	x	0	X	0	X	x
	b3	Construct the different laws of chemical thermodynamics	x	0	X	0	X	x
	b4	Construct different thermodynamics functions and their relationship with the direction of the physical and chemical reactions.	x	0	X	0	X	x
Practical and professional skills	c1	Summarize the different state thermodynamic functions such as Enthalpy and free energies.	x	0	X	0	X	x
	c2	Examine the knowledge that the student studied to propose the molecular structures of the transition metal complexes.	x	0	X	0	X	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	X	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with Others positively.	x	0	X	0	0	x
	d4	Life- long learning the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3.and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	b 4	C 1	C 2	d 1	d 2	d 3	d 4
1. Introduction to chemical thermodynamics concepts (System, Types of process, functions, equilibrium state).	x	x		x	x										
2. Reversible and irreversible process, work and types of energies	x		X	x	x	x	x						x	X	
3. Zero law and first law of thermodynamic(statements and mathematical expressions)	x		X					x	x	x		x	x	X	
4. Internal energy, enthalpy and heat capacity			X				x		x	x		x	x		
5. Applications of first law of thermodynamics and calculations of different thermodynamic functions			X			x	x	x	x	x	X	x	x	X	x
6. Carnot cycle and the efficiency of heat engine			X		x			x	x	x		x	x	X	
7. Mid-Term Exam.	x	x	X	x		x						x	x		
8. Second law of thermodynamic (statements and mathematical expressions)	x		X				x	x	x	x	X	x		X	
9. Entropy concept, microstates and its calculations	x		X	x			x		x	x		x	x		
10. Free energies and the direction of physical and chemical reactions			X	x			x		x	x		x	x	X	
11. Chemical potential and thermodynamics of solutions			X	x			x		x	x			x	X	
12. Chemical equilibrium and equilibrium constant and its relation with the free energy and its dependence on pressure and temperature part (1).			X		x		x		x		X	x	x		x
13. Chemical equilibrium and equilibrium constant and its relation with the free energy and its dependence on pressure and temperature part (2).			X		x		x		x		X	x	x	X	x
14. Revision	x	x	X	x	x	x	x	x		x					



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

E. N. Yeregin `` Fundamentals of chemical Thermodynamics``.

6-5 Recommended books

- 1-G. M. Anderson `` Thermodynamics of natural systems``
- 2- P. Atkins, J. de Paula `` physical chemistry for the life Sciences``
- 3- E. I. Peters `` Problem solving for chemistry`` 2nd Edition

6-6 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

physical Chemistry

<http://www.google.com>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Dr. Asmaa Abo El-soud

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

Chm 242: Chemistry of Water treatment (1)

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Dr. Alaa Amin
Dr. Hesham El-feky

B - Basic information

Title: Chemistry of Water treatment (1)	Code: Chm242	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to get information about the different sources of water pollution and information about different methods of water treatment.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1- Locate water resources and water pollution
- a2- Recognize water purification
- a3- Recognize water pollution treatment

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Decide ways of sampling
- b2- Select testing water chemistry
- b3- Select method of purification

c- Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Predict method of treatment
- c2- Examine water quality

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and the internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to water sources and Maximum containment level (MCL). - Introduction into methods of water purification.	2	0	0	17.4%
2. Types of inorganic pollutants and their methods of determination. - Colorimetric determination of pH.	2	0	0	17.4%
3. Types of organic pollutants and their methods of determination. - Electrochemical measurements of pH using pH-meter.	2	0	0	17.4%
4. Physical properties of water samples such as TDS, TSS, TS, pH, Turbidity, Transparency and EC. - Determination of transparency.	2	0	0	17.4%
5. Chemical properties of water samples such as hardness of water, alkalinity, chlorosity and amount of dissolved oxygen. - Determination of turbidity 1.	2	0	0	17.4%
6. Treating water samples from pollutants by chemical adsorption using inorganic materials. - Determination of turbidity 2.	2	0	0	17.4%
7. Mid-term exam.	2	0	0	17.4%
8. Treating water samples from pollutants by chemical adsorption using inorganic / organic polymers materials. - Determination of electrical conductivity of water.	2	0	0	17.4%
9. Studying different factors affecting on removing pollutants such as time, pH, concentration, amount of adsorbent, ionic strength, and point of zero charge. - Determination of the salinity of water.	2	0	0	17.4%
10. Studying Thermodynamic parameters affecting on removing pollutants. - Determination of hardness of water.	2	0	0	17.4%
11. Studying Adsorption isotherms such as Langmuir, freundlich, and DR isotherm. - Determination of alkalinity of water.	2	0	0	17.4%
12. Studying kinetics of adsorption process such as pseudo first order, pseudo second order and intraparticle diffusion model. - Determination the percent of chlorosity in water.	2	0	0	17.4%

13. Studying other methods of water treatment such as Reverse osmosis, Desalination and ultracentrifugation. - Determination the percent of sulphate in water.	2	0	0	17.4%
14. Designing membranes and filters for treatment. - Revision.	2	0	0	17.4%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against ILOS :

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Locate water resources and water pollution	x	0	x	x	0	x
	a2	Recognize water purification	x	0	x	0	0	x
	a3	Recognize water pollution treatment	x	x	x	x	x	x
Intellectual Skills	b1	Design ways of sampling	x	0	0	0	x	0
	b2	Interpret testing water chemistry	x	0	x	x	x	x
	b3	method of purification	x	x	0	x	x	x
Practical and professional skills	c1	Interpret Predict method of treatment	x	0	x	x	0	x
	c2	Examine water quality	x	0	x	x	0	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with Others positively.	x	0	x	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, d3, d1, and d2	Fifth week	3 %
Mid-Term Exam	a1, a2, a3 and b3	Seventh week	3 %
Oral exam	a1, a2, a3, b1, b2, b3 and c1	Thirteenth week	6 %
Practical exam	C1 and C2	Sixteenth week	40%
Written exam	a1, a2, a3, b1, b2, b3.	Fourteenth week	48 %
Total			100 %

Course matrix

Topic	Knowledge and understanding			Intellectual skills			Practical and professional skills		General Skills		
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
1. Introduction to water sources and Maximum containment level (MCL). - Introduction into methods of water purification.	x						x				
2. Types of inorganic pollutants and their methods of determination. - Colorimetric determination of pH.	x		x				x	X	X		
3. Types of organic pollutants and their methods of determination. - Electrochemical measurements of pH using pH-meter.			x				x	X	X		
4. Physical properties of water samples such as TDS, TSS, TS, pH, Turbidity, Transparency and EC. - Determination of transparency.					x		x	X			
5. Chemical properties of water samples such as hardness of water, alkalinity, chlorsity and amount of dissolved oxygen. - Determination of turbidity 1.				x			x	X			x
6. Treating water samples from pollutants by chemical adsorption using inorganic materials. - Determination of turbidity 2.		X					x	X			x
7. Mid-term exam.	x	X	x			x	x	X			
8. Treating water samples from pollutants by chemical adsorption using inorganic / organic polymers materials. - Determination of electrical conductivity of water.							x	X			
9. Studying different factors affecting on removing pollutants such as time, pH, concentration, amount of adsorbent, ionic strength, and point of zero charge. - Determination of the salinity of water.		X					x	X			
10. Studying Thermodynamic parameters affecting on removing pollutants.							x	x		X	



- Determination of hardness of water.												
11. Studying Adsorption isotherms such as Langmuir, freundlich, and DR isotherm. - Determination of alkalinity of water.							x	X			X	
12. Studying kinetics of adsorption process such as pseudo first order, pseudo second order and intraparticle diffusion model. - Determination the percent of chloristy in water.							x	X				
13. Studying other methods of water treatment such as Reverse osmosis, Desalination and ultracentrifugation. - Determination the percent of sulphate in water.							x	X				
14. Designing membranes and filters for treatment. - Revision.							x	X				

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

Chemistry, Experimental and Theory, Bernice G.Segal, 2nd edition, John wiley & Sons Inc. (1996).

Basic Water Treatment, Chris Binnie, Martin Kimber and George Smethurst, 2nd edition, Thomas Telford (2002).

6-7 Recommended books

Vogel's Textbook of Quantitative Chemical Analysis, Arthur Israel Vogel, 6th edition, Prentice Hall (2000).

Handbook of Water and Wastewater Treatment Technologies, Nicholas P Cheremisinoff, 1st edition, Elsevier (2001).

6-8 Periodicals, Web sites, etc.

Journal of separation and purification technology (Elsevier)

Inorganic Chemistry (ACS)

<http://www.intechopen.com/books/water-treatment>

<http://water.epa.gov/drink/contaminants/>

http://en.wikipedia.org/wiki/Maximum_Contaminant_Level

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using of slit overhead projector

Using a black board

Group Discussions

Course coordinator: Prof. Dr. Alaa Amin

Dr. Hesham El-feky

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

(241M Statistics and Computer Science)

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Mathematics
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. Hosni Kamel

B - Basic information

Title:	Code:	Year/level:
Statistics and Computer Science	241 M	Second level
Teaching Hours:	Lectures: 2 h/week	Tutorial: 2 h/week
	Practical: —	Total: 3 h/week

C - Professional information

1 – Course Learning Objectives:

At the end of this course, the students should be able to:
Recognize the basic concepts, of Probability such as Sample Space, Random Variables, Bivariate and Multivariate Random Variables and Some special bivariate Distributions, Function of Random Variables, Sampling Theory.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

At the end of this course, the students must be able to:

- a1- Discover the Probability theory.
- a2- Organize difficulties with Sample Space and Random Variables.
- a3- Interpret Postulates of Some Discrete Distributions - Some Continuous Distributions.
- a4- Modify the Bivariate and Multivariate Random Variables - Some special bivariate Distributions.

b - Intellectual skills:

At the end of this course, the students must be able to:

- b1- Show the validity of mathematical statistics results.
- b2- Analyze the fundamental differences between mathematical statistics objects.
- b3- Investigate lines of argument and appropriate judgments in accordance with scientific theories and concepts.

c - Practical and professional skills:

At the end of this course, the students must be able to:

- c1- Prepare confidence in their abilities to use mathematics.
- c2- Solve problems using various formats.

c3- Summarize logical techniques to construct convincing mathematical statistical arguments.

c4- Identify required mathematics statistics and other technical information independently.

d - General skills:

At the end of this course, the students must be able to:

d1- Work in groups effectively.

d2 Think independently, set tasks and solve problems on scientific bases.

d3- manage information and communication technology effectively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours
Random Variables(1)	2	2	-
Random Variables(2)	2	2	
Bivariate and Multivariate Random Variables Some special bivariate Distributions(1)	2	2	
Bivariate and Multivariate Random Variables Some special bivariate Distributions(2)	2	2	
Bivariate and Multivariate Random Variables Some special bivariate Distributions(3)	2	2	-
Revision and mid-term exam	2	2	
Bivariate and Multivariate Random Variables Some special bivariate Distributions(4)	2	2	
Function of Random Variables(1)	2	2	
Function of Random Variables(2)	2	2	
Function of Random Variables(2)	2	2	
Sampling Theory(1)	2	2	
Sampling Theory(2)	2	2	
Tests Hypothesis (1)	2	2	-
Tests Hypothesis (2)	2	2	
Total hours	28	28	-

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1-	Discover the Probability theory.	✓				✓	
	a2-	Interpret Postulates of Some Discrete Distributions - Some Continuous Distributions	✓		✓		✓	
	a3-	Know Postulates of Some Discrete Distributions - Some Continuous	✓				✓	✓

		Distributions						
	a4-	Modify the Bivariate and Multivariate Random Variables - Some special bivariate Distributions	✓				✓	
Intellectual Skills	b1-	Show the validity of mathematical statistics results.	✓	✓			✓	
	b2-	Analyze the fundamental differences between mathematical statistics objects.	✓				✓	✓
	b3-	Investigate lines of argument and appropriate judgments in accordance with scientific theories and concepts.	✓				✓	
Practical and professional skills	c1-	Prepare confidence in their abilities to use mathematics.	✓		✓		✓	
	c2-	Solve problems using various formats.	✓				✓	
	c3-	Summarize logical techniques to construct convincing mathematical statistics arguments.	✓		✓		✓	
	c4-	Identify required mathematics statistics and other technical information independently.	✓	✓			✓	
General Skills	d1-	Work in groups effectively.	✓				✓	✓
	d2-	Think independently, set tasks and solve problems on scientific bases.	✓		✓		✓	
	d3-	Manage information and communication technology effectively.	✓				✓	✓

5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1, a2,c1,c2	Week 7	10 %
Oral exam	d1, d2,	Week 15	10 %
Practical exams			
Written exam	a3,a4,c3,c4,d3	Start of the sixteenth week	80 %
Total			100 %

6 – Course Matrix

Topic	Knowledge & Understanding				Intellectual Skills			Practical and professional skills				General Skills		
	a1	a2	a3	a4	b1	b2	b3	c1	c2	c3	c4	d1	d2	d3
Random Variables(1)	x				x			x					x	
Random Variables(2)		x				x					x			x
Bivariate and Multivariate Random Variables Some special bivariate Distributions(1)		x			x							X		
Bivariate and Multivariate Random Variables Some special bivariate Distributions(2)			x			x		x						x
Bivariate and Multivariate Random Variables Some special bivariate Distributions(3)			x		x			x						x
Bivariate and Multivariate Random Variables Some special bivariate Distributions(4)	x			x					x					x
Function of Random Variables(1)	x					x			x				x	
Function of Random Variables(2)	x		x					x				X		
Function of Random Variables(2)		x			x			x						x
Sampling Theory(1)		x				x				x			x	
Sampling Theory(2)		x			x					x				x
Tests Hypothesis (1)			x				x				x			x
Tests Hypothesis (2)	x				x						x			x



7- List of references:

7-1 Course notes

-Notes were approved by the Math Department.

7-2 Required books.

- Joseph McKean and Allen T Craig , Introduce to the probability theory, (2001)

7-3 Recommended books.

- W.D.McGlenn, "Introduction to probability theory ", John. Hopkins Univ. Press, (2003).

7-4 Periodicals, Web sites, etc.

1-<https://cran.r-project.org/web/packages/IPSUR/vignettes/IPSUR.pdf>

2-http://www4.ncsu.edu/~rsmith/MA797V_S10/Statistics.pdf

8- Facilities required for teaching and learning:

1-Data show

2-white board

Course coordinator: Prof. Dr. Hosni Kamel

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Phy 245: Introduction to Physical Optics

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Physics
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. N. Hendawy

B - Basic information

Title: Introduction to Physical Optics	Code: Phy 245	Year/level: Second level
Teaching Hours:	Lectures: 1 Practical: 3 Course marks: 100 marks	Tutorial: - Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the graduate to distinguish between the interference , diffraction and polarization. Understanding analytical treatment of the diffraction and Polarization. Study the different methods for obtaining on the interference , diffraction and Polarization. Tell about the applications of interferometry and its applications. Recognize what are a thin film and the interference due to it. Discover the thickness defects of materials. Connect between the optical properties of the materials and the interference , diffraction and polarization.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1-Discover the characteristics and some optical properties of matter.
- a.2 - Recognize the treatment analysis for the interference, diffraction and polarization.
- a.3- Describe some methods for obtaining on the interference, diffraction, Polarization and its applications.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

b.1- Assess , according to the interferometry, what about is the optical propeirts of this materials.

b.2- Compare between the optical properties for different materials.

b.3- Analyze the output data from each technique

c - Practical and professional skills:

On successful completion of the course, the student should be able to.

c.1 - investigate the interferometry techniques and interference phenomena.

c.2- Modify the optical properties of materials according to the interferometry.

c.3- Collect a lot of information about , interference, diffraction, polarization and its applications by investigation techniques

d - General skills:

On successful completion of the course, the student should be able to.

d.1- Choose the suitable interferometry of the desired applications.

d.2- Work in team to synthesis and study some optical properties of some materials .

d.3- Collect data and write reports in the standard optical properties of some materials.

3 – Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1	The wave motion	1	0	3	7.14%
2	Wave principle of superposition of waves.	1	0	3	7.14%
3	Interference of wave optics.	1	0	3	7.14%
4	Interference pattern from double slits (Young experiment).	1	0	3	7.14%
5	The interference due to thin films.	1	0	3	7.14%
6	The diffraction of wave light.	1	0	3	7.14%
7	Mid-Term Exam	1	0	3	7.14%
8	The diffraction by single and N slits (diffraction grating).	1	0	3	7.14%
9	Resolving power of the diffraction grating.	1	0	3	7.14%
10	X- ray diffraction by crystals.	1	0	3	7.14%
11	Polarization of light.	1	0	3	7.14%
12	Laser physics principles.	1	0	3	7.14%
13	Introduction to fiber optics	1	0	3	7.14%
14	applications in medicine and communications	1	0	3	7.14%
Total		14	0	42	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a.1	To know the characteristics and some optical properties of matter.	x	0	x	0	0	0
	a.2	Identify the treatment analysis for the interference, diffraction and polarization.	x	0	x	X	0	x
	a.3	Describe some methods for obtaining on the interference, diffraction, polarization and its applications.	x	x	0	0	0	0
Intellectual Skills	b.1	Report, according to the interferometry, what about is the optical properties of this materials.	x	0	0	X	x	0
	b.2	Compare between the optical properties for different materials.	x	0	0	0	0	x
	b.3	Interpret the output data from each technique	x	0	x	X	0	0
Practical and professional skills	c.1	Investigate the interferometry techniques and interference phenomena	x	x	0	X	0	0
	c.2	Examine the optical properties of materials according to the interferometry	x	0	0	X	0	x
	c.3	Collect a lot of information about , interference, diffraction, polarization and its applications by investigation techniques	x	0	x	X	0	0
General Skills	d.1	Community linked thinking to choose the suitable interferometry of the desired applications.	x	0	x	X	0	0
	d.2	Work in team to synthesis and studying some optical properties of some materials.	x	0	x	X	0	0
	d.3	Use the internet to collect data and weighting reports in the standard optical properties of some materials.	x	0	x	X	x	0

5- Students' Assessment Methods and Grading:

Semester Work	a1,a2,b1,b2,c1,c2,d1and d2	Fifth week	3 %
Mid-Term Exam	a3,b2,b3,c3 and a1	Seventh week	3 %
Oral exam	a.2,b.3, d.1,d.3	Fifteenth week	6 %
Practical exam	c.1,c.2,c3	Sixteenth week	40 %
Written exam	a.1 to a.3, b.1 to b.3.	Sixteenth week	48 %
Total			100 %

Course matrix

Topic	Knowledge and understanding			Intellectual skills			Practical and professional skills			General Skills		
	a 1	2 a	3 a	b1	b2	b 3	C 1	c 2	c 3	d 1	d 2	d 3
1. The wave motion	x		x									
2. Wave principle of superposition of waves.				x								
3. Interference of wave optics.		x										
4. Interference pattern from double slits (Young experiment).		x	x									
5. The interference due to thin films.					x							
6. The diffraction of wave light.						x				x		
7. Mid-Term Exam	x		x		x	x			x			
8. The diffraction by single and N slits (diffraction grating).							x			x		
9. Resolving power of the diffraction grating.							x					
10. X- Ray diffraction by crystals.								x				
11. Polarization of light.							x					
12. Laser physics principles.									x			
13. Introduction to fiber optics	x											
14. applications in medicine and communications											x	x



6- List of references:

6-1 Course notes

Lecture notes approved by Physics department.

6-2 Required books.

A text book of optics , N.Subrahmanyam , Brij Lal, S. Chamd and Company LTD (2001)

6-3 Recommended books.

Fundamentals of Optics , Francis A.Jenkins, Harvey E. White , Macgro-Hill Book Company , new york (1957)

6-4 Periodicals, Web sites, etc.

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Nabil Hendawy

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

291B: General Microbiology

A- Affiliation

Relevant program:	Chemistry B.Sc. Program
Department offering the program:	Chemistry Department
Department offering the course:	Botany Department
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohamed Hesham

B - Basic information

Title: General Microbiology	Code: 291 B	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: -
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students:

- To study the characters of Bacteria and fungi.
- To understand the physiological basis of microorganisms.
- To understand the basis of taxonomy of microorganisms.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

- A1- Know different characters of bacteria.
- A2- Understand different characters of Fungi.
- A3 – Know differences between the different groups of Bacteria

b - Intellectual skills:

- B1- Interpret differences between the different groups of Fungi.
- B2- Report on nutrition and reproduction of Bacteria.
- B3- Interpret nutrition and reproduction of fungi.

c - Practical and professional skills:

- C1- Make microbial isolation and purification identification.
- C2- Prepare Pure culture
- C3-Examine microbial contamination.

d - General skills:

d1- Communicate with each other, time management, accuracy and enthusiasm

d2- Work in groups.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Microbiological methods	2	-	3	7.14%
2. Control of microbial growth	2	-	3	7.14%
3. Characterization of microorganisms	2	-	3	7.14%
4. Classification and Identification of microorganisms	2	-	3	7.14%
5. The morphology and fine structure of Bacteria part (1)	2	-	3	7.14%
6. The morphology and fine structure of Bacteria part (2)	2	-	3	7.14%
7. Mid-Term Exam	2	-	3	7.14%
8. Spores and cysts of Bacteria	2	-	3	7.14%
9. Cultivation of Bacteria	2	-	3	7.14%
10. Reproduction and growth of Bacteria	2	-	3	7.14%
11. Vegetative structure of fungi	2	-	3	7.14%
12. Reproductive structure of fungi	2	-	3	7.14%
13. Medically important phyla of fungi	2	-	3	7.14%
14. Revision	2	-	3	7.14%
Total hours	28	-	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1-	To Know different characters of Bacteria	x	x	X	X	0	x
	a2-	Identify different characters of Fungi.	x	x	X	X	0	x
	a3-	Outline differences between the different groups of Bacteria	x	x	X	X	0	x
Intellectual Skills	B1	Interpret differences between the different groups of Fungi.	x	x	X	X	X	x
	B2	Report on nutrition and reproduction of Bacteria	x	0	0	0	X	x
	B3	Discover nutrition and reproduction of fungi.	x	x	X	X	X	x
Practical and profession	C1	Make microbial isolation and purification identification	0	0	0	X	X	0
	C2	Prepare Pure culture	0	0	0	X	X	0
	C3	Examine microbial contamination	0	0	0	X	X	0
General Skills	D1	Communicate with each other, time Management, accuracy and enthusiasm	x	0	0	X	0	0
	D2	Work in groups	0	0	0	X	0	0

5- Students' Assessment Methods and Grading:

Tools:		Time schedule	Grading
Semester work	A1, A2, B1, B2, C1, D1 and d2 C2	Fourth week	3%
Mid-Term Exam	A1, A2, B1, B2, C1 and C2	Seventh week	3%
Oral exam	A1, A2, A3, B1, B2, B3, C1, C2, and C3	Fifteenth week	6%
Practical exams	C1, C2, and C3	Sixteenth Week	40%
Written exam	A1, A2, A3, B1, B2, B3.	Seventeenth Week	48%
Total			100 %

Course matrix											
Topic	Knowledge and understanding			Intellectual skills			Practical and professional skills			General Skills	
	a1	a2	a3	b ₁	b ₂	b ₃	c1	c2	c3	d1	d2
1. Microbiological methods	x										
2. Control of microbial growth					x						
3. Characterization of microorganisms		x	x								
4. Classification and Identification of microorganisms				x							
5. The morphology and fine structure of Bacteria part (1)							x				
6. The morphology and fine structure of Bacteria part (2)							x				
7. Mid-Term Exam	x	x		x	x		x	X			
8. Spores and cysts of Bacteria						x					
9. Cultivation of Bacteria									x		
10. Reproduction and growth of Bacteria							x				
11. Vegetative structure of fungi										X	x
12. Reproductive structure of fungi						x					
13. Medically important phyla of fungi								X			
14. Revision											



6- List of references:

6-1 Course notes

Notes approved by department of botany

6-2 Required books.

Microbiology, 5th, edition, L. M. Prescott, 2002

6-3 Recommended books.

Microbiology, 5th, edition, L. M. Prescott, 2002

6-4 Periodicals, Web sites, etc.

Annu. Rev. Microbiology

7- Facilities required for teaching and learning:

-Data show

-Chemicals, glasswares, slides and microscopes

- Petri -dishes and autoclave.

Course coordinator: Prof. Dr. Mohamed Hesham

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

210 Ch: Chemistry of Small Industry

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:	Prof. Dr. Mohamed Arief Dr. Enas Abdelaleem
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B - Basic information

Title: Chemistry of Small Industry	Code: 210 Ch	Year/level: Second level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand some of small industry such as hard soap, liquid detergent, shampoo, dyes, creams, paints, nylon 6,6, plastic and paper industry.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- State the chemical structure of liquid detergents.
- a.2- List the different methods for the preparation of hard soap.
- a.3- Describe the different types of creams, perfume and shampoo.
- a.4- Illustrate the different types of dyes.
- a.5- Recognize the industry of paints and pigments.
- a.6- Recite plastic and paper industry.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Explain the composition of liquid detergent and hard soap.
- b2- Differentiate between liquid detergents and hard soap.
- b3- Develop new types of creams.

b4- Distinguish different types of dyes.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Identify different small industry.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Solve problems on the scientific basis taught in this course.

d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction	2	0	3	7.14%
2. Liquid detergents - Preparation of liquid detergent	2	0	3	7.14%
3. Hard soap - Preparation of hard soap	2	0	3	7.14%
4. Shampoo - Preparation of shampoo	2	0	3	7.14%
5. Dyes - Preparation of some dyes	2	0	3	7.14%
6. Creams - Preparation of creams	2	0	3	7.14%
7. Mid- Term Exam	2	0	3	7.14%
8. Perfume formulation - Preparation of perfume	2	0	3	7.14%
9. Paper industry - Preparation of paper	2	0	3	7.14%
10. Paints - Preparation of glyptal resin	2	0	3	7.14%
11. Pigments - Studying some properties of pigments	2	0	3	7.14%
12. Nylon 6,6 - Preparation of nylon 6,6	2	0	3	7.14%
13. Plastic industry - Preparation of poly ethylene	2	0	3	7.14%
14. Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	State the chemical structure of liquid detergents.	x	0	0	0	0	x
	a2	State the different methods for the preparation of hard soap.	x	0	0	0	x	0
	a3	Describe the different types of creams, perfume and shampoo.	x	0	0	0	x	x
	a4	Explain the different types of dyes.	x	x	0	0	x	x
	a5	Recognize the industry of paints and pigments.	x	0	0	0	x	x
	a6	Locate plastic and paper industry.	x	0	0	0	x	x
Intellectual Skills	b1	Construct the composition of liquid detergent and hard soap.	x	0	X	0	0	x
	b2	Compare between liquid detergents and hard soap.	x	x	0	0	x	x
	b3	Develop new types of creams.	x	0	0	0	0	x
	b4	Compare different types of dyes.	x	0	0	0	0	x
Practical and professional skills	c1	Show different small industry.	0	x	X	x	0	x
General Skills	d1	Community linked thinking on the scientific basis taught in this course.	x	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with	x	x	0	0	x	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a4, b1, b2 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, b1, and b2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, d2 and c1	fifteenth week	6 %
Practical exam	C1	Sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3.	Seventeenth week	48 %
Total			100 %

Course matrix														
Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills	General Skills		
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	c1	d1	d2	
1. Introduction	x	x	x	x	x	x					X			
2. Liquid detergents - Preparation of liquid detergent	x						x	x			X	x	x	
3. Hard soap - Preparation of hard soap		x					x	x			X		x	
4. Shampoo - Preparation of shampoo			x	x							X	x	x	
5. Dyes - Preparation of some dyes									x		X		x	
6. Creams - Preparation of creams			x						x		X		x	
7. Mid- Term Exam	x	x	x								X			
8. Perfume formulation -Preparation of perfume			x				x	x			X			
9. Paper industry - Preparation of paper						x					X			
10. Paints - Preparation of glyptal resin					x						X			
11. Pigments -Studying some properties of pigments					x						X		x	
12. Nylon 6,6 Preparation of nylon 6,6						x					X			
13. Plastic industry - Preparation of poly ethylene						x					X			
14. Revision	x	x	x	x				x	x	x	X		x	



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructors and proved by chemistry department.

6-2 Required books

"*Organic Chemistry for competitive examinations*", Arun Bahl, Punjab University, INDIA, 2009

6-9 Recommended books

6-10 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Microphone

Black/white board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Arief
Dr. Enas Abdelaleem

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Chm 212: Aromatic and Polynuclear Chemistry

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Dr. Mohamed Arief

Prof. Dr. Amal Ahmed

B - Basic information

Title: Aromatic and Polynuclear Chemistry	Code: Chm212	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand and identify the Aromaticity; orientation in aromatic compounds; aromatic hydrocarbons; halogenated derivatives; aromatic Sulfonic, Nitro- derivatives, aromatic amines; diazonium salt; phenols and Aromatic aldehyde and ketones.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the Aromaticity.
- a.2- Recognize the different types of aromatic compounds.
- a.3- Describe the difference between the aromatic and non-aromatic organic compounds.
- a.4- Name the aromatic derivatives.
- a.5- Draw the structure of different aromatic derivatives.
- a.6- Tell the most applications for the studied topics



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Explain the possible conversions in aromatic organic compounds.
- b2- Differentiate between aromatics and non-aromatic compounds.
- b3- Predicts suitable conditions appropriate to complete a chemical reaction.
- b4- Distinguish the different types of aromatic organic compounds.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Select the suitable methods for preparation of aromatic organic compounds.
- c2- Modify the conditions for synthesis of aromatic organic compounds.
- c3- Predict the organic reaction will complete or not.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction	2	0	0	7.14%
2. Aromaticity	2	0	0	7.14%
3. Structure of Benzene	2	0	0	7.14%
4. Nomenclature of Benzene Derivatives	2	0	0	7.14%
5. Reactions of benzene	2	0	0	7.14%
6. Aromatic halogenated derivatives	2	0	0	7.14%
7. Mid-term	2	0	0	7.14%
8. Nitro compounds	2	0	0	7.14%
9. Aromatic carboxylic acids	2	0	0	7.14%
10. Aldehydes	2	0	0	7.14%
11. Ketones	2	0	0	7.14%
12. Aromatic amines	2	0	0	7.14%
13. Diazonium salts	2	0	0	7.14%
14. Revision	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define the Aromaticity.	X	0	0	0	0	0
	a2	Recognize the different types of aromatic compounds.	X	X	0	0	x	0
	a3	Describe the difference between the aromatic and non-aromatic organic compounds.	X	0	0	0	x	x
	a4	Name the aromatic derivatives	X	X	0	0	x	x
	a5	Diagram the structure of different aromatic derivatives.	X	0	x	0	x	x
	a6	State the most applications for the studied topics	X	0	0	x	0	x
Intellectual Skills	b1	Construct the possible conversions in aromatic organic compounds	X	0	0	0	0	x
	b2	Compare between aromatics and non-aromatic compounds	X	X	0	0	x	x
	b3	Hypothesize suitable conditions appropriate to complete a chemical reaction	X	0	0	0	0	x
	b4	Compare the different types of aromatic organic compounds.	X	X	x	0	0	x
Practical and professional skills	c1	Identification of different solid organic compounds	X	X	x	0	x	x
	c2	Investigate the suitable methods for preparation of aromatic organic compounds.	0	0	0	0	0	x
	c3	Investigate the conditions for synthesis of organic compounds.	X	0	0	0	0	x
	c4	Show the organic reaction will complete or not.	X	0	0	0	x	x
General Skills	d1	Community linked thinking on the scientific basis taught in this course.	X	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with	X	X	0	0	x	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2 and d1	Fifth week	5 %

Mid-Term Exam	a1, a2, a3, a5, a6, b2, b3, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, c4 d1 and d2	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix																
Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills				General Skills	
	a 1	a 2	a 3	a 4	a 5	a 6	b 1	b 2	b 3	b 4	c 1	c 2	c 3	c 4	d 1	d 2
1. Introduction	x	x					x				x					
2. Aromaticity	x						x	x								
3. Structure of Benzene				x												
4. Nomenclature of Benzene Derivatives			x													
5. Reactions of benzene					x	x			x							
6. Aromatic halogenated derivatives		x				x										
7. Mid-term	x	x	x		x	x		x	x						x	x
8. Nitro compounds		x														
9. Aromatic carboxylic acids		x				x										
10. Aldehydes		x											x	x		
11. Ketones		x											x	x		
12. Aromatic amines		x				x										
13. Diazonium salts		x											x	x		
14. Revision										x	x		x	x		x



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructors proved by chemistry department

6-2 Required books

"*Organic Chemistry for competitive examinations*", Arun Bahl, Punjab University, INDIA, 2009

6-11 Recommended books

6-12 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Arief
Prof. Dr. Amal Ahmed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification 214Ch: Aromatic Organic Chemistry (2)



A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohamed Arief Prof. Dr. Amal Ahmed

B - Basic information

Title: Aromatic Organic Chemistry (2)	Code: 214 Ch	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 1
	Practical: 0	Total: 3 h/week
	Course marks:	
	100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand and identify the aromatic acids and their derivatives; isolated polynuclear aromatic compounds and their reactions; fused polynuclear aromatic compounds and their reactions; the uses and applications of aromatic compounds in industry.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define aromatic acids and their nomenclature.
- a.2- Name the various derivatives of aromatic acids and isolated or fused polynuclear aromatics.
- a.3- Describe the difference between aromatic compounds.
- a.4- Draw the structure of different aromatic polynuclear derivatives.
- a.5- State the suitable industrial applications of the studied aromatic compounds.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Explain the possible conversions in aromatic organic compounds.
- b2- Compare between aromatic acids and their derivatives.
- b3- Predict the convenient conditions to complete a chemical reaction.
- b4- Distinguish the different classes of isolated and fused polynuclear aromatics.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Identify the aromatic acids and their derivatives.
- c2- Select the suitable pathways for preparation of polynuclear and aromatic acids .
- c3- Improve the conditions for synthesis of aromatic acids.
- c4- Predict major product produced from electrophilic substitution reaction in isolated or fused polynuclear aromatics

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with Others positively.

3 – Contents				
Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to carboxylic acids and derivatives.	2	1	0	7.14%
2. Aromatic acids and their acidic properties	2	1	0	7.14%
3. Aromatic acid derivatives	2	1	0	7.14%
4. Aromatic acid derivatives	2	1	0	7.14%
5. Introduction to polynuclear aromatic compounds	2	1	0	7.14%
6. Isolated polynuclear aromatic	2	1	0	7.14%
7. Mid-term exam.	2	1	0	7.14%
8. Stereo chemistry of isolated polynuclear aromatic.	2	1	0	7.14%
9. Fused (Naphthalene, Anthracene, Phenanthrenes).	2	1	0	7.14%
10. Reactions of fused polynuclear aromatic compounds	2	1	0	7.14%
11. Nonbenzenoid aromatic compounds	2	1	0	7.14%
12. Applications of aromatic acids and their derivatives	2	1	0	7.14%
13. Industrial applications of polynuclear aromatics	2	1	0	7.14%
14. Revision	2	1	0	7.14%
Total hours	28	14	0	100%

4 - Teaching and Learning methods against course ILOs:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Course & Under	a1	Define aromatic acids and their nomenclature.	x	0	0	0	0	0
	a2	Name the various derivatives of aromatic acids and isolated or fused polynuclear aromatics.	x	x	0	0	x	0

	a3	Describe the difference between aromatic compounds.	x	0	0	0	x	x
	a4	Graph the structure of different aromatic polynuclear derivatives.	x	0	0	0	x	x
	a5	State the suitable industrial applications of the studied aromatic compounds.	x	0	X	0	x	x
Intellectual Skills	b1	Construct the possible conversions in aromatic organic compounds.	x	0	0	0	0	x
	b2	Compare between aromatic acids and their derivatives.	x	x	0	0	x	x
	b3	Hypothesis the convenient conditions to complete a chemical reaction.	x	0	0	0	0	x
	b4	Compare the different classes of isolated and fused polynuclear aromatics.	x	x	X	0	0	x
Practical and professional skills	c1	Relate the aromatic acids and their derivatives.	x	x	X	0	x	x
	c2	Show the suitable pathways for preparation of polynuclear and aromatic acids.	0	0	0	0	0	x
	c3	Investigate the conditions for synthesis of aromatic acids.	x	0	0	0	0	x
	c4	Criticize major product produced from electrophilic substitution reaction in isolated or fused polynuclear aromatics	x	0	0	0	x	x
General Skills	d1	Community linked thinking on the scientific basis taught in this course.	x	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with	x	x	0	0	x	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, b2 and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3,a4, b2, b3, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, b1, b2, b3, c4 d1and d2	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, and b3	sixteenth week	80 %
Total			100 %

Course matrix																
Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills						
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	c3	c4	d1	d2	
1. Introduction to carboxylic acids and derivatives.	x		x													
2. Aromatic acids and their acidic properties	x															
3. Aromatic acid derivatives		X				x	x			x						



4. Aromatic acid derivatives		X					x					x		x	x
5. Introduction to polynuclear aromatic compounds				x								x			
6. Isolated polynuclear aromatic				x				x				x			
7. Mid-term exam.															
8. Stereo chemistry of isolated polynuclear aromatic.				x					x						
9. Fused (Naphthalene, Anthracene, Phenanthrenes).									x						
10. Reactions of fused polynuclear aromatic compounds													x	x	x
11. Non-benzenoid aromatic compounds													x		x
12. Applications of aromatic acids and their derivatives					x										
13. Industrial applications of polynuclear aromatics					x										
14. Revision		X	x		x	x		x							

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructors provided by chemistry department

6-2 Required books

- 1- "*Organic Chemistry for Competitive Examinations*", Punjab University, India, 2009.
- 2- "*A Textbook of Organic Chemistry*", Arun Bahl and B.S. Bahl, reprint 2013.
- 3- "*Morrison and Boyd Organic Chemistry*", sixth Edn., India reprint 2008.
- 4- "*Organic Chemistry*", I. L. Finar, Longman, Vol. 1, 1973.

6-13 Recommended books

"*A Textbook of Organic Chemistry*", Arun Bahl and B.S. Bahl, reprint 2013.

6-14 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>



<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone, Using a black board
Group Discussions, Data show

Course coordinator: Prof. Dr. Mohamed Arief
Prof. Dr. Amal Ahmed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification

Chm 222: Chemistry of Representative Elements

A- Affiliation

Relevant program: Chemistry BSc Program

Department offering the program: Department of Chemistry

Department offering the course: Department of Chemistry

Academic year/level: Second level

Date of specifications approval: 9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. Mohamed Heikal
Prof. Dr. Ebrahim El-sayed
Prof. Dr. Mostafa Shahin
Prof. Dr. El-sayed El-Badawy

B - Basic information

Title: Chemistry of Representative Elements	Code: 222 Ch	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	



C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to be aware with the general properties of the main group elements such as reactivity, radii size, oxidation states, and existence of various compounds with these elements and their stability, etc. Also, teach students the nomenclature, theories of bonding, and importance of their compound and complexes in industry. Study the similarities and difference between elements in groups and periods

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Study the properties of elements and their classification in the periodic table.
- a.2- Define some chemical concepts in main group elements.
- a.3- Describe some physical and chemical properties of the elements of interest.
- a.4- Recognize theories of chemical bonding in compounds of the main group elements.
- a.5- Mention some of the current issues of application and research of transition metals.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Compare between the properties of main group elements.
- b2- Differentiate between different classes of the compounds of these elements.
- b3- Explain the bond lengths, geometries, of the main group element compounds depending on understanding of the bonding theories.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Distinguish between different compounds depending on the bonding.
- c2- Apply the knowledge that the student studied to propose the molecular structures of the main group elements compounds.
- c3- Propose some compounds for industrial purposes.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and the internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Periodic table	2	0	3	7.14%
2. Valence bond theory and its applications	2	0	3	7.14%
3. Molecular orbital theory and its applications	2	0	3	7.14%
4. General properties and chemistry of group I _A / 1	2	0	3	7.14%

elements				
5. General properties and chemistry of group II _A / 2 elements	2	0	3	7.14%
6. General properties and chemistry of group III _A /13 elements	2	0	3	7.14%
7. Mid-term exam	2	0	3	7.14%
8. General properties and chemistry of group V _A /15	2	0	3	7.14%
9. General properties and chemistry of group VI _A / 16	2	0	3	7.14%
10.General properties and chemistry of group VII _A / 17	2	0	3	7.14%
11.General properties and chemistry of group VIII _A /18	2	0	3	7.14%
12.Applications of main group elements part1	2	0	3	7.14%
13.Applications of main group elements part2	2	0	3	7.14%
14.Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Outline the properties of elements and their classification in the periodic table.	x	0	X	0	0	x
	a2	Define some chemical concepts in main group elements.	x	0	X	0	0	0
	a3	Describe some physical and chemical properties of the elements of interest.	x	x	X	0	0	x
	a4	Recognize theories of chemical bonding in compounds of the main group elements.	x	x	X	0	0	x
	a5	State some of the current issues of application and research of transition metals.	x	x	X	0	x	x
Intellectual Skills	b1	Compare between the properties of main group elements.	x	0	X	0	0	x
	b2	Compare between different classes of the compounds of these elements.	x	0	X	0	x	x
	b3	Construct the bond lengths, geometries, of the main group element compounds depending on understanding of the bonding theories.	x	0	X	0	x	x
Practical and professional skills	c1	Differentiate between different compounds depending on the bonding.	x	0	X	0	x	x
	c2	Assess the knowledge that the student studied to propose the molecular structures of the main group elements compounds.	x	x	X	0	0	x
	c3	Criticize some compounds for industrial purposes.	x	0	X	0	0	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	X	0	x	x



d2	Community linked thinking on the scientific basis taught in this course.	x	0	X	0	x	x
d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	X	x	x	x
d4	Life –long learning the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	X	0	x	x



5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1, d1 and d2	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b1, and b2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c2, d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills			General Skills			
	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3	d4
1. Periodic table	x											x			
2. Valence bond theory and its applications				x				x	x		x		x		
3. Molecular orbital theory and its applications				x				x	x	x	x		x		
4. General properties and chemistry of group I _A / 1 elements		x				x	x					x		x	
5. General properties and chemistry of group II _A / 2 elements		x				x	x					x		x	
6. General properties and chemistry of group III _A / 13 elements		x				x	x					x		x	
7. Mid-term exam	x	x	x	x		x	x								
8. General properties and chemistry of group V _A / 15 elements		x				x	x								
9. General properties and chemistry of group VI _A / 16 elements		x				x	x								
10. General properties and chemistry of group VII _A / 17 elements		x				x	x								
11. General properties and chemistry of group VIII _A / 18 elements		x				x	x								
12. Applications of main group elements part1			x		x							x			x
13. Applications of main group elements part2			x		x							x			x
14. Revision	x		x	x	x			x	x	x					

6- List of references:



6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

J.D. Lee, Concise Inorganic Chemistry, 5th Edn. Blackwell Science, Australia, 1996.

6-15 Recommended books

1-F.A. Cotton, G. Wilkinson, C.A.Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th Edn, John Wiley&Sons, Inc., New York, 1999.

2- N.N. Greenwood, A. Earnshaw, Chemistry of Elements, 2nd Edn, Butterworth Heinemann, USA 1997.

6-16 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

<http://ocw.mit.edu/courses/chemistry>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Prof. Dr. Mohamed Heikal

Prof. Dr. Ebrahim El-sayed

Prof. Dr. Mostafa Shahin

Prof. Dr. El-sayed El-Badawy

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023



Course Specification

Chm 232: Electrochemistry (1)

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Nahed Fouad Dr. Asmaa Abo El-soud

B - Basic information

Title: Electrochemistry (1)	Code: Chm 232	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to Know the difference between chemical and electrochemical reaction, the meaning of electrochemistry, types of electrodes and types of cell. Also, the Nernst equation , E.M.F series and some electrochemical application.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the oxidation, reduction, fuel cell and corrosion.
- a.2- Discover the relation between potential and concentration.
- a.3- Explain types of electrodes.
- a.4-. Describe types of cell.
- a.5- Mention some of electrochemical application.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Discover solving problems in electrochemistry.
- b.2- Differentiate between the different types of cell and electrodes.
- b.3- Illustrate the effect of concentration on the potential

b.4-. Point out some electrochemical application.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Solve problems on electrochemistry.
- c2- Apply the knowledge that the student studied to design a type of galvanic cell.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and the internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- work in a team effectively, manage time and communicate with others positively
- d4- Discover the important of the electrochemistry and its applications in our life.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to electrochemistry.	2	0	0	7.14
2. Galvanic cell	2	0	0	7.14
3. E. M.F series	2	0	0	7.14
4. Types of electrode	2	0	0	7.14
5. Types of cell (part 1).	2	0	0	7.14
6. Types of cell (part 2).	2	0	0	7.14
7. Mid-Term Exam.	2	0	0	7.14
8. Fuel cell	2	0	0	7.14
9. Types of fuel cells	2	0	0	7.14
10. Potentiometry	2	0	0	7.14
11. Corrosion	2	0	0	7.14
12. Inhibition of corrosion	2	0	0	7.14
13. Prevention corrosion	2	0	0	7.14
14. Revision	2	0	0	7.14
Total hours	28	0	0	100

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes	Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming

Knowledge & Understanding	a1	Define the oxidation, reduction, fuel cell and corrosion.	x	0	x	0	X	x
	a2	State the relation between potential and concentration.	x	X	x	0	X	0
	a3	Explain types of electrodes.	x	0	x	0	0	x
	a4	Describe types of cell.	x	0	x	0	X	x
	a5	State some of electrochemical application.	x	X	x	0	X	x
Intellectual Skills	b1	Design solving problems in electrochemistry.	x	0	x	0	X	x
	b2	Compare between the different types of cell and electrodes.	x	X	x	0	X	x
	b3	Construct the effect of concentration on the potential	x	0	x	0	X	x
	b.4	Create some electrochemical application.	x	X	x	0	X	x
Practical and	c1	Solve problems on electrochemistry.	x	0	x	0	X	x
	c2	Asses the knowledge that the student studied to design a type of galvanic cell.	x	0	x	0	X	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	wok in a team effectively, manage time and communicate with others positively	0	0	x	x	0	x
	d4	Compute the important of the electrochemistry and its applications in our life.	x	0	x	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, b2, b3 c1, d1 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, b1, b2, b3 , and d2	Seventh week	5 %
Oral exam	a1, a2, a3,a4, a5, b1, b2, b3, b4, d2 and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5.	sixteenth week	80 %
Total			100 %



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s) Approved from Chemistry Department.

6-2 Required books

Cynthia G. Zoski, *Handbook of Electrochemistry*, Elsevier 2007.

6-17 Recommended books

- 1) V. S. BAGOTSKY., *FUNDAMENTALS OF ELECTROCHEMISTRY*, Wiley & Sons, 2006
- 2) CHRISTOPHER M. A. BRETT And ANA MARIA OLIVEIRA BRETT, *ELECTROCHEMISTRY Principles, Methods, and Applications*, Oxford University Press Inc 1994
- 3) Waldfried Plieth, *Electrochemistry for Materials Science*, Elsevier, 2008

6-18 Periodicals, web sites, etc

http://chemwiki.ucdavis.edu/Analytical_Chemistry/Electrochemistry/Basics_of_Electrochemistry

<http://www.chem1.com/acad/webtext/elchem/>

<http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch20/electro.php>

<https://www.khanacademy.org/science/chemistry/oxidation-reduction>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a white board

Group Discussions

Data show

Course coordinator:

Dr. Nahed Fouad

Dr. Asmaa Abo El-soud

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-Dougdoug

Date:

2022-2023

Course Specification

Chm 241: Analytical Chemistry (1)

A- Affiliation



Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Sayed Shama Dr. Eslam Shahin Dr. Hesham El-feky

B - Basic information

Title: Analytical Chemistry (1)	Code: Chm 241	Year/level: second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to learn the quantitative chemical analysis and underlying principles, with introduction to fundamental concepts to develop the necessary skills to perform chemical analysis. In this course is to enable the students to understand the basic principles for the different methods of volumetric (neutralization, oxidation-reduction, precipitation, and complexometry) and gravimetric analyses. Students learn the different factors affecting the solubility product to determine the elements by precipitation gravimetry.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1- Obtain a strong foundation in analytical chemistry and its principles.
- a2- Recognize the fundamentals of volumetric and gravimetric analyses.
- a3- Describe different types of volumetric analysis.
- a4- Locate the different factors affecting the solubility product.
- a5- Investigate the concentration of element in sample under study by precipitation in gravimetric analysis.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Explain the different methods of expressing concentrations, types of indicators and their theories
- b2-Differentiate between different types of volumetric and gravimetric analyses.



b3- Analyze the analytical data to identify the concentration of organic and inorganic compounds.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Perform standard laboratory in analytical chemistry.

c2- Apply the knowledge that the student studied to determine concentration of compounds depending on their properties.

c3- Show the principles and limitations of practical techniques.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Cooperate and communicate with other members of teamwork positively.

d4- Write reports and giving oral presentations.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to analytical chemistry, quantitative chemical analysis and its principles. - Standardization of hydrochloric acid by using sodium carbonate.	2	0	3	7.14%
2. Methods of expressing concentrations. - Determination the purity of mixture of sodium hydroxide and sodium carbonate by using hydrochloric acid.	2	0	3	7.14%
3. Equivalent weight, standard solution and its	2	0	3	7.14%

requirements. - Determination the purity of mixture of sodium bicarbonate and sodium hydroxide by using hydrochloric acid.				
4. Acids bases titration 1. - Determination the purity of mixture of sodium hydroxide and ammonium hydroxide by using hydrochloric acid.	2	0	3	7.14%
5. Acids bases titration 2. - Determination the purity of mixture of phosphoric acid and hydrochloric acid by using sodium hydroxide.	2	0	3	7.14%
6. Theories of indicators used in acid-base titration. - Determination the purity of aspirin via back titration.	2	0	3	7.14%
7. Mid-term exam.	2	0	3	7.14%
8. Precipitation titration. - Determination the purity of ammonia via back titration.	2	0	3	7.14%
9. Theories of indicators used in precipitation titration. - Determination the purity of mixture of Fe^{+3} and Fe^{+2} by using potassium permanganate.	2	0	3	7.14%
10. Complexometric titration and detect end point and requirements of indicator. - Determination the purity of mixture of sodium oxalate and oxalic acid by using potassium permanganate.	2	0	3	7.14%
11. Introduction to gravimetric analysis and different types of Gravimetric Methods. - Precipitation titration.	2	0	3	7.14%
12. Study the different factors affecting the solubility product and the precipitation process. - Iodometry and Iodometric titration.	2	0	3	7.14%
13. Study different types of contamination. - Complexometric titration.	2	0	3	7.14%
14. Study different types of precipitant (organic and inorganic). - Revision.	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes	Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming

Knowledge & Understanding	a1	Recognize a strong foundation in analytical chemistry and its principles.	x	x	0	0	0	x
	a2	Recognize the fundamentals of volumetric and gravimetric analyses.	x	0	0	0	0	0
	a3	Describe different types of volumetric analysis.	x	x	x	0	x	x
	a4	Locate the different factors affecting the solubility product.	x	x	x	0	x	x
	a5	State the concentration of element in sample under study by precipitation in gravimetric analysis.	x	0	0	0	0	x
Intellectual Skills	b1	Construct the different methods of expressing concentrations, types of indicators and their theories	x	x	x	0	X	x
	b2	Compare between different types of volumetric and gravimetric analyses.	x	0	x	0	X	x
	b3	Modify the analytical data to identify the concentration of organic and inorganic compounds.	x	x	x	x	X	x
	b4	Compare between the advantages and disadvantages of the gravimetric methods.	x	0	x	x	0	x
Practical and profession	c1	Investigate standard laboratory in analytical chemistry.	x	0	x	x	x	x
	c2	Assess the knowledge that the student studied to determine concentration of compounds depending on their properties.	x	0	x	x	X	x
	c3	Show the principles and limitations of practical techniques.	x	0	x	x	x	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Cooperate and communicate with others members of teamwork positively.	0	0	x	0	0	x
	d4	Write reports and giving oral presentations.	x	0	0	x	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, a5, b2, and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	3%
Oral exam	a1, a2, a3, a4, b1, b2, b3 and d4	fifteenth week	6 %
Practical exam	c1 to cx3	sixteenth week	40%
Written exam	a1, a2, a3, a4, b1, b2, and b3	seventeenth week	48%
Total			100 %

Course matrix																
Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills			General Skills			
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3	d4

1. Introduction to analytical chemistry, quantitative chemical analysis and its principles. - Standardization of hydrochloric acid by using sodium carbonate.	x						x			x	x	X					
2. Methods of expressing concentrations. - Determination the purity of mixture of sodium hydroxide and sodium carbonate by using hydrochloric acid.					x	x		x		X	x	x					
3. Equivalent weight, standard solution and its requirements. - Determination the purity of mixture of sodium bicarbonate and sodium hydroxide by using hydrochloric acid.		x									x	x	X				
4. Acids bases titration 1. - Determination the purity of mixture of sodium hydroxide and ammonium hydroxide by using hydrochloric acid.			x								X	x	x				
5. Acids bases titration 2. - Determination the purity of mixture of phosphoric acid and hydrochloric acid by using sodium hydroxide.			x								X	x	x				
6. Theories of indicators used in acid-base titration. - Determination the purity of aspirin via back titration.			x								X	x	x				
7. Mid-term exam.											X	x	x				
8. Precipitation titration. - Determination the purity of ammonia via back titration.					x						X	x	x				
9. Theories of indicators used in precipitation titration. - Determination the purity of mixture of Fe^{+3} and Fe^{+2} by using potassium permanganate.						x					X	x	x				



10. Complexometric titration and detect end point and requirements of indicator. - Determination the purity of mixture of sodium oxalate and oxalic acid by using potassium permanganate.											X	x	x						
11. Introduction to gravimetric analysis and different types of Gravimetric Methods. - Precipitation titration.										X	X	x	x						
12. Study the different factors affecting the solubility product and the precipitation process. - Iodometry and Iodometric titration.												X	x	x					
13. Study different types of contamination. - Complexometric titration.												X	x	x					
14. Study different types of precipitant (organic and inorganic). - Revision.												X	x	x					

6- List of references:

6-1 Course notes

1. Course Notes

Lecture notes prepared by Faculty Members.

6-2 Required books

- 1- Analytical Chemistry, Gary D. Christian, 5th ed. John Wiley and Sons, New York, (1994).
- 2- Principles of Instrumental Analysis" D. A. Skoog, F. J. Holler, S. R. Crouch (2007), 6th ed., Thomson, Belmont, USA.
- 3- Recommended books

6-19 Periodicals, Web sites, etc.

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Laboratories with enough chemicals and equipment

Course coordinator:

Prof. Dr. Sayed Shama

Dr. Eslam Shahin

Dr. Hesham El-feky



Program coordinator: Prof. Dr. Safinaz M. Reda
Head of the Department: Prof. Dr. Wagdy El-Dougdoug
Date: 2022-2023

Course Specification (Mat 201: Ordinary Differential Equations (1))

A- Affiliation

Relevant program: Mathematics
Department offering the program: Chemistry BSc Program
Department offering the course: Department of Chemistry
Academic year/level: Second Level
Date of specifications approval: 9/12/2015 (Faculty council meeting no. 390), updated 10/1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

B - Basic information

Title: Ordinary Differential Equations (1)	Code: Mat 201	Year/level: Second Level
Teaching Hours: 28	Lectures: 1 h/week	Tutorial: 2
	Practical: —	Total: 2 h/week

C - Professional information

1 – Course Learning Objectives:

Provide an overview of standard methods for the solution of single ordinary differential equations and systems of equations, with an introduction to some of the underlying theory and calculus of functions of more than one variable.

2 - Intended Learning Outcomes (ILOS)



a - Knowledge and understanding:

At the end of this course, the students must be able to:-

- a1- To know the implications of existence and uniqueness theorems.
- a2- Determine continuity and differentiability of functions of two or more variables.
- a3- Explain the different methods between graphs some Surfaces and
- a4- calculate some integrals using Mathematics and Matlab programs.

b - Intellectual skills:

At the end of this course, the students must be able to:

- b1- Develop skills in the use of computer tools for solving differential equations and integration.
- b2- Create differential equations from physical experiments.
- b3- Discover new methods for solving second order differential equations.
- b4- Apply the basic skills of continuity and differentiability of functions of two variables.

c - Practical and professional skills:

At the end of this course, the students must be able to:

- c1- Label the first and second order ODEs
- c2- Solve linear ODEs using standard methods.
- c3- Show further studies in more advanced branches of modern mathematics: functional analysis, topology, optimization and nonlinear analysis

d - General skills:

At the end of this course, the students must be able to:

- d1- Community linked thinking and solve problems on a scientific basis.
- d2- Working in groups effectively; manage time, collaborate and communicate with others positively.
- d3- Using internet and library.

3 – Contents			
Topic	Lecture hours	Tutorial hours	Practical hours
Definitions. First order differential eq	1	2	-
First order differential eq. linear, separable, exact and homogenous	1	2	-
Equations of first order but not of the first Degree	1	2	-
Riccati Equations	1	2	-
Integrating Factor technique	1	2	-
Numerical Technique: Euler's Method	1	2	-
Picard Iterative Process	1	2	-
Linear Independence and the Wronskian	1	2	-
Reduction of Order	1	2	-
Euler-Cauchy Equations	1	2	-
Linear equations of second order and with out constant coefficients	1	2	-
Linear equations of second order and with constant coefficient	1	2	-
System of differential equations	1	2	-
Application and modeling	1	2	-
Total hours	14	28	-

4 - Teaching and Learning methods:								
		Intended Learning Outcomes	Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	To know the implications of existence and uniqueness theorems.	✓				✓	
	a2	Determine continuity and differentiability of functions of two or more variables.	✓				✓	✓
	a3	Explain the different methods between graphs some Surfaces and calculate some integrals using Mathematics and Matlab programs.	✓				✓	
Intellectual Skills	b1	Develop skills in the use of computer tools for solving differential equations and integration.	✓		✓		✓	
	b2	Create differential equations from physical experiments.	✓				✓	
	b3	Discover new methods for solving second order differential equations.	✓				✓	
	b4	Apply the basic skills of continuity and differentiability of functions of two variables.	✓				✓	
Practical and professional skills	c1	Classify the first and second order ODEs	✓		✓			✓
	c2	Solve linear ODEs using standard methods.	✓				✓	
	c3	Show further studies in more advanced branches of modern mathematics: functional analysis, topology, optimization and nonlinear analysis	✓				✓	
General Skills	d1	Community linked thinking and solve problems on a scientific basis.	✓	✓			✓	
	d2	Working in groups effectively; manage time, and communicate with others positively.	✓				✓	

	d3	Using internet and library.			✓		✓	
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5- Students' Assessment Methods and Grading:

Tools:	To Measure	Time schedule	Grading
Mid-Term Exam	a1 , a2, b1, b3 , c2, c3	Week 7	10 %
Oral exam	a3, a4, a5, b1,b2,c1	Week 15	10 %
Written exam	a5,b3, b2,a1,a3	Start of 16 th week	80 %
Total			100 %

6-Course matrix

Topic	Knowledge and understanding			Intellectual skills				Practical and professional skills			General Skills		
	a1	a2	a3	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3
Definitions. First order differential eq	x					X		x					
First order differential eq. linear, separable, exact and homogenous	x				x				x		x		
Equations of first order but not of the first Degree	x			x		X				x			X
Riccati Equations		X								x			
Integrating Factor technique				x					x				
Numerical Technique: Euler's Method	x	X											
Picard Iterative Process						X					x		X
Linear Independence and the Wronskian			x							x		x	
Reduction of Order			x		x			x					X
Euler-Cauchy Equations								x					
Linear equations of second order and with out constant coefficients				x					x			x	
Linear equations of second order and with constant coefficient	x		x		x					x			X
System of differential equations						X						x	
Application and modeling		X		x					x				X



7- List of references:

7-1 Course notes

- Notes were approved by the Math Department.

7-2 Required books.

- C. H Edwards, Elementary differential equations with boundary value problems, Pearson Prentice Hall, 2004

7-3 Recommended books.

- W.E. Boyce & R.C. Di Prima, "Elementary Differential Equations and Boundary Value Problems", Wiley
- M. Braun, "Differential Equations and their Applications", Springer-Verlag.
- C.H. Edwards & D.E. Penney, "Elementary Differential Equations with Boundary Value Problems", Prentice Hall.
- R.K. Nagle & E.B. Saff, & A.D. Snider, "Fundamentals of Differential Equations and Boundary Value Problems", Addison-Wesley

Web sites, etc.

<http://www.sosmath.com/diffeq/diffeq.html>

<https://www.youtube.com/watch?v=HKvP2ESjJbA&list=PLwIFHT1FWIUJYuP5v6YEM4WWrY4kEmIuS>

8- Facilities required for teaching and learning:

Black board and white board

Course coordinator: Prof. Dr. Hosni kamel

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Department:

Date: 2022-2023

Course Specification

Chm 216: Organic Environmental Green Chemistry (1)

A- Affiliation



Relevant program: Chemistry BSc Program
Department offering the program: Department of Chemistry
Department offering the course: Department of Chemistry
Academic year/level: Second level
Date of specifications approval: 9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Dr. Abdelfattah Fadel
Prof. Dr. Mohamed M. Azab

B - Basic information

Title: Organic Environmental Green Chemistry (1) **Code:**Chm216 **Year/level:** Second level
Teaching Hours: **Lectures:** 2 **Tutorial:** 0
 Practical: 0 **Total:** 2 h/week
 Course marks:
 100 marks

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the basic information about green chemistry, environmental organic chemistry and Environmental un-harmful reactions. Also, teach students the basic twelve principles of **Green Chemistry**.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate the basic information about green chemistry.
- a.2- Define the basic twelve principles of green chemistry.
- a.3- Name the main types of environmentally un-harmful reactions.
- a.4- Recognize theories of different reactions in green chemistry.
- a.5- Mention the basic science of environmental organic chemistry.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Analyze the given chemical data to identify the green condition
- b2- Differentiate between traditional and green chemistry.
- b3- explain a specific green chemistry reaction.
- b4- Solve environmental pollution problems.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Calculate the atom Economy % for different reactions.
- c2- Apply the knowledge that the student studied to propose the green reactions with prevent or decreases the waste.



d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d3- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to green chemistry.	2	0	0	7.14%
2. Green Chemistry – Definition and Principles	2	0	0	7.14%
3. Atom Economy & yield%	2	0	0	7.14%
4. Organic Preparations : acetylation of primary amine (Preparation of acetanilide)-base catalyzed aldol condensation-(Synthesis of dibenzalpropanone)	2	0	0	7.14%
5. (Bromination of trans-stilbene) [4+2] cycloaddition reaction (Diels-Alder reaction between furan and maleic acid	2	0	0	7.14%
6. Electrophilic aromatic substitution reaction (Nitration of phenol).Electrophilic aromatic substitution reaction-II (Bromination of acetanilide)	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Rearrangement reaction (1): (Benzil - Benzilic acid rearrangement)-Pinacol-pinacolone rearrangement - (Preparation of benzopinacolone).	2	0	0	7.14%
9. Rearrangement reaction – (2) (Rearrangement of diazoamino benzene to p-aminoazobenzene) -radical coupling reaction -(Preparation of 1,1-bis-2-naphthol)	2	0	0	7.14%
10. Green photochemical reaction: -(Photoreduction of benzophenone to benzopinacol).	2	0	0	7.14%
11. Oxidation Reactions: green oxidation reaction (Synthesis of adipic acid)-Three component coupling (Synthesis of dihydropyrimidinone)	2	0	0	7.14%
12.Solvent-free reaction : (Microwave-assisted ammonium formate-mediated Knoevenagel reaction) Synthesis of Green Reagents (Tetrabutylammonium tribromide (TBATB) and its application)	2	0	0	7.14%
13.Alternative Green Procedure for Organic Qualitative Analysis: Detection of N, S, Cl, Br and I i) Use of zinc and sodium carbonate instead of metallic sod. ii) Novel use of salt of some organic acids in organic mixture analysis.	2	0	0	7.14%

14. Alternative Green Procedure for Derivative for Carboxylic Acids.	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Record the basic information about green chemistry.	X	0	x	0	0	x
	a2	Define the basic twelve principles of green chemistry.	X	0	0	0	0	0
	a3	Name the main types of environmentally unharmed reactions.	X	X	x	0	x	x
	a4	Recognize theories of different reactions in green chemistry.	X	X	x	0	x	x
	a5	State the basic science of environmental organic chemistry.	X	0	0	0	0	x
Intellectual Skills	b1	Design the given chemical data to identify the green condition	X	X	x	X	0	x
	b2	Compare between traditional and green chemistry.	X	0	x	0	0	x
	b3	Construct specific green chemistry reactions.	X	0	x	0	0	x
	b4	Examine environment pollution problems.	0	X	x	0	x	x
Practical and professional	c1	Summarize the atom Economy % for different reactions.	X	0	0	0	x	x
	c2	Assess the knowledge that the student studied to propose the green reactions with prevent or decreases the waste.	X	0	x	0	x	x
General Skills	d1	Community linked thinking on the scientific basis taught in this course	X	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	X	X	x
	d3	Life-long learning the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	X	0	x	0	0	x

5- Students' Assessment Methods and Grading:



Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3 and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4,a5, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix														
Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills		General Skills		
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	d1	d2	d3
1. Introduction to green chemistry.	x		x	x										
2. Green Chemistry – Definition and Principles		x	x	x										
3. Atom Economy & yield%										x		x		
4. Organic Preparations : acetylation of primary amine (Preparation of acetanilide)-base catalyzed aldol condensation-(Synthesis of dibenzalpropanone)				x							x		x	
5. (Bromination of trans-stilbene) [4+2] cycloaddition reaction (Diels-Alder reaction between furan and maleic acid)				x					x		x		x	
6. Electrophilic aromatic substitution reaction (Nitration of phenol). Electrophilic aromatic substitution reaction-II (Bromination of acetanilide)				x					x					
7. Mid-Term Exam.														
8. Rearrangement reaction (1): (Benzil - Benzilic acid rearrangement)-Pinacol-pinacolone rearrangement -(Preparation of benzopinacolone).				x						x			x	
9. Rearrangement reaction – (2) (Rearrangement of diazoamino benzene to p-aminoazobenzene) -radical coupling reaction -(Preparation of 1,1-bis-2-naphthol)				x						x				
10. Green photochemical reaction: - (Photoreduction of benzophenone to benzopinacol).					x	x					x		x	
11. Oxidation Reactions: green oxidation reaction (Synthesis of adipic acid)-Three component coupling (Synthesis of dihydropyrimidinone)					x		x				x		x	
12. Solvent-free reaction : (Microwave-assisted ammonium formate-mediated Knoevenagel reaction) Synthesis of Green Reagents (Tetrabutylammonium tribromide (TBATB) and its application)					x			x			x		x	x



13. Alternative Green Procedure for Organic Qualitative Analysis: Detection of N, S, Cl, Br and I Use of zinc and sodium carbonate instead of metallic sod. Novel use of salt of some organic acids in organic mixture analysis.					x							x	x		x	
14. Alternative Green Procedure for Derivative for Carboxylic Acids.					x	x							x			x



6- List of references:

6-1 Course notes:

Lecture notes prepared by the course instructor(s) a proved from chemistry department.

6-2 Required books:

- 1- *Green Chemistry and Pollutants in Ecosystems*, Eric Lichtfouse, Jan Schwarzbaue, Didier Robert (2005), Library of Congress Control Number: 2004110949 ISBN 3-540-22860-8 Springer Berlin Heidelberg New York ,Springer is a part of Springer Science+Business Media, springeronline.com, © Springer-Verlag Berlin Heidelber.

6-20 Recommended books:

- 1- *GREEN CHEMISTRY: An Introductory Text*, Mike Lancaster (2002); Network, University of York. Published by The Royal Society of Chemistry (RSC), Thomas Graham House, Science Park, Milton Road, Cambridge CB4 0WF, UK, Registered Charity Number 207890.

- 2- *Environmental organic chemistry 2nd Edn*, Rene P. Schwarzenbach; Philip M. Gschwend and Dieter M. Imboden(2003), by John Wiley & Sons, Inc.
All rights reserve.

6-21 Periodicals, Web sites, etc.

http://www.frontiersin.org/Green_and_Environmental_Chemistry
http://www.knockhardy.org.uk/ppoints_htm_files/greenpps.pps

7- Facilities required for teaching and learning:

Using a microphone in lectures-Using a black board-White board Marker - Group Discussions -Data show

Course coordinator:	Prof. Dr. Abdel Fattah Fadel Prof. Dr. Mohamed M. Azab
Program coordinator:	Prof. Dr. Safinaz M. Reda
Head of the Department:	Prof. Dr. Wagdy El-DougDoug
Date:	2022-2023

Course Specification 215 Ph: Modern Physics



A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Physics
Academic year/level:	Second level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Eslam Shiha

B - Basic information

Title: Modern Physics	Code: 215 Ph	Year/level: Second level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the graduate to recognize the concept of Newtonian relativity and Galilian transformation of coordinates. Study postulates of special relativity and its applications in time dilation and length contraction. Illustrate black body radiation in two cases; classical and quantum concept. Illustrate photoelectric effect using classical concept and Einstein concept which agree with the experiment. Introduce the x-ray Compton and Doppler effect to discuss the concept of particle wave complementarity. Illustrate quantum Bohr model of atom which helps understanding of some spectral series for hydrogen atom and prediction to other spectral lines.

2 - Intended Learning Outcomes (ILOS)

a- Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate the black body radiation in two cases ; classical and quantum concept
- a.2- Describe the photoelectric effect using classical concept and Einstein concept
- a.3- memorize the difference between Newtonian relativity concept and Einstein relativity
- a.4 tell about wave complementarity and Doppler effect

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Compare between X-ray applications in many research tasks.
- b.2- Interpret qualitatively and quantitatively relevant data
- b.3- Confirm the validity of different atomic modes

c - Practical and professional skills:

On successful completion of the course, the student should be able to.

- c.1 - Analyze the atomic spectra.
- c.2- Sketch the phase diagramed for different types of materials
- c.3- Differentiate between any atomic phenomena in a logical way.



d - General skills:

On successful completion of the course, the student should be able to.

- d.1- Design the computer programs to describe the atomic spectroscopy
- d.2- Communicate to work efficiently in a team or separately
- d.3- Solve problems in time dilation and length contraction using Lorentz transformations.

3 – Contents

No.	Topic	Lecture hours	Tutorial hours	Practical hours	%of total
1	Principles of Modern Physics	2	0	3	7.14%
2	Black body radiation	2	0	3	7.14%
3	Plank's law and photoelectric effect	2	0	3	7.14%
4	Rutherford model for hydrogen atom	2	0	3	7.14%
5	Bohr and Somerfield theories	2	0	3	7.14%
6	Compton effect	2	0	3	7.14%
7	Mid-Term Exam	2	0	3	7.14%
8	Dual nature of the matter	2	0	3	7.14%
9	De Broglie waves and Uncertainty Principles	2	0	3	7.14%
10	Principle of special relativistic theory	2	0	3	7.14%
11	Concept of particle wave complementarity.	2	0	3	7.14%
12	Newtonian relativity	2	0	3	7.14%
13	Galilian transformation of coordinates	2	0	3	7.14%
14	Doppler effect	2	0	3	7.14%
	Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a.1	Identify the black body radiation in two cases ; classical and quantum concept	x	0	x	x	x	0
	a.2	Describe the photoelectric effect using classical concept and Einstein concept	x	x	0	x	0	x
	a.3	memorize the difference between Newtonian relativity concept and Einstein relativity	x	0	x	x	0	0
	a.4	Explain wave complementarity and Doppler effect	x	0	x	x	x	0
Intellectual Skills	b.1	Compare between X-ray applications in many research tasks	x	0	0	x	0	0
	b.2	Interpret qualitatively and quantitatively relevant data	x	x	x	x	0	x
	b.3	Confirm the validity of different atomic modes	x	0	0	x	0	0
Practical and professional skills	c.1	Analyze the atomic spectra	x	0	0	0	0	0
	c.2	Draw the phase diagramed for different types of materials	x	x	x	0	x	0
	c.3	Differentiate between any atomic phenomena by a logic way.	x	x	x	0	0	0
General Skills	d.1	Work in groups to solve problems in time dilation and length contracting using Lorentz transformations	0	x	0	x	x	x
	d.2	Communicate with each other's to work efficiently in a team or separately	0	0	0	x	0	0
	d.3	Use the internet to Collect data and writing reports in the different model of atom	x	0	x	x	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a.1, a.2,a.3 , b.1, b.2,c.1,c.2, d.1 and d.2	Fifth week	5 %

Mid-Term Exam	a.3, a.4, b.2, b.3, d.2, ,and d.3	Seventh week	5 %
Oral exam	a.2,a.3, a.4 , b.2, b.3, ,and d.3	Fifteenth week	10 %
Written exam	a.1 to a.4, b.1 to b.3, ,d.1 and d3	Sixteenth week	80 %
Total			100 %

Course matrix													
Topic	Knowledge and understanding				Intellectual skills			Practical and professional skills			General Skills		
	a1	a2	a3	a4	b1	b2	b3	c1	c2	c3	d1	d2	d3
1. Principles of Modern Physics	x	x											
2. Black body radiation	x												
3. Plank's law and photoelectric effect		x											x
4. Rutherford model for hydrogen				x								x	
5. Bohr and Somerfield theories								x			x		
6. Compton effect				x									
7. Mid-Term Exam			x	x		X	x						
8. Dual nature of the matter						X							
9. De Broglie waves and Uncertainty Principles								x					
10. Principle of special relativistic theory		x											
11. Concept of particle wave complementarity.				X	X								
12. Newtonian relativity			X						x				
13. Galilian transformation of coordinates							x						
14. Doppler effect										x			

6- List of references:



6-1 Course notes

Lecture notes approved by Physics department.

6-2 Required books.

1- The concepts and theories of modern physics by John Bernhard Stallo, BiblioBazaar (2009)

6-11 Recommended books.

1- Ancient and Modern Physics by Thomas E. Willson Hard Press Publishing (2010)

6-4 Periodicals, Web sites, etc.

[http://www. Physics2000](http://www.Physics2000)

<http://www. Physics today>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Eslam Shiha

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification

Geo 231: Crystallography and optical mineralogy (2)

A- Affiliation

Relevant program:

Chemistry B.Sc. Program



Department offering the program:	Department of Chemistry
Department offering the course:	Department of Geology
Academic year/level:	fourth level
Date of specifications approval:	9/12/2015 (Faculty council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Basem Zoheir

B - Basic information

Title: Crystallography and optical mineralogy (2)	Code: Geo 231	Year/level: Second level
Teaching Hours:	Lectures: 1	Tutorial: 0
	Practical: 3	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course is aimed to introduce students to the different systems and classes of crystal forms for mineralogical applications and solid state physics. Identifying the crystal system and related properties is a clue to understand the behavior of crystalline materials. Optical mineralogy deals with the polarizing microscope and uses the optical properties of minerals for their identification. Fundamentals of the polarized light and bi-refraction form a significant part serves a wide variety of applications in physics and chemistry. It also aims to provide appropriate practical skills about crystallography.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should to be able to:

- a1. Explain the interrelationship between crystallography and optical mineralogy,
- a2. Identify the applications of crystal forms and symmetry in geological and other natural science fields,
- a3. Describe the crystal forms and identify each shape if composite,
- a4. Outline the basics and theories of mineral optics using polarized light.

b - Intellectual skills:

On successful completion of the course, the student should to be able to:

- b1. Differentiate between different types of crystal forms,
- b2. Discover the symmetry elements of crystalline materials,
- b3. Confirm the basic, advanced techniques and methods related to optical mineralogy
- b4. Compare between the different minerals based on their optical properties.

c - Practical and professional skills:

On successful completion of the course, the student should to be able to:

- c1. Show the crystal system and class of a given mineral,
- c2. Exam the symmetrical elements of a crystalline material,

- c3. Show the polarizing microscope and identify minerals and their optical properties,
c4. Apply the investigation results for mineral classification and distinctions.

d - General skills:

On successful completion of the course, the student should be able to:

- d1. Collect data from sample examination and other data resources,
d2. Using the internet and commination to meet the projected goals in an easy, readable final form.
d3. Work in team smoothly adhere to ethics and manage time.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1.Introduction and course description	1	0	3	7.14%
2.Fundamentals of crystallography	1	0	3	7.14%
3.Crystal properties and crystal systems	1	0	3	7.14%
4.The 32 crystallographic classes: classification	1	0	3	7.14%
5.The isometric and tetragonal systems	1	0	3	7.14%
6.Orthorhombic and monoclinic systems	1	0	3	7.14%
7.Mid-term exam	1	0	3	7.14%
8.Triclinic system and composite crystal forms	1	0	3	7.14%
9.Classification of minerals	1	0	3	7.14%
10.The polarizing microscope: properties normal light	1	0	3	7.14%
11.Optical properties of minerals in plane polarized light	1	0	3	7.14%
12.Optical properties of minerals between crossed Nichols	1	0	3	7.14%
13.Isotropic and anisotropic minerals	1	0	3	7.14%
14.Revision and course evaluation/feedback	1	0	3	7.14%
Total hours	14	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Explain the interrelationship between crystallography and optical mineralogy,	x	x	o	x	o	o
	a2	Identify the applications of crystal forms and symmetry in geological and other natural science fields,	x	x	o	o	o	x
	a3	Describe the crystal forms and identify	x	x	o	x	x	x

		each shape if composite,						
	a4	Outline the basics and theories of mineral optics using polarized light.	x	x	o	x	o	o
Intellectual Skills	b1	Differentiate between different types of crystal forms,	x	x	o	x	x	x
	b2	Discover the symmetry elements of crystalline materials,	x	o	o	x	o	o
	b3	Confirm the basic, advanced techniques and methods related to optical mineralogy	x	x	o	x	x	o
	b4	Compare between the different minerals based on their optical properties.	x	x	x	x	o	o
Practical and professional skills	c1	Show the crystal system and class of a given mineral,	o	x	x	x	x	o
	c2	Exam the symmetrical elements of a crystalline material,	x	x	o	x	o	o
	c3	Show the polarizing microscope and identify minerals and their optical properties.	x	x	o	x	x	o
	c4	Apply the investigation results for mineral classification and distinctions.	x	x	o	x	o	x
General Skills	d1	Collect data from sample examination and other data resources,	x	x	x	x	o	o
	d2	Using the internet and commination to meet the projected goals in an easy, readable final form.	x	x	o	x	o	o
	d3	Work in team smoothly adhere to ethics and manage time.	o	x	o	x	x	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, b2, b4, c1 and c2	Fifth week	5%
Mid-Term Exam	a1, a4, b3, b4.	Seventh week	5%
Oral exam	a2, a3, a4, b1, b4, c3 and c4.	fifteenth week	10%
Written exam	a1, a2, a3, b1, b2, b4.	sixteenth week	80%
Total			100 %

Course matrix				
Topic	Knowledge and understanding	Intellectual skills	Practical and professional skills	General Skills



	a 1	a 2	a 3	a 4	b 1	b 2	b 3	b 4	C 1	C 2	C 3	C 4	d 1	d 2	d 3
1.Introduction and course description	x														x
2.Fundamentals of crystallography	x														
3.Crystal properties and crystal systems		x			x	x				x			x		x
4.The 32 crystallographic classes: classification			x							x					
5.The isometric and tetragonal systems			x							x					
6.Orthorhombic and monoclinic systems			x							x				x	x
7.Mid-term exam	x														
8.Triclinic system and composite crystal forms			x												
9.Classification of minerals				x						x					x
10.The polarizing microscope: properties normal light							x			x	x		x		
11.Optical properties of minerals in plane polarized light							x	x		x	x		x		
12.Optical properties of minerals between crossed Nichols							x	x	x	x			x	x	
13.Isotropic and anisotropic minerals				x									x		x
14.Revision and course evaluation/feedback	x	x	x		x	x									



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s) approved by the department

6-2 Required books

None

6-3 Recommended books

Introduction to Crystallography and Mineral Crystal Systems

<http://www.rockhounds.com/rockshop/xtal/index.shtml>

William Nesse 2012 Introduction to Optical Mineralogy

Oxford University Press; Fourth Edition edition (March 31 2012) 368 pages,

6-4 Periodicals, Web sites, etc.

<http://dave.ucsc.edu/myrtreia/crystal.html>

7- Facilities required for teaching and learning:

Power point presentations

Data show

Sound system to ensure the ease listening

Group discussions

Course coordinator: Prof. Dr. Wael Haggag

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

336 Ch: Catalysis Technology

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level

Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Dr. Zeinab Abdel Bary

B - Basic information

Title: Surface Chemistry	Code: 336 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the concepts of surface catalysis. Give explanation of catalysis concept and the catalyst, its components and how can be prepared. Give explanation on the characterization of catalyst and the properties of catalyst. Also, explain the recycling of catalyst and the modification of catalyst. Give explanation on photo catalysis

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate the relation between properties of catalyst with the behavior and the surface properties of different materials.
- a.2- Define the concepts of catalysis and photo-catalysis.
- a.3- Recognize the function of catalyst, different types of materials consisted of catalyst.
- a.4- Investigate the preparation methods of the catalyst
- a.5- Investigate the characterizations tools for catalyst and how it recycled.



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Analyze the given chemical data to identify the acidity and active sites of catalyst.
- b2- explain the different theories of catalysis and its function
- b3. explain the properties and preparation methods.
- b4. Explain the surface, morphological and bulk characterization of catalyst.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Calculate the surface area, pore volume and pore radius of solids.
- C2- Calculate and determine the acidity, particle size of catalyst.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to catalysis.	2	0	0	7.14%
2. Properties of catalyst	2	0	0	7.14%
3. Preparation methods of catalyst	2	0	0	7.14%
4. Components of catalyst part (1)	2	0	0	7.14%
5. Components of catalyst part (2)	2	0	0	7.14%
6. Characterization tools for catalyst	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Determination of acidity, active sites.	2	0	0	7.14%
9. Determination of surface area, total surface area, microporosity, pore volume and pore	2	0	0	7.14%
10. Recycling processes of catalyst.	2	0	0	7.14%
11. The modification of catalyst part (1)	2	0	0	7.14%
12. The modification of catalyst part (1)	2	0	0	7.14%
13. Photocatalysis, principles and explanations.	2	0	0	7.14%
14. Revision	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Describe the relation between properties of catalyst with the behavior and the surface Properties of different materials.	x	x	x	0	0	x
	a2	Define the concepts of catalysis and photocatalysis	x	x	x	0	0	x
	a3	Identify the function of catalyst, different types of materials consisted of catalyst.	x	x	x	0	x	x
	a4	Determine the preparation methods of the catalyst	x	0	x	0	x	x
	a5	Explain the characterizations tools for catalyst and how it recycled.	x	0	x	0	x	x
Intellectual Skills	b1	Interpret the given chemical data to identify the acidity and active sites of catalyst.	x	0	x	0	x	x
	b2	Compare the different theories of catalysis and its function	x	x	x	0	x	0
	b3	Interpret the properties and preparation methods.	x	x	x	0	x	0
	b4	Report the surface, morphological and bulk characterization of catalyst.	x	x	x	0	x	0
Practical and professional skills	c1	Investigate the surface tension of liquid, surface area, pore volume and pore radius of solids.	x	0	x	0	x	x
	C2	Analyze and determine the acidity, particle size of catalyst	x	0	x	0	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	x	0	0	0	x
	d2	community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Work in a team effectively, time management, collaborate and communication with others .	0	0	x	x	0	0
	d4	Ethical behavior of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c1, and d4	Thirteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3.	Fourteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills		General Skills			
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	d1	d2	d3	d4
1. Introduction to catalysis.	x														
2. Properties of catalyst		x					x		x			x			
3. Preparation methods of catalyst				x				x		x				x	
4. Components of catalyst part (1)			x					x							
5. Components of catalyst part (2)			x												
6. Characterization tools for catalyst					x			x	x	x	x	x			
7. Mid-Term Exam.															
8. Determination of acidity, active sites.						x			x	x	x			x	
9. Determination of surface area, total surface area, microporosity, pore volume and pore radius.	x						x		x	x	x		x	x	
10. Recycling processes of catalyst.					x						x	x			x
11. The modification of catalyst part (1)				x							x		x	x	
12. The modification of catalyst part (1)				x											
13. Photocatalysis, principles and explanations.			x				x					x			x
14. Revision															



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

I. Chorkendorff, J. W. Niemantsverdriet (Concepts of Modern Catalysis and Kinetics)

6-22 Recommended books

1- Richard I. Masel `Chemical Kinetics & Catalysis`

2- P.V. Kamat, D. Meisel, Studies in Surface Science and Catalysis, Vol. 103; Semiconductor Nanoclusters—Physical, Chemical, and Catalytic Aspects, Elsevier: Amsterdam, 1997.

Periodicals, Web sites, etc.

Journal of Applied catalysis A

physical Chemistry

<http://www.google.com>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Dr. Zeinab Abdel Bary

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

313 Ch: Reaction Mechanism and StereoChemistry

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohamed Sayed Behalo Dr. Abdel Motaal Abdel Mgeed

B - Basic information

Title: Reaction Mechanism and StereoChemistry	Code: 313 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable students to develop the ability to propose and identify reasonable pathways for reactions based on available experimental data. Also, to predict synthesis of different products from the reaction and determination of the ratio between them.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

By the end of the course, the student should understand knowledge and understanding of:

- a.1- Utilize principles of kinetics, thermodynamics, and equilibria in the prediction of reaction pathway.
- a.2- Analyze organic compound form any functional group or class and compose an acceptable functionality behavior for each type of compound.
- a.3- Recognize and utilize the major reaction mechanisms, especially those involving Intermediates: Electrophilic addition, elimination, oxidation-reduction, electrophilic aromatic substitution free radical.
- a.4- Investigate the relative stability of intermediates.



a.5- Achieve the structure of organic compounds and the reactivity associated with functional groups.

a.6- Investigate nature of organic compound and elements present in it.

b - Intellectual skills:

By the end of the course, the student should be able to.

b1- Draw mechanisms for complex reactions.

b2- Appreciate how orbital interactions affect structure and reactivity.

b3- Propose more complex syntheses than previously.

b4- Recognize direction of electron flow in reaction mechanisms.

c - Practical and professional skills:

By the end of the course, the student should be able to:

c1- Apply the reaction mechanisms, stereochemistry and kinetics in identification of organic reactions and preparation of new compounds.

c2- Evaluate substitution and elimination reactions.

c3- Describe principles of molecular rearrangements and energy relationship

d - General skills:

d1- Use information technology and web search for collecting information.

d2- Work effectively in a team, and independently on solving organic chemistry problems.

d3- Exchange ideas, principles and information by oral, written and visual means.

d4- Communicate effectively with his lecturer and colleagues.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to organic reaction mechanism - Investigation the presence of N, S, halogen atoms in organic compound	2	0	3	7.14%
2. Unimolecular nucleophilic substitution at saturated carbon (SN1) - Preparation of alkaline filtrate from organic compound	2	0	3	7.14%
3. Bimolecular nucleophilic substitution at saturated carbon (SN2) -The acidic and aromatic properties of organic compound	2	0	3	7.14%
4. Nucleophilic substitution at unsaturated carbon - Studying the unsaturation of organic compound	2	0	3	7.14%
5. Electrophilic substitution reactions - Investigation the effect of sodium hydroxide and concentrated sulphoric acid	2	0	3	7.14%
6. Addition reactions to carbonyl compounds - The effect of heat on organic compound	2	0	3	7.14%
7. Mid-term Exam	2		3	7.14%
8. Addition reactions to alkenes and nitriles - The effect of soda lime on organic compound	2	0	3	7.14%
9. Pericyclic addition reactions - Studying the solubility and reverse precipitation of organic compound	2	0	3	7.14%
10.Elimination reactions (α , β , γ - elimination - Combination of C, H and $\{O\}$ compounds	2	0	3	7.14%
11.Elimination reactions (E1, E2- elimination) - Combination of C, H, N and $\{O\}$ compounds	2	0	3	7.14%
12.Molecular rearrangements -Combination of C, H, N, Cl and $\{O\}$ compounds	2	0	3	7.14%
13.Non-kinetic methods for the elucidation of reaction mechanism - Combination of C, H, N, S and $\{O\}$ compounds	2	0	3	7.14%
14.Revision	2	0	3	7.14%
Total hours	28	0	42	100

4 - Teaching and Learning methods against ILOS:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming	
Knowledge & Understanding	a1	Identify principles of kinetics, thermodynamics, and equilibria in the prediction of reaction pathway.	X	0	x	0	0	x
	a2	State organic compound form any functional group or class and compose an acceptable functionality behavior for each type of compound.	x	x	x	x	0	0
	a3	Determine the major reaction mechanisms, especially those involving intermediates: Electrophilic addition, elimination, oxidation-reduction, electrophilic aromatic substitution free radical.	x	x	x	0	x	x
	a4	Identify the relative stability of intermediates.	x	x	x	0	0	x
	a5	Define the structure of organic compounds and the reactivity associated with functional groups.	x	0	x	X	x	x
	a6	explain nature of organic compound and elements present in it.	x	0	x	X	x	0
Intellectual Skills	b1	Design mechanisms for complex reactions.	x	x	x	0	x	x
	b2	Interpret how orbital interactions affect structure and reactivity.	x	x	0	0	0	x
	b3	Hypothesis more complex syntheses than previously.	x	0	0	x	x	x
	b4	Interpre direction of electron flow in reaction mechanisms.	x	x	0	0	0	x
Practical and professional skills	c1	Relate the reaction mechanisms, stereochemistry and kinetics in identification of organic reactions and preparation of new compounds.	x	x	0	x	x	x
	c2	Assess substitution and elimination reactions.	x	x	0	x	x	0
	c3	Analyze principles of molecular rearrangements and energy relationship	x	x	x	x	x	0
General Skills	d1	Use information technology and web search for collecting information.	0	0	0	0	0	x
	d2	Work effectively in groups, and independently on solving organic chemistry problems.	0	0	0	0	x	x
	d3	Community linked thinking in ideas, principles and information by oral, written and visual means	x	0	x	0	0	x
	d4	Communicate effectively with his lecturer and colleagues.	x	0	0	0	0	x



5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, a5, b3, b4 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a5, a6, b1 and c1	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b4, .d3, and d4	fifteenth week	6 %
Practical exam	c1 to c3	sixteenth week	40%
Written exam	a1, a2, a3, a4, b1, b2, b3.	seventeenth week	48 %
Total			100 %

Course matrix																	
Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills			General Skills			
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3	d4
1. Introduction to organic reaction mechanism - Investigation the presence of N, S, halogen atoms in organic compound	x						x					x					x
2. Unimolecular nucleophilic substitution at saturated carbon (SN1) - Preparation of alkaline filtrate from organic compound	x	x		x			x					x	x	x	x		x
3. Bimolecular nucleophilic substitution at saturated carbon (SN2) -The acidic and aromatic properties of organic		x		x			x				x	x			x		
4. Nucleophilic substitution at unsaturated carbon - Studying the unsaturation of organic compound				x				x				x				x	x
5. Electrophilic substitution reactions - Investigation the effect of sodium hydroxide and concentrated sulphuric acid				x	x							x	x		x		
6. Addition reactions to carbonyl compounds - The effect of heat on organic compound				x		x	x						x	x			
7. Mid-term Exam	x	x	x		x	x	x				x						
8. Addition reactions to alkenes and nitriles - The effect of soda lime on organic compound				x					x		x		x			x	
9. Pericyclic addition reactions - Studying the solubility and reverse precipitation of organic compound				x					x		x						



10. Elimination reactions (α , β , γ - elimination - Combination of C, H and $\langle O \rangle$ compounds				x					x	x				x	x			x
11. Elimination reactions (E1, E2- elimination) - Combination of C, H, N and $\langle O \rangle$ compounds				x					x	x								x
12. Molecular rearrangements -Combination of C, H, N, Cl and $\langle O \rangle$ compounds						x				x	x							x
13. Non-kinetic methods for the elucidation of reaction mechanism - Combination of C, H, N, S and $\langle O \rangle$ compounds	x									x	x						x	
14. Revision	x	x	x	x			x	x	x	x			x					

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

- Basics in physical Organic chemistry, 4 th Edition by W.I. biter, London, 1988
- Organic Chemistry, 4 th Edition by Robert Wlorrison and Robert Boyd, Allyn and Bacon, Ir.c., Boston, London , Sydney, Toronto, 1983

6-23 Recommended books

- 1- Reaction mechanisms of organic chemistry, 9th edition, 2001
- 2- Organic Chemistry, 6 th Edition by I. L. Finar, Longmann Group Limited, volume I and II 1975.

6-24 Periodicals, Web sites, etc.

Journal of Organic chemistry (JOC)

Journal of American Chemical Society (JACS)

<http://www.chemguide.co.uk/mechanisms/frmenu.html#top>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board, Group Discussions, Data show

Course coordinator: Prof. Dr. Mohamed Sayed Behalo
Dr. Abdel Motaal Abdel Mgeed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

313 Ch: Pesticides and toxins chemistry

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Aml Mohammed Dr. Enas Abdel Alim

B - Basic information

Title: : Insecticides and toxins chemistry	Code: 313 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable students to understand the principles underlying specifications for pesticide quality control. To introduce the principles and practice of defining acceptable quality and equivalence of pesticides and knew different methods for their preparation.

2 - Intended Learning Outcomes (ILOS)

A- Knowledge and understanding:

By the end of the course, the student should understand knowledge and understanding of:

- A1- Recognize the classification and properties of insecticides.
- A2- Understand mode of action of different insecticides
- A3- investigate different methods for synthesis of different types of insecticides
- A4- Define different applications of insecticides.
- A5- Recognize insecticides environmental problems related to massive use of insecticide.
- A6- Outline integrated insect control procedures.



B- Intellectual skills:

By the end of the course, the student should be able to.

- B1 – Predict relation between structures and toxicity of organic compounds
- B2- Knew how to synthesize insecticides
- B3- Compare between the different types of insecticides.
- B4- Be aware of toxicology of insecticides

C - Practical and professional skills:

By the end of the course, the student should be able to:

- C1- Relate and follow up action and potency of insecticide.
- C2- Determine methods of pest control.
- C3- Recommend suitable type of insecticide.
- C4- Investigate which insecticide is safe and effective

D - General skills:

- D1- Use information technology and web search for collecting information.
- D2- Work effectively in a team, and independently on solving organic chemistry problems.
- D3- Exchange ideas, principles and information by oral, written and visual means.
- D4- Communicate effectively with his lecturer and colleagues.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to insecticides and toxins	2	0	0	7.14%
2. Classification of insecticides	2	0	0	7.14%
3. Toxicity of organic compounds	2	0	0	7.14%
4. Synthesis of DDT	2	0	0	7.14%
5. Properties of DDT	2	0	0	7.14%
6. Organic sulfur compounds	2	0	0	7.14%
7. Organic nitrogen compounds	2	0	0	7.14%
8. Mid-term exam	2	0	0	7.14%
9. Organic phosphorous compounds	2	0	0	7.14%
10.Chloro derivatives	2	0	0	7.14%
11.Carbamate insecticides	2	0	0	7.14%
12.Natural insecticides	2	0	0	7.14%
13.Degradation of insecticides	2	0	0	7.14%
14.Revision	0	0	0	7.14%
Total hours	24	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define the classification and properties of insecticides.	x	x	x	0	0	x
	a2	Identify mode of action of different insecticides	x	0	x	0	0	0
	a3	Explain different methods for synthesis of different types of insecticides	x	x	0	0	x	x
	a4	Define different applications of insecticides.	x	x	x	0	x	0
	a5	State insecticides environmental problems related to massive use of insecticide.	x	0	x	0	0	x
	a6	Outline integrated insect control procedures.	x	0	x	0	x	x
Intellectual Skills	b1	Construct relation between structures and toxicity of organic compounds	x	x	x	0	x	x
	b2	Report the synthesise of insecticides	x	0	x	0	x	x
	b3	Compare between the different types of insecticides.	0	0	x	0	x	x
	b4	Be aware of toxicology of insecticides	x	x	x	0	0	x
Practical and professional skills	c1	Relate and follow up action and potency of insecticide.	x	x	x	0	x	x
	c2	Show methods of pest control.	x	0	x	0	x	0
	c3	Recommend suitable type of insecticide.	x	0	x	0	x	x
	C4	Investigate which insecticide is safe and effective	x	x	x	0	0	x
General Skills	d1	Use information technology and web search for collecting information.	x	0	0	0	0	x
	d2	Work effectively in groups, and independently on solving organic chemistry problems.	0	0	x	0	x	x
	d3	community linked thinking in ideas, principles and information by oral, written and visual means	x	0	x	0	0	x
	d4	Communicate effectively with his lecturer and colleagues.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, a5, b3, b4, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a5, a6, b1, d1, and d2.	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b4, c3,d3, and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3d1, and d4	Sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills				General Skills			
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	c1	c2	c3	c4	d1	d2	d3	d4
1. Introduction to insecticides and toxins	x					x									x			
2. Classification of insecticides		x				x	x		x		x		x	x				x
3. Toxicity of organic compounds	x					x	x			x	x	x		x				x
4. Synthesis of DDT			x	x				x					x					
5. Properties of DDT			x	x							x				x	x		x
6. Organic sulfur			x					x					x					
7. Organic nitrogen			x					x										x
8. Mid-term exam	x	x	x		x	x	x								x	x		
9. Organic phosphorous compounds			x					x			x		x					
10. Chloro derivatives			x	x											x			
11. Carbamate insecticides				x				x			x							
12. Natural insecticides				x							x			x			x	
13. Degradation of insecticides				x	x	x				x	x	x						
14. Revision	x	x		x	x	x	x			x	x							



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

The chemistry and toxicology of insecticides, Harold H Shepard, Burgess publishing co (1993)

6-25 Recommended books

Palmer, WE, Bromley, PT, and Brandenburg, RL. Wildlife & pesticides - Peanuts. North Carolina Cooperative Extension Service. Retrieved on 14 October 2007

6-26 Periodicals, Web sites, etc.

1. "Pesticide Fact Sheet- chlorantraniliprole". <http://www.epa.gov/opprd001/factsheets/chloran.pdf>
2. <http://en.wikipedia.org/wiki/Insecticide>

Journal of Organic chemistry (JOC)

Journal of American Chemical Society (JACS)

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Dr. Aml Mohammed
Dr. Enas Abdel Alim

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

322 Ch: Characterization of Inorganic Compounds

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr El-Sayed El-Mossalamy Dr. Ayman Awad Ali Abdel Razik

B - Basic information

Title: Characterization of Inorganic Compounds	Code: 322 Ch	Year/level: third level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to learn the different methods for preparation of inorganic compounds, molecular spectroscopies and their application in inorganic chemistry with different examples. In this course is to enable the students to study different methods for fabrication nanomaterial and characterization tools depending on molecular spectra in inorganic chemistry as Microscopies, IR, Raman, NMR, ESR and Mossbauer techniques. Students also study symmetry elements and operations as rotation, reflection and inversion with different examples from inorganic compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1- Recognize the different types of inorganic materials
- a2-. Outline the application of inorganic compounds in our life
- a3- Explain the different methods using in the preparation of inorganic materials
- a4- Understand the symmetry elements and operations as rotation, reflection and inversion
- a5- Recognize theories and fundamentals of different characterization techniques related to physical and chemical properties of inorganic compounds.
- a6- Describe structure, functional groups and morphology of different chemical inorganic compounds using different spectroscopic techniques.



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Compare different concepts of various tools using in inorganic chemistry.
- b2- Report the chemical data to identify the compositions, size and chemical structures of inorganic compounds
- b3- Modify the methods for preparation of inorganic materials.
- b4- Discover the symmetry elements and operations of some inorganic compounds

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Prepare the different inorganic compounds
- c2- Examine the chemical and physical properties of inorganic compounds.
- c3-Collect the knowledge using different characterization tools in inorganic chemistry

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively
- d2- Solve problems on the scientific basis taught in this course.
- d3- Cooperate and communicate with others members of teamwork positively.
- d4- Search for information and engage in life-long self learning discipline.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction in inorganic chemistry and its application in our life. - Preparation of hexaminenickel II chloride complex.	2	0	3	7.14%
2. Different symmetry operations and elements. - Analysis of Ni ⁺² in hexaminenickel II chloride complex.	2	0	3	7.14%
3. Rotation, Reflection and Inversion operation for different inorganic and organic compounds. - Analysis of NH ₃ in hexaminenickel II chloride complex.	2	0	3	7.14%
4. Introduction to different methods of the preparation of inorganic materials and different characterization tools. - Preparation of monooxalate complex.	2	0	3	7.14%
5. The preparation of inorganic materials using solid state method. - Analysis of Fe ⁺² in monooxalate complex.	2	0	3	7.14%
6. The preparation of inorganic nano-materials (1). - Analysis of C ₂ O ₄ ⁻² in monooxalate complex.	2	0	3	7.14%
7. Mid -term exam.	2	0	3	7.14%
8. The preparation of inorganic nano-materials (2). - Preparation of trioxalate iron III complex.	2	0	3	7.14%
9. Optical and Electron microscopies technique. - Analysis of Fe ⁺³ in trioxalate iron III complex.	2	0	3	7.14%
10. IR and Raman spectroscopies. - Analysis of C ₂ O ₄ ⁻² in trioxalate iron III complex.	2	0	3	7.14%
11. NMR and ESR spectroscopies. - Preparation of coper II ammonia complex.	2	0	3	7.14%
12. Application of inorganic compounds in different fields (1). - Analysis of Cu ⁺² in coper II ammonia complex.	2	0	3	7.14%
13. Application of inorganic compounds in different fields (2). - Analysis of NH ₃ in coper II ammonia complex.	2	0	3	7.14%
14. Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain	
Knowledge & Understanding	a1	Identify the different types of inorganic materials	x	0	x	0	0	x
	a2	Outline the application of inorganic compounds in our life	x	x	x	0	0	0
	a3	Explain the different methods using in the preparation of inorganic materials	x	x	x	x	0	x
	a4	Define the symmetry elements and operations as rotation, reflection and inversion	x	x	x	0	x	x
	a5	Identify theories and fundamentals of different characterization techniques related to physical and chemical properties of inorganic compounds.	x	x	x	0	x	x
	a6	Describe structure, functional groups and morphology of different chemical inorganic compounds using different spectroscopic techniques.	x	x		x	x	x
Intellectual Skills	b1	Compare different concepts of various tools using in inorganic chemistry.	x	x	0	0	x	x
	b2	Report the chemical data to identify the compositions, size and chemical structures of inorganic compounds	x	0	x	0	x	x
	b3	Modify the methods for preparation of inorganic materials.	x	0	x	0	x	x
	b4	Discover the symmetry elements and operations of some inorganic compounds	x	0	x	0	x	x
Practical and professional skills	c1	Prepare the different inorganic compounds	0	0	x	x	0	x
	c2	Examine the chemical and physical properties of inorganic compounds.	0	0	x	x	x	x
	c3	Collect the knowledge using different characterization tools in inorganic chemistry	x	0	x	x	x	x
General Skills	d1	community linked thinking on the scientific basis taught in this course.	x	0	0	x	0	x
	d2	Use computers and internet for information and communication technology effectively	0	0	x	x	x	x
	d3	Communicate with others members of teamwork positively.	0	0	x	x	0	x
	d4	life-long self learning discipline and Searching for information	x	x	0	x	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a4, b2, c1, d2, d3, d4 and d2	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, b2, b4 and d1	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, b4 and c3	fifteenth week	6 %
Practical exam	c1 to c3	Sixteenth week	40%
Written exam	a1, a2, a3, a4,a5, a6, b1, b2, b4, and d1	seventeenth week	48 %
Total			100 %

Course matrix

Topic	Knowledge and understanding						Intellectual skills				and professional skills			General Skills				
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3	d4	
1. Introduction in inorganic chemistry and its application in our life. - Preparation of hexaminenickel II chloride complex.	x	x										x	x	x				x
2. Different symmetry operations and elements. - Analysis of Ni ²⁺ in hexaminenickel II chloride complex.				x						x	x	x	x	x	x			
3. Rotation, Reflection and Inversion operation for different inorganic and organic compounds. - Analysis of NH ₃ in hexaminenickel II chloride complex.				x						x	x	x	x	x				
4. Introduction to different methods of the preparation of inorganic materials and different characterization tools. - Preparation of monooxalate complex.			x	x	x		x	x			x	x	x	x	x	x		
5. The preparation of inorganic materials using solid state method. -Analysis of Fe ²⁺ in monooxalate complex.			x						x		x	x	x				x	
6. The preparation of inorganic nano-materials (1). - Analysis of C ₂ O ₄ ²⁻ in monooxalate complex.			x						x		x	x	x					



7. Mid -term exam.	x	x	x	x					x		x	x	x	x					
8. The preparation of inorganic nano-materials (2). - Preparation of trioxalate iron III complex.			x						x			x	x	x				x	
9. Optical and Electron microscopies technique. - Analysis of Fe ⁺³ in trioxalate iron III complex.					x	x	x	x				x	x	x				x	
10. IR and Raman spectroscopies. - Analysis of C ₂ O ₄ ⁻² in trioxalate iron III complex.					x	x	x	x				x	x	x				x	
11. NMR and ESR spectroscopies. - Preparation of coper II ammonia complex.					x	x	x	x				x	x	x				x	
12. Application of inorganic compounds in different fields (1). - Analysis of Cu ⁺² in coper II ammonia complex.		x											x	x	x				x
13. Application of inorganic compounds in different fields (2). - Analysis of NH ₃ in coper II ammonia complex.		x											x	x	x				x
14. Revision		x	x	x	x	x	x	x			x	x	x	x	x				

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

David M. Bishop, Group Theory and Chemistry, London, 1972, pp. 1-314

Bernhard Schrader, Infrared and Raman Spectroscopy, New York, 1994, pp. 1-200.

R. v. Parish, NMR, NQR, EPR and Mossbauer spectroscopy in inorganic chemistry, London, 1990, pp. 1-222.

Recommended books

6-27 Periodicals, Web sites, etc.

http://en.wikipedia.org/wiki/Infrared_spectroscopy

http://en.wikipedia.org/wiki/Raman_spectroscopy

http://en.wikipedia.org/wiki/Nuclear_magnetic_resonance

http://en.wikipedia.org/wiki/M%C3%B6ssbauer_spectroscopy

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board, Group Discussions, Data show

Laboratories with enough chemicals and equipments

Course coordinator: Prof. Dr El-Sayed El-Mossalamy

Dr. Ayman Awad Ali Abdel Razik

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

323 Ch: Chemistry of Transition Metals

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mostafa Y. Nassar Dr. Sabry Hamed

B - Basic information

Title: Chemistry of Transition Metals	Code: 323 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general properties of the transition elements such as color, magnetism, isomerism, variable oxidation states. Also, teach students the nomenclature, theories of bonding, and importance of transition metal complexes.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:



On successful completion of the course, the student should demonstrate knowledge and understanding of:

a.1- Investigate general properties of each group of the transition elements in the periodic table.

a.2- Define some chemical concepts in coordination compounds.

a.3- Name neutral, cationic and anionic complexes.

a.4- Recognize theories of chemical bonding in coordination compounds.

a.5- Mention some of the current issues of application and research of transition metals.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

b1- Analyze the given chemical data to identify the transition metal complexes chemical structure.

b2- Differentiate between different types of coordination compounds.

b3- explain the bond lengths, geometries, magnetism, and color of the transition metal complexes depending on understanding of their bonding theories.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Calculate the number of unpaired electrons in the complex depending on its given magnetism.

c2- Apply the knowledge that the student studied to propose the molecular structures of the transition metal complex.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to transition metal complexes including Werner theory.	2	0	0	7.14%
2. Nomenclature of coordination compounds.	2	0	0	7.14%
3. Isomerism of coordination compounds.	2	0	0	7.14%
4. Valence bond theory.	2	0	0	7.14%
5. Crystal field theory.	2	0	0	7.14%
6. Magnetism, color, and Molecular orbital theory.	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. General properties of groups 3 and 4 elements	2	0	0	7.14%
9. General properties of groups 5 and 6 elements	2	0	0	7.14%
10. General properties of groups 7 and 8 elements	2	0	0	7.14%
11. General properties of groups 9 and 10 elements	2	0	0	7.14%
12. General properties of gp 11 and 10 elements part (1)	2	0	0	7.14%
13. General properties of gp 11 and 10 elements part (2)	2	0	0	7.14%
14. Revision	2	0	0	7.14%

Total hours	28	0	0	100%
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4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Investigate general properties of each group of the transition elements in the periodic table.	x	0	x	0	0	x
	a2	Define some chemical concepts in coordination compounds.	x	0	0	0	0	0
	a3	Name neutral, cationic and anionic complexes.	x	x	x	0	x	0
	a4	Identify theories of chemical bonding in coordination compounds.	x	x	x	0	x	x
	a5	Outline some of the current issues of application and research of transition metals.	x	0	0	0	0	x
Intellectual Skills	b1	Report the given chemical data to identify the transition metal complexes chemical structure.	x	x	x	0	x	x
	b2	Compare between different types of coordination compounds.	x	0	x	0	x	0
	b3	Interpret the bond lengths, geometries, magnetism, and color of the transition metal complexes depending on understanding of their bonding theories.	x	x	x	0	x	x
Practical and professional skills	c1	Show the number of unpaired electrons in the complex depending on its given magnetism.	x	0	x	0	x	x
	c2	analyze the knowledge that the student studied to propose the molecular structures of the transition metal complexes.	x	0	x	0	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Work in a team effectively, time management, communication with others .	0	0	x	0	0	x



	d4	Ethical behaviour of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x
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5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, and d4	Fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	c1	c2	d 1	d 2	d 3	d 4
1. Introduction to transition metal complexes including Werner theory.	x	x				x								
2. Nomenclature of coordination compounds.			x								x	x	x	
3. Isomerism of coordination compounds.	x					x	x	x		x		x		
4. Valence bond theory.				x			x	x		x		x		x
5. Crystal field theory.				x			x	x		x		x		x
6. Magnetism, color, and Molecular orbital theory.	x					x	x	x	x	x		x		x
7. Mid-Term Exam.	x	x	x	x			x					x		
8. General properties of groups 3 and 4 elements	x				x						x			
9. General properties of groups 5 and 6 elements	x				x						x		x	
10. General properties of groups 7 and 8 elements	x				x								x	
11. General properties of groups 9 and 10 elements	x				x									
12. General properties of gp 11 and 10 elements part (1)	x				x						x		x	
13. General properties of gp 11 and 10 elements part (2)	x				x									x
14. Revision		x	x	x		x	x	x	x	x				



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

J.D. Lee, Concise Inorganic Chemistry, 5th Edn. Blackwell Science, Australia, 1996.

6-28 Recommended books

1-F.A. Cotton, G. Wilkinson, C.A. Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th Edn, John Wiley & Sons, Inc., New York, 1999.

2- N.N. Greenwood, A. Earnshaw, Chemistry of Elements, 2nd Edn, Butterworth Heinemann, USA 1997.

6-29 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions, Data show

Course coordinator: Prof. Dr. Mostafa Y. Nassar

Dr. Sabry Hamed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

383 Ch: Irreversible Electrochemistry

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Nahed Fouad

B - Basic information

Title: Irreversible Electrochemistry	Code: 383 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2 h/week
	course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to Know the difference between reversible and irreversible electrochemistry, the meaning of Polarization, kinetics of reaction and types of double layer. Also, some electrochemical application.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the faraday laws, polarization, and double layer.
- a.2- Discover the reasons for deviation from faraday law.
- a.3- Explain types of polarization.
- a.4-. Describe types of double layer.
- a.5- Mention some of electrochemical application.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Discover the weight of materials loss or gained in electrochemical cell.
- b.2- Differentiate between the different types of polarization and double layer.
- b.3- Illustrate the hydrogen and oxygen evolution
- b.4-. Point out some electrochemical application.



c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Calculate weight of materials loss or gained in electrochemical cell.
- c2- Apply the knowledge that the student studied to design battery from commercial compounds

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- work in a team effectively, manage time and communicate with others positively
- d4- Discover the important of the irreversible electrochemistry in our life.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to electrochemistry.	2	0	0	7.14%
2. Faraday 's laws	2	0	0	7.14%
3. Kinetics of electrode reaction	2	0	0	7.14%
4. Types of polarization	2	0	0	7.14%
5. Hydrogen and oxygen evolution	2	0	0	7.14%
6. Types of double layer	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Electroplating part (1)	2	0	0	7.14%
9. Electroplating part (2)	2	0	0	7.14%
10. Batteries (part 1)	2	0	0	7.14%
11. Batteries (part 2)	2	0	0	7.14%
12. Polarography part (1)	2	0	0	7.14%
13. Polarography part (2)	2	0	0	7.14%
14. Revision	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define the faraday laws, polarization, and double layer.	x	0	x	0	x	0
	a2	Identify the reasons for deviation from faraday law.	x	x	x	0	x	x
	a3	Explain types of polarization.	x	0	x	0	0	x
	a4	Describe types of double layer.	x	0	x	0	x	0
	a5	State some of electrochemical application.	x	x	x	0	x	x
Intellectual Skills	b1	Discover the weight of materials loss or gained in electrochemical cell.	x	x	x	0	x	x
	b2	Compare between the different types of polarization and double layer.	x	x	x	0	x	x
	b3	Interpret the hydrogen and oxygen evolution	x	0	x	0	x	x
	b.4	Report some electrochemical application.	x	0	x	0	x	0
Practical and professional skills	c1	Show weight of materials loss or gained in electrochemical cell.	x	0	x	0	x	x
	c2	Analyze the knowledge that the student studied to battery from commercial compounds	x	0	x	0	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	wok in a team effectively, manage time and communicate with others positively	0	0	x	0	0	x
	d4	Compute the different applications of the irreversible electrochemistry in our life.	x	0	x	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, b2, b3 c1, d1 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, b1, b2, b3 , and d2	Seventh week	5 %
Oral exam	a1, a2, a3,a4, a5, b1, b2, b3, b4,c1, c2 d2 and d4	Thirteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, and d2	Fourteenth week	80 %
Total			100 %

Course matrix																
Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills		General Skills				
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	b 4	c1	c2	d 1	d 2	d 3	d 4	
1. Introduction to electrochemistry.	x						x					x		x	x	
2. Faraday 's laws	x	x										x	x		x	
3. Kinetics of electrode reaction					x					x						
4. Types of polarization	x		x												x	
5. Hydrogen and oxygen evolution						x		x		x			x			
6. Types of double layer	x			x			x			x			x			
7. Mid-Term Exam.	x	x	x			x	x	x				x				
8. Electroplating part (1)					x				x			x		x		
9. Electroplating part (2)					x				x		x				x	
10. Batteries (part 1)					x				x		x	x		x		
11. Batteries (part 2)					x				x							
12. Polarography part (1)					x				x			x		x		
13. Polarography part (2)					x				x						x	
14. Revision	x	x	x	x		x	x	x		x						



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s) Approved from Chemistry Department.

6-2 Required books

V. S. BAGOTSKY., *FUNDAMENTALS OF ELECTROCHEMISTRY*, Wiley & Sons, 2006

6-30 Recommended books

- 1) Cynthia G. Zoski, *Handbook of Electrochemistry*, Elsevier 2007.
- 2) CHRISTOPHER M. A. BRETT And ANA MARIA OLIVEIRA BRETT, *ELECTROCHEMISTRY Principles, Methods, and Applications*, Oxford University Press Inc 1994
- 3) Waldfried Plieth, *Electrochemistry for Materials Science*, Elsevier, 2008

6-31 Periodicals, web sites, etc

http://chemwiki.ucdavis.edu/Analytical_Chemistry/Electrochemistry/Basics_of_Electrochemistry

<http://www.chem1.com/acad/webtext/elchem/>

<http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch20/electro.php>

<https://www.khanacademy.org/science/chemistry/oxidation-reduction>

<http://batteryuniversity.com/>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a white board

Group Discussions

Data show

Course coordinator: Dr. Nahed Fouad

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

331 Ch: Kinetics & Photochemistry Chemistry

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Wafaa Abdallah Bayumy Prof. Dr. Safinaz Mohamed Reda

B - Basic information

Title: Applied Electrochemistry	Code: 331 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand principle of chemical kinetics, photochemical reactions, laws of photochemistry, kinetics of photochemical reactions, theories of rate of reaction. Also, teach students the methods of measurement photochemical quantum yield and order of reaction.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1-State the difference between thermal and photo-reactions.
- a.2 Define laws of photochemical reactions.
- a.3- List steady state mechanism to some photochemical reactions.
- a.4- Recognize kinetics of complex chemical reactions.

b - Intellectual skills:

On successful completion of the course, the student should be able to:

- b1- Decide photochemical quantum yield to measure efficacy of photochemical reactions.
- b2- Differentiate between order and molecularity of chemical reactions.
- b3- Explain factors affecting on the rate of reactions.
- b4- Consider kinetics laws.
- b5- Analysis mechanism of chain and non-chain reactions.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Solve some problems on kinetics laws and complex reactions.

- c2- Predict thermodynamic parameters and activation energy for some reactions.
c3- Apply the knowledge that the student studied to calculate the rate constant, half-life and order of reaction.
c4- Show the effect of adding salt on the rate of some reactions.
c5- Propose the phase diagram of two component system.
c6- Apply Freundlich adsorption isotherm on bone charcoal.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
d2- Solve problems on the scientific basis taught in this course.
d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to principle of chemical kinetics and photochemical reactions. - Determination of absolute density of liquids.	2	0	3	7.14 %
2. Definition of rate of reactions and laws of photochemical reactions. - Catalytic decomposition of H ₂ O ₂ .	2	0	3	7.14 %
3. a) Factors affecting on rate of reactions b) Quantum efficiency. - Sabonification of ethyl acetate in a basic medium.	2	0	3	7.14 %
4. a) Rate laws b) Factor affecting on quantum yield. - Clock reaction.	2	0	3	7.14 %
5. a) Kinetics laws (Zero, first, second). b) Experimental determination of quantum yield. - Determination the number of ligand in a copper ammonia complex.	2	0	3	7.14 %
6. a) Kinetics laws (third, higher). b) Experimental determination of quantum yield. - Catalytic salt effect.	2	0	3	7.14 %
7. Mid-Term Exam.	2	0	3	7.14 %
8. a) Kinetics laws (fractional, second). b) High and low quantum yields. - Determination of the critical temperature of the phenol-water system.	2	0	3	7.14 %
9. a) Methods of determination of order of reactions (half- life time, graphical method and variation rate method).	2	0	3	7.14 %



b) Steady treatment for chain and non-chain of photoreactions. - Construction of the thermal diagram of phenol and naphthalene.				
10. Theories for rate of reactions (Arrhenius equation and significance of activation energy). - Distribution of acetic acid between benzene and water strength of the hydrogen bond.	2	0	3	7.14 %
11. Mechanism of chain reactions. - Determination of the strength of the hydrogen bridge responsible for the dimerisation of acetic acid in benzene.	2	0	3	7.14 %
12. Kinetics of complex reactions and photochemical reactions. - Adsorption of oxalic acid on a charcol.	2	0	3	7.14 %
13. Steady state treatment to some photoreactions. - Adsorption of acetic acid on a charcol.	2	0	3	7.14 %
14. Kinetics of thermal reactions. - Revision.	2	0	3	7.14 %
Total hours	28	0	42	100 %

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	State the difference between thermal and photo-reactions	x	0	x	0	0	0
	a2	Define laws of photochemical reactions.	x	0	x	0	0	0
	a3	Outline steady state mechanism to some photochemical reactions.	x	x	x	0	X	0
	a4	Identify kinetics of complex chemical reactions.	x	0	x	0	X	0
Intellectual Skills	b1	Confirm photochemical quantum yield to measure efficacy of photochemical reactions.	x	0	x	0	X	0
	b2	Compare between order and molecularity of chemical reactions	x	x	x	x	0	x
	b3	Interpret factors affecting on the rate of reactions.	x	0	x	0	0	x
	b4	Report kinetics laws.	x	x	x	x	x	0
	b5	Discover mechanism of chain and non-chain reactions.	x	0	x	0	x	0
Practical and professional skills	c1	Investigate some problems on kinetics laws and complex reactions.	0	0	x	x	x	x
	c2	Examine thermodynamic parameters and activation energy for some reactions	0	0	0	x	x	0
	c3	Analyze the knowledge that the student studied to calculate the rate constant, half-life and order of reaction.	0	0	0	x	x	0
	c4	Show the effect of adding salt on the rate of some reactions.	0	0	0	x	x	0
	c5	Label the phase diagram of two component system	0	x	0	x	x	0
	c6	Analyze Freundlich adsorption isotherm on bone charcoal.	0	0	0	x	x	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	0	0	x
	d2	community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	x	0	0	x
	d4	Ethical behaviour of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Mid-Term Exam	a1, a2, b3,b4, d1, d3 and d4	Seventh week	3%
Semester practical work	a1,a2,a4,b1,b2,c1 and d2	Seventh week	3 %
Oral exam	a2, b2, d1, d2 ,d3 and d4	Twelfth week	6%
Practical exam	c1 to c5	Thirteenth week	40 %
Written exam	a1, a2, a4, b1,b3,b4,c3, d1, d3 and d4	Fourteenth week	48%
Total			100 %

Course matrix																			
Topic	Knowledge and understanding				Intellectual skills					Practical and professional skills						General Skills			
	a1	a2	a3	a4	b1	b2	b3	b4	b5	c1	c2	c3	c4	c5	c6	d1	d2	d3	d4
1. Introduction to principle of chemical kinetics and photochemical reactions. - Determination of absolute density of liquids.	x			x							x	x	x	x	x				x
2. Definition of rate of reactions and laws of photochemical reactions. - Catalytic decomposition of H ₂ O ₂ .		x									x	x	x	x	x				x
3. a) Factors affecting on rate of reactions b) Quantum efficiency. - Sabonification of ethyl acetate in a basic medium.											x	x	x	x	x				x
4. a) Rate laws b) Factor affecting on quantum yield. - Clock reaction.							x				x	x	x	x	x				x
5. a) Kinetics laws (Zero, first, second). b) Experimental determination of quantum yield. - Determination the number of ligand in a copper ammonia complex.				x															x
							x	x			x	x	x	x	x				

6. a) Kinetics laws (third, higher). b) Experimental determination of quantum yield. - Catalytic salt effect.				x							x	x	x	x	x	x	x	x				x			
7. Mid-Term Exam.	x	x		x	x	x				x	x	x	x	x	x	x					x				
8. a) Kinetics laws (fractional, second). b) High and low quantum yields. - Determination of the critical temperature of the phenol-water system.				x																	x	x			
9. a) Methods of determination of order of reactions (half- life time, graphical method and variation rate method). b) Steady treatment for chain and non-chain of photoreactions. - Construction of the thermal diagram of phenol and naphthalene.			x						x														x	x	x
10. Theories for rate of reactions (Arrhenius equation and significance of activation energy). - Distribution of acetic acid between benzene and water strength of the hydrogen bond.																						x		x	x
11. Mechanism of chain reactions. - Determination of the strength of the hydrogen bridge responsible for the dimerisation of acetic acid in benzene.										x															
12. Kinetics of complex reactions and photochemical reactions. - Adsorption of oxalic acid on a charcol.				x																			x		
13. Steady state treatment to some photoreactions. - Adsorption of acetic acid on a charcol.				x																					



14. Kinetics of thermal reactions. - Revision.	x										x	x	x	x	x	x				
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6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

1- J.P., Basic chemical kinetics, Tata Mc Graw-Hill Publishing Company Limited, New York, 1990.

2- S. Murov, Handbook of Photochemistry, New York: Marcel Dekker Inc. New York, 1973.

6-32 Recommended books

1-A. kitai, Luminescent Materials and Applications, Canada: John Wiley and Sons, 2008.

2- J. Albani, Structure and Dynamics of Macromolecules: Absorption and Fluorescence, London: Elsevier .2004.

6-33 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Wafaa Abdallah Bayumy

Prof. Dr. Safinaz Mohamed Reda

Program coordinator: Prof. Dr. Safinaz Mohamed Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023

Course Specification

321 Ch: Chemistry of counterfeiting and forgery

A- Affiliation

Relevant program:

Special Chemistry B.Sc. Program

Department offering the program:

Chemistry Department



Department offering the course:

Department of Chemistry

Academic year/level:

Third level

Date of specifications approval:

9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Dr. Gamal Ewies
Dr. Ehab Saleh

B - Basic information

Title: Chemistry of counterfeiting and forgery

Code: 321 Ch

Year/level: Third level

Teaching Hours:

Lectures: 2

Tutorial: 0

Practical: 2

Total: 3 h/week

Course marks: 100 marks

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general properties of the transition elements such as color, magnetism, isomerism, variable oxidation states. Also, teach students the nomenclature, theories of bonding, and importance of transition metal complexes. It also aims to provide appropriate practical skills for counterfeiting and forgery.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1-To know general methods of counterfeiting and forgery in either paper documents or banknotes such as copy, write-offs or chemical erasure.
- a.2- Identify different types of inks, secret inks and chemical and instrumental methods of knowing ink dating and Banknote counterfeiting
- a.3- Understand different types of both of Fingerprint and footprints and methods of raising and comparing it from crime scene
- a.4- Understand different methods of raising and comparing blood, liquid sialic, semen and hair residues from crime scene
- a.5- Describe examination of DNA and their criminal significance

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Differentiate between different types of both of fingerprints and footprints.
- b2- Discover difference between inks and secret inks.
- b3- Solve the method of counterfeiting and forgery either in paper documents or banknotes

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Investigate chemical and instrumental methods of knowing ink dating and both of paper documents and Banknote counterfeiting
- c2-Analyze footprints, fingerprints, blood, semen and hair residues from crime scene.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.



d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. General methods of counterfeiting and forgery in either paper documents or banknotes such as copy, write-offs or chemical erasure. - Introduction to Chemistry of counterfeiting and forgery.	2	0	2	7.14%
2. Different types of inks, secret inks and chemical and instrumental methods of knowing ink dating and Banknote counterfeiting (Part 1) - Shapes of finger print.	2	0	2	7.14%
3. Different types of inks, secret inks and chemical and instrumental methods of knowing ink dating and Banknote counterfeiting (Part 2) - Latent finger print development by using powder.	2	0	2	7.14%
4. Method of protection used in the value-documents such as pulp, fillers and glazing materials - Latent finger print development by using iodine.	2	0	2	7.14%
5. Security features included in the paper industry such as water mark, security thread and Thermal capillaries - Latent finger print development by using cyano acrylate part 1.	2	0	2	7.14%
6. Printing used in the value-documents such as lithographic, intaglio, letter press and microprint - Latent finger print development by using cyano acrylate part 2.	2	0	2	7.14%
7. Mid-Term Exam.	2	0	2	7.14%
8. Different types of both of Fingerprint and footprints and methods of raising and comparing it from crime scene (Part 1) - Latent finger print development by using crystal violet part 1.	2	0	2	7.14%
9. Different types of both of Fingerprint and footprints and methods of raising and comparing it from crime scene (Part 2) - Latent finger print development by using crystal violet part 2.	2	0	2	7.14%
10. Different methods of raising and comparing blood, liquid sialic, semen and hair residues from crime scene (Part 1) - Comparison between different samples of hair part 1.	2	0	2	7.14%
11. Different methods of raising and comparing blood, liquid sialic, semen and hair residues from crime	2	0	2	7.14%

scene (Part 2) - Comparison between different samples of hair part 2.				
12. Examination of DNA and their criminal significance - Identify ink by using paper chromatography part1.	2	0	2	7.14%
13. Some instrumental devices (IR and UV) in the examination of documents, Fingerprint and banknotes (Part 1) - Identify ink by using paper chromatography part2.	2	0	2	7.14%
14. Some instrumental devices (IR and UV) in the examination of documents, Fingerprint and banknotes (Part 2) - Revision.	2	0	2	7.14%
Total hours	28	0	28	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	practical	Problem solving	Brain storming
Knowledge & Understanding	a1	To know general methods of counterfeiting and forgery in paper documents or banknotes such as copy, either write-offs or chemical erasure.	x	0	x	0	0	x
	a2	Identify different types of inks, secret inks and chemical and instrumental methods of knowing ink dating and Banknote counterfeiting	x	0	0	0	0	0
	a3	Describe different types of both of Fingerprint and footprints and methods of raising and comparing it from crime scene.	x	x	x	0	x	x
	a4	State different methods of raising and comparing blood, liquid sialic, semen and hair residues from crime scene .	x	x	x	0	x	x
	a5	Describe examination of DNA and their criminal significance	x	0	0	0	0	x
Intellectual Skills	b1	Compare between different types of both of fingerprints and footprints.	x	x	x	0	x	x
	b2	Discover difference between inks and secret inks.	x	0	x	0	x	x
	b3	Solve the method of counterfeiting and forgery either in paper documents or banknotes	x	x	x	0	x	x
Practical and	c1	Interpret chemical and instrumental methods of knowing ink dating and both of paper documents and Banknote counterfeiting	0	0	x	x	x	x

	c2	Report footprints, fingerprints, and blood, semen and hair residues from crime scene.	0	0	x	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	0	0	x
	d2	community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	x	0	x
	d4	Ethical behaviour of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1 and d3	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, b1, b2, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c1, c2, and d4	fifteenth week	6 %
Practical method	C1 and C2	Sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, b1, b2, b3, d1, and d4	Seventeenth week	48 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	c1	c2	d 1	d 2	d 3	d 4
1. General methods of counterfeiting and forgery in either paper documents or banknotes such as copy, write-offs or chemical erasure.	x								x	x	x			x
2. Different types of inks, secret inks and chemical and instrumental methods of knowing ink dating and Banknote counterfeiting (Part 1)		x					x		x	x		x		
3. Different types of inks, secret inks and chemical and instrumental methods of knowing ink dating and Banknote							x		x	x	x			x
4. Method of protection used in the value-documents such as pulp, fillers and glazing materials									x	x		x	x	
5. Security features included in the paper industry such as water mark, security thread and Thermal capillaries									x	x				x
6. Printing used in the value-documents such as lithographic, intaglio, letter press and	x		x						x	x				
7. Mid-Term Exam.	x	x	x	x		x	x		x	x		x		
8. Different types of both of Fingerprint and footprints and methods of raising and comparing it from crime scene (Part 1)			x						x	x	x	x		x
9. Different types of both of Fingerprint and footprints and methods of raising and comparing it from crime scene (Part 2)			x						x	x				
10. Different methods of raising and comparing blood, liquid sialic, semen and hair residues from crime scene (Part 1)				x		x			x	x	x	x		
11. Different methods of raising and comparing blood, liquid sialic, semen and hair residues from crime scene (Part 2)				x		x			x	x			x	
12. Examination of DNA and their criminal significance					x				x	x				
13. Some instrumental devices (IR and UV) in the examination of documents, Fingerprint and banknotes (Part 1)						x			x	x	x		x	
14. Some instrumental devices (IR and UV) in the examination of documents, Fingerprint and banknotes (Part 2)						x			x	x			x	



6- List of references:

6-1 Course notes

Lecture note approved by Department of Chemistry.

6-2 Required books

1-Paul Craddock, Scientific Investigation of Copies, Fakes and Forgeries

2-Mark Hawthorne, Fingerprints: Analysis and Understanding

6-34 Recommended books

Lorne T. Kirby, DNA Fingerprinting: An Introduction (Breakthroughs in Molecular Biology)

Lisa Yount, Forensic Science: From Fibers to Fingerprints (Milestones in Discovery and Invention)

6-35 Periodicals, Web sites, etc.

<http://www.journals.elsevier.com/forensic-science-international>

<http://www.journals.elsevier.com/journal-of-criminal-justice>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board, Group Discussions, Data show

Course coordinator: Prof. Dr. Gamal Ewies

Dr. Ehab Saleh

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

331 Ch: Applied Electrochemistry

A- Affiliation

Relevant program:	Special Chemistry B.Sc. Program
Department offering the program:	Chemistry Department
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. El-Sayed Mabrouk

B - Basic information

Title: Applied Electrochemistry	Code: 331 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to know the meaning of electroplating, corrosion, thermodynamics of corrosion, kinetics of corrosion and types of corrosion. Also, the different methods used to control corrosion.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the electroplating, corrosion, galvanic series, cathodic protection and inhibitors.
- a.2- Explain thermodynamics and kinetics of corrosion.
- a.3-. Mention passivity of corrosion.
- a.4-. Describe types of corrosion.
- a.5- Discover how to prevent corrosion.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Discover the importance of corrosion and electroplating.
- b2- Differentiate between the different types of corrosion.
- b3- Illustrate the effect of passivity on corrosion.
- b4- Point out some techniques used to control corrosion.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Analyze the obtained practical data to calculate the corrosion rate for some materials in absence and presence of different inhibitors.



c2- Apply the knowledge that the student studied to electroplate some materials.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Discover the important of the application of electrochemistry in our life.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction on electrochemistry and its application. - Lab safety and equipments.	2	0	3	7.14%
2. Electroplating and faraday's law. - Determination the inhibition coefficient for different metal sheets.	2	0	3	7.14%
3. Definitions and Importance of corrosion. - Study the effect of concentration of inhibitor on the inhibition coefficient.	2	0	3	7.14%
4. Thermodynamics of corrosion - Study the effect of time on the inhibition coefficient.	2	0	3	7.14%
5. Kinetics of corrosion - Determination the rate of corrosion by using hydrogen evolution method part1.	2	0	3	7.14%
6. Mixed potential theory. - Determination the rate of corrosion by using hydrogen evolution method part2.	2	0	3	7.14%
7. Mid-Term Exam.	2	0	3	7.14%
8. Passivity. - Corrosion protection part1.	2	0	3	7.14%
9. Types of corrosion (part 1). - Corrosion protection part2.	2	0	3	7.14%
10. Types of corrosion (part 2). - Corrosion protection part2.	2	0	3	7.14%
11. Prevention Corrosion (part1). - Determination the rate of corrosion by using thermometry methods part1.	2	0	3	7.14%
12. Prevention Corrosion (part2).	2	0	3	7.14%

- Determination the rate of corrosion by using thermometry methods part2.				
13. Kinetics of inhibition. - Making photo-cells by the method of electro-polymerization for solar cell application.	2	0	3	7.14%
14. Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define the electroplating, corrosion, galvanic series, cathodic protection and inhibitors.	x	0	x	0	x	x
	a2	Explain thermodynamics and kinetics of corrosion.	x	0	x	0	x	x
	a3	Outline passivity of corrosion.	x	0	x	0	0	x
	a4	Describe types of corrosion.	x	0	x	0	0	x
	a5	Identify how to prevent corrosion.	x	x	x	0	0	x
Intellectual Skills	b1	Discover the importance of corrosion and electroplating.	x	x	x	0	x	x
	b2	Compare between the different types of corrosion.	x	x	x	0	0	x
	b3	Report the effect of passivity on corrosion	x	0	x	0	0	x
	b4	Confirm some techniques used to control corrosion.	x	0	x	x	0	x
Practical and professional skills	c1	Analyze the obtained practical data to calculate the corrosion rate for some materials in absence and presence of different inhibitors.	0	0	0	x	x	0
	c2	Collect the knowledge that the student studied to electroplate some materials	0	0	0	x	x	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	community linked thinking on the scientific basis taught in this course.	x	0	x	x	x	x
	d3	work in a team effectively, manage time and communicate with others positively	0	0	x	x	0	x
	d4	Compute the different application of electrochemistry in our life.	x	0	x	x	0	x



5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, b2, b3 c1, d1 and d3	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, b1, b2, b3 and d2	Seventh week	3%
Oral exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, d2 and d4	fifteenth week	6%
Practical Exam	C1 and C2	Sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5.	seventeenth week	48 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills		General Skills			
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	d1	d2	d3	d4
1. Introduction on electrochemistry and its application. - Lab safety and equipments.	x									x	x	x			
2. Electroplating and faraday 's law. - Determination the inhibition coefficient for different metal sheets.	x					x				x	x			x	
3. Definitions and Importance of corrosion. - Study the effect of concentration of inhibitor on the inhibition coefficient.	x									x	x	x			
4. Thermodynamics of corrosion - Study the effect of time on the inhibition coefficient.		x								x	x	x	x		
5. Kinetics of corrosion - Determination the rate of corrosion by using hydrogen evolution method part1.		x								x	x		x	x	
6. Mixed potential theory. - Determination the rate of corrosion by using hydrogen evolution method part2.	x									x	x				
7. Mid-Term Exam.	x	x	x			x	x	x		x	x		x		
8. Passivity. - Corrosion protection part1.			x					x		x	x	x		x	
9. Types of corrosion (part 1). - Corrosion protection part2.	x			x			x			x	x				x
10. Types of corrosion (part 2). - Corrosion protection part3.				x			x			x	x	x		x	
11. Prevention Corrosion (part1). - Determination the rate of corrosion by using thermometry methods part1.	x				x				x	x	x				x
12. Prevention Corrosion (part2). - Determination the rate of corrosion					x				x	x	x	x			x



by using thermometry methods part2.															
13. Kinetics of inhibition. - Making photo-cells by the method of electro-polymerization for solar cell application.	x									x	x		x	x	x
14. Revision	x	x	x	x		x	x		x	x	x		x		

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s) Approved from Chemistry Department.

6-2 Required books

- 1) Pierre R. Roberge, *Handbook of Corrosion Engineering*, McGraw-Hill 2000.
- 2) V. S. BAGOTSKY, *FUNDAMENTALS OF ELECTROCHEMISTRY*, Wiley & Sons, 2006

6-3 Recommended books

- 1) Philippe Marcus, Florian Mansfeld, *Analytical Methods in CORROSION SCIENCE AND ENGINEERING*, Taylor & Francis Group, LLC, 2006
- 2) CHRISTOPHER M. A. BRETT And ANA MARIA OLIVEIRA BRETT, *ELECTROCHEMISTRY Principles, Methods, and Applications*, Oxford University Press Inc 1994
- 3) Waldfried Pilth, *Electrochemistry for Materials Science*, Elsevier, 2008

6-4 Periodicals, web sites, etc

http://chemwiki.ucdavis.edu/Analytical_Chemistry/Electrochemistry/Electrolytic_Cells/Electroplating
<http://www.corrosion-doctors.org/>
<https://en.wikipedia.org/wiki/Corrosion>
<http://www.chem1.com/acad/webtext/elchem/>
<http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch20/electro.php>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a white board

Group Discussions, Data show

Course coordinator:

Prof. Dr. El-Sayed Mabrouk

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023

Course Specification

316 Ch: Organic Spectroscopy (1)

A- Affiliation

Relevant program:

Special Chemistry B.Sc. Program

Department offering the program:

Department of Chemistry



Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Amr Fteha Dr. Amaal Younis

B - Basic information

Title: Organic Spectroscopy (1)	Code: 316 CHM	Year/level: Third level
Teaching Hours: 2	Lectures: 2 Practical: 3	Tutorial: 0 Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general principles of infra red and ultraviolet spectroscopy. The students will be introduced to the physical basics, the instrumentation, and the applications of both IR and UV spectroscopy in structural elucidation of organic compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Physical basics of IR and UV.
- a.2- The characteristic absorptions in an infrared spectrum.
- a.3- Interpreting IR Spectra.
- a.4- How to measure the ultraviolet (or UV–visible) spectrum of organic compounds.
- a.5- The λ_{\max} from UV–visible spectra.
- a.6- The electronic energy differences between orbitals in the molecule.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Identify the reliable characteristic absorptions in an infrared spectrum.
- b.2- Propose which functional groups are likely to be present in the molecule.
- b.3- Explain which functional groups cannot be present in a molecule because their characteristic peaks are absent from the IR spectrum.
- b.4- Use values of λ_{\max} from UV–visible spectra to estimate the length of conjugated



systems.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1- Define and explain the relevant terms used in basic IR and UV spectroscopy.
- c.2- Calculate both wavenumber and λ_{\max} using IR and UV respectively.
- c.3- Interpret both IR and UV Spectra.

d - General skills:

On successful completion of the course, the student should be able to:

- d.1- Use computers and internet for information and communication technology effectively.
- d.2- Solve problems on the scientific basis taught in this course.
- d.3- Search for new information about the new techniques.
- d.4- Discover the important of spectroscopic techniques in chemistry and biology.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to IR Spectroscopy.	2	0	3	7.14%
2. Molecular vibrations, active and inactive IR vibrations.	2	0	3	7.14%
3. Measurement of the IR spectrum.	2	0	3	7.14%
4. Infrared spectroscopy of hydrocarbons and characteristic absorptions of alcohols and amines.	2	0	3	7.14%
5. Characteristic absorptions of carbonyl compounds and C-N bonds.	2	0	3	7.14%
6. Reading and interpreting IR spectra.	2	0	3	7.14%



7. Mid-Term Exam.	2	0	3	7.14%
8. Introduction to UV Spectroscopy, spectral region and ultraviolet light and electronic transitions	2	0	3	7.14%
9. ultraviolet light and electronic transitions	2	0	3	7.14%
10. Obtaining an Ultraviolet Spectrum.	2	0	3	7.14%
11. Interpreting UV–Visible Spectra part (1).	2	0	3	7.14%
12. Interpreting UV–Visible Spectra part (2).	2	0	3	7.14%
13. UV-Visible analysis in biology and medicine.	2	0	3	7.14%
14. General revision on both IR and UV spectroscopy.	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a.1	Explain Physical basics of IR and UV.	x	x	x	0	0	x
	a.2	State The characteristic absorptions in an infrared spectrum.	x	x	x	0	0	0
	a.3	Define IR Spectra.	x	x	x	0	x	x
	a.4	To know How to measure the ultraviolet (or UV–visible) spectrum of organic compounds.	x	x	x	0	x	x
	a.5	Identify The λ_{\max} from UV–visible spectra.	x	x	x	0	x	x
	a.6	Outline The electronic energy differences between orbitals in the molecule.	x	x	x	0	0	x
Intellectual Skills	b.1	Interpret the reliable characteristic absorptions in an infrared spectrum.	x	0	x	0	x	x
	b.2	Hypothesize which functional groups are likely to be present in the molecule.	x	0	x	0	x	x
	b.3	Interpret which functional groups cannot be present in a molecule because their characteristic peaks are absent from the IR spectrum.	x	0	x	0	x	x
	b.4	Report values of λ_{\max} from UV–visible spectra to estimate the length of conjugated systems.	x	0	x	0	x	x
Pr act ica	c.1	Analyze and Investigate the relevant terms used in basic IR and UV spectroscopy.	x	0	x	x	x	x

	c.2	Show both wavenumber and λ_{\max} using IR and UV respectively.	0	0	x	x	x	0
	c.3	Investigate both IR and UV Spectra.	0	0	x	x	x	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	x	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Life-long learning new information about the new techniques.	x	0	x	0	0	x
	d4	Compute the Different applications of spectroscopic techniques in chemistry and biology.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, c1 and d1 .	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b1, b2 and b3.	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, c1 and b4.	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, b4.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills			General Skills			
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	c1	c2	c3	d1	d2	d3	d4
1. Introduction to IR Spectroscopy.	x													x			
2. Molecular vibrations, active and inactive IR vibrations.		x					x				x						
3. Measurement of the IR spectrum.									x		x						



Using a microphone in lectures
Using of slit overhead projector
Using a black board
Group Discussions
Data show

Course coordinator: Dr. Amr Fteha
Dr. Amaal Younis
Program coordinator: Prof. Dr. Safinaz M. Reda
Head of the Department: Prof. Dr. Wagdy El-DougDoug
Date: 2022-2023

Course Specification

310 Ch: Advanced Organic Chemistry

A- Affiliation

Relevant program: Special Chemistry B.Sc. Program
Department offering the program: Department of Chemistry
Department offering the course: Department of Chemistry
Academic year/level: Third level
Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course co-coordinator: Dr. Eman Gad El-Kareem



Dr. Mohamed abo Raia

B - Basic information

Title: Advanced Organic Chemistry	Code: 310 CHM	Year/level: Third level
Teaching Hours: 2	Lectures: 2 Practical: 0 Course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general principles of nuclear magnetic resonance spectroscopy and mass spectrometry. The students will be introduced to the physical basics, the instrumentation, and the applications of both NMR spectroscopy and mass spectrometry in structural elucidation of organic compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.7- Physical basics of NMR and Mass.
- a.8- The principles of shielding and deshielding in NMR.
- a.9- Chemical shifts, spin-spin splitting and coupling constants.
- a.10- Carbon-13 NMR spectroscopy.
- a.11- Modern 2D-NMR techniques.
- a.12- Different ionization methods of mass spectrometry.
- a.13- Fragmentation patterns of the most common classes of organic compounds.
- a.14- Modern applications of mass spectrometry in biology.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.5- Differentiate between different types of protons using NMR.



- b.6- Analyze the NMR spectra and mass spectra to elucidate the structures of unknown compounds.
- b.7- Identify the right ionization method to be used with each class of compounds.
- b.8- Identify the molecular formula of organic compounds using mass spectrometry.
- b.9- Distinguish between the different types of compounds using both NMR and Mass.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.4- Define and explain the relevant terms used in basic NMR and Mass.
- c.5- Interpret 1- and 2-dimensional NMR spectra from simple organic compounds.
- c.6- Determine the molecular formula and interpret mass spectra for organic compounds.
- c.7- Elucidate the structures of different organic compounds using both NMR and mass.

d - General skills:

On successful completion of the course, the student should be able to:

- d.5- Use computers and internet for information and communication technology effectively.
- d.6- Solve problems on the scientific basis taught in this course.
- d.7- Search for new information about the new techniques.
- d.8- Discover the important of spectroscopic techniques in chemistry and biology.



3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% Of Total
1. Introduction to NMR and Mass Spectrometry.	2	0	0	7.14%
2. Theory of Nuclear Magnetic Resonance and Magnetic Shielding by Electrons.	2	0	0	7.14%
3. The NMR Spectrometer and the Chemical Shift.	2	0	0	7.14%
4. The number of Signals, Areas of the Peaks, Spin-Spin Splitting, and Complex Splitting	2	0	0	7.14%
5. Stereochemical Nonequivalence of protons and Time Dependence of NMR Spectroscopy.	2	0	0	7.14%
6. Carbon-13 NMR Spectroscopy.	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Introduction to Mass Spectrometry.	2	0	0	7.14%
9. Determination of the Molecular Formula by Mass Spectrometry.	2	0	0	7.14%
10. Different Ionization Methods of Mass Spectrometry part (1).	2	0	0	7.14%
11. Different Ionization Methods of Mass Spectrometry part (2)	2	0	0	7.14%
12. Fragmentation Patterns in Mass Spectrometry.	2	0	0	7.14%
13. Applications of Mass Spectrometry in Modern Biology.	2	0	0	7.14%
14. Revision	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against ILOS

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a.1	Identify Physical basics of NMR and Mass.	x	x	x	0	0	x
	a.2	Define The principles of shielding and deshielding in NMR.	x	x	x	0	0	0
	a.3	State Chemical shifts, spin-spin splitting and coupling constants.	x	x	x	0	x	x
	a.4	Outline Carbon-13 NMR spectroscopy.	x	x	x	0	x	x
	a.5	Explain Modern 2D-NMR techniques.	x	x	x	0	0	x
	a.6	Identify Different ionization methods of mass spectrometry.	x	x	x	0	0	x
	a.7	Determine Fragmentation patterns of the most common classes of organic compounds.	x	x	x	0	0	x
	a.8	Outline Modern applications of mass spectrometry in biology.	x	x	x	0	0	x
Intellectual Skills	b.1	Compare between different types of protons using NMR.	x	0	x	0	x	x
	b.2	Interpret the NMR spectra and mass spectra to elucidate the structures of unknown compounds.	x	0	x	0	0	x
	b.3	Discover the right ionization method to be used with each class of compounds.	x	0	x	0	x	x
	b.4	Report the molecular formula of organic compounds using mass spectrometry.	x	0	x	0	x	x
	b.5	Compare between the different types of compounds using both NMR and Mass.	x	x	x	0	x	x
Practical and professional skills	c.1	Examine and analyze the relevant terms used in basic NMR and Mass.	x	0	x	x	x	x
	c.2	Analyze 1- and 2-dimentional NMR spectra from simple organic compounds.	x	0	x	x	x	x
	c.3	Show the molecular formula and interpret mass spectra for organic compounds.	x	0	x	x	x	x
	c.4	Investigate the structures of different organic compounds using both NMR and mass.	x	0	x	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	x	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Life-long learning for new information about the new techniques.	0	0	x	0	0	x
	d4	Compute the different applications of spectroscopic techniques in chemistry and biology.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:



Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, c1 and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a7, b1, and b2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, a6, a7, a8, b1, b2, b3, b4, c2 and b5	Fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, a7, a8, b1, b2, b3, b4, b5.	Sixteenth week	80 %
Total			100 %

Course matrix																					
Topic	Knowledge and understanding								Intellectual skills					Practical and professional skills				General Skills			
	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	b 1	b 2	b 3	b 4	b 5	c 1	c 2	c 3	c 4	d 1	d 2	d 3	d 4
1. Introduction to NMR and Mass Spectrometry.	x													x				x		x	
2. Theory of Nuclear Magnetic Resonance and Magnetic Shielding by Electrons.		x			x													x			
3. The NMR Spectrometer and the Chemical Shift.			x		x										x						
4. The number of Signals, Areas of the Peaks, Spin-Spin Splitting, and Complex Splitting			x										x					x	x	x	
5. Stereochemical Nonequivalence of protons and Time Dependence of NMR Spectroscopy.					x				x												
6. Carbon-13 NMR Spectroscopy.				x											x					x	x
7. Mid-Term Exam.	x	x	x					x	x												
8. Introduction to Mass Spectrometry.	x																				
9. Determination of the Molecular Formula by Mass Spectrometry.	x											x	x			x	x	x			
10. Different Ionization Methods of Mass Spectrometry part (1).						x			x	x									x		
11. Different Ionization Methods of Mass Spectrometry part (2)						x			x	x										x	



12.Fragmentation Patterns in Mass Spectrometry.								x											x			x	x	x		
13.Applications of Mass Spectrometry in Modern Biology.									x											x			x	x		x
14. Revision	x	x	x	x	x				x	x	x	x	x													

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

Organic Structure Analysis (Topics in Organic Chemistry) by Phillip Crews, Jaime Rodriguez and Marcel Jaspars.

6-3 Recommended books

1. Spectrometric Identification of Organic Compounds by Robert M. Silverstein, Francis X. Webster, David Kiemle and David L. Bryce.
2. Organic Spectroscopy by William Kemp.
3. NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry by Harald Günther.

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Dr. Eman Gad El-Kareem

Dr. Mohamed abo Raia

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-Dougdoug

Date:

2022-2023



Course Specification

314 Ch: Chemistry of Carbohydrates, Lipids, Amino Acids and Natural Products (1)

A- Affiliation

Relevant program:	Special Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course co-coordinator:	Prof. Dr. Mohammed Salah Omar Dr. Hany Ibrahim
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B - Basic information

Title: Chemistry of Carbohydrates, Lipids, Amino Acids and Natural Products (1)	Code: 314 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to know general information about carbohydrates such as carbohydrates categories, stereo forms (D, L) of Aldoses and Hexoses, Monosaccharides, Disaccharides and Polysaccharides reactions. Also, teach students the chemical structures of Alkaloids and Terpenes with chemical and physical methods.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Recognize general properties of carbohydrates and its categories.
- a.2- Know stereo forms (D, L) of Aldoses and Hexoses.
- a.3- Understand Monosaccharides, Disaccharides and Polysaccharides reactions
- a.4- Recognize chemical categories of Alkaloids and Terpenes.
- a.5- Mention chemical structures of Alkaloids and Terpenes with chemical and physical methods.
- a 6- Identify preparation methods of Alkaloids and Terpenes.



b - Intellectual skills:

On successful completion of the course, the student should be able to.

b1- Interpret the given chemical data to identify Monosaccharides, Disaccharides and Polysaccharides.

b2- Differentiate between different types of carbohydrates, their closed structures and their reaction.

b3- Explain chemical structures of Alkaloids and Terpenes and their preparation methods.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Determine Monosaccharides reactions.

c2- Apply preparation methods of Alkaloids and Terpenes.

c3- Differentiate between Monosaccharide's, Disaccharides and Polysaccharides.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

d3- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to carbohydrates and its categories. - Separation Technique.	2	0	3	7.14%
2. Stereo forms (D, L) of Aldoses and Hexoses. - Mixture of Acid – Acid.	2	0	3	7.14%
3. Reactions of Monosaccharides. - Mixture of Acid - Base.	2	0	3	7.14%
4. Stereo chemistry of glucose. - Mixture of Acid - Carbohydrates.	2	0	3	7.14%
5. Cyclic structures of Monosaccharides. - Mixture of Phenol - Carbohydrates.	2	0	3	7.14%
6. Formation of glycosides. - Mixture of Base - Carbohydrates.	2	0	3	7.14%
7. Mid-Term Exam.	2	0	3	7.14%
8. Disaccharides. - Mixture of Neutral - Neutral.	2	0	3	7.14%
9. Polysaccharides. - Mixture of Base - Phenol.	2	0	3	7.14%
10. Alkaloids and Terpenes chemistry. - Mixture of Acid - Phenol.	2	0	3	7.14%

11. Chemical category of Alkaloids. - Mixture of Acid - Salt of acid.	2	0	3	7.14%
12. Terpenes - Mixture of Phenol - Salt of acid.	2	0	3	7.14%
13. Chemical and physical composition of Alkaloids and Terpenes. - Mixture of Base - Salt of acid.	2	0	3	7.14%
14. Preparation methods of Alkaloids and Terpenes. -Revision.	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Identify general properties of carbohydrates and its categories.	x	0	x	x	0	x
	a2	To Know stereo forms (D, L) of Aldoses and Hexoses.	x	0	0	0	0	0
	a3	Describe Monosaccharides, disaccharides and Polysaccharides reactions.	x	x	x	0	X	x
	a4	Define chemical categories of Alkaloids and Terpenes.	x	x	x	x	X	x
	a5	State chemical structures of Alkaloids and Terpenes with chemical and physical methods.	x	0	0	x	0	x
	a6	Outline preparation methods of Alkaloids and Terpenes.	x	x	x	o	0	x
Intellectual Skills	b1	Interpret the given chemical data to identify Monosaccharides, disaccharides and Polysaccharides.	x	x	x	x	X	x
	b2	Compare between different types of carbohydrates, their closed structures and their reaction.	x	0	x	x	X	x
	b3	Report chemical structures of Alkaloids and Terpenes and their preparation methods.	x	x	x	0	X	x
Practical and	c1	Analyze Monosaccharides reactions.	0	0	x	x	X	0
	c2	Show preparation methods of Alkaloids and Terpenes.	0	0	x	x	X	x

	c3	Differentiate between Monosaccharide's, Disaccharides and Polysaccharides.	0	0	0	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	x	0	X	x
	d3	Ethical behaviour of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	x	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2 and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b1, b2 and c1	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3.	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, b3.	Sixteenth week	80 %
Total			100 %

Course matrix																
Topic	Knowledge and understanding						Intellectual skills			Practical and professional skills			General Skills			
	a1	a2	a3	a4	a5	a6	b1	b2	b3	c1	c2	c3	d1	d2	d3	
1. Introduction to carbohydrates and its categories. - Separation Technique.	x							x			x	x			x	
2. Stereo forms (D, L) of Aldoses and Hexoses. - Mixture of Acid – Acid.		x										x				



3. Reactions of Monosacharides. - Mixture of Acid - Base.			x								x			x
4. Stereo chemistry of glucose. - Mixture of Acid - Carbohydrates.		x								x		x		
5. Cyclic structures of Monosacharides. -Mixture of Phenol - Carbohydrates.			x				x			x		x		
6. Formation of glycosides. - Mixture of Base - Carbohydrates.	x									x			x	
7. Mid-Term Exam.	x	x	x	x			x	x		x				
8. Disaccharides. - Mixture of Neutral - Neutral.			x									x		x
9. Polysaccharides. - Mixture of Base - Phenol.			x									x		x
10. Alkaloids and Terpenes chemistry. - Mixture of Acid - Phenol.							x			x		x		x
11. Chemical category of Alkaloids. - Mixture of Acid - Salt of acid.				x								x		
12. Terpenes - Mixture of Phenol - Salt of acid.				x								x		x
13. Chemical and physical composition of Alkaloids and Terpenes. - Mixture of Base - Salt of acid.												x		
14. Preparation methods of Alkaloids and Terpenes. -Revision.							x					x		x
														x

6- List of references:



6-1 Course notes

Lecture notes approved by Department of Chemistry.

6-2 Required books

A. P. Rauter, T. Lindhorst, Carbohydrate Chemistry, Volume 37, 2011, **37**, P001-P004.

6-3 Recommended books

1- B. G. Davis , A. J. Fairbanks, Carbohydrate Chemistry (Oxford Chemistry Primers), 1st Edn, 2002.

2- S. Hanessian, Preparative Carbohydrate Chemistry, 1st Edn, 1997.

3- P. B. Saxena, Chemistry of Alkaloids, 2007.

6-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS); *Organic Chemistry* (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohammed Salah Omar

Dr. Hany Ibrahim

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification 332 Ch: Surface Chemistry

A- Affiliation

Relevant program:

Special Chemistry BSc Program



Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390) update 10/ 1/2018 (Faculty council; meeting number, 419). update 8/ 3/2023 (Faculty council; meeting number, 484).

Course co-coordinator:

Prof. Dr. Mohamed M. Mokhtar
Prof. Dr. Safenaz Mohamed Reda

B - Basic information

Title: Surface Chemistry	Code: 332 Ch	Year/level: third level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 0	Total: 2h/week
	Course marks: 100 marks	

C - Professional information

1 – Course Learning Objectives:

The objective of this course is to enable the students to understand the concepts of surface, colloid and catalysis. Give explanation of surface tension and its relation with temperature, its measurements also give information on the different interfaces such as solid/liquid, solid/gas and liquid/liquid and how can determine the surface texturing of solid materials and explains the colloid state and different classification of colloid systems. Give explanation of catalysis concept and the catalyst, its types, its components and the role of it in different reactions and how can be prepared.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate the relation between surface and solid crystal structure on the catalyst behavior and the surface properties of different materials and the colloid state of matter.
- a.2- Define the concepts of surface, colloid and catalysis.
- a.3- Recognize the different theories of catalysis, different types of colloid systems.
- a.4- Investigate the how catalyst work in different reactions
- a.5- Investigate the different applications of thin films of liquid on solid materials.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Analyze the given chemical data to identify the activity of catalyst.
- b2- Explain the different theories of catalysis, different types of colloid systems.
- b3. Explain the types of catalyst materials.



b4. Explain the surface properties of liquid and solid materials.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Calculate the surface tension of liquid, surface area, pore volume and pore radius of solids.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours
1. Introduction to surface chemistry, catalysis, colloid state.	2	0	0
2. Surface tension and its relation with curvature and effect of temperature on it.	2	0	0
3. Measurements of surface tension and surface activity	2	0	0
4. Surface excess and how be measured, solid/liquid interface, spreading coefficient, Liquid/liquid interface and application of thin films	2	0	0
5. Gas/solid interface, adsorption and adsorption isotherms, hysteresis and surface area, pore volume and pore radius measurements part (1).	2	0	0
6. Gas/solid interface, adsorption and adsorption isotherms, hysteresis and surface area, pore volume and pore radius measurements part (2).	2	2	2
7. Mid-Term Exam.	2	0	0
8. Introduction to Colloid state, types of colloid systems, preparation of them and purification.	2	0	0
9. The properties of colloid solutions(electrical, optical and kinetic properties, protection of colloid systems)	2	0	0
10. Introduction to catalysis,	2	0	0
11. The components of catalyst part (1).	2	0	0
12. The components of catalyst part (2).	2	0	0
13. Materials used as catalyst (metals, semiconductor, insulators)	2	0	0
14. Preparation of catalyst, function of catalyst	2	0	0
Total hours	28	0	0

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Investigate the relation between surface and solid crystal structure on the catalyst behavior and the surface properties of different materials and the colloid state of matter.	x	0	x	0	0	x
	a2	Define the concepts of surface, colloid and catalysis.	x	0	x	0	0	x
	a3	Identify the different theories of catalysis, different types of colloid systems.	x	0	x	0	x	x
	a4	Define how catalyst work in different reactions	x	0	x	0	x	x
	a5	Outline the different applications of thin films of liquid on solid materials.	x	0	x	0	x	x
Intellectual Skills	b1	Interpret the given chemical data to identify the activity of catalyst.	x	0	x	0	X	0
	b2	Report the different theories of catalysis, different types of colloid systems.	x	0	x	0	X	x
	b3	Discover the types of catalyst materials.	x	0	x	0	X	x
	b4	Interpret the surface properties of liquid and solid materials.	x	0	x	0	X	x
Practical and professional skills	c1	Analyze the surface tension of liquid, surface area, pore volume and pore radius of solids.	x	0	x	0	X	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	0	0	0

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c1 and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills	General Skills		
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	b 4	c1	d 1	d 2	d 3
1. Introduction to surface chemistry, catalysis, colloid state.	x	x									x		
2. Surface tension and its relation with curvature and effect of temperature on it.	x	x								x		x	x
3. Measurements of surface tension and surface activity			x						x	x	x		x
4. Surface excess and how be measured, solid/liquid interface, spreading coefficient, Liquid/liquid interface and application of thin films			x		x				x	x			x
5. Gas/solid interface, adsorption and adsorption isotherms, hysteresis and surface area, pore volume and pore radius measurements part (1).			x						x	x	x	x	x
6. Gas/solid interface, adsorption and adsorption isotherms, hysteresis and surface area, pore volume and pore radius measurements part (2).			x						x	x			x
7. Mid-Term Exam.	x	x	x	x			x					x	
8. Introduction to Colloid state, types of colloid systems, preparation of them and purification.	x		x				x			x			x
9. The properties of colloid solutions(electrical, optical and kinetic properties, protection of colloid systems)			x				x			x	x		x
10. Introduction to catalysis				x									
11. The components of catalyst part (1).				x			x	x			x		
12. The components of catalyst part (2).				x									
13. Materials used as catalyst (metals, semiconductor, insulators)					x			x		x		x	x
14. Preparation of catalyst, function of catalyst						x		x					

6- List of references:



6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

Richard M. Pashley and Marilyn E. Karaman `` Applied Colloid and Surface Chemistry ``.

6-37 Recommended books

1- **Duncan J. Shaw** `` Introduction to Colloid and Surface Chemistry ``

2- P.V. Kamat, D. Meisel, Studies in Surface Science and Catalysis, Vol. 103; Semiconductor Nanoclusters—Physical, Chemical, and Catalytic Aspects, Elsevier: Amsterdam, 1997.

6-38 Periodicals, Web sites, etc.

Journal of Applied catalysis A
physical Chemistry

<http://www.google.com>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed M. Mokhtar
Prof. Dr. Safenaz Mohamed reda

Program coordinator: Prof. Dr. Safenaz Mohamed reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug
Date: 2022 / 2023

Course Specification 343 Ch: Analytical Chemistry (2)

A- Affiliation

Relevant program: Special Chemistry BSc Program

Department offering the program: Department of Chemistry

Department offering the course: Department of Chemistry

Academic year/level: Fourth level

Date of specifications approval: 9/12/2015 (faculty member council)



meeting no. 390), updated 10/ 1/2018
(Faculty council; meeting number,
419), 8/3/2023 (Faculty council;
meeting number, 484).

Course coordinator:

Prof.Dr. Gamal Owes
Dr. Naglaa Mashaal
Dr. Hesham H. El-Feky

B - Basic information

Title: Analytical Chemistry (2)

Code: 343Ch

Year/level: Third level

Teaching Hours:

Lectures: 2

Tutorial: 0

Practical: 3

Total: 3 h/week

Course marks: 100 marks

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to study the theory of extraction (as solvent extraction) of organic and inorganic compounds; factors affect the extraction and quantitative analysis of obtained materials after separation. Also to enable the students to understand the basic of chromatography instruments, its types and application. It also provides appropriate practical skills about analytical methods.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate general properties of chromatography instrument and its applications
- a.2- Describe some chemical concepts about the extraction and separation technique .
- a.3- Explain the rate of follow, time of elution and peak resolution.
- a.4- Recognize theories of distribution coefficient between the stationary and mobile phases.
- a.5- Define some of application and research of chromatographic separation techniques.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Classify the chemical structure of the separated compound by the different type of the chromatographic method used .
- b2 -Separate between different phases during the chromatographic analysis or solvent extraction method .
- b3- Explain the rate of follow four compounds such as drugs, dyes and its chemical structure .

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Determine the concentration of separated materials by using different methods.
- c2- Apply the knowledge of the subject which are studied to propose the yield of



synthesized inorganic compounds.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively related to uses of this instruments.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.



3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to different types of chromatographic technique - Introduction to gravimetric analysis.	2	0	3	7.14%
2. Paper, planar and column chromatography - Determination the percent of water hydrated in barium chloride salt.	2	0	3	7.14%
3. Liquid chromatography - Determination the purity of barium in barium sulfate.	2	0	3	7.14%
4. Gas chromatography - Determination the purity of sulfate in barium sulfate.	2	0	3	7.14%
5. High-performance liquid chromatography - Determination the purity of lead in lead chromate.	2	0	3	7.14%
6. General properties of ion exchangers chromatography - Determination the purity of chromate in lead chromate.	2	0	3	7.14%
7. Mid-term exam	2	0	3	7.14%
8. Application studies of chromatographic tools - Determination the purity of calcium in calcium oxalate.	2	0	3	7.14%
9. Qualitative & quantitative detection of different materials using chromatography tools. - Determination the purity of oxalate in calcium oxalate.	2	0	3	7.14%
10. Introduction to solvent extraction - Determination the purity of magnesium in magnesium carbonate.	2	0	3	7.14%
11. General properties of solvents & ligands in extraction process - Determination the purity of iron in ferric oxide.	2	0	3	7.14%
12. Study the different type of chelate formation - Determination the purity of mixture of Ca^{+2} and Mg^{+2} .	2	0	3	7.14%
13. Factors affect the separation and extraction - Determination the purity of mixture of Fe^{+2} and Fe^{+3} .	2	0	3	7.14%
14. Revision.	2	0	3	7.14%
Total hours	28	0	42	100%



Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & understanding	a1	Investigate general properties of chromatography instrument and its applications	x	0	x	0	0	x
	a2	Describe some chemical concepts about the extraction and separation technique.	x	0	0	x	x	0
	a3	Explain the rate of follow, time of elution and peak resolution.	x	x	x	x	X	x
	a4	Identify theories of distribution coefficient between the stationary and mobile phases.	x	x	x	0	X	x
	a5	Define some of application and research of chromatographic separation techniques.	x	0	0	0	0	x
Intellectual Skills	b1	Report the chemical structure of the separated compound by the different type of the chromatographic method used.	x	x	x	0	x	x
	b2	Compare between different phases during the chromatographic analysis or solvent extraction method.	x	0	x	0	x	x
	b3	Interpret the rate of follow four compounds such as drugs, dyes and its chemical structure.	x	x	x	0	x	x
Practical and professional skills	c1	Investigate the concentration of separated materials by using different methods.	x	0	x	x	x	x
	c2	Collect the knowledge of the subject which are studied to propose the yield of synthesized inorganic compounds.	x	0	x	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	x	0	x

5- Students' Assessment Methods and Grading:			
Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, b3, and d2	seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3 and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, b1, b2, b3.	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills		
	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	d1	d2	d3
1. Introduction to different types of chromatographic technique - Introduction to gravimetric analysis.	x			x					x		x		
2. Paper, planar and column chromatography - Determination the percent of water hydrated in barium chloride salt.	x		x			x		x			x	x	
3. Liquid chromatography - Determination the purity of barium in barium sulfate.	x		x		x		x	x					
4. Gas chromatography - Determination the purity of sulfate in barium sulfate.	x		x		x	x		x					
5. High-performance liquid chromatography - Determination the purity of lead in lead chromate.	x		x		x	x		x			x		
6. General properties of ion exchangers chromatography - Determination the purity of chromate in lead chromate.	x		x			x							
7. Mid-term exam	x	x	x	x			x	x				x	
8. Application studies of chromatographic tools - Determination the purity of calcium in calcium oxalate.					x			x	x	x			x
9. Qualitative & quantitative detection of different materials using chromatography tools. - Determination the purity of oxalate in calcium oxalate.					x			x	x	x		x	x
10. Introduction to solvent extraction - Determination the purity of magnesium in magnesium carbonate.		x	x	x			x		x		x	x	x



11. General properties of solvents & ligands in extraction process - Determination the purity of iron in ferric oxide.				x					x	x				x
12. Study the different type of chelate formation - Determination the purity of mixture of Ca^{+2} and Mg^{+2} .				x					x	x				x
13. Factors affect the separation and extraction - Determination the purity of mixture of Fe^{+2} and Fe^{+3} .				x				x					x	
14. Revision.														



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s), proved from Chemistry department.

6-2 Required books

J.D. Lee, Concise Inorganic Chemistry, 5th Edn. Blackwell Science, Australia, 1996.

CHARLES E. WEAVER THE CHEMISTRY OF CLAY MINERALS *School of Geophysical Sciences, Georgia Institute of Technology, Atlanta, Ga. (U.S.A.)*

6-3 Modern analytical chemistry / David Harvey. — 1st ed.

p. cm. Harvey, David, 1956–

Includes bibliographical references and index.

ISBN 0–07–237547–7

6-4. Recommended books

1-F.A. Cotton, G. Wilkinson, C.A.Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th Edn, John Wiley&Sons, Inc., New York, 1999.

2- N.N. Greenwood, A. Earnshaw, Chemistry of Elements, 2nd Edn, Butterworth Heinemann, USA 1997.

6-5 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using of slit overhead projector

Using a black board

Group Discussions

Data show

Course coordinator:

Prof. Dr. Gamal Owes

Dr. Naglaa Mashaal

Dr. Hesham H. El-Feky

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023



Course Specification

312Ch: Therapeutic Chemistry and Vitamins

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Eman Gad El-Kareem Dr. Abdel Motaal Abdel Mgeed

B - Basic information

Title: Therapeutic Chemistry and Vitamins	Code: 312 Ch	Year/level: Third level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the principles of Chemotherapy; its goals; antimetabolites (sulfa drugs); antimalarial agents; beta-lactam antibiotics; Non-beta-lactam antibiotics; and mechanism of action for these chemotherapeutic agents.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- State goals of chemotherapy and the concept meaning.
- a.2- List the different types of chemotherapeutic agents.
- a.3- Describe the synthetic pathway for sulfa-drugs
- a.4- Illustrate the preparation methods for antimalarials & antibiotics.
- a.5- Classify the antimalarial agents according to chemical structure.
- a.6- Recite the mechanism of action for different chemotherapeutic agents.



b - Intellectual skills:

On successful completion of the course, the student should be able to:

- b1- Explain the compounds with therapeutic effect.
- b2- Differentiate between metabolites and antimetabolites
- b3- Compare the mode of action of sulfa drugs, antimalarials and antibiotics.
- b4- Distinguish between β -lactam and non- β -lactam antibiotics.

C-Practical and professional skills

C1- Identify chemotherapeutical compounds according to their structures

C2-Modify the synthesis methods of chemotherapeutic agents.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on the scientific basis taught in this course.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to chemotherapy	2	0	3	7.14%
2. Antimetabolites (Sulfa drugs)	2	0	3	7.14%
3. Mode of action of sulfa drugs	2	0	3	7.14%
4. Antimalarial drugs: Part one	2	0	3	7.14%
5. Antimalarial drugs: Part two	2	0	3	7.14%
6. Mode of action of antimalarials	2	0	3	7.14%
7. Mid-term exam	2	0	3	7.14%
8. Beta-lactam antibiotics	2	0	3	7.14%
9. Mode of action of beta-lactam antibiotics	2	0	3	7.14%
10. Non-beta-lactam antibiotics part (1)	2	0	3	7.14%
11. Non-beta-lactam antibiotics part (2)	2	0	3	7.14%
12. Mode of action of non-beta-lactam antibiotics part (1)	2	0	3	7.14%
13. Mode of action of non-beta-lactam antibiotics part (2)	2	0	3	7.14%
14. Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & understanding	a1	State goals of chemotherapy and the concept meaning.	x	0	x	0	0	0
	a2	Define the different types of chemotherapeutic agents.	x	0	0	0	0	x
	a3	Describe the synthetic pathway for sulfa-drugs	x	0	x	0	0	0
	a4	Explain the preparation methods for antimalarials and antibiotics.	x	0	x	0	x	0
	a5	Determine the antimalarial agents according to chemical structure	x	0	x	0	0	x
	a6	Outline the mechanism of action for different chemotherapeutic agents.	x	x	x	0	0	0
Intellectual Skills	b1	Interpret the compounds with therapeutic effect	x	0	x	0	0	x
	b2	Compare between metabolites and antimetabolites	x	0	x	0	0	x
	b3	Report the mode of action of sulfa drugs, antimalarials and antibiotics.	x	x	0	0	0	0
	b4	Compare between β -lactam and non- β -lactam antibiotics	x	0	x	0	0	x
Practical and professo	c1	Investigate chemotherapeutical compounds according to their structures	x	0	x	0	x	x
	c2	Show the synthesis methods of chemotherapeutic agents.	0	0	x	0	x	0
General Skills	d1	Community linked thinking on the scientific basis taught in this course.	x	0	0	0	0	x
	d2	Work in a team effectively, manage time, and communicate with each other.	x	x	0	x	x	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, b2 and c1	Fifth week	5 %



Mid-Term Exam	a1, a2, a3, a4, a5, b1, b2, b3 and d1	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, b4, c1 and d1	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, b1, b2, b3, b4.	Sixteenth week	80 %
Total			100 %

Course matrix														
Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills		General Skills	
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	c1	c2	d1	d2
1. Introduction to chemotherapy	x	x					x							
2. Antimetabolites (Sulfa drugs)		x						x		x	x		x	
3. Mode of action of sulfa drugs			x			x							x	
4. Antimalarial drugs: Part one				x			x			x	x		x	
5. Antimalarial drugs: Part two				x	x			x						
6. Mode of action of antimalarials				x		x	x						x	
7. Mid-term exam	x	x	x	x	x		x	x	x				x	
8. Beta-lactam antibiotics				x				x		x	x		x	
9. Mode of action of beta-lactam antibiotics				x		x							x	
10. Non-beta-lactam antibiotics part (1)						x			x					
11. Non-beta-lactam antibiotics part (2)						x			x					
12. Mode of action of non-beta-lactam antibiotics part						x			x				x	
13. Mode of action of non-beta-lactam antibiotics part (2)						x			x					
14. Revision	x	x	x	x	x	x	x	x	x					



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructors and proved by chemistry department.

6-2 Required books

- 1- "The Chemotherapy Source Book", Michael Clinton Perry, 4th edition, Lippincott Williams & Wilkins, 2008.
- 2- " Basic Principles of Chemotherapy", book chapter, Christina S. Chu and Stephen C. Rubin, 2012.

6-39 Recommended books

- 1- "Antimicrobial Chemotherapy", David Greenwood, 4th edition, Oxford University Press, 2000
- 2- " Antimalarial Chemotherapy", Philip J. Rosenthal, Humana Press, 2001
- 3- " Lippincott ´s Cancer Chemotherapy Handbook", David S. Fischer, 2nd edition, Lippincott Williams & Wilkins Publishers, 2001.

6-40 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Microphone
Black/White board
Group Discussions
Data show

Course coordinator: Dr. Eman Gad El-Kareem
Dr. Abdel Motaal Abdel Mgeed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

350 Ch: Nuclear and Radiation Chemistry

A- Affiliation

Relevant program:	Special Chemistry B.Sc. Program
Department offering the program:	Chemistry Department
Department offering the course:	Department of Chemistry
Academic year/level:	Third level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohamed Heikal Prof. Dr. Hesham Marwan

B - Basic information

Title: Nuclear and Radiation Chemistry	Code: 350Ch	Year/level: Third level
Teaching Hours:	Lectures: 2 Practical: 0 Course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general properties of the isotopic radiation elements such ,properties of nucleos of the atom , laws of nuclear decay, effects of the radiation on nuclear reactions , using of the countres to detect the radiations

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Investigate general properties of each group of the elements in the periodic table.
- a.2- Define the isotopic properties of the elements .
- a.3- Investigate the laws of nuclear decay .
- a.4- Recognize the effect of radiation on the nuclear reactions .
- a.5- Mention some of the application on the statistical operation for counter radiation .

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Interpret the given chemical data to identify the properties of the isotopic elements
- b2- Differentiate between different types of radiation isotopic elements .



b3- Explain the radiation effects on the nuclear reactions and the nuclear diffusion.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Calculate the number of counts per minute for the decayed sample under the effect of applied voltage .

c2-Apply the knowledge that the student studied to propose the half life time , and the decay constant for each radioisotope .

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to the principles of radiation and nuclear chemistry	2	0	0	7.14 %
2. Properties of the nuclear atom.	2	0	0	7.14 %
3. The different laws of radiation decay.	2	0	0	7.14 %
4. Effects of the radiation on the nuclear reactions.	2	0	0	7.14 %
5. Nuclear diffusion of different particles.	2	0	0	7.14 %
6. Some examples of the reactions between particles and nuclear atom.	2	0	0	7.14 %
7. Mid-Term Exam.	2	0	0	7.14 %
8. General properties of counters used in measurements	2	0	0	7.14 %
9. Analytical methods of the measurements	2	0	0	7.14 %
10. Statistical operations for the measurements	2	0	0	7.14 %
11. Applications of radioactive isotopes part (1)	2	0	0	7.14 %
13.Applications of radioactive isotopes part (2)	2	0	0	1.14 %
14.Some problems of the decay law and statistical operations	2	0	0	7.14 %
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Problem solving	Brain storming
Knowledge & understanding	a1	Identify general properties of each group of the elements in the periodic table.	x	0	x	0	x
	a2	Define the isotopic properties of the elements.	x	0	0	0	0
	a3	State the laws of nuclear decay.	x	x	x	x	x
	a4	Explain the effect of radiation on the nuclear reactions.	x	x	x	x	x
	a5	Outline some of the application on the statistical operation for counter radiation.	x	0	0	0	x
Intellectual Skills	b1	Interpret the given chemical data to identify the properties of the isotopic elements	x	x	x	x	x
	b2	Compare between different types of radiation isotopic elements.	x	0	x	x	x
	b3	Report the radiation effects on the nuclear reactions and the nuclear diffusion.	x	x	x	x	x
Practical and professional skills	c1	Show the number of counts per minute for the decayed sample under the	x	0	x	x	x
	c2	Collect the knowledge that the student studied to propose the half life time, and the decay constant for each radioisotope.	x	0	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	x
	d2	Community linked thinking on the scientific basis taught in this course.	x	0	x	x	x
	d3	Work in a team effectively, manage time and communicate with others positively.	0	0	x	0	0
	d4	Ethical behaviour of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b1, b2, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3 and d4.	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2 and b3.	sixteenth week	80 %
Total			100 %



Course matrix														
Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	c1	c2	d 1	d 2	d 3	d 4
1. Introduction to the principles of radiation and nuclear chemistry	x										x		x	x
2. Properties of the nuclear atom.		x				x	x	x		x				
3. The different laws of radiation decay.			x							x		x		
4. Effects of the radiation on the nuclear reactions.				x			x	x		x				
5. Nuclear diffusion of different particles.				x				x						x
6. Some examples of the reactions between particles and nuclear atom.				x			x					x		
7. Mid-Term Exam.	x	x	x	x		x	x					x		
8. General properties of counters used in measurements	x								x		x		x	
9. Analytical methods of the measurements									x		x			
10. Statistical operations for the measurements									x			x		
11. Applications of radioactive isotopes part (1)	x				x									x
12. Applications of radioactive isotopes part (2)					x						x		x	
13. Some problems of the decay law and statistical operations												x		
14. Reversion	x	x	x	x	x	x			x	x		x		

6- List of references:



6-1 Course notes

Lecture note approved by Department of Chemistry.

6-2 Required books

Petrucci , Harwood ,Herring , Madura . General Chemistry: Principles, Modern Applications (9th edition) .New Jersey ; Pearson Education , 2007.

6-41 Recommended books

1-Petrucci , Herring , Bissonnette . General Chemistry ; principles , Modern application (10th edition) new Jersey ; Pearson education ,2011

2- Nuclear fission vs nuclear fusion – difference and comparison diff . diffen – comare anything . diffen . discern . decide . web . 04 june 2011

6-42 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Heikal

Prof. Dr. Hesham Marwan

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

319 Z: Molecular and cell biology

A- Affiliation

Relevant program: Special Chemistry B.Sc. Program
Department offering the program: Department of Chemistry
Department offering the course: Department of Zoology

Academic year/level: Third level

Date of specifications approval: 9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator: Prof. Dr. Mohammed Hussin Awaad

B - Basic information

Title: Molecular and cell biology	Code: 319 Z	Year/level: Third level
Teaching Hours:	Lectures: 2 Practical: 2 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand cell components (cell membrane and modification of cell membrane, endoplasmic reticulum, ribosomes, Mitochondria, Golgi apparatus, lysosomes, cytoskeleton and nucleus). Students also understand mitosis and meiosis. They will also be aware of chromatin structure and functions, including chromatin modifications and how they affect gene regulation.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1- Identity cell components.
- a2- Recognize structure and functions of each cell components .
- a3- Recognize the structure of DNA and RNA.
- a4- Discover different phases of mitosis.



- a5- Discover different phases of meiosis.
- a6- Understand chromatin structure and functions.

b - Intellectual skills:

On successful completion of the course, the student should be able to:

- b1- Distinguish the difference between each cell components.
- b2- Interpret modifications of cell membrane.
- b3- Compare between mitosis and meiosis phases.
- b4- Combine between genes and DNA.
- b5- Link between structure and functions of each cell components
- b6- Interpret chromosomal model.
- b7- Link chromatin structure and functions

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Use the laboratory microscopes by responsible, safe and ethical manner to investigate living systems.
- c2- Describe different phases of mitosis and meiosis.
- c3- Identity cell components.
- c4- Draw cell components structures.
- c5- Describe principles of chromatin Immunoprecipitation

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use information and communication technology effectively.
- d2- Think independently and solve problems on scientific basis in practical.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Modify sense of beauty and neatness.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1.General concept of cell biology.	2	0	2	7.14%

2. Cell membrane	2	0	2	7.14%
3.Modification of cell membrane.	2	0	2	7.14%
4.Endoplasmic Reticulum.	2	0	2	7.14%
5.Ribosomes.	2	0	2	7.14%
6.Mitochondria.	2	0	2	7.14%
7.Mid-term exam	2	0	2	7.14%
8.Lysosomes.	2	0	2	7.14%
9.Cytoskeleton.	2	0	2	7.14%
10. Nucleus.	2	0	2	7.14%
11. Nuclear matrix and nucleolus	2	0	2	7.14%
12. Mitosis and Meiosis.	2	0	2	7.14%
13. Deoxyribonucleic acid (DNA) and Ribonucleic acid (RNA).	2	0	2	7.14%
14.Chromatin structure and functions.	2	0	2	7.14%
Total hours	28	0	28	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Identity cell components.	x	0	0	x	0	0
	a2	Define structure and functions of each cell components.	x	x	x	x	0	0
	a3	Determine the structure of DNA and RNA.	x	0	0	0	0	0
	a4	Outline different phases of mitosis.	x	x	x	x	0	0
	a5	State different phases of meiosis.	x	x	x	x	0	0
	a6	Explain chromatin structure and functions.	x	x	x	x	0	0
Intellectual Skills	b1	Report the difference between each cell components.	x	0	x	x	x	x
	b2	Interpret modifications of cell membrane.	x	0	x	x	x	x
	b3	Compare between mitosis and meiosis phases.	x	0	x	x	x	x
	b4	Create relation between genes and DNA.	x	0	x	x	0	0
	b5	Construct relation between structure and functions of each cell components.	x	0	x	x	0	0
	b6	Interpret chromosomal model.	x	x	x	x	0	0
	b7	Discover chromatin structure and functions	x	0	x	x	0	0
Pr a	c1	Examine by the laboratory microscopes by	0	0	0	x	0	0



		responsible, safe and ethical manner to investigate living systems.						
	c2	Show different phases of mitosis and meiosis.	x	0	0	x	0	0
	c3	Investigate cell components.	X	0	0	x	0	0
	c4	Draw cell components structure s.	0	0	0	x	0	0
	c5	Analyze principles of chromatin Immunoprecipitation	0	0	0	x	0	0
General Skills	d1	Use information and communication technology effectively.	0	0	0	x	x	0
	d2	Life-long learning Thinking independently, and solving problems on scientific basis in practical.	X	0	0	x	x	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	0	x	x	x
	d4	Ethical behaviour ,sense of beauty and neatness	X	0	x	x	0	0

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Mid-Term Exam	a1 to a5 and b1 to b5	seventh week	6%
Practical exams	c1 to c5	fifteenth week	40 %
Oral exam	a1 to a6 , b1 to b7 and C3	sixteenth week	6%
Written exam	a1 to a6 and b1 to b7	Seventeenth week	48 %
Total			100 %

Course matrix																								
Topic	Knowledge and understanding						Intellectual skills							Practical and professional skills					General Skills					
	a 1	a 2	a 3	a 4	a 5	a 6	b 1	b 2	b 3	b 4	b 5	b 6	b 7	c 1	c 2	c 3	4	c 5	d 1	d 2	d 3	d 4		
1.General concept of cell biology.	x						x						x							x				
2. Cell membrane	x	x						x	x												x			
3.Modification of cell membrane.		x												x										
4.Endoplasmic Reticulum.		x																			x	x		
5.Ribosomes.		x			x																			
6.Mitochondria.		x																						
7.Mid-term exam	x	x	x	x	x		x	x	x	x	x													
8.Lysosomes.				x																	x			
9.Cytoskeleton.			x																					
10. Nucleus.		x											x			x	x					x		
11. Nuclear matrix and nucleolus																							x	
12. Mitosis and Meiosis.				x	x					x					x									
13.Deoxyribonucleic acid (DNA) and Ribonucleic acid (RNA).			x											x						x				
14.Chromatin structure and functions.						x					x		x								x	x		x



6- List of references:

6-1 Course notes

Lecture and practical notes approved by Zoology Department.

6-2 Required books

- Alberts B., Bray D., Hopkin K. and Johnson A. (2013). Essential Cell Biology (4th ed).
- Alberts B., Johnson A., Lewis J. and Raff M. (2007). Molecular Biology of the Cell.

6-3 Recommended books

- Alberts B., Johnson A., Lewis J., Raff M., Roberts K. and Walter P. (2002). Molecular Biology of the Cell (4th ed.).
- Lodish H., Berk A., Matsudaira P., Kaiser C.A., Krieger M., Scott M.P., Zipurksy S.L. and Darnell J. (2004). Molecular Cell Biology (5th ed.). WH Freeman: New York, NY.
- Cooper G.M. (2000). The cell: a molecular approach (2nd ed.). Washington, D.C: ASM Press.

6-4 Periodicals, Web sites, etc.

http://www.dmoz.org/Science/Biology/Cell_Biology/

<http://www.freebookcentre.net/Biology/Cell-Biology-Books.html>

7- Facilities required for teaching and learning:

- Histology Lab.
- Microscopies and slides.
- Data show
- Using a black board

Course coordinator: Prof. Dr. Mohammed Hussin Awaad

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Nasr Allah Hassan

Date: 2022-2023



Course Specification

Chm 411: Polymer Chemistry and Applications (1)

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Dr. Moahammed Abo Riya
Dr. Aml Mohammed

B - Basic information

Title: Polymer Chemistry and Applications (1)	Code: Chm 411	Year/level: Fourth level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the origin, composition and petroleum process including separation, conversion and treating process. Also, teach students the polymer

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Explain the origin of petroleum and its composition.
- a.2- Describe the methods of crude oil treatments.
- a.3- Outline the petroleum process.
- a.4- Define the preparation and structures of polymers and macromolecules.
- a.5- State the polymer properties and the development of its physical properties.
- a.6- Memorize the uses of polymers and the synthesis of fibers in industrial fields.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Formulate chemical composition of the petroleum oil.
- b.2- Report the chemical used in treating process for petroleum.
- b.3- Discover different concepts of using petroleum in industrial life.
- b.4- Construct chemical and physical testing of polymers.



b.5- Compare between the different types of industrial polymers products and its uses.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1- Summarize the methods to determine properties of petroleum.
- c.2- Analyze the chemical composition of the petroleum composition.
- c.3- Relate the methods to prepare the different types of polymers.
- c.4- Investigate the properties of polymers.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Search for new information about the new techniques for petroleum and polymers .
- d4- Discover the importance of the petroleum and polymers in industrial life.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to petroleum chemistry. - Lab. safety and equipments	2	0	3	7.14%
2. The theory of the origin of petroleum, its Physical properties and its chemical composition. - Estimation of sulfur content in crude oil	2	0	3	7.14%
3. Petroleum processing. - Estimation of ash content in crude oil	2	0	3	7.14%
4. Separation processes. - Estimation of nitrogen in crude oil	2	0	3	7.14%
5. Conversion processes. - Determination of cloud point of crude oil	2	0	3	7.14%
6. Treating process. - Determination of aniline point of crude oil	2	0	3	7.14%
7. Mid-Term Exam.	2	0	3	7.14%
8. Introduction of polymers and the types of polymerization - Determination of average molecular weight of polymer	2	0	3	7.14%
9. Synthesis methods of some polymers - Determination of average molecular weight of poly ethylene	2	0	3	7.14%
10. General properties of polymers and its improvement. - Determination of average molecular weight of P.V.C	2	0	3	7.14%
11. Use of polymer in industrial and its application part (1). - Determination of average molecular weight of poly vinyl pyrrolidone	2	0	3	7.14%

12. Use Of Polymer In Industrial And Its Application Part (2). - Determination of average molecular weight of poly methyl methacrylate	2	0	3	7.14%
13. Preparation of some polymer used in industrial part (1). - Determination of refractive index of oil	2	0	3	7.14%
14. Use of polymer in industrial and its application part (2) -Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Illustrate the origin of petroleum and its composition.	x	0	x	0	0	x
	a2	Describe the methods of crude oil treatments.	x	x	0	0	0	0
	a3	Outline the petroleum process.	x	0	x	0	0	x
	a4	Recognize the preparation and structures of polymers and macromolecules.	x	0	x	0	X	x
	a5	Investigate the polymer properties and the development of its physical properties.	x	0	x	0	0	x
	a6	Recognize the uses of polymers and the synthesis of fibers in industrial fields.	x	0	x	0	0	x
Intellectual Skills	b1	Formulate chemical composition of the petroleum oil	x	0	x	0	X	x
	b2	Report the chemical used in treating process for petroleum.	x	0	x	0	0	x
	b3	Discover different concepts of using petroleum in industrial life.	x	0	x	0	X	x
	b.4	Construct chemical and physical testing of polymers.	x	0	x	0	x	x
	b.5	Compare between the different types of industrial polymers products and its uses.	x	X	x	0	x	x
Practical and professional skills	c1	Summarize the methods to determine properties of petroleum.	x	0	x	x	x	0
	c2	Analyze the chemical composition of the petroleum composition.	0	0	x	x	x	x
	c3	Relate the methods to prepare the different types of polymers.	0	0	x	x	x	x
	c4	Investigate the properties of polymers.	0	0	x	x	x	x



General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Search for new information about the new techniques for petroleum and polymers.	0	0	x	0	0	x
	d4	Discover the important of the petroleum and polymers industrial life.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, c1 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, b1, , b2, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, and d4	fifteenth week	6 %
Practical exam	C1 to c4	sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5.	seventeenth week	48 %
Total			100 %

Course matrix																				
Topic	Knowledge and understanding						Intellectual skills					Practical and profession-al skills				General Skills				
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	b5	c1	c2	c3	c4	d1	d2	d3	d4	
4. Introduction to petroleum chemistry. - Lab. safety and equipments	x	x															x			
5. The theory of the origin of petroleum, its Physical properties and its chemical composition. - Estimation of sulfur content in crude oil		x					x	x				x		x						x
6. Petroleum processing. - Estimation of ash content in crude oil			x					x				x	x						x	
4. Separation processes. - Estimation of nitrogen in crude oil			x										x						x	
5. Conversion processes. - Determination of cloud point of crude oil			x					x				x							x	



6. Treating process. - Determination of aniline point of crude oil			X						X			X	X			X	X	
7. Mid-Term Exam.	X	X	X					X	X								X	
8. Introduction of polymers and the types of polymerization - Determination of average molecular weight of polymer				X	X					X	X			X				
9. Synthesis methods of some polymers - Determination of average molecular weight of poly ethylene					X							X	X				X	
10. General properties of polymers and its improvement. - Determination of average molecular weight of P.V.C									X				X	X			X	
11. Use of polymer in industrial and its application part (1). - Determination of average molecular weight of poly vinyl pyrrolidone						X								X			X	
12. Use Of Polymer In Industrial And Its Application Part (2). - Determination of average molecular weight of poly methyl methacrylate					X								X			X	X	
13. Preparation of some polymer used in industrial part (1). - Determination of refractive index of oil					X					X			X				X	
14. Use of polymer in industrial and its application part (2) -Revision					X										X		X	X



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

- 6 James G. Speight, The Chemistry and Technology of Petroleum, FOURTH EDITION, by Taylor & Francis Group, LLC 2006.
- 7 Robert J. Young, Peter A. Lovell, Introduction to Polymers, Third Edition, by CRC Press 2011.

6-3 Recommended books

- 1- [D. R. Skinner](#), Introduction to Petroleum Production: Reservoir engineering, drilling, well completions, Gulf Pub. Co., Book Division, 1981.
- 2- [Joel R. Fried](#), Polymer Science and Technology, 3rd Edition, by [Prentice Hall](#), 2014.

6-4 Periodicals, Web sites, etc.

[Oil and Petroleum - American Chemical Society](#)

<http://www.acs.org/content/acs/en/careers/college-to-career/chemistry-careers/oil-petroleum.html>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black and white board

Group Discussions

Data show

Course coordinator: Dr. Moahammed Abo Riya
Dr. Aml Mohammed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Chm 439: Basis of Quantum and Statistical Dynamics Chemistry

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Mervat Asem Dr. Kamal. A. Soliman

B - Basic information

Title: Basis of Quantum and Statistical Dynamics Chemistry	Code: Chm 439	Year/level: fourth level
Teaching Hours:	Lectures: 2 Practical: 0 Course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable students to obtain fundamental understanding of chemical structures and processes at the microscopic level. Fundamental microscopic properties of matter and radiation are discussed. Topics include quantum chemistry and statistical thermodynamics.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the elementary principles of quantum mechanics.
- a.2- Describe the electronic structure of atoms and their periodicity.
- a.3- Outline the electronic structure of molecules and chemical bonding.
- a.4- have a basic understanding of chemical structure determination.
- a.5- Determine the principles of molecular vibration and chemical bonding
- a.6- Know the principles of statistical thermodynamics.
- a.7- Identify simple quantum-chemical calculations.



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1-Report atomic/molecular structure in terms of quantum mechanics and molecular symmetry.
- b.2- Create molecular structure from molecular vibration and chemical bonding data.
- b.3- Interpret macroscopic properties of matter in terms of a statistical mechanical analysis of atoms and molecules.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c.1-Solve Schrödinger equation for atoms/molecules and solve problems connecting quantum theory and group theory.
- c.2. Analyze data of statistical thermodynamics from both classical mechanical and quantum mechanical points of views.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.



Topic	Lecture hours	Tutorial hours	Practical hours	% OF TOTAL
1- The time- independent and time-dependent Schrodinger equation	2	0	0	7.14%
2- Operators - Commutations relations	2	0	0	7.14%
3- Postulates and Theorems of Quantum Mechanics	2	0	0	7.14%
4- Some analytically soluble problems - Time-independent and dependent Perturbation theory	2	0	0	7.14%
5- The variation theorem- Huckel theory of conjugated hydrocarbons - Symmetry elements and symmetry	2	0	0	7.14%
6- Reducible and Irreducible representations	2	0	0	7.14%
7-Midterm exam	2	0	0	7.14%
8- Molecular vibrations- Bonding theory	2	0	0	7.14%
9- Kinetic theory of gases- Principles of equipartition of energy- Classical calculations of heat capacity	2	0	0	7.14%
10- The partition function- Separation of energy components	2	0	0	7.14%
11- The electronic, translational, rotational, and vibrational partition functions	2	0	0	7.14%
12- Entropy at absolute zero- Entropies of gases	2	0	0	7.14%
13- Tests of the third law of thermodynamics- The Boltzman-Planck equation	2	0	0	7.14%
14- Thermodynamic probability and statistical calculations of entropy- Vibrational, nuclear spin, and rotational entropies- Comparison of third law and statistical entropy.	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes		Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming	
Knowledge & Understanding	a1	Define the elementary principles of quantum mechanics.	x	0	x	0	0	x
	a2	Describe the electronic structure of atoms and their periodicity.	x	0	0	0	x	0
	a3	Outline the electronic structure of molecules and chemical bonding.	x	x	x	0	x	x
	a4	Have a basic understanding of chemical structure determination.	x	x	x	0	x	x
	a5	Determine the principles of molecular vibration and chemical bonding	x	x	0	0	x	x
	a6	Know the principles of statistical thermodynamics..	x	0	x	0	0	x



	a7	Identify simple quantum-chemical calculations.	x	x	x	0	x	x
Intellectual Skills	b1	Report atomic/molecular structure in terms of quantum mechanics and molecular symmetry.	x	x	x	0	x	x
	b2	Create molecular structure from molecular vibration and chemical bonding data.	x	0	x	0	x	x
	b3	Interpret macroscopic properties of matter in terms of a statistical mechanical analysis of atoms and molecules.	x	x	x	0	x	x
Practical and professional skills	c1	Solve Schrödinger equation for atoms/molecules and solve problems connecting quantum theory and group theory.	x	0	x	0	X	x
	c2	Analyze data of statistical thermodynamics from both classical mechanical and quantum mechanical points of views.	x	0	x	0	X	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	0	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, a5,a6,b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5,a6,a7,b1, b2, b3, and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5,a6, a7, b1, b2 and b3.	sixteenth week	80 %
Total			100 %

Course matrix



Topic	Knowledge and understanding							Intellectual skills			Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	a 6	a 7	b 1	b 2	b 3	c1	c2	d 1	d 2	d 3	d 4
1- The time- independent and time-dependent Schrodinger equation	x										x		x	x	x	
2- Operators - Commutations relations	x										x					
3- Postulates and Theorems of Quantum Mechanics								x								x
4- Some analytically soluble problems - Time-independent and dependent Perturbation theory	x													x		
5- The variation theorem- Huckel theory of conjugated hydrocarbons - Symmetry elements and symmetry operations	x						x	x					x	x	x	
6- Reducible and Irreducible representations	x						x	x						x		
7-Midterm exam	x	x	x	x	x	x			x				x	x		
8- Molecular vibrations- Bonding theory		x	x						x	x						x
9- Kinetic theory of gases- Principles of equipartition of energy- Classical calculations of heat capacity		x								x			x		x	
10- The partition function- Separation of energy components				x						x						
11- The electronic, translational, rotational, and vibrational partition functions		x	x		x					x			x	x	x	
12- Entropy at absolute zero- Entropies of gases		x														
13- Tests of the third law of thermodynamics- The Boltzman-Planck equation						x						x	x		x	x
14- Thermodynamic probability and statistical calculations of entropy- Vibrational, nuclear spin, and rotational entropies- Comparison of third law and statistical entropy.				x		x						x				

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

Rae A.I.M. (2007), Quantum Mechanics (5th edition), Chapman and Hal, ISBN 1-584-88970-5.

McMurry S.M. (1994), Quantum Mechanics, Addison Wesley, ISBN 0-201-54439-3

6-3 Recommended books

1- S. M. Blinder, Quantum Chemistry, University of Michigan, 2002.

2- Ira N. Levine, Quantum Chemistry, Allyn and Bacon, 1983.

6-3 Periodicals, Web sites, etc.

<http://web.nmsu.edu/~snsm/classes/chem537/>



<http://www.quimica.urv.es/w3qf/>

<http://web.uconn.edu/~ch351vc/>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:	Dr. Mervat Asem Dr. Kamal. A. Soliman
Program coordinator:	Prof. Dr. Safinaz M. Reda
Head of the Department:	Prof. Dr. Wagdy El-DougDoug
Date:	2022-2023



Course Specification

Chm 441: Instrumental Analysis (1)

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Prof. Dr. Mostafa Y. Nassar
Prof. Dr. Gamal Owes
Dr. Aymn Abdel Razek

B - Basic information

Title: Instrumental Analysis (1)	Code: Chm 441	Year/level: Fourth level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand theoretical and applied basis for different methods of instrumental analysis such as spectroscopic, electrical and modern methods for analysis. Also, it concluded spectroscopic determination in IR, Visible and UV regions, atomic absorption and emission, different methods for X-ray and X-ray spectroscopy and thermal analysis determination.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Identify theoretical and the basis of different types of spectroscopy.
- a.2- Describe the constructions of each instrument .
- a.3- Outline the benefits of each part.
- a.4- State the knowledge of the application of each tool.
- a.5- Explain structure and morphology of different chemical compounds using different spectroscopic and analytical techniques.
- a.6- Outline the bases of thermal analysis.
- a.7- Determine the concentration of unknown solution.



- a.8- Define the crystalline structure.
- a.9- Draw diagrams, graphs and can record the experimental data.
- a.10- State some of the current issues of application .

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Solve chemical problems using some data processing skills.
- b2- Interpret the given chemical data to identify the composition and chemical structures of inorganic and organic compounds
- b3- Design the preparation of solutions and examine the concentration.
- b4- Compare the different methods of spectroscopy.
- b5- Report and interpret experimental data

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Prepare the concentrations of unknown solutions.
- c2- Relate the knowledge that the student acquired to study chemical structures of organic and inorganic compounds.
- c3- Compare data from different instrumental techniques.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to spectral analysis. - Determination the concentration of unknown solution by using spectrophotometry part1.	3	0	3	7.14 %
2. Beer's Law and its deviations. - Determination the concentration of unknown solution by using spectrophotometry part2.	3	0	3	7.14 %
3. Component of the instrument. - Determination the dissociation constant of complex by using spectrophotometry.	3	0	3	7.14 %
4. Application of spectrophotometry. - Determination the stiochiometry of complex by using spectrophotometry.	3	0	3	7.14 %



5. Introduction to atomic absorption spectrometry. - Study the stability of inorganic compound by using thermal analysis.	3	0	3	7.14 %
6. Instrumentation of atomic spectrometry. - Study the purity of inorganic compound by using thermal analysis part1.	3	0	3	7.14 %
7. Mid-Term Exam.	3	0	3	7.14 %
8. Atomic emission spectrometry. - Study the purity of inorganic compound by using thermal analysis part2.	3	0	3	7.14 %
9. Introduction to IR spectrometry - Determination crystal size of crystalline material by using XRD.	3	0	3	7.14 %
10. Application of IR spectra - Determination lattice parameter of crystalline material by using XRD.	3	0	3	7.14 %
11. X-ray spectrometry - Polography part1.	3	0	3	7.14 %
12. Introduction to thermal analysis - Polography part2.	3	0	3	7.14 %
13. Application of thermal analysis - Cyclic voltammetry	3	0	3	7.14 %
14. Final revision with explain some charts - Revision	3	0	3	7.14 %
Total hours	42	0	42	100

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Identify theoretical and the basis of different types of spectroscopy.	x	x	x	0	0	x
	a2	Describe the constructions of each instrument	x	x	x	x	0	x
	a3	Outline the benefits of each part.	x	x	x	0	0	x
	a4	State the knowledge of the application of each tool.	x	x	x	0	0	x
	a5	Explain structure and morphology of different chemical compounds using different spectroscopic and analytical techniques	x	0	x	x	x	x
	a6	Outline the bases of thermal analysis	x	x	x	0	0	x
	a7	Determine the concentration of unknown solution.	x	x	x	x	x	x
	a8	Define the crystalline structure.	x	x	x	0	0	0
	a9	Draw diagrams, graphs and can record the experimental data.	x	x	x	x	x	x
	a10	State some of the current issues of application.	x	x	x	x	0	x
Intellectual Skills	b1	Solve chemical problems using some data processing skills.	x	x	x	0	x	x
	b2	Interpret the given chemical data to identify the composition and chemical structures of inorganic and organic compounds	x	x	x	x	x	x
	b3	Design the preparation of solutions and examine the concentration.	x	x	x	x	x	x
	b4	Compare the different methods of spectroscopy.	x	x	x	x	0	x
	b5	Report and interpret experimental data	x	x	x	x	x	x
Practical and professional	c1	Prepare the concentrations of unknown solutions.	x	0	x	x	x	x
	c2	Relate the knowledge that the student acquired to study chemical structures of organic and inorganic compounds	x	0	x	x	x	x
	c3	Compare data from different instrumental techniques.	x	x	x	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	x	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	0	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x



5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3,a5, b2, and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, a7,b2,b4, d1, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4,a7,a8, b1, b2, b3, and d4	fifteenth week	6 %
Practical exam	C1 to c3	sixteenth week	40%
Written exam	a1, a2, a3, a4,a10, b1, b2, b3, b4.	seventeenth week	48 %
Total			100 %

Course matrix																						
Topic	Knowledge and understanding										Intellectual skills					Practical and professional skills			General Skills			
	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	b1	b2	b3	b4	b5	c1	c2	c3	d1	d2	d3	d4
1. Introduction to spectral analysis. - Determination the concentration of unknown solution by using spectrophotometry part1.	x																x	x	x			
2. Beer's Law and its deviations. - Determination the concentration of unknown solution by using spectrophotometry part2.			x				x				x	x			x		x	x	x		x	x
3. Component of the instrument. - Determination the dissociation constant of complex by using spectrophotometry.		x															x	x	x			x
4. Application of spectrophotometry. - Determination the stoichiometry of complex by using spectrophotometry.			x						x	x				x	x		x	x	x			



6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

- 1- Robert. D. Brown "Introduction to analytical chemistry"
- 2- Gundeepchatwal "Atomic Spectroscopy"

7-3 Recommended books

- 1- [J. Mendham](#), [R.C. Denney](#), [J. D. Barnes](#), [M.J.K. Thomas](#), [Vogel's Quantitative Chemical Analysis](#), 6th Edition (1999).
- 2- [Heinz-Helmut Perkampus](#) , [H. Charlotte Grinter](#) Uv-Vis Spectroscopy and Its Applications, (1992)
- 3- M. E. Brown "Introduction to thermal analysis"
- 4- John H. Harley; Stephen E. Wiberley, Wiley, 1954

7-4 Periodicals, Web sites, etc.

http://www.questia.com/Instrumental_Analysis

<http://www.coursera.org/course/analyticalchem>

7- Facilities required for teaching and learning:

Using a microphone in lectures
Using a black board
Group Discussions
Data show

Course coordinator: Prof. Dr. Mostafa Y. Nassar
Prof. Dr. Gamal Owes
Dr. Aymn Abdel Razek
Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug
Date: 2022-2023



Course Specification

Chm 413: Chemistry of Petroleum Additives

A- Affiliation

Relevant program:	Special Chemistry B.Sc. Program
Department offering the program:	Chemistry Department
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Dr. Ahmed Tantawy Dr. Hany Ibrahim

B - Basic information

Title: Chemistry of Petroleum Additives	Code: Chm 413	Year/level: fourth level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand general properties of the petrochemical and petroleum additives such as principles of petroleum chemistry, uses of petroleum compounds in industrial fields as rubbers, fibers, industrial detergents, Pesticides. Also, teach students the components of petroleum, properties and uses of these compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define the principles of petroleum additives.
- a.2- Describe the properties petroleum additives.
- a.3- State the mean of petroleum additives of fuels, lubricating oils, gasoline, and kerosene.
- a.4- To know the physical properties fuels, lubricating oils, gasoline, and kerosene after addition of additives.
- a.5- Explain the improvement properties of fuels, lubricating oils, gasoline, and kerosene.

b - Intellectual skills:



On successful completion of the course, the student should be able to.

b1- Interpret the given chemical data to identify the role of petroleum additives.

b2- Modify the petroleum additives uses of fuels, lubricating oils, gasoline, and kerosene.

b3- Report the physical properties of fuels, lubricating oils, gasoline, and kerosene after addition of petroleum additives.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- show the physical properties of fuels, lubricating oils, gasoline, and kerosene after addition of additives.

c2-Relate the knowledge that the student studied to propose petroleum additives of fuels, lubricating oils, gasoline, and kerosene.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture	Tutorial	Practical	% of
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	hours	hours	hours	total
1. Introduction to the principals of petroleum chemistry	2	0	0	7.14%
2. General introduction of petroleum additives	2	0	0	7.14%
3. General properties of petroleum additives	2	0	0	7.14%
4. Application of petroleum additives in lubricating oils.	2	0	0	7.14%
5. Application of petroleum additives in fuels.	2	0	0	7.14%
6. Application of petroleum additives in kerosene.	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Application of petroleum additives in gasoline.	2	0	0	7.14%
9. The important properties of fuels, lubricating oils, gasoline, and kerosene additives.	2	0	0	7.14%
10. Changing in physical properties after addition of additives for fuels and lubricating oils part (1).	2	0	0	7.14%
11. Changing in physical properties after addition of additives for fuels and lubricating oils part (2).	2	0	0	7.14%
12. Gasoline and kerosene additives.	2	0	0	7.14%
13. Changing in physical properties after addition of additives for gasoline and kerosene	2	0	0	7.14%
14. Improvements properties of fuels, lubricating oils, gasoline, and kerosene after additives	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define the principals of petroleum additives.	x	0	x	0	0	x
	a2	Describe the properties petroleum additives.	x	0	0	0	0	0
	a3	State the mean of petroleum additives of fuels, lubricating oils, gasoline, and kerosene.	x	x	x	0	X	x
	a4	To know the physical properties fuels, lubricating oils, gasoline, and kerosene after addition of additives	x	x	x	0	X	x
	a5	Explain the improvement properties of fuels, lubricating oils, gasoline, and kerosene.	x	0	0	0	0	x
Intelle	b1	Interpret the given chemical data to identify the role of petroleum additives.	x	x	x	0	x	x

	b2	Modify the petroleum additives uses of fuels, lubricating oils, gasoline, and kerosene.	x	0	x	0	x	x
	b3	Report the physical properties of fuels, lubricating oils, gasoline, and kerosene after addition of petroleum additives.	x	x	x	0	x	x
Practical and professional	c1	Show the physical properties of fuels, lubricating oils, gasoline, and kerosene after addition of additives.	x	0	x	0	x	x
	c2	Relate the knowledge that the student studied to propose petroleum additives of fuels, lubricating oils, gasoline, and kerosene.	x	0	x	0	X	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	x	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	0	x	x	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1 and d3	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c1 and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, b3	sixteenth week	80 %
Total			100 %

Course matrix



Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	c1	c2	d 1	d 2	d 3	d 4
1. Introduction to the principals of petroleum chemistry	x										x		x	x
2. General introduction of petroleum additives		x									x		x	
3. General properties of petroleum additives		x							x					
4. Application of petroleum additives in lubricating oils.						x				x				
5. Application of petroleum additives in fuels.			x							x				
6. Application of petroleum additives in kerosene.			x							x				
7. Mid-Term Exam.	x	x	x	x			x				x	x		
8. Application of petroleum additives in gasoline.			x							x	x		x	
9. The important properties of fuels, lubricating oils, gasoline, and kerosene additives.				x										
10. Changing in physical properties after addition of additives for fuels and lubricating oils part (1).					x		x		x					
11. Changing in physical properties after addition of additives for fuels and lubricating oils part (2).					x				x			x		
12. Gasoline and kerosene additives.			x								x			
13. Changing in physical properties after addition of additives for gasoline and kerosene					x		x	x	x			x		
14. Improvements properties of fuels, lubricating oils, gasoline, and kerosene after additives					x		x	x	x			x		x

6- List of references:



6-1 Course notes

Lecture note approved by Department of Chemistry.

6-2 Required books

- ❖ William L. Leffler, Richard Pattarozzi, Gorgon Sterling; Deep water petroleum 2nd, 2011.
- ❖ William L. Leffler; Petroleum Refining in Nontechnical Language 4th, 2008.
- ❖ Jon Gluyas, Richard Swarbrick; Petroleum Geoscience, 2008.
- ❖ Saeid Mokhatab, John Y. Mak , Jaleel V. Valappil , David A. Wood; Handbook of Liquefied Natural Gas, 2013.

7-5 Recommended books

- 1-David S. G. Gones, Peters R. Dugado; Handbook of petroleum processing, 2006.
- 2- Games H. Gary, Galenn E. Handwerk; Petroleum refining 5th, 2001.

7-6 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)
Petroleum Chemistry (ACS)
<http://www.springer.com/us/book/9783319145280>

7- Facilities required for teaching and learning:

Using a microphone in lectures
Using a black board
Group Discussions
Data show

Course coordinator: Dr. Ahmed Tantawy

Program coordinator: Dr. Hany Ibrahim
Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

415Ch: Stereo- and Photo-organic Chemistry

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484)
Course coordinator:	Prof. Dr. Mohamed Behalo Dr. Eman Gad El-Kareem

B - Basic information

Title: Stereo- and Photo-organic Chemistry	Code: 415 Ch	Year/level: fourth level
Teaching Hours:	Lectures: 2 Practical: 0 course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand an introduction to photo organic chemistry, reaction mechanism of photo organic compounds, energy levels of molecules, absorption and emission of light, principal reactions of photochemistry, photo chemistry of carbonyl compounds, photochemistry of alkenes, photochemistry of enones, photo chemistry of aromatic compounds, introduction to identify isomers and stereochemistry of some organic compounds.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Write reaction mechanism of photo organic compounds.
- a.2- Define energy levels of molecules.
- a.3- Describe the principal reactions of photochemistry
- a.4- Outline the photo chemistry of aromatic compounds
- a.5- Memorize the structures of isomers.
- a.6- Identify the stereochemistry of some organic compounds.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Report Synthesis of the racemic compounds



- b2- Compare between different types isomers.
- b3- Confirm the mechanism of reactions
- b4- Discover the molecular symmetry of optically active compounds

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Investigate the most stable molecule in the space.
- c2- Relate the optically active phenomena in drugs.
- C3- Prepare compounds with asymmetric carbon atom.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Solve problems on knowing the shape of organic compounds in the space.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to photo organic chemistry.	2	0	0	7.14%
2. Reaction mechanism of photo organic compounds.	2	0	0	7.14%
3. Energy levels of molecules.	2	0	0	7.14%
4. Absorption and emission of light	2	0	0	7.14%
5. Principal reactions of photochemistry.	2	0	0	7.14%
6. Photo chemistry of carbonyl compounds.	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Photochemistry of alkenes part (1).	2	0	0	7.14%
9. Photochemistry of alkenes part (2).	2	0	0	7.14%
10. Photochemistry of enones part (1).	2	0	0	7.14%
11. Photochemistry of enones part (2).	2	0	0	7.14%
12. Photo chemistry of aromatic compounds.	2	0	0	7.14%
13. Introduction to identify isomers	2	0	0	7.14%
14. Stereochemistry of some organic compounds	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Write reaction mechanism of photo organic compounds.	x	0	x	0	0	x
	a2	Define energy levels of molecules.	x	x	0	0	0	0
	a3	Describe the principal reactions of photochemistry.	x	0	X	0	X	x
	a4	Outline the photo chemistry of aromatic compounds.	x	x	0	0	X	x
	a5	Memorize the structures of isomers	x	0	X	0	0	X
	a6	Identify the stereochemistry of some organic compounds	x	x	0	0	x	x
Intellectual Skills	b1	Report Synthesis of the racemic compounds.	x	0	X	0	X	0
	b2	Compare between different types isomers.	x	0	X	0	x	x
	b3	Confirm the mechanism of reactions	x	0	0	0	X	0
	b4	Discover the molecular symmetry of optically active compounds	x	0	0	0	0	x
Practical and professional skills	c1	Investigate the most stable molecule in the space.	x	0	0	0	X	x
	c2	Relate the optically active phenomena in drugs.	x	0	0	0	X	x
	C3	Prepare compounds with asymmetric carbon atom	x	0	0	0	x	x
General Skills	d1	Solve problems on knowing the shape of organic compounds in the space.	x	x	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with others positively.	x	x	0	X	X	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	5 %
Mid-Term Exam	a1, a5, a6, b3, b4.	Seventh week	5 %
Oral exam	a1, a3, a4, a5, a6, b1	fifteenth week	10 %
Written exam	a1, a2, a3, a5, a6, b1, b2 and b4	sixteenth week	80 %
Total			100 %



Course matrix

Topic	Knowledge and understanding						Intellectual skills				Practical and professional skills			General Skills	
	a 1	a 2	a 3	a 4	a 5	a 6	b 1	b 2	b 3	b 4	c1	c2	c 3	d 1	d 2
1. Introduction to photo organic chemistry.	x	x													
2. Reaction mechanism of photo organic compounds.	x		x						x						
3. Energy levels of molecules.	x	x													
4. Absorption and emission of light		x													
5. Principal reactions of photochemistry.		x	x						x	x		x			x
6. Photo chemistry of carbonyl							x		x				x		x
7. Mid-Term Exam.	x				x	x			x	x					
8. Photochemistry of alkenes part (1).							x							x	
9. Photochemistry of alkenes part (2).							x							x	
10. Photochemistry of enones part (1).							x							x	
11. Photochemistry of enones part (2).							x							x	
12. Photo chemistry of aromatic compounds.				x			x		x			x		x	x
13. Introduction to identify isomers					x	x	x	x		x	x				
14. Stereochemistry of some organic compounds						x				x	x	x			x



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

None

7-7 Recommended books

None

7-8 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mohamed Behalo

Dr. Eman Gad El-Kareem

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Chm 402: Research and Essay

A- Affiliation

Relevant program:	Special Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Staff Of Chemistry Department

B - Basic information

Title: Scientific essay	Code: Chm 402	Year/level: Fourth level
Teaching Hours:	Lectures: 3	Tutorial: 0
	Practical: 0	Total: 3 h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to write a scientific essay, know, and apply the ethics related to this type of writing.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1-Outline some current issues of the chemical research.
- a.2- Write on development of specific chemical research point.
- a.3- State the ethics of writing.
- a.4- Identify different parts of essay.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Construct different parts of essay.



b2- Organize different parts of essay.

b3- Interpret the results you wrote.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Collect different scientific articles on a specific chemical point.

c2-Relate the knowledge that the students studied to write a scientific essay.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Use computers and internet for information and communication technology effectively.

d2- Solve problems on the scientific basis taught in this course.

d3- Work in a team effectively, manage time, collaborate and communicate with others positively.

d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1 Ethics of scientific writing.	2	0	0	7.14%
2 How to research and get a scientific article.	2	0	0	7.14%
3 Parts of the essay?	2	0	0	7.14%
4 How to write an abstract?	2	0	0	7.14%
5 How to write an introduction?	2	0	0	7.14%
6 How to write an experimental section?	2	0	0	7.14%
7 Mid-Term Exam.	2	0	0	7.14%
8 How to write the results?	2	0	0	7.14%
9 How to write the discussion?	2	0	0	7.14%
10 How to write references?	2	0	0	7.14%
11 Writing an essay part1	2	0	0	7.14%
12 Writing an essay part2.	2	0	0	7.14%
13 Reviewing the written essay.	2	0	0	7.14%
14 Oral exam-Presenting the written essay	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Problem solving	Brain storming
Knowledge & Understanding	a1	Outline some current issues of the chemical research.	x	0	x	0	x
	a2	Write on development of specific chemical research point.	x	0	x	0	0
	a3	State the ethics of writing.	x	x	x	0	x
	a4	Identify different parts of essay.	x	0	x	0	x
Intellectual Skills	b1	Construct different parts of essay.	x	x	x	0	x
	b2	Organize different parts of essay.	x	x	x	0	x
	b3	Interpret the results you wrote.	x	0	x	0	x
Practical and professional	c1	Collect different scientific articles on a specific chemical point.	0	0	x	0	x
	c2	Relate the knowledge that the students studied to write a scientific essay.	x	0	x	0	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, c1 d1 and d2	fifteenth week	50 %
Final exam (discussion and the presentation)	a1, a2, a3, a4, b1, b2, b3, c2, d1, d2, d3 and d4	Fifteenth week	50%
Total			100 %

Course matrix



Topic	Knowledge and understanding				Intellectual skills			Practical and professional skills		General Skills			
	a1	a2	a3	a4	b1	b2	b3	c1	c2	d1	d2	d3	d4
1. Ethics of scientific writing.			x						x	x		x	x
2. How to research and get a scientific article.	x							x					x
3. Parts of the essay?				x	x						x	x	
4. How to write an abstract?		x								x		x	
5. How to write an introduction?		x											
6. How to write an experimental section?		x											
7. Mid-Term Exam.													
8. How to write the results?		x								x			
9. How to write the discussion?		x											
10. How to write references?		x											
11. Writing an essay part1						x							
12. Writing an essay part2.						x							
13. Reviewing the written essay.							x			x	x		x
14. Oral exam-Presenting the written essay							x		x		x		

6- List of references:

6-1 Course notes

6-2 Required books

Gordon Taylor, A Student's Writing Guide: How to Plan and Write Successful Essays, Cambridge University Press, England, 2009.

7-9 Recommended books

Alan Barker, How to Write an Essay, BookBoon.com, 2013.

6-4 Periodicals, Web sites, etc.

<http://library.bcu.ac.uk/learner/writingguides/1.01%20Essays.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures, Using of slit overhead projector, Using a black board

Group Discussions and Data show

Course coordinator: Staff of Chemistry Department

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

Chm 415: Chemistry of Dyes and Textiles (1)

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mhasen Amin Dr.Ahmed Tantawy Dr. Hany Ibrahim

B - Basic information

Title: Chemistry of Dyes and Textiles (1)	Code: Chm 415	Year/level: Fourth level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3 h/week
	Course marks:	
	100 marks	

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand Study of different types of textiles and its classification as natural and synthetic textile, and studying of the different methods of treatment each of these textiles. Study of different types of dyes used in each textile and evaluation of after dyeing processes as (dye stability, dye resistance to natural agents, type of adhesion between dye molecule and the used textile. Study of different dyeing techniques, and factors affecting it. It also provide appropriate practical skills for the synthesis of textile and Dyes.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- State of different types of textiles
- a.2- Define the classification of textiles as natural and synthetic.
- a.3- Describe the different methods of treatment each of these textiles.



a.4- Explain the different types of dyes used in each textile

b - Intellectual skills:

On successful completion of the course, the student should be able to.

b1- Construct dying processes as (dye stability, dye resistance to natural agents, type of adhesion between dye molecule and the used textile.

b2- Discover different dying techniques, and factors affecting it.

b3- Compare between methods of treatment each of the different textiles

b4- Report the different dying techniques, and factors affecting it

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

c1- Prepare different types of dyes and evaluation after dying processes.

c2- Analyze of dye stability, dye resistance to natural agents.

d - General skills:

On successful completion of the course, the student should be able to:

d1- Solve problems on the scientific basis taught in this course.

d2- Work in a team effectively, manage time, collaborate and communicate with others positively.

3 - Contents

Topic	Lecture hours	Tutoria l hours	Practica l hours	% of total
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1. Study of different types of textiles - Introduction about dyes	2	0	2	7.14%
2. Classification of textiles - Preparation of 2-tolyl azo-2-naphthol	2	0	2	7.14%
3. Study of different dyeing techniques - Direct dyeing of cotton fabric	2	0	2	7.14%
4. Factors affecting dyeing - Yield calculation of 2-phenyl azo-2-naphthol	2	0	2	7.14%
5. Studying of the different methods of treatment natural textiles - Preparation of fast green dye	2	0	2	7.14%
6. Studying of the different methods of treatment synthetic textiles. - Yield calculation of fast green dye	2	0	2	7.14%
7. Mid-Term Exam	2	0	2	7.14%
8. Classification of Dyes part (1) - Preparation of resole dye	2	0	2	7.14%
9. Classification of Dyes part (2) - Preparation of picric acid	2	0	2	7.14%
10. Evolution of textiles after dyeing process - Preparation of naphthol yellow S	2	0	2	7.14%
11. Study of different types of dyes used in each textile part (1) - Preparation of amino yellow E	2	0	2	7.14%
12. Study of different types of dyes used in each textile part (2) - Preparation of lithol yellow G	2	0	2	7.14%
13. Study of different dyeing techniques - Preparation of acid red	2	0	2	7.14%
14. Studying of the different methods of treatment each of these textiles - Revision	2	0	2	7.14%
Total hours	28	0	28	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	State of different types of textiles	x	0	0	0	0	x
	a2	Define the classification of textiles as natural and synthetic.	x	x	0	0	0	0
	a3	Describe the different methods of treatment each of these textiles.	x	0	0	0	x	x
	a4	Explain the different types of dyes used in each textile	x	0	0	0	x	x
Intellectual Skills	b1	Construct dying processes as (dye stability, dye resistance to natural agents, type of adhesion between dye molecule and the used textile.	x	0	0	0	0	x
	b2	Discover different dying techniques, and factors affecting it.	x	x	0	x	x	x
	b3	Compare between methods of treatment each of the different textiles	x	0	0	x	0	x
	b4	Report the different dying techniques, and factors affecting it.	x	0	0	0	0	x
Practical and professional skills	c1	Prepare different types of dyes and evaluation after dying processes.	x	x	x	x	x	x
	c2	Analyze dye stability, dye resistance to natural agents.	x	0	x	x	x	x
General Skills	d1	Solve problems on the scientific basis taught in this course.	x	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with	0	x	0	0	x	0

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, b3 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, b1, b2, d1, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, , and d2	fifteenth week	6 %
Practical exam	C1 to c2	fifteenth week	40%
Written exam	a1, a2, a3, a4, b1, b2, b3,	sixteenth week	48%
Total			100 %

Course matrix												
Topic	Knowledge and understanding				Intellectual skills				Practical and professional skills		General Skills	
	a1	a2	a3	a4	b1	b2	b3	b4	c1	c2	d1	d2
1. Study of different types of textiles - Introduction about dyes	x								x			
2. Classification of textiles - Preparation of 2-tolyl azo-2-naphthol	x	x								x		x
3. Study of different dyeing techniques - Direct dyeing of cotton fabric			x			x				x	x	
4. Factors affecting dyeing - Yield calculation of 2-phenyl azo-2-naphthol					x	x		x			x	
5. Studying of the different methods of treatment natural textiles - Preparation of fast green dye			x					x	x	x		
6. Studying of the different methods of treatment synthetic textiles. - Yield calculation of fast green dye			x					x	x		x	
7. Mid-Term Exam	x	x	x	x	x	x					x	x
8. Classification of Dyes part (1) - Preparation of resole dye		x						x				x



9. Classification of Dyes part (2) - Preparation of picric acid		x							x			x
10. Evolution of textiles after dyeing process - Preparation of naphthol yellow S				x					x	x		
11. Study of different types of dyes used in each textile part (1) - Preparation of amino yellow E			x			x	x			x		
12. Study of different types of dyes used in each textile part (2) - Preparation of lithol yellow G			x			x			x			x
13. Study of different dyeing techniques - Preparation of acid red							x			x		
14. Studying of the different methods of treatment each of these textiles - Revision			x				x			x		x

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

Christie, R. M, Colour chemistry, 2001, royal society of chemistry Cambridge.

7-10 Recommended books

Allen, R L M, colour chemistry, 1971, Nelson, great Britain.

7-11 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Prof. Dr. Mhasen Amin --- Dr.Ahmed Tantaw

Dr. Hany Ibrahim

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023



Course Specification

Chm 412: Heterocyclic Chemistry and Applications

A- Affiliation

Relevant program:	Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Ali Abdelmaaboud Dr. Mohamed Sayed Behalo

B - Basic information

Title: Heterocyclic Chemistry and Applications	Code: Chm 412	Year/level: Fourth level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the principles of chemistry of heterocyclic compounds (synthesis, chemical reactions and applications). Also, to predict applications of different heterocyclic derivatives based on standard products and provide the structural elucidation based on the spectral studies.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

By the end of the course, the student should understand knowledge and understanding of:

- a.1- Outline principles of organic synthesis in the prediction of reaction pathway and the size of the synthesized heterocycles.
- a.2- Describe organic compound form any functional group or class and compose an acceptable functionality behavior for each type of compound.
- a.3- Identify and utilize different techniques for the synthesis of different heterocyclic derivatives.
- a.4- Define the relative stability of different heterocyclic products.
- a.5- Determine the structure of heterocyclic compounds and the reactivity associated with functional groups.
- a.6- Explain nature of heterocycle present in natural products.

b - Intellectual skills:

By the end of the course, the student should be able to.

- b1- Design different methods for the synthesis of heterocycles.



- b2- Formulate mechanisms for reaction pathways.
- b3- Hypothesize the relation between structures and the biological activity of heterocyclic compounds.
- b4- Report a method for the synthesis of heterocycles analogues of naturally occurred derivatives.
- b5- Discover purification of a mixtures of heterocycles.
- b6- Create relation between structures and toxicity of organic compounds

c - Practical and professional skills:

By the end of the course, the student should be able to:

- c1- Analyze the preparation of simple heterocycles.
- c2-Examine the purity of the synthesized products
- c3- Prepare model drugs.
- c4- Collect data to separate active molecules from natural products.

d - General skills:

- d1- Use information technology and web search for collecting information.
- d2- Work effectively in a team, and independently on solving organic chemistry problems.
- d3- Exchange ideas, principles and information by oral, written and visual means.
- d4- Communicate effectively with his lecturer and colleagues.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Nomenclature of heterocyclic compounds - Introduction about preparation of pharmaceuticals	2	0	3	7.14%
2. Synthesis, reactions and applications of three and four membered heterocycles - Review about recrystallization process of heterocycles	2	0	3	7.14%
3. Synthesis, reactions and applications of five membered heterocycles (one heteroatom) part (1) - Recrystallization of benzoic acid by using aqueous media	2	0	3	7.14%
4. 3. Synthesis, reactions and applications of five membered heterocycles (one heteroatom) part (2) - Recrystallization of phthalic acid by mixed solvent	2	0	3	7.14%
5. Synthesis, reactions and applications of five membered heterocycles (more than one heteroatom) part (1) - Preparation of aspirin	2	0	3	7.14%
6. 5. Synthesis, reactions and applications of five membered heterocycles (more than one heteroatom) part (2) - Preparation of β -naphthyl acetate	2	0	3	7.14%
7. Mid-term exam	2	0	3	7.14%
8. Synthesis, reactions and applications of six membered heterocycles (one heteroatom) - Preparation of phthalimide	2	0	3	7.14%
9. Synthesis, reactions and applications of fused five membered heterocycles - Preparation of phthalyl glycine	2	0	3	7.14%

10. Synthesis, reactions and applications of six membered heterocycles (more than one heteroatom) part (1) - Preparation of N-benzylidene aniline	2	0	3	7.14%
11. Synthesis, reactions and applications of six membered heterocycles (more than one heteroatom) part (2) - Preparation of chalcone	2	0	3	7.14%
12. Nomenclature of fused heterocycles part (1) - Part 1: preparation of N-hydroxy phthalimide	2	0	3	7.14%
13. Nomenclature of fused heterocycles part (2) - Part 2: preparation of N-hydroxy phthalimide	2	0	3	7.14%
14. Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Outline principles of organic synthesis in the prediction of reaction pathway and the size of the synthesized heterocycles	X	0	x	0	0	x
	a2	Describe organic compound form any functional group or class and compose an acceptable functionality behavior for each type of compound.	X	x	x	x	0	0
	a3	Identify and utilize different techniques for the synthesis of different heterocyclic derivatives.	X	x	x	x	x	x
	a4	Define the relative stability of different heterocyclic products.	X	x	x	X	0	x
	a5	Determine the structure of heterocyclic compounds and the reactivity associated with functional groups	X	0	x	X	x	x
	a6	Explain nature of heterocycle present in natural products	X	0	x	X	x	x
Intellectual Skills	b1	Design different methods for the synthesis of heterocycles.	X	x	x	0	x	x
	b2	Formulate mechanisms for reaction pathways.	X	x	x	0	0	0
	b3	Hypothesize the relation between structures and the biological activity of heterocyclic compounds.	X	0	x	x	x	0
	b4	Report a method for the synthesis of heterocycles analogues of naturally occurred derivatives.	X	x	x	x	x	x
	b5	Discover purification of mixtures of heterocycles.	X	x	x	x	0	x
	b6	Create relation between structures and toxicity of organic compounds	X	x	x	0	0	x
Practical and professional	c1	Analyze on the preparation of simple heterocycles.	X	x	0	X	x	x
	c2	Examine the purity of the synthesized products	X	x	0	X	x	x
	c3	Prepare model drugs.	X	x	0	X	x	x
	C4	Collect data to separate active molecules from natural products	X	x	0	X	x	0



General Skills	d1	Use information technology and web search for collecting information.	0	0	0	0	0	x
	d2	Work effectively in a team, and independently on solving organic chemistry problems.	0	0	x	0	x	x
	d3	Exchange ideas, principles and information by oral, written and visual means.	x	0	x	0	0	x
	d4	Communicate effectively with his lecturer and colleagues	X	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, a5, b3, b4, c2, and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a5, a6, b1, b6 d1, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b4, b5 d3, and d4	Thirteenth week	6 %
Practical exam	C1 to 4	Fifteenth week	40%
Written exam	a1, a2, a3, a4, b1, b2, b3	sixteenth week	48%
Total			100 %

Course matrix																				
Topic	Knowledge and understanding						Intellectual skills						Practical and professional skills				General Skills			
	a1	a2	a3	a4	a5	a6	b1	b2	b3	b4	b5	b6	c1	c2	c3	c4	d1	d2	d3	d4
1. Nomenclature of heterocyclic compounds - Introduction about preparation of pharmaceuticals	x					x											x	x	x	
2. Synthesis, reactions and applications of three and four membered heterocycles - Review about recrystallization process of heterocycles			x	x	x							x	x		x	x				x
3. Synthesis, reactions and applications of five membered heterocycles (one heteroatom) part (1) - Recrystallization of benzoic acid by using aqueous media			x	x		x	x	x					x	x			x	x	x	



6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

- 1- Heterocyclic Chemistry, 5th Edition, [John A. Joule](#), [Keith Mills](#), 2010
- 2- Textbooks of Heterocyclic Chemistry, R. Breinbauer, 1998

6-3 Recommended books

Heterocyclic Chemistry, [Raj K. Bansal](#), 1999

6-4 Periodicals, Web sites, etc.

Journal of Heterocyclic chemistry

Heteroatom Chemistry

Heterocycles

Journal of American Chemical Society (JACS)

<http://www.chemguide.co.uk/mechanisms/frmenu.html#top>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board, Group Discussions, Data show

Course coordinator: Prof. Dr. Ali Abdelmaaboud

Dr. Mohamed Sayed Behalo

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023



Course Specification

Chm 422: Advanced Inorganic Chemistry (Chemical Applications of Group Theory)

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mostafa Y. Nassar Dr. Sabry Hamed

B - Basic information

Title: Advanced Inorganic Chemistry (Chemical Applications of Group Theory)	Code: Chm 422	Year/level: Fourth level
Teaching Hours:	Lectures: 2 Practical: 0 Course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand how he/she can determine the point group of different chemical compounds. Also, teach students how he/she can interpret molecular vibrations, electronic transitions and bonding as chemical applications of group theory.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define symmetry elements and symmetry operations.
- a.2- Outline the point groups of different compounds.
- a.3- Know reducible and irreducible representation.
- a.4- Describe the different parts of the character tables.
- a.5- Identify different vibrational modes.
- a.6- Determine the bonding in some compounds with the help of character tables.
- a.7- State different electronic transitions in some compounds.



a.8- Graph the molecular orbital diagrams for some compounds.

b - Intellectual skills:

On successful completion of the course, the student should be able to:

- b1- Formulate the vibrational modes of some compounds.
- b2- Compare between different symmetry operations.
- b3- Interpret geometries and bonding of some compounds depending on understanding of the group theory.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Examine the number of unpaired electrons in the complex depending on its given magnetism.
- c2-Relate the knowledge that the student studied to propose the molecular structures of the transition metal complexes.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to group theory and its applications in Chemistry	2	0	0	7.14%
2. Symmetry elements and symmetry operations	2	0	0	7.14%
3. Determination of point group of a molecule	2	0	0	7.14%
4. Group representation and character tables part 1	2	0	0	7.14%
5. Group representation and character tables part 2	2	0	0	7.14%
6. Reducible and irreducible representation	2	0	0	7.14%
7. Mid-Term Exam.	2	0	0	7.14%
8. Reducible and irreducible representation part (1)	2	0	0	7.14%
9. Reducible and irreducible representation part (2)	2	0	0	7.14%
10. Molecular vibrations part 1	2	0	0	7.14%
11. Molecular vibrations part 2	2	0	0	7.14%
12. Bonding and Molecular orbital theory part (1)	2	0	0	7.14%
13. Bonding and Molecular orbital theory part (2)	2	0	0	7.14%
14. Electronic transition	2	0	0	7.14%

Total hours	24	0	0	100%
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4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Define symmetry elements and symmetry operations	x	0	x	0	x	x
	a2	Outline the point groups of different compounds.	x	x	x	0	x	x
	a3	Know reducible and irreducible representation.	x	0	x	0	x	x
	a4	Describe the different parts of the character tables.	x	0	x	0	x	x
	a5	Identify different vibrational modes.	x	x	x	0	x	x
	a6	Determine the bonding in some compounds with the help of character tables.	x	x	x	0	x	x
	a7	State different electronic transitions in some compounds.	x	0	x	0	x	x
	a8	Graph the molecular orbital diagrams for some compounds.	x	0	x	0	x	x
Intellectual Skills	b1	Formulate the vibrational modes of some compounds.	x	0	x	0	x	x
	b2	Compare between different symmetry operations.	x	0	x	0	x	x
	b3	Interpret geometries and bonding of some compounds depending on understanding of the group theory.	x	x	x	0	x	x
Practical and professional skills	c1	Examine the number of unpaired electrons in the complex depending on its given magnetism.	x	0	x	0	x	0
	c2	Relate the knowledge that the student studied to propose the molecular structures of the transition metal complexes.	x	x	x	0	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	X	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x



5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, d1, and d2	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, a5, a6, b1, b2, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, a6, a7, a8, b1, b2, c2, b3, and d4	fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, a6, a7, a8, b1, b2, b3,	sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding								Intellectual skills			Practical and professional skills		General Skills			
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	c1	c2	d1	d2	d3	d4
1. Introduction to group theory and its applications in Chemistry	x													x		x	x
2. Symmetry elements and symmetry operations	x								x					x	x	x	
3. Determination of point group of a molecule		x												x	x	x	
4. Group representation and character tables part 1				x													
5. Group representation and character tables part 2				x													
6. Reducible and irreducible representation			x												x	x	
7. Mid-Term Exam.	x	x	x	x	x	x			x	x					x		
8. Reducible and irreducible representation part (1)			x														
9. Reducible and irreducible representation part (2)			x														
10. Molecular vibrations part 1					x				x					x	x	x	x
11. Molecular vibrations part 2					x				x								
12. Bonding and Molecular orbital theory part (1)						x					x		x				
13. Bonding and Molecular orbital theory part (2)						x		x			x		x	x	x		x
14. Electronic transition							x					x					x

6- List of references:



6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

F. Albert Cotton, Chemical Applications of Group Theory, 3th Edn. John Wiley&Sons, Inc., New York, USA, 1990.

7-12 Recommended books

1- Daniel C. Harris, Michael D. Bertolucci, Symmetry and Spectroscopy: An Introduction to Vibrational and Electronic Spectroscopy, Courier Dover Publications, USA, 1978.

7-13 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS)

Inorganic Chemistry (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Mostafa Y. Nassar

Dr. Sabry Hamed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdoug

Date: 2022-2023

Course Specification Chm 486: Materials Science (1)



A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Academic year/level:	Fourth Level
Department offering the course:	Department of Chemistry
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), update 10/ 1/2018 (Faculty council; meeting number, 419). update 8/ 3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr.Wafaa Abdalla Prof.Dr. Eman Abdalla

B - Basic information

Title: Materials Science (1)	Code: Chm 486	Year/level: fourth level
Teaching Hours:	Lectures: 2	Tutorial: 0
	Practical: 3	Total: 3h/week
	Course marks: 100 marks	

C - Professional information

1 – Overall aim of the course:

The aims of the course are to give fundamental knowledge about type of materials, properties and characteristics. Classification of materials (metallic, ceramics, polymer and composite). Also advanced materials and future materials. Types of chemical bonds in ceramics. Types of ceramics. Fabrication and processing of ceramics. Also give explanation of the mechanical, electrical, optical and magnetic properties of different materials (metals, semiconductors, ceramic materials). Give explanation of applications of some materials.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1-State the relation between structure, properties, processing and performance of different materials.
- a.2- Define the concepts of materials science.
- a.3- Identify the different types of materials.
- a.4- Explain the preparation methods of different materials including metals and ceramics.
- a.5- Outline the properties of materials (optical, electrical, magnetic and mechanical).



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Interpret the given chemical data to identify properties of materials.
- b2- Compare between the different types of materials (metals, semiconductor and ceramics).
- b3. Confirm the properties and preparation methods.
- b4. Formulate the applications of different materials.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Label the electrical conductivity, dielectric constant and dielectric loss.
- c2- Analyze some mechanical and magnetic properties.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to materials science . A- Determination of molecular weight of high molecular weight polymers by using viscosity.	2	0	2	7.14%
2. Types of materials - Determination of radius of molecules by using viscosity.	2	0	2	7.14%
3. Properties of ceramic materials part (1) - Determine the percentage of calcium oxide in cement.	2	0	2	7.14%
4. Properties of ceramic materials part (2) - Determine the ionic volume by conductivity	2	0	2	7.14%
5. Preparation methods of ceramic materials - Determine the ionic radius by conductivity	2	0	2	7.14%
6. Introduction of super conductors materials. - Preparation of nano zinc oxide.	2	0	2	7.14%
7. Mid-term exam	2	0	2	7.14%
8. Electrical properties of different materials part (1) - Characterization of nano zinc.	2	0	2	7.14%
9. Electrical properties of different materials part (2)	2	0	2	7.14%

- Adsorption by solids from solution				
10. Mechanical properties of different materials - Determination of Heat of solution	2	0	2	7.14%
11. Defects of solids. - Determination of strength of H-bond of acetic acid	2	0	2	7.14%
12. Optical properties of different materials. - Determination of partial molar volume of pure solvent.	2	0	2	7.14%
13. Magnetic properties of materials. - Determination of partial molar volume of solution.	2	0	2	7.14%
14. Different applications of materials. - Revision	2	0	2	7.14%
Total hours	24	0	28	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	State the relation between structure, properties, processing and performance of different materials.	x	0	x	0	0	x
	a2	Define the concepts of materials science tetrahedron.	x	X	x	0	0	x
	a3	Identify the different types of materials..	x	0	x	0	x	x
	a4	Explain the preparation methods of different materials including metals and ceramics.	X	X	x	0	x	x
	a5	Outline the properties of materials (optical, electrical, magnetic and mechanical).	X	0	x	0	x	x
Intellectual Skills	b1	Interpret the given chemical data to identify properties of materials.	x	X	x	0	X	x
	b2	Compare between the different types of materials (metals, semiconductor and ceramics).	x	X	x	0	X	x
	b3	Confirm the properties and preparation methods	x	X	x	0	X	x
	b4	Formulate the applications of different materials.	x	0	x	0	X	x
Practical and professional skills	c1	Label the electrical conductivity, dielectric constant and dielectric loss.	x	0	x	0	X	0
	C2	Analyze some mechanical and magnetic properties.	x	0	x	0	X	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this	x	0	x	0	X	x



	course.						
d3	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	X	0	x
d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, b2, d1, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b3, c1, c2 and d4	fifteenth week	6 %
Practical exam	C1 to c2	sixteenth week	40%
Written exam	a1, a2, a3, a4, b1, b2, b3,	seventeenth week	48%
Total			100 %

Course matrix															
Topic	Knowledge and understanding					Intellectual skills				Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	b 4	c1	c2	d 1	d 2	d 3	d 4
1. Introduction to materials science . A- Determination of molecular weight of high molecular weight polymers by using viscosity.	x									x	X				x
2. Types of materials - Determination of radius of molecules by using viscosity	x	x	x				x			x	x	x			
3. Properties of ceramic materials part (1) Determine the percentage of calcium oxide in cement.		x		x				x		x	x			x	
4. Properties of ceramic materials part (2) - Determine the ionic volume by conductivity.		x		x				x		x	x	x			
5. Preparation methods of ceramic materials - Determine the ionic radius by conductivity	x					x		x		x	x				
6. Introduction of super conductors materials. - Preparation of nano zinc oxide.	x					x		x		x	x				
7. Mid-term exam	x	x	x	x			x			x	x	x	x		
8. Electrical properties of different materials part (1) - Characterization of nano zinc.					x					x	x	x	x	x	
9. Electrical properties of different materials part (2) - Adsorption by solids from solution					x					x	x				
10. Mechanical properties of different materials - Determination of Heat of solution					x					x	x	x			x
11. Defects of solids. - Determination of strength of H-bond of acetic acid.					x					x	x			x	x



12. Optical properties of different materials. - Determination of partial molar volume of pure solvent.						X							X	X				
13. Magnetic properties of materials. - Determination of partial molar volume of solution.						X							X	X			X	X
14. Different applications of materials. - Revision													X	X	X	X		X

6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

I. William D. Callister, David G. Rethwisch (Materials Science and Engineering)

6-2 Recommended books

1- William D. Callister, David G. Rethwisch (Fundamentals of Materials Science and Engineering)

2- Reel Wheels: an Application Of Material Science

6-3 Periodicals, Web sites, etc.

<http://www.google.com>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Prof. Dr. Wafaa Abdalla

Prof. Dr. Eman Abdalla

Program coordinator: Prof. Dr. Safinaz Mohamed Reda

Head of the Department: Prof. Dr. Wagdy El-Dougdog

Date: 2022/ 2023



Course Specification

440 Ch: Advanced Analytical Chemistry

A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:	Dr . Aymn Awad Dr. Islam Moustafa Dr. Hesham El-Feky
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B - Basic information

Title: Advanced Analytical Chemistry	Code: 440 Ch	Year/level: Fourth level
Teaching Hours:	Lectures: 2 Practical: 0 Course marks: 100 marks	Tutorial: 0 Total: 2 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to get information about some instrumental devices such as GC, HPLC, Electrophoresis, Photoluminescence Spectroscopy and polarography.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a1- Identify basic principles of GC
- a2- Define basic principles of HPLC
- a3- Know basic information on Electrophoresis
- a4- State basic information on Photoluminescence Spectroscopy
- a5- Outline polarography

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Construct ways of instrumental tools
- b2- Compare between different instrumental tools
- b3- Develop Separation of mixtures using chromatography

c- Practical and professional skills:



On successful completion of the course, the student should be able to:

- c1- Analyze methods of separation
- c2- Examine quality of instrumental tools

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d4- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to chromatography and overview on analytical separations and general theory of column chromatography.	2	0	0	7.14%
2. Classifications of chromatographic methods	2	0	0	7.14%
3. Instrumentation of Gas chromatography	2	0	0	7.14%
4. Detectors of Gas chromatography such as TCD, FID and ECD	2	0	0	7.14%
5. Qualitative, quantitative applications and evaluations of Gas chromatography.	2	0	0	7.14%
6. Instrumentation of HPLC	2	0	0	7.14%
7. Mid-term exam	2	0	0	7.14%
8. Qualitative, quantitative applications and evaluations of HPLC.	2	0	0	7.14%
9. Introduction to the theory of capillary electrophoresis	2	0	0	7.14%
10. Instrumentation, application and evaluation of electrophoresis	2	0	0	7.14%
11. Introduction to Photoluminescence Spectroscopy (Fluorescence and Phosphorescence Spectra)	2	0	0	7.14%
12. Instrumentation, application and evaluation of Photoluminescence Spectroscopy (Fluorescence and Phosphorescence Spectra)	2	0	0	7.14%
13. 13. Introduction to polarography (Theory, Types and Instrumentation)	2	0	0	7.14%
14. 14. Applications and evaluations of polarography.	2	0	0	7.14%
Total hours	28	0	0	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	Identify basic principles of GC	x	0	x	0	0	x
	a2	Define basic principles of HPLC	x	0	x	0	0	x
	a3	Know basic information on Electrophoresis	x	x	x	0	x	x
	a4	State basic information on Photoluminescence Spectroscopy	x	x	0	0	x	X
	a5	Outline polarography	x	x	0	0	x	x
Intellectual Skills	b1	Construct ways of instrumental tools	x	0	0	0	x	0
	b2	Compare between different instrumental tools.	x	0	x	0	x	x
	b3	Develop Separation of mixtures using chromatography	x	x	0	0	x	x
Practical and professional skills	c1	Analyze methods of separation	x	0	x	0	0	x
	c2	Examine quality of instrumental tools	x	0	x	0	0	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Work in a team effectively, manage time, collaborate and communicate with Others positively.	0	0	x	X	0	x
	d4	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b1, d3 and d1	Fifth week	5 %
Mid-Term Exam	a1, a2, a3, a4, b3, d1, and d2	Seventh week	5 %
Oral exam	a1, a2, a3, a4, a5, b1, b2, b3, and d4	Fifteenth week	10 %
Written exam	a1, a2, a3, a4, a5, b1, b2, b3,	Sixteenth week	80 %
Total			100 %

Course matrix

Topic	Knowledge and understanding					Intellectual skills			Practical and professional skills		General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	c1	c2	d 1	d 2	d 3	d 4
1. Introduction to chromatography and overview on analytical separations and general theory of column chromatography.						x				x				x
2. Classifications of chromatographic methods							x				x			
3. Instrumentation of Gas chromatography	x									x			x	
4. Detectors of Gas chromatography such as TCD, FID and ECD	x											x		
5. Qualitative, quantitative applications and evaluations of Gas chromatography.	x							x	x		x			
6. Instrumentation of HPLC		x								x			x	
7. Mid-term exam	x	x	x	x				x			x	x		
8. Qualitative, quantitative applications and evaluations of HPLC.		x						x	x				x	
9. Introduction to the theory of capillary electrophoresis			x								x			x
10. Instrumentation, application and evaluation of electrophoresis			x							x		x	x	
11. Introduction to Photoluminescence Spectroscopy (Fluorescence and Phosphorescence Spectra)				x							x			
12. Instrumentation, application and evaluation of Photoluminescence Spectroscopy (Fluorescence and Phosphorescence Spectra)				x								x		x
13. Introduction to polarography (Theory, Types and Instrumentation)					x					x	x	x	x	
14. Applications and evaluations of polarography.					x						x			



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s); proved from chemistry department.

6-2 Required books

Modern analytical chemistry, David Harvey, 5th edition, Mc Graw-Hill. (2000).

Introduction to Polarography and Allied Techniques, Kamala Zutshi, 1st edition, New Age International (p) Limited (2006).

7-14 Recommended books

- Vogel's Textbook of Quantitative Chemical Analysis, Arthur Israel Vogel, 6th edition, Prentice Hall (2000).
- Principles and practice of chromatography, Raymond p.W. Scott, 1st edition, EULA (2012).

7-15 Periodicals, Web sites, etc.

Journal of chromatography A (Elseiver)

Analytical Chemistry (ACS)

<http://www.chromatography-online.org>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator: Dr . Aymn Awad

Dr. Islam Moustafa

Dr. Hesham El-Feky

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023



Course Specification

414 Ch: Chemistry of Industry Detergents

A- Affiliation

Relevant program:	Special Chemistry B.Sc. Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Forth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).
Course coordinator:	Prof. Dr. Mohammed Hussien Dr. Ahmed Tantawy

B - Basic information

Title: Chemistry of Industry Detergents	Code: 414 Ch	Year/level: Forth level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to know general information about types of surfactant such as anionic, cationic, etc. Also, teach students the properties of surfactant, identify HLB and CMC. Study industrial application and green natural surfactant. provide appropriate practical skills to how to produce detergents.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- Define types of surfactant.
- a.2- Know properties of surfactant.
- a.3- Determine Relationship between properties and chemical structure.
- a.4- Identify (HLB) Hydrophilic lypophilic balance, (CMC) critical micille concentration.
- a.5- State Industrial applications of surfactant and Green natural surfactant.
- a 6- Identify Biodegradability.



b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b1- Interpret the given chemical data to identify properties of surfactant.
- b2- Discover different types of surfactant.
- b3- Compare between surfactant and green natural surfactant.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Prepare different types of surfactant.
- c2- Collect industrial application of surfactant.
- c3- Compare between surfactant and green natural surfactant.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Work in a team effectively, manage time, collaborate and communicate with others positively.
- d3- Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and communities.

3 – Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1 Introduction. - Introduction about soap and detergents	2	0	3	7.14%
2 Anionic Surfactants. - Measurement of foam height of detergent	2	0	3	7.14%
3 Cationic Surfactants. - Measurement of foam stability of detergent	2	0	3	7.14%
4 Amphoteric Surfactants. - Measurement of foam height with temperature	2	0	3	7.14%
5 Gemini Surfactants. - Measurement of emulsion stability	2	0	3	7.14%
6 Nonionic Surfactants. - Measurement of emulsion stability with temperature	2	0	3	7.14%
7 Mid-Term Exam.	2	0	3	7.14%
8 Surface Active properties. - Measurement of krafft point of detergent	2	0	3	7.14%
9 Relationship between properties and chemical structure. - Measurement of cloud point of detergent	2	0	3	7.14%
10 (HLB) Hydrophilic lypophilic balance, (CMC) critical micille concentration. - Measurement of CMC of detergent	2	0	3	7.14%

11 Industrial applications of surfactant. - Measurement of stability of detergent in acidic media	2	0	3	7.14%
12 Biodegradability - Measurement of stability of detergent in basic media	2	0	3	7.14%
13 Green natural surfactant. - Measurement of calcium stability of detergent	2	0	3	7.14%
14 Revision.	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:

Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Problem solving	Brain storming
Knowledge & Understanding	a1	Define types of surfactant.	x	0	x	0	X
	a2	Know properties of surfactant.	x	0	0	0	0
	a3	Determine Relationship between properties and chemical structure.	x	x	x	X	X
	a4	Identify (HLB) Hydrophilic lipophilic balance, (CMC) critical micelle concentration.	x	x	x	X	X
	a5	State Industrial applications of surfactant and Green natural surfactant.	x	0	0	0	X
	a6	Identify Biodegradability.	X	0	0	x	0
Intellectual Skills	b1	Interpret the given chemical data to identify properties of surfactant.	x	x	x	X	x
	b2	Discover different types of surfactant.	x	0	x	X	x
	b3	Compare between surfactant and green natural surfactant.	x	x	x	X	x
Practical and professional skills	c1	Prepare different types of surfactant.	0	0	x	x	x
	c2	Collect industrial application of surfactant.	0	0	x	x	x
	c3	Compare between surfactant and green natural surfactant.	0	0	x	X	0
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	0	x
	d2	Work in a team effectively, manage time, collaborate and communicate with others positively.	0	0	x	X	x
	d3	Help raising public awareness of the benefits of conserving intellectual property rights and scientific patents on the individuals and	x	0	x	0	x

		communities.					
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5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, a4, b2 and d1	Seventh week	3 %
Oral exam	a1, a2, a3, a4, b1, b2, b3 and c3	Fifteenth week	6 %
Practical exam	c1 to c3	sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, b1, b2, b3	seventeenth week	48 %
Total			100 %

Course matrix															
Topic	Knowledge and understanding						Intellectual skills			Practical and professional skills			General Skills		
	a 1	a 2	a 3	a 4	a 5	a 6	b1	b2	b3	c 1	c 2	c3	d 1	d 2	d 3
1. Introduction. - Introduction about soap and detergents	x												x		x
2. Anionic Surfactants. - Measurement of foam height of detergent	x							x		x	x			x	
3. Cationic Surfactants. - Measurement of foam stability of detergent	x							x		x	x			x	
4. Amphoteric Surfactants. - Measurement of foam height with temperature	x							x		x	x			x	
5. Gemini Surfactants. - Measurement of emulsion stability	x							x		x	x			x	
6. Nonionic Surfactants. - Measurement of emulsion stability with temperature	x							x		x	x		x	x	
7. Mid-Term Exam.	x	x	x	x				x			x		x		



8. Surface Active properties. - Measurement of krafft point of detergent		x					x				x			
9. Relationship between properties and chemical structure. - Measurement of cloud point of detergent		x	x				x				x		x	
10.(HLB) Hydrophilic lypophilic balance, (CMC) critical micille concentration. - Measurement of CMC of detergent				x								x		
11.Industrial applications of surfactant. - Measurement of stability of detergent in acidic media					x						x	x		x
12.Biodegradability - Measurement of stability of detergent in basic media						x						x		
13.Green natural surfactant. - Measurement of calcium stability of detergent					x					x				x
14.Revision.		x	x	x	x	x	x	x						

6- List of references:



6-1 Course notes

Lecture notes approved by Department of Chemistry.

6-2 Required books

R. J. Farn, Chemistry and Technology of Surfactants, 1st Edn, 2006.

7-3 Recommended books

1- B. Kronberg, K. Holmberg, Surface Chemistry of Surfactants and Polymers, 1st Edn, 2014.

2- M. Ash and I. Ash, Handbook of Industrial Surfactants, 3rd Edn, 2000.

3- K. R. Lange, Surfactants: A Practical Handbook, 1999.

7-4 Periodicals, Web sites, etc.

Journal of Chemical Education (ACS); *Organic Chemistry* (ACS)

http://www.public.asu.edu/~jpbirk/CHM-115_BLB/Chpt24/

<http://ocw.mit.edu/courses/chemistry/5-112-principles-of-chemical-science-fall-2005/>

<http://www.docbrown.info/page07/appendixtrans11.htm>

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

Course coordinator:

Prof.Dr.Mohammed Hussien

Dr. Ahmed Tantawy

Program coordinator:

Prof. Dr. Safinaz M. Reda

Head of the Department:

Prof. Dr. Wagdy El-DougDoug

Date:

2022-2023

Course Specification 416 Ch: Chemistry and technology of paints



A- Affiliation

Relevant program:	Special Chemistry BSc Program
Department offering the program:	Department of Chemistry
Department offering the course:	Department of Chemistry
Academic year/level:	Fourth level
Date of specifications approval:	9/12/2015 (faculty member council meeting no. 390), updated 10/ 1/2018 (Faculty council; meeting number, 419), 8/3/2023 (Faculty council; meeting number, 484).

Course coordinator:

Dr. Mohamed Abo Riya

Dr. Aml Mohammed

B - Basic information

Title: Chemistry and technology of paints	Code: 416 Ch	Year/level: Fourth level
Teaching Hours:	Lectures: 2 Practical: 3 Course marks: 100 marks	Tutorial: 0 Total: 3 h/week

C - Professional information

1 – Overall aim of the course:

This course aims to enable the students to understand the composition, Paint Formulation and different methods for prepare the paints. Also, teach students the industry methods to prepare paints, its application and its testing methods.

2 - Intended Learning Outcomes (ILOS)

a - Knowledge and understanding:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

- a.1- State the important of paints.
- a.2- Describe different types of paints.
- a.3- Outline the paint formulation.
- a.4- Know the preparation and estimation of the paint compounds.
- a.5- Define some of the current testing and application of paints.

b - Intellectual skills:

On successful completion of the course, the student should be able to.

- b.1- Discover the different types of paints.
- b.2- Report the chemical composition of paints.
- b.3- Formulate different concepts paint industry.
- b.4- Construct chemical and mechanical testing of paints.
- b.5- Compare between the different types of industrial products and its uses.

c - Practical and professional skills:

On successful completion of the course, the student should be able to:

- c1- Examine the methods to determine properties of paints.



- c2- Relate the chemical composition of this compounds.
- c3- Collect the methods to prepare the different types of paints.
- c4- Investigate the mechanical properties of drying films from paints.

d - General skills:

On successful completion of the course, the student should be able to:

- d1- Use computers and internet for information and communication technology effectively.
- d2- Solve problems on the scientific basis taught in this course.
- d3- Search for new information about the new techniques.
- d4- Discover the important of the paint industry in our life.

3 - Contents

Topic	Lecture hours	Tutorial hours	Practical hours	% of total
1. Introduction to paint industrial chemistry. - Introduction about paints preparation	2	0	3	7.14%
2. The chemical composition of paints. - Preparation of glyptal resin	2	0	3	7.14%
3. Binders and resins. - Preparation of urea formaldehyde resin	2	0	3	7.14%
4. Binders and resins. - Preparation of phenol formaldehyde resin	2	0	3	7.14%
5. Plasticizers. - Part 1: preparation of alkyd resin	2	0	3	7.14%
6. Paint Pigments. - Part 2: preparation of alkyd resin	2	0	3	7.14%
7. Mid-term exam	2	0	3	7.14%
8. Paint Additives. - Part 1: preparation of plastic coating	2	0	3	7.14%
9. Paint Additives and testing of additives. - Part 2: preparation of plastic coating	2	0	3	7.14%
10. Paint formulation. - Part 1: preparation of building coating	2	0	3	7.14%
11. Drying and film formation. - Part 2: preparation of building coating	2	0	3	7.14%
12. Paint systems. - Part 1: preparation of textile binders	2	0	3	7.14%
13. Properties and paint testing. - Part 2: preparation of textile binders	2	0	3	7.14%
14. Paint application and causes for paint failure and Revision	2	0	3	7.14%
Total hours	28	0	42	100%

4 - Teaching and Learning methods against course ILOS:



Intended Learning Outcomes			Lecture	Presentations & Movies	Discussions & Seminars	Practical	Problem solving	Brain storming
Knowledge & Understanding	a1	State the important of paints.	x	0	x	0	0	x
	a2	Describe different types of paints.	x	x	0	0	0	0
	a3	Outline the paint formulation.	x	0	x	0	X	x
	a4	Know the preparation and estimation of the paint compounds.	x	0	x	0	X	x
	a5	Define some of the current testing and application of paints.	x	0	x	0	0	x
Intellectual Skills	b1	Discover between the different types of paints.	x	0	x	0	X	x
	b2	Report the chemical composition of paints.	x	0	x	0	0	x
	b3	Formulate different concepts paint industry.	x	0	x	0	X	x
	b.4	Construct chemical and mechanical testing of paints.	x	0	x	0	x	x
	b.5	Compare between the different types of industrial products and its uses.	x	X	x	0	x	x
Practical and professional skills	c1	Examine the chemical properties of chemical compounds.	x	0	x	x	X	x
	c2	Relate the chemical composition of these compounds.	x	0	x	x	X	x
	c3	Collect the methods to prepare the different types of paints.	x	0	x	x	x	x
	c4	Investigate the mechanical properties of drying films from paints.	x	0	x	x	x	x
General Skills	d1	Use computers and internet for information and communication technology effectively.	0	0	0	X	0	x
	d2	Solve problems on the scientific basis taught in this course.	x	0	x	0	X	x
	d3	Search for new information about the new techniques.	0	0	x	0	0	x
	d4	Discover the important of the paint industry in our life.	x	0	0	0	0	x

5- Students' Assessment Methods and Grading:

Tools	To Measure	Time schedule	Grading
Semester Work	a1, a2, a3, b2, c1 and d1	Fifth week	3 %
Mid-Term Exam	a1, a2, a3, b2, , d1, and d2	Seventh week	3 %
Oral exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, and d4	fifteenth week	6 %
Practical exam	C1 to c4	sixteenth week	40%
Written exam	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5	seventeenth week	48%
Total			100 %

Course matrix



Topic	Knowledge and understanding					Intellectual skills					Practical and professional skills				General Skills			
	a 1	a 2	a 3	a 4	a 5	b 1	b 2	b 3	b 4	b 5	c 1	c 2	c 3	c 4	d 1	d 2	d 3	d 4
1. Introduction to paint industrial chemistry. - Introduction about paints preparation	x	x				x		x							x			x
2. The chemical composition of paints. - Preparation of glyptal resin	x					x	x					x	x				x	
3. Binders and resins. - Preparation of urea formaldehyde resin		x											x					
4. Binders and resins. - Preparation of phenol formaldehyde resin		x											x		x			x
5. Plasticizers. - Part 1: preparation of alkyd resin		x											x					
6. Paint Pigments. - Part 2: preparation of alkyd resin		x											x		x	x	x	x
7. Mid-term exam	x	x	x				x								x	x		
8. Paint Additives. - Part 1: preparation of plastic coating			x										x					
9. Paint Additives and testing of additives. - Part 2: preparation of plastic coating			x						x				x					
10. Paint formulation. - Part 1: preparation of building coating			x						x				x		x	x	x	
11. Drying and film formation. - Part 2: preparation of building coating				x					x				x	x				
12. Paint systems. - Part 1: preparation of textile binders				x									x			x		x
13. Properties and paint testing. - Part 2: preparation of textile binders				x							x		x		x			x
14. Paint application and causes for paint failure. - Revision					x					x					x			x



6- List of references:

6-1 Course notes

Lecture notes prepared by the course instructor(s).

6-2 Required books

- 1- Turner, G. P. A., *Introduction to Paint Chemistry*, 2d ed., Chapman and Hall, London, 1980
- 2- Wicks, Jr. Z. W, Jones R N., and Pappas S. P., *Organic Coatings, Science and Technology*, 2nd ed., Wiley-Interscience, New York, 1999.

7-5 Recommended books

- 1- Riegel's Handbook of Industrial Chemistry, 8th ed., Kent J. A. (ed.), Van Nostrand Reinhold, New York, 1983.
- 2- Surface Coatings, Volumes 1 and 2, prepared by the Oil and Color Chemists' Association, Australia, Tafe Educational Books, Randwick, Australia, 1983 and 1984.
- 3- Shreve's Chemical Process Industries, 5th ed., Austin G. T. (ed.), McGraw-Hill, New York, 1984.

<http://www.sherwin-williams.com/painting-contractors/business-builders/paint-technology-and-application/>

http://www.pra-world.com/nandl/training/courses/paint_technology

7- Facilities required for teaching and learning:

Using a microphone in lectures

Using a black board

Group Discussions

Data show

03

Course coordinator: Dr. Mohamed Abo Riya

Dr. Aml Mohammed

Program coordinator: Prof. Dr. Safinaz M. Reda

Head of the Department: Prof. Dr. Wagdy El-DougDoug

Date: 2022-2023