Specification for General Chemistry course

2019/2020

A-Affiliation

1.	**Relevant program**	Bachelor of Veterinary Medical Science (BVMSc)
2.	**Department offering the course**	Department of Chemistry, Faculty of science

Date of specification approval: ministerial decree No. 1727 on 26/4/2017
(Approved in this template by the department council on 1/10/2019**)**

B-Basic information

1.	**Course title**	General chemistry
2.	**Course code**	102(A) I
3.	**Level**	1st year
4.	**Semester**	1st semester
5.	**Total hours**	3 h /W
6.	**Lecture hours**	1 h / W
7.	**Practical hours**	2 h / W

C-Professional Information

1- Course learning objectives

This course aims to study the atomic structures, gases laws, Chemical bondings, geometrical configuration, state of matter. Also to enable the differentiate between acidic and basic radicals beside the volumetric analysis (acid-base titration) and (oxidation –reduction titration).students learn the various methods to express the concentration of solution and he can prepare standard solution. they also learn the determination of unknown concentration using acid-base titration or oxidation – reduction titration. and physical properities of the unkown liquid such as colour, odour 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 of the course (ILOs):

a- Knowledge and understanding

After successful completion of the course the students should be able to:

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 whithin the periodic table and related theories.

a.3- Define the chemical concepts of inorganic and physical chemistry.

a.4- Describe theories of chemical bonding and molecular orbital diagram for diatomic molecules .
a.5- State the principles of thermochemistry
a.6- Explain the different types of neutralization reaction in analytical chemistry
a.7- Describe the different units of concentration
a.8- Identify the requirement the primary standard solution
a.9- Describe the different types of indictors in neutralization reaction
a.10- Identify physical and chemical properties of aromatic hydrocarbons " benzene, toluene
a.11- Describe physical and chemical properties of alcohols "methanol, ethanol and glycerol".
a.12- Explain physical and chemical properties of aldehydes and ketones "formaldehyde, acetaldehyde, benzaldehyde and acetone".
a.13- Outline physical and chemical properties of carboxylic acids "formic acid, acetic acid"
a.14- State physical and chemical properties of aromatic amines "aniline"
a.15- Mention general scheme for identification of simple liquid organic compounds.

b- Intellectual skills

After successful completion of the course the students 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.
b.8- Analyse collected chemical data using some data processing skills
b.9- point out different concepts of neutralization reaction in analytical chemistry
b.10- Analyze chemical data to determine the concentration of unknown
b.11- Differentiate between the different compounds based on the recognition of the properities
b.12- Identify the compositions and chemical structures of organic compounds
b.13- Propose some reaction mechanisms for different chemical processes

c- Professional and practical skills

After successful completion of the course the students 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

c4- perform standard laboratory procedures in neutralization reactionin analytical chemistry
c5- 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 laboratory techniques
c6- report observations and measurements of change of colour of indicator in neutralization titration to determine the concentration of unknown
c7- Perform standard laboratory procedures in organic chemistry
c8- 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 laboratory techniques
c9- Examine the physical and chemical properties of compounds
c10- Report observations and results of different chemical properties

d- General and transferable skills

After successful completion of the course the students should have the following skills

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- Course contribution in the program ILOs:

Course ILOS		Program ILOS
A	**Knowledge and understanding**	a^{1}
B	**Intellectual skills**	-
C	**Professional and practical skills**	-
D	**General and transferable skills**	$d^{1,6}$

3.1- Course contents:

Topic	**Lecture hours**	**Practical hours**
Introduction	**2**	
Identify chemical formulae of inorganic		
Characteristics of different states of the matter	**2**	
Characteristics of elements including trends within the periodic table and related theories.	**2**	
Study the chemical bonding	**1**	
State the principles of electrochemistry.	**1**	
Study the molecular orbital diagram for diatomic molecules.	**1**	
Study the state of matter	**1**	
Thermochemistry study	**1**	

Stoichiometric study.	**1**	
Atomic structure	**2**	
Hybridization	**1**	
Introduction to neutralization reactions with standardization of hydrochloric acid with sodium carbonate.		**3**
Titration of strong acid with strong base and weak acid with weak base.		**2**
Titration of strong acid with weak base and weak acid with strong base.		**2**
Titration of mix(sodium carbonate and sodium hydroxide)with hydrochloric acid		**2**
Titration of mix(sodium carbonate and sodium bicarbonate)with hydrochloric acid		**3**
Titration of mix(hydrochloric acid and phosphoric acid)with sodium hydroxide.		**2**
Titration of mix(acetic acid and phosphoric acid)with sodium hydroxide.		**2**
Aromatic hydrocarbons		**2**
Alcohols		**2**
Aldehydes and ketones		**3**
Carboxylic acids		**2**
Aromatic amines		**3**
General scheme for identification of simple liquid organic compounds		**2**
Total	**15**	**30**

3.2- ILOs matrix:

Topic	A) Knowledge and understanding	B) Intellectual skills	C) Professional and practical skills	D) General and transferable skills
Introduction	a1	-	-	-
Identify chemical formulae of inorganic	a1	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Characteristics of different states of the matter	a2	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Characteristics of elements including trends within the periodic table	a2,a3	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4

and related theories.				
Study the chemical bonding	a4	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
State the principles of electrochemistry.	a4,a5	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Study the molecular orbital diagram for diatomic molecules.	a4,a5	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Study the state of matter	a2	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Thermochemistry study	a5	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Stoichiometric study.	a3,a4,a5	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Atomic structure	a4,a5	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Hybridization	a5	b1,b2,b3,b4,b5,b6	c1,c2,c3	d1,d2,d3,d4
Introduction to neutralization reactions with standardization of hydrochloric acid with sodium carbonate.	a6,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Titration of strong acid with strong base and weak acid with weak base.	a7,a8,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Titration of strong acid with weak base and weak acid with strong base.	a7,a8,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Titration of mix(sodium carbonate and sodium hydroxide)with hydrochloric acid	a7,a8,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Titration of	a7,a8,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4

mix(sodium carbonate and sodium bicarbonate)with hydrochloric acid				
Titration of mix(hydrochloric acid and phosphoric acid)with sodium hydroxide.	a7,a8,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Titration of mix(acetic acid and phosphoric acid)with sodium hydroxide.	a7,a8,a9	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Aromatic hydrocarbons	a10	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Alcohols	a11	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Aldehydes and ketones	a12	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Carboxylic acids	a13	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
Aromatic amines	a14	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4
General scheme for identification of simple liquid organic compounds	a15	b7,b8,b9,b10,b11	c4,c5,c6,c7,c8,c9,c10	d1,d2,d3,d4

4- Teaching, learning and assessment methods:

ILOs		Teaching and Learning methods							assessment method				
		L	P&M	D&S	T	Ps	Bs	R and R	semester	midterm	practical	oral	written
Knowledge and understanding	a1	x	0	x	0	0	x	0	x	x	0	x	x
	a2	x	0	0	0	0	0	0	x	x	0	x	x
	a3	x	x	x	0	0	x	x	x	x	0	x	x
	a4	x	x	x	0	0	x	0	x	0	0	x	x
	a5	x	0	0	0	0	x	0	x	0	0	x	x
	a6	x	x	x	x	0	x	0	x	x	0	x	x
	a7	x	x	x	x	x	x	x	x	x	0	x	x
	a8	x	x	x	x	0	x	0	x	x	0	x	x
	a9	x	x	x	x	0	x	x	x	0	0	x	x
	a10	0	0	x	x	0	x	0	x	0	0	x	x
	a11	0	0	x	x	0	x	0	x	0	0	x	x
	a12	0	0	x	x	x	x	0	x	0	0	x	x

	a13	0	0	x	x	x	x	0	x	0	0	x	x
	a14	0	0	x	x	0	x	0	x	0	0	x	x
	a15	0	0	x	x	x	x	0	x	0	0	x	x
Intellectual skills	b1	x	x	x	0	x	x	x	x	x	0	x	x
	b2	x	0	x	0	x	x	x	x	x	0	x	x
	b3	x	x	x	0	x	x	x	x	x	0	x	x
	b4	x	x	x	0	x	x	x	x	x	0	x	x
	b5	x	x	x	0	x	x	x	x	0	0	x	x
	b6	x	x	x	0	x	x	x	x	0	0	x	x
	b7	x	x	x	0	x	x	x	x	x	0	x	x
	b8	0	x	x	x	x	x	x	x	x	0	x	x
	b9	x	x	x	x	x	x	x	x	x	0	x	x
	b10	0	x	x	x	x	x	x	x	0	0	x	x
	b11	0	0	x	x	x	x	x	x	0	0	x	x
	b12	0	0	x	x	x	x	x	x	0	0	x	x
	b13	0	0	x	x	x	x	x	x	0	0	x	x
Professional and practical skills	c1	x	0	x	0	x	x	0	0	0	x	x	x
	c2	x	0	x	0	x	x	0	0	0	x	x	x
	c3	x	x			x		0	0	0	x	x	x
	c4	0	x	x	x	0	x	0	0	0	x	x	x
	c5	0	x	x	x	0	x	0	0	0	x	x	x
	c6	0	0	x	x	x	x	0	0	0	x	x	x
	c7	0	0	x	x	x	x	0	0	0	x	x	x
	c8	0	0	x	x	x	x	0	0	0	x	x	x
	c9	0	0	x	x	x	x	0	0	0	x	x	x
	c10	0	0	x	x	x	x	0	0	0	x	x	x
General skills	d1	x	0	0	0	0	x	x	x	x	0	x	0
	d2	x	0	x	0	x	x	x	x	x	0	x	0
	d3	x	0	x	0	0	x	x	x	0	0	x	0
	d4	x	0	0	0	0	x	x	x	0	0	x	0

L **:Lecture,** P&M**: Presentations & Movies,** D&S: **Discussions & Seminars PT: Practical training,** Ps: **Problem solving,** Bs: **Brain storming**

5- Assessment timing and grading:

Assessment method	timing	grade
Mid-term exam	6th week	15
Practical exam	14th week	20
oral exam	End of semester	15
Written exam	End of semester	50
total		100

6- List of references

6.1- Course notes: Lecture notes approved by Chemistry Department

6.2- Essential books (text books)

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

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

6.3- Recommended books

- F.A. Cotton, G. Wilkinson, C.A.Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th Edn, John Wiley&Sons, Inc., New York, 1999.
- N.N. Greenwood, A. EarnShaw, Chemistry of Elements,2nd Edn, Butterworth Heinemann, USA 1997.

6.4- Periodicals, Web sites, . . . etc

- Journal of Chemical Education (ACS).
- http://www.docbrown.info/page07/appendixtrans11.htm.
- www.ekb.eg.

7- Facilities required for teaching and learning

- Data show.
- Laboratory.
- White board.

Course coordinator: Prof. Dr. WAGDI ELDOGDOG

Head of department Prof. Dr. ALA AMIN

Date 1/10/2019