



## Course Specification

**Course Title:** Metals & non metals chem.

**Code:** Chem.271

**Program (s) on which the course is given:** Chemistry

**Major or minor element of Program** : Single  Double

**Department offering the program** : Chemistry

**Department offering the Course** : Chemistry

**Academic:** Year  2<sup>nd</sup> Level  1<sup>st</sup>

## A. Basic Information:

<b>Academic year : 2<sup>nd</sup></b>	<b>Course Title: Metals &amp; non metals chem.</b>	<b>Code: Chem. 271</b>	
<b>Lecture: 4</b>	<b>Practical: 3</b>	<b>Tutorial: 1</b>	<b>Total: 7</b>

### 1- Course Aims

The course aims to provide student with knowledge and understanding into:

- 1- Develop wide background in knowledge related to of physico-chemical properties, reactions, structure, synthesis and industrial applications of representative elements and their compounds.
- 2- Utilize chemistry facts and theories to analyze and interpret practical data.
- 3- Apply their chemical knowledge and skills to solve theoretical and practical problems in chemistry.
- 4- Assess risks and work safely in the laboratory.

### 2. Intended learning outcomes of course (ILOs):

<b>(a) Knowledge and Understanding</b>	<b>a1</b> Explain the important chemical concepts, principles, techniques and theories across a wide range of for formation and synthesis of different inorganic molecules. <b>a2.</b> Describe the relation between properties of elements and their compounds. <b>a3.</b> Illustrate the essential knowledge of the principles, procedures and techniques used in chemical analysis, characterization and structural investigations of different chemical compounds. <b>a6.</b> Explain the theories on which practice and measurements in chemistry are based and method applied for interpreting and analyzing data. <b>a8.</b> Describe the main characteristics of the elements, including trends within the periodic table and the related theories.
<b>(b) Intellectual skill</b>	<b>b2.</b> Differentiate between the different elements and compounds based on the recognition and quantification of the properties. <b>b5.</b> Analyze chemical data to identify and confirm the chemical structures as well as chemical composition. <b>b8.</b> Select the computational software's and data processing skills in handling of chemical information and analysis of chemical data.
<b>(c) Professional</b>	<b>C1.</b> Report on the investigated data, using appropriate techniques and

<b>and practical skills</b>	<p>considering scientific guidance.</p> <p><b>c5.</b> Solve problems using a range of formats and approaches.</p> <p><b>c7.</b> Use different laboratory instruments used in determining various physical properties such as viscosity, density .</p>
<b>(d) General and transferable skill</b>	<p><b>d1.</b> Use information and communication technology effectively for reviewing certain scientific topic and preparing scientific presentation.</p> <p><b>d2.</b> Think independently, set tasks and solve problems on scientific basis, relating to qualitative and quantitative information.</p> <p><b>d3.</b> Work in a team effectively and communicate with others positively.</p>

### 3. Contents

Week	Topic	NO of Lecture	Practical	No of Hours
1-3	<p>Principles of qualitative analysis some general aspects of volumetric analysis.</p> <p>Volumetric methods of analysis- neutralization reaction.</p> <p>Neutralization curves.</p> <p>Neutralization of a weak poly basic acid with a strong base.</p> <p>Redoximetry including iodo and iodi-metry.</p>	4	3	7
4-6	<p>Precipimetry.</p> <p>Complex formations titrations.</p> <p>Equilibria involved in EDTA titration.</p> <p>Types of EDTA titration.</p> <p>Masking by complexation and demasking.</p>	4	3	7
7-9	<p>Hydrogen.</p> <p>Group (I): Alkali metals.</p> <p>Group (II): Alkaline earth metals.</p> <p>Group (III): Boron, aluminum, gallium, indium and thallium.</p> <p>Group (IV): Carbon, silicon,</p>	4	3	7

	germanium, tin and lead.			
9-12	Group (V): Nitrogen, phosphorus, arsenic, antimony and bismuth. Group (VI): Oxygen, sulphur, selenium, tellurium and polonium. Group (VII): The halogens. Group (zero): The noble gases	2		2

#### 4. Teaching and learning methods

- 1- Lectures.
- 2- Practical sessions.
- 3- Tutorials.
- 4- Office meeting.

#### 5- Student assessment

<b>5.1. Methods</b>	5.1.1. Written exam .
	5.1.2. Oral
	5.1.3. Practical
	5.1.4. Semester work
<b>5.2. Assessment schedule</b>	5.2.1. Final exam at the end of term. 5.2.2. Oral exam at the end of term. 5.2.3. Final practical exam at the end of term. 5.2.4. Semester work during the term.
<b>5.3. Weighting of assessments</b>	Final Examination (60 %)
	Oral Examination (6 %)
	Practical Examination (20 %)
	Semester Work (14 %)

#### 6. List of references

<b>6.1. Course Note (if available)</b>	<b>course note</b>
<b>6.2. Recommended Text Book</b>	Physical Chemistry, G. Barrow, 6th ed., 2011, McGraw-Hill Com

## 7. Matrix between chemistry program specification ILOs and ILOs of Course

Knowledge & understanding		Intellectual skills		Professional practical skills		General & transferable skills	
ILOs of Course	ILOs of Program	ILOs of Course	ILOs of Program	ILOs of Course	ILOs of Program	ILOs of Course	ILOs of Program
a1	A1	b1	B2	c1	C1	d1	D1
a2	A2	b2	B5	c2	C5	d2	D2
a3	A3	b3	B8	c3	C7	d3	D3
a4	A6						
a5	A8						

Course coordinator :

Head of Department

<b>Course content</b>	<b>Week (s) No.</b>	<b>A knowledge and Understanding Skills</b>	<b>Intellectual Skills</b>	<b>Professional skills</b>	<b>General skills</b>
Principles of qualitative analysis some general aspects of volumetric analysis. Volumetric methods of analysis- neutralization reaction. Neutralization curves. Neutralization of a weak poly basic acid with a strong base. Redoximetry including iodo and iodi-metry. Precipimetry. Complex formations titrations. Equilibria involved in EDTA titration. Types of EDTA titration. Masking by complexation and demasking.	<b>1-6</b>	<b>a1,a2,a3,a4</b>	<b>b1,b2</b>	<b>c1,c2,c3</b>	<b>d1</b>
Hydrogen. Group (I): Alkali metals. Group (II): Alkaline earth metals. Group (III): Boron, aluminum, gallium, indium and thallium. Group (IV): Carbon, silicon, germanium, tin and lead. Group (V): Nitrogen, phosphorus, arsenic, antimony and bismuth. Group (VI): Oxygen, sulphur, selenium, tellurium and polonium. Group (VII): The halogens. Group (zero): The noble gases	<b>7-12</b>	<b>a1,a4,a5</b>	<b>b1,b3</b>	<b>c1,c2,c3</b>	<b>d1,d2,d3</b>