



-5 Course Specification of General Pharmaceutical Chemistry

I. Course Identification and General Information:						
1	Course Title	General Pharmaceutical Chemistry				
2	Course Number & Code:	Ph511				
3	Credit hours:	C.H				Total
		Th.	Pr.	Tr.	Seminar.	
		2	2			3
4	Study level/ semester at which this course is offered:	1 st level /1 st semester				
5	Pre –requisite (if any):					
6	Co –requisite (if any):	-				
7	Program (s) in which the course is offered:	Bachelor of pharmacy				
8	Language of teaching the course:	English				
	The department in which the course is offered:	Department of Medicinal Chemistry, Pharmaceutical Organic and Analytical Chemistry				
9	Location of teaching the course:	Faculty of Pharmacy-Sana`a University				
10	Prepared by:	Dr. Mokhtar Al-Ghorafy				
11	Date of approval:					

II. Course description:

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إ.د. هدى العماد

عميد الكلية
إ.د. خالد الشوبه

وحدة ضمان الجودة
رئيس الجامعة
إ.د. محمود البريهي
القاسم محمد عباس



The course is concerned with the fundamental knowledge of chemistry, of chemical and physical properties of the elements, bonds, compounds and chemical reactions, kinetics, equilibrium, acidity basicity and methods of qualitative analysis.

III. Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the state of matter and units of measurements.
2. Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory
3. Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them
4. Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.
5. Recognize the importance of chemistry to human body.
6. Classify chemical reactions according to their rates and energy.
7. Predict structure, bonding and trends in the behavior of matter using the atomic theory.
8. Differentiate the bonding types, atomic structure, and geometrical shape of molecules.
9. Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Operate different equipment used in the lab
12. Prepare some inorganic compounds and Calculate the concentrations and pH of solutions
13. Carry out the separation and qualitative analysis of some mixtures of components and ions.
14. Communicate and cooperate effectively with his colleagues and other specialist.
15. Implement writing and presentation skills
16. Work effectively in a team to perform the required tasks.
17. Demonstrate creativity and time management.

IV. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

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Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.			
Program Intended Learning Outcomes (Sub- PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
A1-	Recognize the principles of physical, chemical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Recognize the state of matter and units of measurements.
		a2-	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory
		a3-	Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them.
		a4-	Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.
		a5-	Recognize the importance of chemistry in human body.
Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
a1-	Recognize the state of matter and units of measurements.		Oral Exam, Quizzes, Attendance,



a2-	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory	Lecture method , group discussion, brain storming and tutorial	Participation, Short answers, reports, homework, and Written exam.
a3-	Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them.		
a4-	Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.		
a5-	Recognize the importance of chemistry in human body.		

(B) Intellectual Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **Intellectual skills**

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students would be able to:		After participating in the course, students would be able to:	
B1-	Consolidate the chemical, biochemical and physiological principles to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamic profiles of the drug.	b1-	Classify chemical reactions according to their rates and energy.
		b2-	Predict structure, bonding and trends in the behavior of matter using the atomic theory.
B2-	Categorize the synthetic and natural drugs according to their mechanism of action,	b3-	Differentiate the bonding types, atomic structure, and geometrical shape of molecules.

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systemic effect, therapeutic uses, contraindication and toxicity.	b4-	Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.
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Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:		
<i>Course Intended Learning Outcomes (CILOs) in Intellectual Skills.</i>	Teaching strategies/methods to be used.	<i>Methods of assessment</i>
After participating in the course, students would be able to:		
b1- Classify chemical reactions according to their rates and energy.	Lecture method, Computer based teaching and learning Group Discussion, Problem solving sessions, Brain Storming	Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam.
b2- Predict structure, bonding and trends in the behavior of matter using the atomic theory.		
b3- Differentiate the bonding types, atomic structure, and geometrical shape of molecules.		
b4- Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.		

(C) Professional and Practical Skills.

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills	
Program Intended Learning Outcomes (Sub- PILOs) in Professional and Practical Skills	Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills
After completing this program, students would be able to:	After participating in the course, students would be able to:

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C2-	Handle and dispose chemicals and pharmaceutical preparations including radiopharmaceuticals safely and effectively.	c1-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
C5-	Conduct research studies and utilize the results in different pharmaceutical fields.	c2-	Operate different equipment used in the lab
		c3-	Prepare some inorganic compounds and calculate the concentrations and pH of solutions
		c4-	Carry out the separation and qualitative analysis of some mixtures of components and ions.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used	Methods of assessment
c1-	Handle and dispose the chemical and pharmaceutical preparations safely and effectively.	Lecture method, Practical sessions and group discussion	Practical works, homework, practical exam and practical reports.
c2-	Operate different equipment used in the lab		
c3-	Prepare some inorganic compounds and Calculate the concentrations and pH of solutions		
c4-	Carry out the separation and qualitative analysis of some mixtures of components and ions.		

(D) General / Transferable Skills:

Alignment Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: **General and Transferable skills**

Program Intended Learning Outcomes (PILOs) in General / Transferable skills	Course Intended Learning Outcomes (CILOs) in General / Transferable skills
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After completing this program, students would be able to:		After participating in the course, students would be able to:	
D3-	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d1-	Communicate and cooperate effectively with his colleagues and other specialists.
		d2-	Implement writing and presentation skills
D5-	Apply information and communication technology and working effectively in a team.	d3-	Work effectively in a team to perform the required tasks.
		d4-	Demonstrate creativity and time management

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods.

Course Intended Learning Outcomes (CILOs) in General and Transferable Skills After participating in the course, students would be able to:		Teaching strategies/methods to be used.	Methods of assessment
d1-	Communicate and cooperate effectively with his colleagues and other specialist to engage in teamwork planning and team processes.	Small group discussions, Tutorials, Self and Independent learning	Homework, and reports.
d2-	Implement writing and presentation skills.		
d3-	Work effectively in a team.		
d4-	Demonstrate creativity and time management		

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Atomic and Electronic Structure	a1, a5, b2, d1-4	Introduction to Chemistry: Matter: Classification, state of matters, properties	1	2



			of matters, Measurements, units of measurements Focus on the Human Body: The Elements of life esis, metabolism,		
2	Atoms, Molecules, and Ions	a2, a5,b2, b3, d1-4	Atoms, Molecules, and Ions: The Atomic Theory, The Structure of the Atom ,Atomic Number, Mass Number, Isotopes, The Periodic Table Molecules and molecular compounds, Ions and ionic compounds, Chemical Formulas, Naming Compounds Life Focus on Health & Medicine: Isotopes in Medicine	1	2
3	Basic Concepts of Chemical Bonding:	a2, a5,b2, b3, d1-4	Basic concepts of chemical bonding: Chemical bonds, Lewis symbols, and the Octel Rule Ionic bonding, Covalent bonding, bond polarity and electronegativity, Lewis structure, Exception to the octel rule, Strengths of covalent bond. Electronegativity and Bond Polarity ,Polarity of Molecules .Focus on Health & Medicine: Covalent Drugs and Medical Product.	2	4
4	Ionic Compounds	a2, a5, b2, d1-4	Ionic Compounds Introduction to Bonding . Ions - Cations and Anions -Relating Group Number to Ionic Charge for Main Group Elements. -Metals with Variable Charge . -Focus on the Human Body: Important Ions in the Body .	1	2
5	Molecular Geometry , Bonding Theory	a2, a5, b3, d1-4	Molecular geometry , bonding theory and hybridization : Molecular shapes, Molecular shape and molecular polarity, Covalent bonding and orbital overlap, Hybrid orbitals, multiple bonds, molecular	1	2



			orbitals , application of molecular orbitals in drug interaction		
6	Thermochemistry:	a4, b1, d1-4	Thermochemistry: Energy Changes, Reaction Rates, and Equilibrium Energy -The Units of Energy	1	2
7	Mid Exam	a1-5, b1-3		1	2
8	Equilibrium	a3, a5, b4, c3, d1-4	-Focus on the Human Body: Energy and Nutrition Reaction Rates -How Concentration and Temperature Affect Reaction Rate -Catalysts -Focus on the Human Body: Lactase, a Biological Catalyst - Focus on the Environment: Catalytic Converters Equilibrium -The Equilibrium Constant -The Magnitude of the Equilibrium Constant -Calculating the Equilibrium Constant -Le Châtelier's Principle -Concentration Changes -Temperature Changes -Pressure Changes Focus on the Human Body: Body Temperature	1	2
9	Solutions	a4, a5, b4, c3, d1-4	Solutions Introduction Solubility—General Features -Basic Principles -Ionic Compounds—Additional Principles Solubility—Effects of Temperature and Pressure	1	2



			-Temperature Effects -Pressure Effects Concentration Units—Molarity -Dilution Osmosis and Dialysis -Osmotic Pressure -Focus on the Human Body: Osmosis and Biological Membranes -Focus on Health & Medicine: Dialysis		
10	Chemical Kinetics, Introduction, Reaction	a3, b1	Chemical kinetics, introduction, reaction rates, rate laws, concentration and time(half-lives), transition states, effect of temperature on reaction rate, catalysts	2	4
11	Acids and Bases	a4, a5, b4, c3, d1-4	Acids and Bases Introduction to Acids and Bases -Brønsted–Lowry Acids -Brønsted–Lowry Bases -Relating Acid and Base Strength -Using Acid Strength to Predict the Direction of Equilibrium Equilibrium and Acid Dissociation Constants Dissociation of Water The pH Scale -Calculating pH -Calculating pH Using a Calculator Focus on the Human Body: The pH of Body Fluids	2	4
12	Revision	a1-5, b1-4		1	2
13	Final Exam	a1-5, b1-4		1	2
Number of Weeks /and Units Per Semester				16	32

b - Practical Aspect

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Order	Tasks/ Experiments	CILOs (symbols)	Number of Weeks	Contact Hours
1	Lab. precautions and Safety practices in the chemistry Laboratory equipment	c1,c2	2	4
2	Identification of inorganic chemical substances by qualitative methods	c1,c2, c4	6	12
6	Mid-Exam	c1,c2, c4,	1	2
7	Preparations. a) Ferrous ammonium sulphate. b) Potassium trioxalato chromate(III) c) Tetraamminecopper(II) Sulphate. d) Microcosmic salt	c1,c2,c3.	3	6
8	Acidimetry Alkalimetry a) Estimation of sodium hydroxide – standard sodium carbonate. b) Estimation of Oxalic acid – standard Oxalic acid.	c1,c2,c3,d1,d4	3	6
16	Final Exam	c1-4	1	2
Number of Weeks /and Units Per Semester			16	32

VI. a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam
Practical works, practical exam and practical reports.

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VII. Assignments:				
No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a2, a5, b1-4, d1-4	Sporadic through the semester	10
2	Reports	a1a5 ,b1, b2,c1-4, d1-4		

III. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Attendance, Participation, reports and quizzes	All Weeks	10	7%	a1,a3,a4,b1,b4, d1-4
	Oral Tests and Homework-assignments	Sporadic through the semester	10	7%	a2, a5, b1-4, , d1-4
2	Practical Reports and Practical mid-semester exam	8 th	30	20%	c1-4
3	Theoretical mid-semester exam	9 th	30	20%	a1-5, b1, b2, b3
5	Final Exam (theoretical)	16 th	50	33%	a1-5, b1-4
6	Final Exam (practical)	16 th	20	13%	c1-4
	Total		150	100%	



I. Students' Support:	
Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

II. Learning Resources:	
1- Required Textbook(s) (maximum two).	
	1. J. W. Solomon's, 2008 "Organic Chemistry" 9th Ed., John Wiley, New York. 2. J.D. Brady, 2000, General Chemistry Principles & Structures, 7 th Edition, John Wiley & Sons, New York.
2- Recommended Books and Reference Materials.	
	1- G.S. Thorpe, (2001), A.P.Chemistry, Third Edition, Hunory Minds Inc, New York. 2- W. S. Warren, (2001), The Physical Basis of Chemistry, Second Edition, Princeton, Harcourt Academic Press. 3- R. Brent,(1960) The Golden Book of Chemistry Experiments How To Set Up a Home Laboratory- Over 200 Simple Experiments. Golden Press Inc, New York. 4- Lectures Notes and Practical Manual.
3- Electronic Materials and Web Sites etc.	
	-1- www.chem.duke.edu/~wwarren 2- www.cliffsnotes.com 3- http://www.cem.msu.edu/%7Ereusch/VirtualText/intro1.htm

III. Facilities Required:	
1 - Accommodation:	<ul style="list-style-type: none"> - Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.



2 - Computing resources:	- Computer laboratory with internet facilities.
IV. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	
	<ul style="list-style-type: none"> Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	<ul style="list-style-type: none"> Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	<ul style="list-style-type: none"> Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	<ul style="list-style-type: none"> Checking of a sample of students' work by an independent faculty member. Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for Periodically Reviewing of Course Effectiveness and Planning for Improvement	
	<ul style="list-style-type: none"> Student rating and feedback Peer rating and feedback



	<ul style="list-style-type: none">Regular meeting of the Curriculum Committee of the faculty.
6- Course Development Plans	
	<ul style="list-style-type: none">Conducting regular workshops for the staff for improving their course specification skills.Regular revision of course specification and syllabus items.

VIII. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to -----

1	Class Attendance: <ul style="list-style-type: none">Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	Tardy: <ul style="list-style-type: none">- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	Exam Attendance/Punctuality: <ul style="list-style-type: none">Exam attendance is obligatory unless being excused by the department and faculty.Absence from assignments or exams will be dealt with according to the general policy of the university.
4	Assignments & Projects: <ul style="list-style-type: none">Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.Projects: Not applicable.
5	Cheating: <ul style="list-style-type: none">Punishment of cheating will be according to the general policy of the university in this respect.
6	Plagiarism: <ul style="list-style-type: none">Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	Other policies:



- General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of General Pharmaceutical Chemistry

I- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Mokhtar A. Al-Ghorafy	Office Hours					
Location & Telephone No.	770010749	SAT	SUN	MON	TUE	WED	THU
E-mail	Alghorafi2030@yahoo.com	2h					

II- Course Identification and General Information:						
1-	Course Title:	General Pharmaceutical Chemistry				
2-	Course Number & Code:	Ph511				
3-	Credit hours:	C.H			C.H	
		Th.	Seminar	Pr.	F. Tr.	Th.
		2		2		2

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4-	Study level/year at which this course is offered:	1 st Level / 2 nd semester
5-	Pre –requisite (if any):	-
6-	Co –requisite (if any):	-
7-	Program (s) in which the course is offered	Bachelor of pharmacy
8-	Language of teaching the course:	English
9-	System of Study:	Semesters
10-	Mode of delivery:	Regular
11-	Location of teaching the course:	Faculty of Pharmacy- Sana`a university

III- Course description:

The course is concerned with the fundamental knowledge of chemistry, of chemical and physical properties of the elements, bonds, compounds and chemical reactions, kinetics, equilibrium, acidity basicity and methods of qualitative analysis.

IV- Intended learning outcomes (ILOs) of the course:

At the end of this course the students should be able to:

1. Recognize the state of matter and units of measurements.
2. Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure and Basic concepts of chemical bonding in addition to Molecular geometry and bonding theory
3. Illustrate the Chemical Equilibrium, kinetics, reaction and the factors affecting them
4. Demonstrate the basic concepts of thermodynamics, solutions and acidity and basicity.
5. Recognize the importance of chemistry to human body.
6. Classify chemical reactions according to their rates and energy.
7. Predict structure, bonding and trends in the behavior of matter using the atomic theory.

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8. Differentiate the bonding types, atomic structure, and geometrical shape of molecules.
9. Distinguish between acids and bases and compare the factors affecting the equilibrium and solubility.
10. Handle and dispose the chemical and pharmaceutical preparations safely and effectively.
11. Operate different equipment used in the lab
12. Prepare some inorganic compounds and Calculate the concentrations and pH of solutions
13. Carry out the separation and qualitative analysis of some mixtures of components and ions.
14. Communicate and cooperate effectively with his colleagues and other specialist.
15. Implement writing and presentation skills
16. Work effectively in a team to perform the required tasks.
17. Demonstrate creativity and time management.

V- Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Week Due	Contact hours
1	Atomic and Electronic Structure	a1, a5, b2, d1-4	Introduction to Chemistry: Matter: Classification, state of matters, properties of matters, Measurements, units of measurements Focus on the Human Body: The Elements of life esis, metabolism,	1	2
2	Atoms, Molecules, and Ions	a2, a5,b2, b3, d1-4	Atoms, Molecules, and Ions: The Atomic Theory, The Structure of the Atom ,Atomic Number, Mass Number, Isotopes, The Periodic Table Molecules and molecular compounds, Ions and ionic compounds, Chemical Formulas, Naming Compounds Life Focus on Health & Medicine: Isotopes in Medicine	2	2

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3	Basic Concepts of Chemical Bonding:	a2, a5,b2, b3, d1-4	Basic concepts of chemical bonding: Chemical bonds, Lewis symbols, and the Octet Rule Ionic bonding, Covalent bonding, bond polarity and electronegativity, Lewis structure, Exception to the octet rule, Strengths of covalent bond. Electronegativity and Bond Polarity ,Polarity of Molecules .Focus on Health & Medicine: Covalent Drugs and Medical Product.	3,4	4
4	Ionic Compounds	a2, a5, b2, d1-4	Ionic Compounds Introduction to Bonding . Ions - Cations and Anions -Relating Group Number to Ionic Charge for Main Group Elements. -Metals with Variable Charge . -Focus on the Human Body: Important Ions in the Body .	5	2
5	Molecular Geometry , Bonding Theory	a2, a5, b3, d1-4	Molecular geometry , bonding theory and hybridization : Molecular shapes, Molecular shape and molecular polarity, Covalent bonding and orbital overlap, Hybrid orbitals, multiple bonds, molecular orbitals , application of molecular orbitals in drug interaction	6	2
6	Thermochemistry:	a4, b1, d1-4	Thermochemistry: Energy Changes, Reaction Rates, and Equilibrium Energy -The Units of Energy	7	2
7	Mid Exam	a1-5, b1-3		8	2
8	Equilibrium	a3, a5, b4, c3, d1-4	-Focus on the Human Body: Energy and Nutrition Reaction Rates	9	2



			<ul style="list-style-type: none"> -How Concentration and Temperature Affect Reaction Rate -Catalysts -Focus on the Human Body: Lactase, a Biological Catalyst - Focus on the Environment: Catalytic Converters Equilibrium -The Equilibrium Constant -The Magnitude of the Equilibrium Constant -Calculating the Equilibrium Constant -Le Châtelier's Principle -Concentration Changes -Temperature Changes -Pressure Changes Focus on the Human Body: Body Temperature 		
9	Solutions	a4, a5, b4, c3, d1-4	<ul style="list-style-type: none"> Solutions Introduction Solubility—General Features -Basic Principles -Ionic Compounds—Additional Principles Solubility—Effects of Temperature and Pressure -Temperature Effects -Pressure Effects Concentration Units—Molarity -Dilution Osmosis and Dialysis -Osmotic Pressure -Focus on the Human Body: Osmosis and Biological Membranes -Focus on Health & Medicine: Dialysis 	10	2



10	Chemical kinetics, introduction, reaction	a3, b1	Chemical kinetics, introduction, reaction rates, rate laws, concentration and time(half-lives), transition states, effect of temperature on reaction rate, catalysts	11,12	4
11	Acids and Bases	a4, a5, b4, c3, d1-4	Acids and Bases Introduction to Acids and Bases -Brønsted–Lowry Acids -Brønsted–Lowry Bases -Relating Acid and Base Strength -Using Acid Strength to Predict the Direction of Equilibrium Equilibrium and Acid Dissociation Constants Dissociation of Water The pH Scale -Calculating pH -Calculating pH Using a Calculator Focus on the Human Body: The pH of Body Fluids	13,14	4
12	Revision	a1-5, b1-4		15	2
13	Final Exam	a1-5, b1-4		16	2
Number of Weeks /and Units Per Semester				16	32

b - Practical Aspect				
Order	Tasks/ Experiments	CILOs (symbols)	Week Due	Contact Hours
1	Lab. precautions and Safety practices in the chemistry Laboratory equipment	c1,c2	1, 2	4

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2	Identification of inorganic chemical substances by qualitative methods	c1,c2, c4	3-8	12
6	Mid-Exam	c1,c2, c4,	9	2
7	Preparations. a) Ferrous ammonium sulphate. b) Potassium trioxalato chromate(III) c) Tetraamminecopper(II) Sulphate. d) Microcosmic salt	c1,c2,c3.	10-12	6
8	Acidimetry Alkalimetry a) Estimation of sodium hydroxide – standard sodium carbonate. b) Estimation of Oxalic acid – standard Oxalic acid.	c1,c2,c3,d1,d4	13-15	6
16	Final Exam	c1-4	16	2
Number of Weeks /and Units Per Semester			16	32

VI- a-Teaching strategies of the course:

Lecture method, computer based teaching and learning group discussion, brainstorming and Problem solving sessions, tutorial, Practical sessions and group discussion

b- Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, homework, and Written exam
Practical works, practical exam and practical reports.

VII- Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a2, a5, b1-4,d1-4	Sporadic through the semester	10
2	Reports	a1a5 ,b1, b2,c1-4,d1-4		

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VIII-Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	Attendance, Participation, reports and quizzes	All Weeks	10	7%	a1,a3,a4,b1,b4,d1-4
	Oral Tests and Homework-assignments	Sporadic through the semester	10	7%	a2, a5, b1-4, , d1-4
2	Practical Reports and Practical mid-semester exam	8 th	30	20%	c1-4
3	Theoretical mid-semester exam	9 th	30	20%	a1-5, b1, b2, b3
5	Final Exam (theoretical)	16 th	50	33%	a1-5, b1-4
6	Final Exam (practical)	16 th	20	13%	c1-4
Total			150	100%	

V. Students' Support:

Office Hours/week	Other Procedures (if any)
Two contact hours per week	None

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القاسم محمد عباس



VI. Learning Resources:	
1- Required Textbook(s) (maximum two).	
	1. J. W. Solomon's, 2008 "Organic Chemistry" 9th Ed., John Wiley, New York. 2. J.D. Brady, 2000, General Chemistry Principles & Structures, 7 th Edition, John Wiley & Sons, New York.
2- Recommended Books and Reference Materials.	
	5- G.S. Thorpe, (2001), A.P.Chemistry, Third Edition, Hunory Minds Inc, New York. 6- W. S. Warren, (2001), The Physical Basis of Chemistry, Second Edition, Princeton, Harcourt Academic Press. 7- R. Brent,(1960) The Golden Book of Chemistry Experiments How To Set Up a Home Laboratory- Over 200 Simple Experiments. Golden Press Inc, New York. 8- Lectures Notes and Practical Manual.
3- Electronic Materials and Web Sites etc.	
	-1- www.chem.duke.edu/-wwarren 2- www.cliffsnotes.com 3- http://www.cem.msu.edu/%7Ereusch/VirtualText/intro1.htm
VII. Facilities Required:	
1 - Accommodation:	- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	- Computer laboratory with internet facilities.
VIII. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	<ul style="list-style-type: none"> ▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).



7- Other strategies for evaluation of teaching by the instructor or by the department.	
	<ul style="list-style-type: none">Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester.Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for Improvement of Teaching.	
	<ul style="list-style-type: none">Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions.Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for Verifying Standards of Students' Achievement	
	<ul style="list-style-type: none">Checking of a sample of students' work by an independent faculty member.Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution.Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments).Regular follow-up of laboratory logbooks to assess the practical achievement of students.
10- Procedures for Periodically Reviewing of Course Effectiveness and Planning for Improvement	
	<ul style="list-style-type: none">Student rating and feedbackPeer rating and feedbackRegular meeting of the Curriculum Committee of the faculty.
6- Course Development Plans	
	<ul style="list-style-type: none">Conducting regular workshops for the staff for improving their course specification skills.Regular revision of course specification and syllabus items.



IX. Course Policies: (including plagiarism, academic honesty, attendance etc)

The University Regulations on academic misconduct will be strictly enforced. Please refer to -----

1	Class Attendance: <ul style="list-style-type: none">Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	Tardy: <ul style="list-style-type: none">Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	Exam Attendance/Punctuality: <ul style="list-style-type: none">Exam attendance is obligatory unless being excused by the department and faculty.Absence from assignments or exams will be dealt with according to the general policy of the university.
4	Assignments & Projects: <ul style="list-style-type: none">Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator.Projects: Not applicable.
5	Cheating: <ul style="list-style-type: none">Punishment of cheating will be according to the general policy of the university in this respect.
6	Plagiarism: <ul style="list-style-type: none">Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	Other policies: <ul style="list-style-type: none">General policies of the Students' Affairs of the University and the Quality Assurance Unit.