CHEM1301	General Chemistry (1)						
Course type	College Needs	Level	1	hours (theoretical)	3	hours (practical)	0

Course Objectives

1 - 1. To become familiar with the scope, methodology, and application of modern chemistry and to learn to appreciate its ability to explain the physical world.

2 - 2. To understand that all matter consists of atoms, and that the limitless variety observed around us stems from the ways that these atoms bond with one another.

3 - 3. To learn problem solving and learning to interpret the data, to employ valid and efficient methods of analysis, and to assess whether or not the results of calculations are reasonable.

4 - 4. To learn the principles of atomic and molecular theory, stoichiometry, and thermodynamics.

5 - 5. To generalize the analytical and quantitative skills gained in this course and to apply them in more advanced courses and throughout ones career.

Intended Learning Outcomes

Knowledge and Understanding

* 1. Be able to know how the atoms are arranged in molecules and ions
* 2. Be able to name chemical compounds
* 3. Be able to balance chemical equations and use variety of problems
* 4. Be able to know properties of solution
* 5. Be able to know Energy changes with reactions
* 6. Be able to describe the electronic structure of atoms
* 7. Be able to know the properties of elements in the periodic table
* 8. Be able to differentiate between types of bonds
* 9. Be able to determine 3D shapes of molecules
* 10. Knowledge of properties and behavior of Gases

Course Contents

1 - The first chemistry course begins with topics such as the mole concept, stoichiometric determination, structure of the atom and the atomic theories, chemical formulas, limiting reactant, electronic configuration of the elements, It includes the periodic table beside the periodic properties of the atoms such as atomic size, ionization energy and electron affinity, The student is also introduced to study the principle of chemical bonding in general terms and stresses the importance of applying theory to practice such as Lewis structure, VSEPR, Valence bond and molecular orbital theories.

Teaching and Learning Methods for the Disabled Students

1 - Chemistry, Raymond Chang, McGraw-Hill

2 - General Chemistry: Principles and Structure, James E. Brady and Gerard E. Humiston, KIMIA Publisher : New York: John Wiley & Sons.

3 - Chemistry , Mortimer, Wadsworth Publishing Co Inc

Books and References

Essential books	General Chemistry Mortimer 6th ed.

ISLM1101	**Holy Quran (1)**						
Course type	UNIV Needs	**Level**	1	**hours (theoretical)**	1	**hours (practical)**	0

PHYS1301	**General Physics(1)**						
Course type	College Needs	**Level**	1	**hours (theoretical)**	3	**hours (practical)**	0

Course Objectives

1 - Physics and Measurement, Motion in One Dimension, Vectors, Motion in Two Dimensions, The Laws of Motion, Circular Motion and Other Applications of Newtons Laws, Energy and Energy Transfer, Potential Energy, Linear Momentum and Collisions, Rotation of a Rigid Object about a Fixed Axis

Intended Learning Outcomes

Knowledge and Understanding	* pply knowledge of linear motion, forces, energy, and circular motion to explain natural physical processes and related technological advances.AAAaaaa * to develop knowledge and skills in the understanding and use of Newtons Laws. * to develop an understanding of the relationship of work, power, and energy. * to gain knowledge and an understanding of the concept of momentum
Intellectual Skills	* Assess the contributions of physics to our evolving understanding of global change and sustainability while placing the development of physics in its historical and cultural context.
Professional Skills	* Use an understanding of algebraic mathematics along with physical principles to effectively solve problems encountered in everyday life, further study in science, and in the professional world.

Course Contents

1 - Physics and Measurement
2 - Motion in One Dimension ,Position, Velocity, and Speed., Instantaneous Velocity and Speed.Acceleration, Motion Diagrams.
3 - One-Dimensional Motion with Constant Acceleration, Freely Falling Objects. Kinematic Equations Derived from Calculus.
4 - Coordinate Systems, Vector and Scalar Quantities, Some Properties of Vectors, Components of a Vector and Unit Vectors
5 - The Position, Velocity, and Acceleration Vectors, Two-Dimensional Motion with Constant Acceleration, Projectile Motion.
6 - Newtons First Law and Inertial Frames, Mass, Newtons Second Law. The Gravitational Force and Weight.
7 - Define work and kinetic energy and solve problems involving these quanties.
8 - Explain gravitational potential energy (GPE) and solve appropriate problems.
9 - Principle of conservative and non conservative forces
10 - conservation of energy and frictiona lforces
11 - Explain the concept of linear momentum.
12 - elastic and inelastic collisions and use these ideas in the solution of appropriate problems
13 - develop an understanding of rotational motion
14 - the analogy of torque and angular acceleration to force and linear acceleration

Teaching and Learning Methods

1 - The courses is given as lecture and discussion, where several problems on the material are solved at the end of each unit. In addition same assignments are given to the students as homework.

Teaching and Learning Methods for the Disabled Students

1 - Physics for medical students, 2011, Hassan Ashour, Naji Al Dahoudi, Amal Al Kahlout, Al Azhar University-Gaza
2 - Physics for Scientists and engineering, 2010, Serway, Cengate

Students Assessment

Assessment Method	TIME	MARKS
Reports and Homeworks	week	10%
mid exams	2 hours	40%
Final exam	2 hours	50%

Books and References

Essential books , 9th editionPhysics for Scientists and Engineers, Raymond A. Serway

GEOL1301 General Geology

Course type College Needs **Level** 1 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - This course introduces the basic knowledge about the origin, development, component, material, and structure of the solid Earth
2 - Introduce students to earth materials: minerals and rock
3 - . Introduction of the fundamental geologic processes that are dynamically involved in the formation of planet earth
4 - Use an understanding of the rock cycle, plate tectonics and surface processes to explain how the Earths surface wears away and is renewed
5 - Use an understanding of geologic dating methods and the interpretation of geologic deposits to explain how geologists reconstruct the history of the Earth
6 - Access earth science information from a variety of sources, evaluate the quality of this information,
7 - Fundamentals of physical geology are covered, which support further study in the Earth and Natural Science

Intended Learning Outcomes

Knowledge and Understanding	* This course aims to provide students with the essential knowledge to understand the external and internal processes of the earth, internal and surface composition of the earth, geologic structures, geologic history * To understand the world in which we live we need to understand geology * The course provides basic information to identify the components of the planet on which we live. In addition the course demonstrates different geologic information, hazards and economic aspect
Intellectual Skills	* Use an understanding of the rock cycle, plate tectonics and surface processes to explain how the Earth's surface wears away and is renewed * Access earth science information from a variety of sources, evaluate the quality of this information
Professional Skills	* Students will demonstrate acceptable knowledge of geologic information by scoring a minimum grade on a standardized test of geologic knowledge * Students will demonstrate acceptable knowledge of geologic information by scoring a minimum grade on a standardized test of geologic knowledge
General Skill	* Use an understanding of the rock cycle, plate tectonics and surface processes to explain how the Earth's surface wears away and is renewed * Introduce students to earth materials: minerals and rock

Course Contents

1 - Introduction to Geology, the structure of the Earth and the Rock Cycle
2 - Matter and Minerals
3 - Igneous Rocks
4 - Metamorphic Rocks
5 - Sedimentary Rocks
6 - Factors forming and shaping the Earth surface
7 - General geologic structures
8 - Plate Tectonic
9 - Earthquake and Volcanos
10 - Principles of Relative Dating and Absolute Dating
11 - Geological Time Scale

Teaching and Learning Methods

1 - The course will have as many of the following components as feasible: lectures, discussions, lab activities, videos, slides, field trips, and computer-aided instruction and animation

2 - The text and materials for the course have been chosen by the department, and reviewed by the lecturer

3 - A digital copy of the lecture notes is available on the lecturer webpage

4 - The course will have as many of the following components as feasible: lectures, discussions, lab activities, videos, slides, field trips, and computer-aided instruction and animation

5 - The text and materials for the course have been chosen by the department, and reviewed by the lecturer

6 - A digital copy of the lecture notes is available on the lecturer webpage

Students Assessment

Assessment Method	TIME	MARKS
The following methods of assessment are used: exams, quizzes, lab exercises, written reports, oral presentations, group projects, class participation, and field trips		
First midterm exam	after 6 weeks	20 points
Second Midterm exam	After 12 weeks	20 points
Final exam	15-16 weeks	50
Class participation	From the first week of semester	10 points

Books and References

Course note	A digital copy of the lecture notes is available on the lecturer webpage
Essential books	Earth. An Introduction to Physical Geology, by Edward J. Tarbuck
	Principles of geology by James Gilluly
	The dynamic earth introduction to physical geology by Brian J. Skinner
Recommended books	Physical geology: exploring the earth by James S. Monroe
	Physical geology earth revealed by David Mcgeary
	Environmental geology by Carla W. Montgomery
	Physical geology by Charles C. Plummer

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Introduction to Geology, the structure of the Earth and the Rock Cycle	1st week	Earth interior Structure	Earth layers and characteristics	Different in Characteristics between Earth interior Structure	Earth Structure and Characteristics
The Rock Cycle	2ed week	The Rock Cycle, the main types of rock: Igneous , Metamorphic , nad Sedimentary	Process to transform one rock to another	,Different between solidification and crystallization Weathering, Lithification, and Cementation Metamorphism and Melting	How rock cycle works Transformation one rock to another
Minerals and Matter	3ed and 4th weeks	Properties of Minerals , Crystal and Crystallography	Physical and chemical properties of Minerals Crystal forms and Systems	Optical and cohesive properties of minerals Chemical structure and groups of minerals	Differentiate between Minerals based on the Physical and Chemical properties
Igneus Rock	5th and 6th week	Definition of Igneous rocks Types and origin Characteristics Textures	Extrusive, Intrusive and Plutonic Igneous Rock Chemical based Classification of Igneous Rock	Main Characteristics of Extrusive Igneous rock Main Characteristics of Intrusive Igneous rock Main Characteristics of Plutonic Igneous rock	Main Characteristics and Classification of Igneous rock texture and the relationship between texture and occurrence
Metamorphic Rocks	7th week	Types and origin of Metamorphic rocks Examples of Metamorphic rocks Metamorphism	Metamorphism Process and conditions Texture of metamorphism	Main Characteristics of Regional and Thermal Metamorphism	Type and agents of Metamorphism Texture

Sedimentary Rocks	8th , 9th week	Origin of Sedimentary rocks Weathering and Erosion Classification of Sedimentary rock Texture of Sedimentary Rock Primary Structure in Sedimentary rock	Lithification of Sediments Factor and material of cementation Porosity and remediability	Types of Sedimentary rocks Texture of clastic sedimentary rock factors affecting in porosity and permeability	Characteristics of Sedimentary Rocks Texture and Environments Porosity Weathering processes Structure in sedimentary rocks
Plate Tectonic	10th, 11th week	Plate Tectonic Theory Evidence of continental drifts theory Tectonic Boundaries	Plate tectonic mechanism Tectonic Boundaries: Convergent, Divergent, and transform faults	Results of convergent boundaries Results of Divergent boundaries and Seafloor Spreading	Understanding the theory of Plate Tectonic and Continental Drifs Tectonic boundaries
Geological Structures	12th, 13th week	Understanding the main Geological Structures Faults and Folds types of Folds and Faults	Rock behaviour and the forces that form normal and reverse faults Different between brittle and ductile deformation types of Folds	Recognize different faults types Recognize different fold types	Faults parts and components fold parts and components Types of faults and folds classification of folds
Earthquake and Volcano	14th week	Earthquake origin and disasters Detection and measuring Earthquake magnitude Volcano Parts and Types	Faults and Earthquake Seismograph and Epicenter Volcano types and Lava characteristics	The main reason for earthquake Measuring Earthquake Strength Types of Volcanos	General Information about how Earthquake happens the structure of normal volcano types of volcano and lava characteristics

Principles of rock dating methods	15th week	Principles of rock dating including Relative dating and absolute Dating	superposition, crosscutting relationship, inclusion, lateral extension, and original horizontality C14 and U235 dating methods	How to determine the rock age based on the relative dating principles Dating with radioactive materials	the general principles of rock dating and the different methods of absolute dating
Geological Time Scale	16th week	the main units of the Geological Time Scale	Different between the Geological Time units the mist important events through the geological time	Geological Time units	Different between the Geological Time units the mist important events through the geological time

GEOL1102	**Practical General Geology**						
Course type	UNIV Needs	**Level**	1	**hours (theoretical)**	1	**hours (practical)**	1

Course Objectives

1 - Definition of the geological maps, contour properties and tennis lines, horizontal layers and oblique, knowing the properties of crystals and crystalline forms and factions and systems affiliate, to know the types of minerals and their collections and their properties and types of igneous rocks and metamorphic and sedimentary

2 - Students ability to distinguish contour lines. Drawing lines and Racquet .autamez horizontal layers and their properties. Classes oblique and their properties, the ability to draw the crystal and knowledge of its properties and its factions and its own rules and law, the names of metals and chemical composition and their collections, the three types of rocks and denominations and chemical composition and metal, and the way the presence of rocks in nature.

Intended Learning Outcomes

Knowledge and Understanding	* Students ability to distinguish contour lines. Drawing lines and Racquet .autamez horizontal layers and their properties. Classes oblique and their properties, the ability to draw the crystal and knowledge of its properties and its factions and its own rules and law, the names of metals and chemical composition and their collections, the three types of rocks and denominations and chemical composition and metal, and the way the presence of rocks in nature.

Course Contents

1 - Geological maps and crystals, minerals, rocks fossils

Teaching and Learning Methods

1 - Lectures regularly preliminary maps, rock crystals and minerals, work reports and geological mapping, work reports of metals, rocks and crystals, the use of computers in a statement geometric shapes crystals, forms and re-forms the rocks in nature.

Students Assessment

Assessment Method	TIME	MARKS
Memoranda of practical geology, geological maps, a book, a memoir of minerals, rocks and crystals, the book Introduction to Cartography.		
Half of the first and second exam in the charts 30 degrees, work reports and the presence of 20 degrees, a final exam in crystals and minerals and rocks from 50 degrees to a total of 100 degrees	seven week	100 degrees Textbooks

Books and References

Course note	Memoranda of practical geology, geological maps, a book, a memoir of minerals, rocks and crystals, the book Introduction to Cartography.

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Geological maps and crystals, minerals, rocks fossils					

MATH1320 Calculus (1)

Course type College Needs **Level** 1 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - Studying Continuous Functions
2 - Have the Knowledge of Algebra, Functions and Trigonometry
3 - Studying the Limits and Techniques for Finding Limits
4 - Have the Knowledge of Tangent Lines, Definition of Derivative and Techniques of Differentiation
5 - Studying Derivatives of the Trigonometric Functions
6 - Studying Increments and Differentials, the Chain Rule and Implicit Differentiation
7 - Studying Extrema of Functions and the Mean Value Theorem
8 - Studying the First Derivative Test, Concavity and the Second Derivative Test
9 - Studying Summary of Graphical Methods
10 - Have the Knowledge of Antiderivatives and Indefinite Integrals, Change of Variables in Indefinite Integrals
11 - Studying Definite Integral, Properties of the Definite Integral and The Fundamental Theorem of Calculus
12 - Studying Area and Solids of Revolution
13 - Studying Volumes by Cylindrical Shells
14 - Have the Knowledge of Arc Length and Surfaces of Revolution

Intended Learning Outcomes

Knowledge and Understanding	* Understand the completeness of the real line * Understand the concept and theory of limit * Understand the concept and theory of continuity * Understand the concept and theory of differentiation * Apply the basic techniques of integration
Intellectual Skills	* Upon successful completion of this course, students are able to recite definitions and demonstrate intuitive understanding of limits, derivatives, and definite integrals; state and prove major theorems of calculus

Course Contents

1 - Real line, Inequalities, Absolute value, Coordinate planes, Equation of straight line, Circles and Quadratic forms, Functions, Trigonometry, Limits & Continuity, Differentiation and its techniques, Increments and Differentials, Chain Rule and Implicit differentiation, Application of derivative, Integrals, Applications of Definite integrals

Teaching and Learning Methods

1 - Lectures
2 - Discussions

Students Assessment

Assessment Method	TIME	MARKS
Quizes		30%
Midterm Exam		30%
Final Exam		40%

Books and References

Essential books	Earl W. Swokowski, Calculus, Fifth Edition.
Recommended books	All Calculus and Analytic Geometry Books.

ENGL1201 English Language (1)

Course type UNIV Needs **Level** 1 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - The course aims at introducing all freshmen students to English Language
2 - This course makes kind of general revision of English grammar, writing and comprehension.

Course Contents

1 - Upon completion of the course, students will be able to ask and answer questions about daily life activities by using correct linguistic forms. Also, they will be able to use new vocabulary and relate the spelling to the sounds of English which will help improve their pronunciation. Being provided with longer reading passages in a higher level, students will be able to deal with less controlled exercises that develop into freer speaking practice. As they are provided with regular recycling of grammar and vocabulary, students will be able to incorporate the integrated skill activities in both speaking and writing.

Teaching and Learning Methods

1 - Lectures
2 - Exercises

Students Assessment

Assessment Method	TIME	MARKS
Final Exam	End of semester	100

Books and References

Course note	Lecturers special notes
Essential books	,New Headway Plus: Pre-Intermediate Student's Book 2010 John and Liz Soars

CHEM1103 General Chemistry Lab(1)

Course type College Needs **Level** 1 **hours (theoretical)** 0 **hours (practical)** 1

Course Objectives

1 - 1. The objective of the general chemistry laboratory course is to become proficient in techniques used by practicing chemist, to carry out experiments safely and carefully in the laboratory, to obtain data accurately and to manipulate the data correctly. This course also complements and consolidates the theoretical knowledge acquired in the general chemistry lecture course. 2. To provide students with basic skills and laboratory safety rules by which they can be qualified for employment or further study. 3. To familiarize the student with handling the chemical substances, balances and equipments.

Intended Learning Outcomes

Knowledge and Understanding	*	1. Gain general basics and principles of chemistry. 2. Recognize physical and chemical properties of substance. 3. Synthesis of some organic compounds.
Intellectual Skills	*	1. Creative thinking 2. Ability to recognize and solve problems related to chemistry 3. Interpret issues in chemistry with reference to the practices of the international scientific community.
Professional Skills	*	1. Ability to interpret experimental results, perform calculations on these results, writing reports and draw reasonable conclusions 2. Ability to diagnose 3. Ability to solve the problem 4. Implement practical training and reporting for solving problems considering scientific ethics. 5. Assess laboratory risk work taking into consideration the specific chemical hazards and safe handling and proper operation of the laboratory techniques.
General Skill	*	1. Ability to recognize and solve problems related to chemistry 2. Ability to communicate with scientists and nonscientists. 3. Demonstrate team-working ability through group projects. 4. Demonstrate time-management skills. 5. Ability to make effective use of the library and other information resources in chemistry, including the primary literature, tabulated data, and secondary sources such as the internet.

Course Contents

1 - 1. Safety role and lab equipments. 2. Physical properties: melting point and density determination. 3. Physical properties: boiling point and solubility determination. 4. Chemical Properties. 5. Formula of Hydrate. 6. Empirical Formula of Magnesium Oxide. 7. Midterm Exam. 8. Limiting Reactant. 9. Molar Mass of Volatile Liquid. 10. Colligative properties of solutions. 11. Synthesis of Aspirin. 12. Acid Base Titration- Analysis of Aspirin. 13. Acid Base Titration: determination the molarity of HCl solution. 14. Final exam.

Teaching and Learning Methods

1 - Laboratory manuals will be provided to students. The modular course consists of twelve experiments performed by teams of two to three students each. The lab work is organized as follows: 1- Preparing for the experiment. The students should read and understand the laboratory protocol and read suggested reference materials prior to the lab session. In addition, some lab session time will usually be devoted to a discussion of the theory concern the experiment. 2- Running the experiment. Each team is responsible for conducting each experiment under supervision of lecturer. 3- End of the experiment. Preliminary discussion of the experimental outcomes with lecturer. 4- Report.

Students Assessment

Assessment Method	TIME	MARKS
1. Mid Exam		20%
2. Attendance and discussion		10%
3. Homework and project reports		20%
4. Notebook		10%
5. Final Exam		40%

Books and References

Course note	Lecture notes.
Essential books	1. Lab manual prepared by lab lecturer 2. Chemistry, by Chang, 9th. ed., 2007, McGraw-Hill.
Recommended books	Chemistry, by Steven S. Zumdahl, 6th ed., Houghton Mifflin College Div.
Other References (Periodical, web sites, ... etc.)	1. http://www.chem.ucla.edu/harding/notes/notes.htm 2. www.siencedirect.com 3. www.chemweb.com

CHEM1302 General Chemistry (2)

Course type Major Needs **Level** 1 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - This course aims to :

2 - Understand and be able to explain the general principles, laws, and theories of chemistry that are discussed and presented throughout the semester

3 - Use given information and other ideas in the solution of problems.

4 - Identify and calculate mathematical descriptions of the kinetics of chemical processes

5 - Demonstrate an understanding of chemical equilibrium and calculate solutions for equilibrium expressions.

6 - Demonstrate an understanding of acid-base equilibrium by calculating resulting values in pH and reactant/product concentrations for acid-base processes such as buffer solutions and titrations.

7 - Using concepts from solubility equilibria, calculate solution concentrations from solubility-product expressions and compound solubility.

8 - Understand the laws of thermodynamics and calculate the change in values of state functions for various physical and chemical processes.

9 - Perform calculations with colligative properties equations.

Intended Learning Outcomes

Knowledge and Understanding	* State the characteristics of liquids and solids, including phase diagrams and spectrometry. * Articulate the importance of intermolecular interactions and predict trends in physical properties. * Identify the characteristics of acids, bases, and salts, and solve problems based on their quantitative relationships. * Determine the rate of a reaction and its dependence on concentration, time, and temperature. * Apply the principles of equilibrium to aqueous systems using LeChatelier's Principle to predict the effects of concentration, pressure, and temperature changes on equilibrium mixtures.

Course Contents

1 - A continuation of general chemistry (I) which deals with gases, properties of solids, liquids, and solutions, studying of the intermolecular forces between solid and liquid molecules, reactions in aqueous solutions such as redox reaction, precipitation reactions and neutralization reaction, kinetics, equilibrium, electrochemistry and redox reaction. The student is introduced to techniques in qualitative analysis given an introduction in analytical chemistry through studying the acids-bases theories, ionic equilibria, calculating the pH of the solutions, principles of buffer solutions and solubility product, and finally the elements of thermodynamics and thermochemistry.

Teaching and Learning Methods

1 - Lectures
2 - power power presentation
3 - exercises solution
4 - exercises solution

Students Assessment

Assessment Method	TIME	MARKS
two med term exams	week number: 5 and 9	30%
Final exam	week number 16	50%
quizzes and assignments, participating and attendence	every lecture	10%
homeworks	weakly	10%

Books and References

Course note	Hand outs
Essential books	Chemistry, Chang 10th edition
Recommended books	Chemistry, Mortimer 6th edition

PHYS1103 Physics Lab

Course type College Needs **Level** 1 **hours (theoretical)** 0 **hours (practical)** 1

Course Objectives

1 - Familiarity with the use of modern scientific equipment

2 - Familiarity with the use of specialized experimental techniques

3 - The ability to communicate clearly , readably , and concisely the results and essentials features of an experiment

4 - .Ohms law used to find the value of unknown resistence and the resistivity of the wire experimentally ,series connection prove that the total resistance equal equivalent resistance experimentally equal the total resistance experimentally , Simple pendulum experiment used to find gravity g , Hooks law experiment used to find spring constant and gravity g , Coefficient of viscosity used to find the coeficient of viscosity of aliquid , free falling used to find the value of gravity g

Intended Learning Outcomes

* Experiment in General physics, properties of matter, Electricity: Projectile motion, Simple pendulum, Hooks law, Static equilibrium, Bernoullis Equation, Viscosity, Ohms law, DC electric circuits, RC circuit.

Course Contents

1 - .Ohms law series connection of resistences , parrallel connection resistences,discharge of a capacitor,simple pendulum,Hooks law,viscosity,un kouunmass,free falling

PHYS1302	General Physics(2)						
Course type	Major Needs	**Level**	1	**hours (theoretical)**	3	**hours (practical)**	0

Course Objectives

1 - Tolearn concept of static charges and electrical forces, magnetic fields

2 - Learn concept of electric potential and equipotential surfaces

3 - Electric Flux and Gauss Law

4 - Capacitors and Dielectric Materials, storage of electrical energy

5 - Electric currents and electric circuits and their analysis

Course Contents

1 - Properties of Electric Charges, Charging Objects By Induction Coulomb's Law
2 - Electric Flux, Gauss's Law, Application of Gauss's Law to Various Charge Distributions
3 - Conductors in Electrostatic Equilibrium, Formal Derivation of Gauss's Law
4 - Potential Difference and, Electric Potential, Potential Differences in a Uniform Electric Field, Electric Potential and Potential Energy Due to Point Charges
5 - Obtaining the Value of the Electric Field from the Electric Potential Electric Potential Due to Continuous Charge Distributions
6 - Electric Potential Due to a Charged Conductor, The Millikan Oil-Drop Experiment, Applications of Electrostatics
7 - Definition of Capacitance, Calculating Capacitance, Combinations of Capacitors, Energy Stored in a Charged Capacitor, Capacitors with Dielectrics, Electric Dipole in an Electric Field,
8 - Electric Current, Resistance, A Model for Electrical Conduction, Resistance and Temperature, Superconductors, Electrical Power
9 - Electromotive Force, Resistors in Series and Parallel, Kirchhoff's Rules
10 - RC Circuits, Electrical Meters
11 - Magnetic Fields and Forces, Magnetic Force Acting on a Current-Carrying Conductor, Torque on a Current Loop in a Uniform Magnetic Field
12 - Motion of a Charged Particle in a Uniform Magnetic Field, Applications Involving Charged Particles Moving in a Magnetic Field, The Hall Effect

Teaching and Learning Methods

1 - The courses is given as lecture and discussion, where several problems on the material are solved at the end of each unit. In addition same assignments are given to the students as homework.

Teaching and Learning Methods for the Disabled Students

1 - The courses is given as lecture and discussion, where several problems on the material are solved at the end of each unit. In addition same assignments are given to the students as homework.

Students Assessment

Assessment Method	TIME	MARKS
Homeworks	one week	10%
mid exams	2 hours	40%
Final exam	2 hours	50%

Books and References

Essential books , 9th editionPhysics for Scientists and Engineers, Raymond A. Serway

MATH1321 Calculus (2)

Course type Major Needs **Level** 1 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - study and recognize other important classes of functions as logarithmic functions, exponential functions and hyperbolic functions
2 - learn basic techniques of integration for functions with one variable
3 - be prepared to take more advanced courses in mathematics
4 - understand infinite series and their convergence and divergence criteria and know how they can be used in approximation techniques
5 - enable student to apply his knowledge to solve practical problems they encounter in phisical sciences and engineering

Intended Learning Outcomes

Knowledge and Understanding	* study and recognize other important classes of functions as logarithmic functions, exponential functions and hyperbolic functions
	* use integration by parts, trigonometric substitution, partial fraction to evaluate definite and indefinite integrals
	* define an improper integral and evaluate some classes of improper integrals by the concepts of limits, convergence and divergence
	* determine convergence or divergence of sequences and series
	* use Taylor and Maclaurin series to represent functions
	* use Taylor and Maclaurin series to integrate functions
Intellectual Skills	* develop and strengthen problem solving
	* understand concepts rather than mimic techniques
	* learn to think about problems mathematically and to solve problems independently
Professional Skills	* be able to state and explain basic calculus definitions and theorems
	* understand the relationship between the process and its corresponding inverse
	* understand the meaning and important applications of the concepts
	* have a clear understanding of the ideas of calculus as a foundation for subsequent courses in mathematics
General Skill	* hone the ability to do reality checks on calculations
	* become effective communicator and team player
	* learn to work together productively and learn to be cooperative
	* be able to communicate mathematics

Course Contents

1 - Logarithmic and Exponential Functions : invers functions- the natural logarithmic function - the natural exponential function - integration - general logarithmic and exponential functions
2 - Inverse Trigonometric and Hyperbolic Functions: inverse trigonometric functions- derivatives and integrals - hyperbolic functions - inverse hyperbolic functions
3 - Techniques of integration: integration by parts - trigonometric integrals - trigonometric substitutions - integrals of rational functions- integrals involving quadratic expressions - miscellaneous substitution
4 - ndeterminant forms and Improper Integrals: indeterminant forms and l Hopitals rule - integrals with infinite limits of integration - integrals with discontinous integrands
5 - Infinite Series: sequences - convergent or divergent series - positive term series tests- the ratio and root test - alternating series and absolute convergence- power series- power series representation of functions - Maclaurin and Taylor series- the binomial series

Teaching and Learning Methods

1 - lectures
2 - discussion

Students Assessment

Assessment Method	TIME	MARKS
first midterm exam	after 6 weeks of study	25%
second midterm exam	after 10 weeks of study	25%
final exam	at the end of the semester	50%

Books and References

Essential books	Calculus, fifth edition; Earl W. Swokowski; Pws-Kent Puplisher Company, 1991
Recommended books	Calculus with analytic geometry- Robert Ellis & Denny Guhick,1996 1996, Calculus- Thomas Finny; Addison-Wiesely Puplishing Company,Inc
Other References (Periodical, web sites, ... etc.)	all calculus books

BIOL1301 General Biology

Course type College Needs **Level** 1 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - To demonstrate an understanding of the language of biology. The fundamentals and concepts of general biology will be presented, including
2 - To illustrate the science of biology , the nature of molecules, the chemical building blocks of life, biology of the cell, cell structure, membranes, cell – cell interactions
3 - To demonstrate how cells divide, sexual reproduction and meiosis, molecular genetics, DNA: the genetic material , genes and how they work
4 - To understand viruses and simple organisms, how we classify organisms, viruses, prokaryotes, protists, fungi
5 - To discuss plant forms and functions plant body, animal forms and functions, organization of the animal body, regulating the animal body, the nervous system, endocrine system, immune systems

Intended Learning Outcomes

Knowledge and Understanding	* Illustrate the nature of molecules, the chemical building blocks of life, biology of the cell, cell structure, membranes, cell – cell interactions
	* Interpret how cells divide, sexual reproduction and meiosis, molecular genetics, DNA: the genetic material , genes and how they work
	* Understand how we classify organisms, viruses, prokaryotes, protists, fung
Intellectual Skills	* Distinguish between branches of fundamental Biology
	* Discriminate the organisms and their diversities and some special branches of biology
General Skill	* Effectively team work for intensive learning

Course Contents

1 - Introduction to Biology
2 - The chemical basis of life
3 - Biological macromolecules
4 - Cell structure
5 - Two basic types of cells
6 - Unique features of planet cells
7 - Movement of substances across the cell membrane
8 - How cell divide
9 - Sexual reproduction and meiosis
10 - Classification of organisms
11 - Animal tissues
12 - Organ systems
13 - From gene to protein

Teaching and Learning Methods

1 - Lectures
2 - Revision and Discussion sections
3 - Student presentation

Teaching and Learning Methods for the Disabled Students

1 - Lectures
2 - Revision and Discussion sections
3 - Help each student according to his needs and his condition

Students Assessment

Assessment Method	TIME	MARKS
First mid-term exam	Week 7	20
Second mid-term exam	Week 13	20
Attendance and discussion	Week 9 & 15	10
Final exam	Week 16	50

Books and References

Essential books	Johnson, G.B.; Raven, P.H. (2002): Biology, 6th edition, McGraw-Hill Higher Education, USA.

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
,Introduction The science of biology	1	to evaluate the basic knowledge of student in the field of biology	Introduction to biology		Appreciate learning from literatures
The nature of molecules The chemical building blocks of life	2 & 3	Characteristics of molecules	Understanding the chemical building blocks of life		Knowledge about nature of molecules and the chemical building blocks of life
Biology of the cell Cell structure Membranes Cell – Cell interactions	4 & 5	Understanding the cell structure and membranes	Knowledge about cell structure and cell – Cell interactions		Understanding about cell structure and cell – Cell interactions
How cells divide Sexual reproduction and Meiosis	5	Understanding the how cells divide	Understanding the how cells divide		Knowledge about the how cells divide
Molecular genetics DNA: The genetic material Genes and how they work	6 & 7	Knowledge about gene	Understanding what are the molecular genetics		Understanding what are the molecular genetics
Viruses and simple organisms How we classify organisms Viruses Prokaryotes Protists Fungi	8 & 9 & 10	Distinguish and classify organisms	Knowledge about viruses, prokaryotes, protists and fungi		Understanding what the differences between viruses, prokaryotes, protists and fungi
Plant forms and functions Plant body	11	Understanding plants forms			
Animal forms and functions Organization of the animal body	12	Characteristics of animal body	Knowledge about animal body		Understanding the organization of the animal body
Regulating the animal body The Nervous System	13	Understanding animal body and its systems	Knowledge about Nervous System		Understanding the Nervous System

Endocrine System Immune System	14 & 15	Understanding animal body and its systems	Knowledge about Endocrine & Immune Systems		Understanding the Endocrine & Immune Systems

BIOL1102	**Biology Lab**							
Course type	College Needs	**Level**	1	**hours (theoretical)**	0	**hours (practical)**	1

Course Objectives

1 - Safety in lab

2 - Commitment to laboratory standards

3 - Identification methodology of study in the lab and that will be different from lectures

4 - Identification biology courses by practical studies

5 - Identification theoretical subjects and concentration on the practical parts

6 - Improve work group skills for students

Intended Learning Outcomes

Knowledge and Understanding	* Distribution of students in groups
	* Identification and usage of tools and equipment with right methodologies
	* Usage of light microscope in a mastery way for examined samples
	* Students must be cautious from used chemicals and equipment
Intellectual Skills	* Selection proper tools for each test
	* Enabling students to do microscoping examination of samples according to magnification power
	* Ability to diagnostic and knowledge the cells and tissue using microscope
	* Students must be cautious from used chemicals and equipment of experiment
	* Ability for reading and analysis results
Professional Skills	* Usage of light microscope
	* Identification of magnification power of samples
	* Mastery working of plant and animal slides
	* Conducting of biochemistry tests and appearing results
	* Dealing with tools and equipment in cautious way
General Skill	* Systematic scientific thinking to study in the laboratory
	* Comparison between results of experiments
	* Presentation and analysis of results

Course Contents

1 - Safety in laboratory
2 - Recognition of tools, equipment used in lab especially light microscope
3 - Recognition types and examination of cells in all organisms
4 - Types of animal tissues (epithelia, connective, muscles, nerves)
5 - Types of plant tissues (meristematic, permanent)
6 - Morphology and anatomy of plants (Roots - stem - leaves)
7 - Classification of algae
8 - Classification of fungi
9 - Macromolecules of cells (Inspection of protein, lipids and fat, carbohydrate)
10 - safety in Lab

Teaching and Learning Methods

1 - Theoretical explanation for experiments
2 - Microscopic examination of cells and tissues
3 - Conducting experiments practically
4 - Reading, analysis and discussion of results
5 - Report writing for experiments
6 - Discussion of results

Teaching and Learning Methods for the Disabled Students

1 - Preparing the lab with required equipment, tools and techniques proper to disabled students

Students Assessment

Assessment Method	TIME	MARKS
Mid-term exam	1Hour	30
Attendance and reports		20
Final exam	1Hour	50

Books and References

Course note	Practical general biology note
Other References (Periodical, web sites, ... etc.)	Webs related to general biology

CHEM2304 Physical Chemistry(1)

Course type Major Needs **Level** 2 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - 1. Discuss the three laws of thermodynamics and their development. 2. Define and use the second and third laws of thermodynamics, and the concept of entropy. 3. be able to derive relationships between thermodynamic quantities. 4. Interpret phase diagrams and discuss phase equilibrium in terms of chemical potentials. 5. Define, understand, and solve problems relating to the ideal gas laws, critical phenomena, and the law of corresponding states. 6. Discuss and use the concepts of exactness, work, heat, the first law, enthalpy, heat capacity, and adiabatic processes. C. Solve problems in thermochemistry.

Intended Learning Outcomes

Knowledge and Understanding	* Obtain a vision of matter energy relationship in physical and chemical systems. * Identify and use correct units for data that will be analyzed. * Analyze themodynamics parameters to determine appropriate ways in which problems may could solved.

Course Contents

1 - Thermodynamic quantities, first law of thermodynamic, isothermal and adiabatic and reversible and irreversible process, Joule-Thomson experiment, thermo chemistry. Hess law lavoiser and laplace, effect of temperature on heat of reaction (Kirchhoff equation), the second law of thermodynamic, carnot cycle, the entropy change of a system, evaluating the entropy and Gibbs function, combination of the first and second laws, Gibbs-Helmholts equation, thermodynamic solution, partial molar property, determination of partial molar volume and free energy etc. ideal and non ideal solution, properties of dilute solutions, colligative properties

Students Assessment

Assessment Method	TIME	MARKS
exam	first mid term	20%
exam	second mid term	20%
homework & others		10%
exam	final	50%

Books and References

Essential books	Physical Chemistry, P.W. Atkins, ELBS Essentials of physical chemistry, Arun Bahl

CHEM2308 Inorganic Chemistry(1)

Course type Major Needs **Level** 2 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - Teach students the basic aspects of atomic structure

2 - Provide students with all types of chemical bonding

3 - Teach students the basic aspects of solid state chemistry

4 - Provide students with all general properties of elements of periodic table

Intended Learning Outcomes

Knowledge and Understanding	* The students should understand and learn the difference between the properties of ionic , covalent compounds and how they differ from metals * They should also learn how to resolve problem and understand all issues radius ratio and geometry. * The students should understand the molecular structure of various covalent compounds.
Intellectual Skills	* Upon completion of this course students should learn and understand all topics and aspects relevant to atomic structure and its different theories relevant to the chemical bonding.

Course Contents

1 - This course include the atomic structure, atomic spectra and Bohr its refinements, schrodinger wave function and its solutions, pauling exclusion principle and Hunds rule, Electronic configuration of all elements and general trends.

2 - In this course we would deal with chemical bonding: Ionic bond,properties of ionic compounds. Structure of ionic solids, radius ratio, close packing, classification of ionic structures, lattice energy, stoichiometric and non-stoichiometric defects.

3 - This course involves covalent bonding and the relevant theories, Lewis theory, valence electron pairs repulsion (VSEPRT), Valence bond theory (VBT) treatment and hybridization and molecular orbital theory(MOT)treatments, sigma and bi types of bondings issues.

4 - Metallic bonding, properties of metallic compounds, and the relevant bonding theories. It also involves the general properties of periodic table elements.

Teaching and Learning Methods

1 - lectures and discussion

Teaching and Learning Methods for the Disabled Students

1 - none

Students Assessment

Assessment Method	TIME	MARKS
medterm exams	4th and 8th weeks	2 *25%
Final exam	end of semster	50%

Books and References

Essential books	Shriver and atkins inorganic chemistry, 5th edition(2010) Advanced Inorganic Chemistry, 6th Edition F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Murillo, Manfred Bochmann ISBN: 978-0-471-19957-1

CHEM2305 Organic Chemistry(1)

Course type Major Needs **Level** 2 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - The objective of the course is for students to develop an understanding and appreciation of both structure and chemical transformations of organic molecules. Students will acquire basic concepts of electronic structure and be able to apply them to solve problems from various areas of organic chemistry, including stereochemistry, reactivity patterns and synthesis. Improvements in learning strategies, critical-thinking, and problem-solving skills are an expected outcome. Also, this course includes the following parts: Introduction to organic chemistry, structure, nomenclature, physical properties, methods of preparation and reactions of alkanes, steriochemistry of carbon compounds, alkyl halides, alcohols preparation and reactions, ethers and epoxides. Alkenes preparation and their reactions.

Course Contents

1 - 1. Structure and properties • Chemical Bonding (ionic bonds, covalent bonds) • Valence-bond theory (hybridization) • Resonance • Electronegativity, dipole moments • Acids and bases 2. Alkanes • Functional groups • Nomenclature • Conformational analysis of alkanes and cycloalkanes (strain) 3. Stereochemistry I. Stereoisomers •Optical activity - enantiomers • Diastereomers • Absolute configuration 4. Nucleophilic aliphatic substitution • SN1 and SN2 • E1 and E2 • Effects of solvent, substrate structure, and nucleophile (base) on reactivity 5. Alcohols and Ethers • Hydrogen bonding, acidity, basicity • Preparation of alcohols • Reactions of alcohols • Williamson synthesis • Cyclic ethers • Reactions of ethers and epoxides 6. Roles of solvent: secondary bonding 7. Alkenes I: structure and properties 8. Alkenes II: reactions • Addition of halogens and water • Reductions (mechanisms excluded) and oxidation, including hydroxylation and oxidative cleavage 9. Stereochemistry II. Stereoselective and stereospecific reactions

Teaching and Learning Methods

1 - Lectures and discussions.

Students Assessment

Assessment Method	TIME	MARKS
Final exam 50% Carry marks 30% Assignments 15% Attendance and participation 5%	16 weeks	100

Books and References

Essential books	Organic Chemistry, 6th Edition, by Robert T. Morrison and Robert N. Boyd

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
General and specific properties of alkanes and alkenes		Knowledge and Understanding of the general and specific properties of alkanes and alkenes	Critical, analytical, synthesising and problem-solving skills		
				When we talk about work skill, we refer to a specific term for describing the skills and knowledge that a person owns to work efficiently	we refer to a general term for describing the skills and knowledge that a person owns to work efficiently

CHEM2107 Practical Analytical Chem.(1)

Course type Major Needs **Level** 2 **hours (theoretical)** 0 **hours (practical)** 1

Course Objectives

1 - 1. To provide students with practical experimentation on the quantitative analysis (gravimetric and volumetric methods). 2. Teaching students the gravimetric method of analysis for determination some ions such as chloride, sulfate, and nickel. 3. Teaching students the volumetric (titrimetric) method of analysis for determination some compounds. 4. Teaching students how to prepare standard solutions and standardization the solutions. 5. Teaching students to be familiar with the correct use of volumetric glassware to prepare solutions and perform titrations. 6. Simple statistical treatment and calculations to ensure proper dealing and interpret the results.

Intended Learning Outcomes

Knowledge and Understanding	*	a. Gain general basics, principles and applications of chemistry b. Understand the fundamentals of gravimetric and volumetric analysis. c. Preparation and standardization of solutions.
Intellectual Skills	*	a. Analyze data from analytical experiments statistically. b. Assess and interpret the different properties of chemical methods of analysis. c. Select suitable methods, conditions to analyze a given compound by volumetric and gravimetric method. d. Interpret issues in chemistry with reference to the practices of the international scientific community.
Professional Skills	*	a. Ability to interpret experimental results, perform calculations on these results, writing reports and draw reasonable conclusions b. Conduct quantitative analyses using gravimetric and volumetric methods. c. Handle basic analytical tools safely and efficiently. d. Gain knowledge and understanding of the issues of safety regulations in the use of chemicals in their laboratory work.
General Skill	*	a. Ability to recognize and solve problems related to chemistry. b. Ability to communicate with scientists and nonscientists. c. Demonstrate team-working ability through group projects. d. Demonstrate time-management skills. e. Ability to make effective use of the library and other information resources in chemistry, including the primary literature, tabulated data, and secondary sources such as the internet.

Course Contents

1 - 1. Solutions preparation. 2. Gravimetric analysis: Determination of chloride gravimetrically. Determination of Ni in sample by DMG. 3. Preparation and standardization of NaOH solution with KHP. 4. Analysis of Aspirin. 5. Analysis of vinegar. 6. Mid Exam. 7. Preparation and standardization of HCl solution and determination the % of sodium carbonate in soda ash. 8. Precipitation Titration: determination of chloride: Mohr method. 10. Complexometric titration: Determination of the water-hardness on drinking water. 11. Redox titration: Preparation and standardization of potassium permanganate solution. 12. Redox titration: Determination of vitamin C in tablets. 13. Final Exam.

Teaching and Learning Methods

1 - Laboratory manuals will be provided to students. The modular course consists of twelve experiments performed by teams of two to three students each. The lab work is organized as follows: 1- Preparing for the experiment. The students should read and understand the laboratory protocol and read suggested reference materials prior to the lab session. In addition, some lab session time will usually be devoted to a discussion of the theory concern the experiment. 2- Running the experiment. Each team is responsible for conducting each experiment under supervision of lecturer. 3- End of the experiment. Preliminary discussion of the experimental outcomes with lecturer. 4- Report.

Students Assessment

Assessment Method	TIME	MARKS
1. Mid Exam		20%
2. Attendance and discussion		10%
3. Homework and reports		20%
4. Notebook		10%
5. Final Exam		40%

Books and References

Course note	Lecture notes.
Essential books	1. Lab manual prepared by lab lecturer. 2. D. A. Skoog and d. M. west, "Fundamentals of Analytical Chemistry", 7th ed CBS Publishing Asia ltd (2000).
Recommended books	1. Vogels Textbook of Quantitative Inorganic Analysis, 6th Edition Longman Scientific and Technical, USA (1998). 2. Christian G. D., "Analytical Chemistry", John?Wiley and Sons, Inc New York(1994).
Other References (Periodical, web sites, ... etc.)	1. http://www.chem.ucla.edu/harding/notes/notes.htm 2. www.siencedirect.com 3. www.chemweb.com

CHEM2306 Analytical Chemistry(1)

Course type Major Needs **Level** 2 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - 1- learning the principles of analytica chemistry and its errors of chemical analysis and the typical steps of quantitative analysis and the pretreatment for sample analysis 2- studing different concentration expressions and calculations 3-learning the principles of quantitative analysis methods

Intended Learning Outcomes

Knowledge and Understanding	* 1- provide the students informations how to deal errors in chemical analysis 2- give the students an idea about the calculation of the concentration and the percentage of analyte in different wayes and differents types concentration expressions 3- provide the students informations about different methods of quantitative analysis including gravimetric analysis and titrimetric methods of analysis.

Course Contents

1 - This course covers the principles of analytical chemistry including errors in chemical analysis, statistical evaluation of analytical data, gravimetric methods of analysis, titrimetric methods of analysis, aqueous solution chemistry, activities and activity coefficients, also study the ionic strength effect on concentration and Debye-Huckel theory, a systematic method for performing equilibrium calculations and precipitation titration of silver nitrate including Mohr, Volhard and Fajan methods.

Students Assessment

Assessment Method	TIME	MARKS
1- First mid term exam 2- Second mid term exam 3- Ctivities and attendence4- final exam 50%		Total 100%

Books and References

Essential books	Fundamentals of analytical chemistry Skoog/ West/ Holler

ISLM2201	Studies in Prophetic Tradition						
Course type	UNIV Needs	**Level**	2	**hours (theoretical)**	2	**hours (practical)**	0

MATH2209	Principles of Statistics						
Course type	College Needs	**Level**	2	**hours (theoretical)**	2	**hours (practical)**	0

Course Objectives

1 - To select and differentiate between sampling methods, and to determine the sample size.

2 - To construct and read the frequency tables and statistical charts.

3 - Explain, calculate, and interpret descriptive statistics including scales of measurement, frequency distributions, measures of central tendency and measures of dispersion .

4 - To understand the characteristics of probability distributions, with concentration on the application of Binomial, Poisson and Normal distributions.

5 - To obtain and interpret the correlation coefficients and simple linear regression model.

6 - To understand the basic concepts of inferential statistics including sampling distribution, confidence intervals, and hypothesis testing.

Intended Learning Outcomes

Knowledge and Understanding	* Understand the basic concepts and terminology of statistics, including types of variables and measurement scales * Understand the central tendency and dispersion measures. * Understand the concepts of classical probability. * Understand selected discrete (Binomial, Poisson) and continuous distributions (Normal Distribution) * Know scatter diagram. * Understand the central limit theorem * Understand the importance and basic principles of estimation.
Intellectual Skills	* Select processes involved in the scientific method and the design of experiments * Interpret the central tendency and dispersion measures. * Interpret the values of probability * Explain the similarities and differences between distributions * Differentiate between relationships types. * Differentiate between correlation and regression. * Interpret a confidence interval from a practical and a probabilistic viewpoints. * Understand the logic of hypothesis testing and interpretation of p values
Professional Skills	* Select samples from a population of subjects. * Organize and display data * Calculate the measures of central tendency and dispersion * Calculate the probability of an event * Calculate probabilities in real-life problems. * Calculate correlations among variables. * Obtain a simple linear regression model and use it to make predictions. * Construct a sampling distribution of a statistic and apply the central limit theorem * Construct interval estimates for location parameters * State a null and alternative hypothesis and carry out a structured hypothesis test.
General Skill	* Appreciate the advantages of using computers in the statistical analysis of data * Communicate with statistical figures effectively, * Making decisions * Team work

Course Contents

1 - Introduction to statistics and sampling
2 - Descriptive statistics
3 - Some basic probability concepts
4 - Popular probability distributions
5 - Correlation and regression
6 - Sampling distributions
7 - Introduction to statistical inference

Teaching and Learning Methods

1 - Lectures
2 - Discussion
3 - Solving problems and exercise
4 - Applications on computer using statistical software packages.

Students Assessment

Assessment Method	TIME	MARKS
First mid-term exam	Week 8	30%
Second mid-term exam / Quizzes	Week 12	10%
Homework and project reports	Week 13 and 14	10%
Final exam	Week 16	50%

Books and References

Course note	Abuzaid, A. H. (2012). Principles of Statistics, Department of Mathematics, Al Azhar University-Gaza
Essential books	Mann, P.S. (2010). Introductory Statistics. John Wiley & Sons Canada, Ltd 7th ed.
Recommended books	MOORE, D. S, McCABE, G. P. and CRAIG, B. A. (2007) Introduction to the Practice of Statistics, W. H. Freeman and Company, New York
	DANIEL, W. W. and CROSS, C. L. (2013). BIOSTATISTICS A Foundation for Analysis in the Health Sciences. John Wiley & Sons, 10th Ed..

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
INTRODUCTION TO STATISTICS AND SAMPLING	2	Understand the basic concepts and terminology of statistics, including variables types and measurement scales	Select processes involved in the scientific method and the design of experiments	Select samples from a population of subjects.	Appreciate the advantages of using computers in the statistical analysis of data
DESCRIPTIVE STATISTICS	3	Understand the central tendency and dispersion measures	Interpret the central tendency and dispersion measures.	Organize and display data -Calculate the measures of central tendency and dispersion	Communicate effectively with statistical figures.
SOME BASIC PROBABILITY CONCEPTS	2	Understand the concepts of classical probability.	Interpret the values of probability	Calculate the probability of an event	
PROBABILITY DISTRIBUTIONS	2	Understand selected discrete (Binomial, Poisson) and continuous distributions (Normal Distribution)	Explain the similarities and differences between probaility distributions	Calculate probabilities in real-life problems.	
CORRELATION AND REGRESSION	2	Know scatter diagram.	Differentiate between types of relationships. Differentiate between correlation and regression.	calculate correlations among variables. -obtain a simple linear regression model and use it to make predictions.	
SAMPLING DISTRIBUTIONS	1	Understand the central limit theorem Know some popular sampling distributions	Implement the central limit theorem	construct a sampling distribution of a statistic.	
INTRODUCTION TO STATISTICAL INFERENCE	2	understand the importance and basic principles of estimation.	Interpret a confidence interval from both a practical and a probabilistic viewpoint. - Interpret p values	* Calculate interval estimates for a variety of parameters * state a null and alternative hypothesis and carry out a	making decision

CHEM2309	Physical Chemistry(2)						
Course type	Major Needs	Level	2	hours (theoretical)	3	hours (practical)	0

Course Objectives

1 - (i) explain and use the terms: rate of reaction; rate equation; order of reaction; rate constant; half-life of a reaction; rate-determining step; activation energy; catalysis. deducing the order of a reaction by the initial rates method (ii) justifying, for zero- and first-order reactions, the order of reaction from concentration-time graphs (iii) verifying that a suggested reaction mechanism is consistent with the observed kinetics (iv) predicting the order that would result from a given reaction mechanism (v) calculating an initial rate using concentration data.

Intended Learning Outcomes

Knowledge and Understanding

* Determine the required conditions to describe chemical and physical processes.
* Fundamentals of kinetics of a chemical reaction in solution.
* Analyze problems of chemical kinetics to determine appropriate solutions.
* Understand the relation between speed of reaction and energy.

Course Contents

1 - Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), concept of collision theory (elementary idea, no mathematical treatment). Activation energy, Arrhenious equation.

Students Assessment

Assessment Method	TIME	MARKS
exam	first mid term	20%
exam	second mid term	20%
homework & others		10%
exam	final	50%

Books and References

Essential books . Physical Chemistry, P.W. Atkins, ELBS. 2

Essentials of physical chemistry, Arun Bahl

CHEM2313	Inorganic Chemistry(2)						
Course type	Major Needs	Level	2	hours (theoretical)	3	hours (practical)	0

Course Objectives

1 - Teach students the new field of coordination compound and its important applications.

2 - Teach the students properties of coordination complexes (conductivity , magnetism and spectroscopy).

3 - Teach student of reaction mechanism in square planar and octahedral complexes.

Intended Learning Outcomes

Knowledge and Understanding	* After completion this course the students should learn all basic aspects of the new field of coordination compounds.the nature of complexes, general properties , relation between geometry and coordination number.understand its reaction mechanisms. * The students should understand the nature type of bonding and how it is change from one theory to another theory. * The students should be learn and understand of the optical and magnetic properties of metal compounds and how they differ from other inorganic compounds.

Course Contents

1 - This course is concerned with coordination compounds, a back ground and Werners theory for coordination componds. Nomenclature of metal complexes. General properties such as molar conductivity

2 - This course includes all theories with respects of coordination chemistry (valence bond theory and its treatment for complexes, crystal field theory and its relation with geometries octahedral fields (strong and weak field) tetrahedral fields vs octahedral and molecular orbital theory treatment for sigma and bi bonding systems)

3 - This course is also covered topics in this concern e.g. octahedral field arrangement, tetrahedral field and square planar field, effects of crystal field splitting and crystal field splitting energy, tetragonal distortion (Jam-Teller effect) – magnetism spectrum in complexes.

Teaching and Learning Methods

1 - Lectures and Discussions

Teaching and Learning Methods for the Disabled Students

1 - none

Students Assessment

Assessment Method	TIME	MARKS
two med terms exams	4th and 8th weeks	2*25%
Final exam	end of semster	50%

Books and References

Essential books	Basic Concepts of Inorganic Chemistry, 2nd Edition by D. N. Singh Inorganic Chemistry: Principles of Structure and Reactivity, 4th ed. James E. Huheey, Ellen A. Keiter, and Richard 1. Keiter. Harper Collins: New York, 1993.

CHEM2111 Practical Organic Chem.(1)

Course type Major Needs **Level** 2 **hours (theoretical)** 1 **hours (practical)** 0

Course Objectives

1 - 1. To familiarize the student with handling the organic compounds.

2 - 2. To teach the student the proper method of setting up all separation and purification apparatuses.

3 - 3. To teach the student the proper method of getting the maximum yield & highest purity of the lab prepared organic compounds.

Intended Learning Outcomes

Knowledge and Understanding	* the student is expected to have skills in measuring physical constants of organic compounds * the student is expected to have skills in all modern methods of purification of organic compounds

Course Contents

1 - 1. Studying and practicing Methods of separation and purification of organic compounds.
2 - Measuring the physical constants of organic compounds.
3 - 3. preparation of some simple organic compounds

Students Assessment

Assessment Method	TIME	MARKS
20% Presence and evaluation		
Midterm Exam 20%		
Lab. Reports and Quizzes 20%		
Final Exam 40%		

Books and References

Course note	The department lab. Manual
Essential books	. Unitized experiments in organic chemistry
Recommended books	Vogel,s Textbook of Practical Organic Chemistry. Fifth edition

CHEM2310 Organic Chemistry(2)

Course type Major Needs **Level** 2 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - The aim of this course is: 1- It is continuation of organic chemistry I. 2- It gives the student the chance know what are aromatic compound, their names, preparation and reaction. 3- The student is teached the basics of spectroscopy IR, NMR, UV Master Program

Course Contents

1 - This course is a continuation of organic chemistry I it includes the following subjects: Physicochemical properties, preparation and reactions of cycloalkanes, aromatic compounds, aldehydes, ketones, carboxylic acids and their derivatives, structural studies of organic compounds employing I.R., U.V. mass and NMR, spectroscopic techniques.

Students Assessment

Assessment Method	TIME	MARKS
(1)mid term exam	1H	20
(2)mid term exam	1H	20
two quizes	30 mint	10
Final exam	2h	50

Books and References

Course note	organic chemistry sixth edition MORRISON AND BOYD

CHEM2312	Analytical Chemistry(2)						
Course type	Major Needs	**Level**	2	**hours (theoretical)**	3	**hours (practical)**	0

Course Objectives

1 - Learning the principles of different methods of volumetric analysis and their applications for simple and complex systems and titration in non aqueous medium and the best choice to do titration in non aqueous medim

Intended Learning Outcomes

Knowledge and Understanding	*	provide the students how to deals with different methods of volumetric analysis and their applicatios in simple and complex systems and to learn the students about the titration in non aqueous medium

Course Contents

1 - This is an extended course of analytical chemistry I. The course covers the volumetric analysis including theory of neutralization titrations, titration course for complex acid/base systems application of neutralization titrations, complex formation titrations, Introduction to electrochemistry including types of electrochemical cells and study the nurnst equation and calculation the potentials. Oxidation reduction titrations and applications of oxidation reduction titrations.

Students Assessment

Assessment Method	TIME	MARKS
First mid term exam 20% and Second Mid term exam 20% and attenance and activities home work 10%		Total 50% + Final exam 50%

Books and References

Course note	Fundamentals of analytical chemistry Authors Skoog , West, Holler

ISLM2105	Holy Quran (2)						
Course type	UNIV Needs	**Level**	2	**hours (theoretical)**	1	**hours (practical)**	0

ISLM1201	Jurisprudence						
Course type	UNIV Needs	**Level**	2	**hours (theoretical)**	2	**hours (practical)**	0

CHEM3221							
Course type	Major Needs	**Level**	3	**hours (theoretical)**	2	**hours (practical)**	0

Course Objectives

1 - Students should be able to: 1. Understand fundamental quantum chemistry principles and problem-solving techniques. 2. Understand how can use Schrodinger equation to solve simple models 3. Develop working knowledge of terminology and tools used by quantum chemists. 4. Learn how quantum mechanics manifests itself in nature and experimental science. 5. Understand advantages and limitations of approximation methods for solving complex problems

2 - The course will be graded on the examinations (three online homework/quizzes/activities/assignments, one med-term examination and one final examination). A score will be assigned on the basis of the results in this examination and the final grade will be made on this basis.

3 - The course will examine the fundamental ideas behind the application of quantum mechanics to chemical systems. Rather than follow an historical approach as is generally done in undergraduate courses, it will treat the ideas of quantum mechanics as a series of postulates that successfully predict experimental results. 1. Introduction to quantum mechanics. Mathematical background, series solutions to differential equations. 2. Description of the postulates of quantum mechanics. 3. “Exact”, i.e. analytical solutions to the Schr?dinger equation for: Particle in a box Potential step Simple harmonic oscillator Spherically symmetric solutions, and hydrogen atom. 4. Use of approximate methods in the solution of the Schr?dinger equation using: Time-independent perturbation theory The variation principle WKB theory. 5. Analysis of angular momentum in quantum mechanics. Commutation and raising and lowering operators Spin angular momentum The addition of angular momentum and the calculation of the resultant eigenfunctions (resulting in the definition of ClebschGordon or Wigner coefficients)

4 - Learning Outcomes: At the end of the course, the student will be able to 1. Describe the concept of energy quantization and wave-particle duality of light and matter 2. Describe the differences between classical and quantum mechanics 3. Construct the Schro?dinger equation for simple systems 4. Normalize a wavefunction and calculate the probability density of a system in a region 5. Construct quantum chemical operators and determine expectation values of observables 6. Describe the solution of the Schro?dinger equation for a free motion in one dimension and confined motion in one and two dimensions and calculate their properties 7. Use the separation of variables technique 8. Describe the solution of the Schro?dinger equation for a harmonic oscillator and calculate it’s properties. 9. Describe the solutions of the Schro?dinger equation for hydrogenic atoms and their properties: quantum numbers, orbital energies, classification in shells

5 - Levine, Ira N. Quantum Chemistry; 6th Edition; Pearson/Prentice Hall

6 - Lectures in class

Course Contents

1 - ntroduction. Wave Paticle Duality schrodinger equation. ... Simple Applications. Separting Variables and Particle in a Box. ... Tunneling and Harmonic Oscillator. Tunneling -part1. ... The Hydrogen Atom. ... Uncertainty Principle, Angular Momentum. ... Approximation Methods, spin and Pauli\s priinciple. ... Chemical Bonding.

BIOL2303	Introduction to Biochemistry						
Course type	Major Needs	**Level**	3	**hours (theoretical)**	3	**hours (practical)**	0

Course Objectives

1 - To know the structure and importance of chemical functional groups
2 - To realize the importance of studying biochemistry and its branches
3 - To study the major constituents of cells
4 - To know how biochemical reactions take place

Course Contents

1 - Introduction to biochemistry, similarities and differences between all livings
2 - Functional groups in chemistry, and major constituents of cells in E.coli
3 - Structure and function of water as a universal solvent
4 - Structure and function of carbohydrates
5 - Structure and function of proteins, 1ry, 2ry, 3ry, and quaternary structure of proteins
6 - Amino acids, classification, structure, isoelectric point
7 - Buffer action, amphoterism of amino acids, diseases related to wrong translation of amino acids, Haemoglobine
8 - Lipids, classification, general properties, function, fatty acids
9 - Saturated, unsaturated, essential, and non essential fatty acids, steroids
10 - Cholesterol, structure and function of steroid hormones
11 - Enzymes as biochemical catalysts, Michaelis-Menten equation
12 - Some diseases caused by enzyme deficiency
13 - Enzyme inhibitors

Students Assessment

Assessment Method	TIME	MARKS
First hour exam	60minutes	20
Second hour exam	60minutes	20
Attendence		10
Final exam	120minutes	50

Books and References

Recommended books	Principles of biochemistry, 7th edition, Smith et al., McGraw- Hill
	Principles of biochemistry, Lehninger
	Biochemistry, 5th edition, Campbell, M.K., Farrell, S.O. (2006)

CHEM3119 Practical Physical Chemistry(1)

Course type Major Needs **Level** 3 **hours (theoretical)** 0 **hours (practical)** 1

Course Objectives

1 - The objective of the physical chemistry laboratory (I) course is: to carry out experiments safely and carefully in the laboratory.
2 - to obtain data accurately and to manipulate the data correctly.
3 - to carry out experiments safely and carefully in the laboratory.
4 - to obtain data accurately and to manipulate the data correctly.

Intended Learning Outcomes

Knowledge and Understanding	* Ability to recognize and solve problems
Professional Skills	* Creative thinking
General Skill	* . Ability to interpret experimental results, perform calculations on these results, writing reports and draw reasonable conclusions

Course Contents

1 - Measuring the activity coeficients of weak electrolytes
2 - clock reaction
3 - determination of order
4 - determination of rate constants
5 - potentiometric reaction of weak acid
6 - Adsorption of charcoal on acetic acid
7 - Adsorption of charcoal on oxalic acid
8 - potentiometric titration
9 - catalytic reactions
10 - Laboratory manuals will be provided to students.
11 - The students should read and understand the laboratory protocol and read suggested reference materials prior to the lab session

Teaching and Learning Methods

1 - The students should read and understand the laboratory protocol and read suggested reference materials prior to the lab session
2 - some lab session time will usually be devoted to a discussion of the theory concern the experiment.
3 - Running the experiment. Each team is responsible for conducting each experiment
4 - End of the experiment. Preliminary discussion of the experimental outcomes with lecturer
5 - Report.

Students Assessment

Assessment Method	TIME	MARKS
Mid Exam		20%
Attendance and discussion		10%
Homework and project reports		20%
Notebook		10%
Final Exam		40%

Books and References

Course note	Lab manual prepared by Dr Nasser Abu Ghalwa 2003

CHEM3315 Orgranic Chemistry(3)

Course type Major Needs **Level** 3 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - The aim of this course are: 1- It is continuation of organic chemistry II. 2- Aldehydes and ketones,and carboxylic acids are studied in details, their physical properties, nomenclature, preparations and reactions. . 3 - The student are teached how to use these compounds in synthesis. 4- The students are introduced to many named reactions.

Course Contents

1 - course is a continuation of organic chemistry II. It includes the following topics: The chemistry of Aldols, Claisen and malonate condensations, amines, phenols, carbanions and their application, aryl halides, ?, ?-unsaturated carbonyl compounds, polycyclic aromatic compounds, neighboring group effects

Students Assessment

Assessment Method	TIME	MARKS
(1)mid term exam	1H	20
(2)mid term exam	1H	20
two quizes	30 mint	10
final exam	2h	50

Books and References

Course note	organic chemistry sixth edition MORRISON AND BOYD

CHEM3118 Prac. Instrumental Analysis

Course type Major Needs **Level** 3 **hours (theoretical)** 0 **hours (practical)** 1

Course Objectives

1 - The students will be trained on using some analytical instruments for chemical analysis. Students will also learn how to write a report and indicate failures and errors

Course Contents

1 - This course covers the application of some analytical techniques including potentiometric titrations, spectrophotometric methods using U.V-VIS and IR spectrometry. The course also covers some experiments in determination of metals using atomic absorption spectrometry (AAS) such as Ni, Fe, Co, Zn, Cr, Pb.

Teaching and Learning Methods

1 - practical experiments

Students Assessment

Assessment Method	TIME	MARKS
Med-term exam	7th week of the course	30%
final exam	14th week of the course	50%
reporting	all experiments	20%

Books and References

Course note	handbook for practical course in instrumental chemistry - Dr. Mazen Hamada

ISLM3107 Holy Quran (3)

Course type UNIV Needs **Level** 3 **hours (theoretical)** 1 **hours (practical)** 0

ISLM2202	Studies in Islamic Faith						
Course type	UNIV Needs	Level	3	hours (theoretical)	2	hours (practical)	0

CHEM3322	Physical Chemistry(3)						
Course type	Major Needs	Level	3	hours (theoretical)	3	hours (practical)	0

Course Objectives

1 - This course complements and consolidates the theoretical knowledge acquired in the physical chemistry (III) as Faradays law of electrolysis types of reversible electrodes , determination of activity coefficient, equilibrium constant, solubility product by e.m.f, concentration cells with and without junction potential types of over potential and its measurements. Electrolysis and electrolytes.

2 - To give the student knowledge of Faradays law of electrolysis , electrical conductance , measurement of conductivity , ion-Kohlruschs law, migration of ions, ionic transport and its determination , application of ion conductance, theories of electrolytes, Debye Huckel theory , mobility of ions Debye-Huckel equation.

3 - This course involves Faradays law of electrolysis , electrical conductance , measurement of conductivity , ion-Kohlruschs law, migration of ions, ionic transport and its determination , application of ion conductance, theories of electrolytes, Debye Huckel theory , mobility of ions Debye-Huckel equation. Reversible and irreversible process, electromotive force and its measurements, reversible electrodes potential, the galvanic cells, types of reversible electrodes , determination of activity coefficient, equilibrium constant, solubility product by e.m.f, concentration cells with and without junction potential types of over potential and its measurements. Electrolysis and electrolytes.

Intended Learning Outcomes

Intellectual Skills	*	consideration of electrical cells
Professional Skills	*	Plating using electrical methods
General Skill	*	Methods of electrical oxidation

Course Contents

1 - This course involves Faradays law of electrolysis , electrical conductance , measurement of conductivity , ion-Kohlruschs law, migration of ions, ionic transport and its determination , application of ion conductance, theories of electrolytes, Debye Huckel theory , mobility of ions Debye-Huckel equation. Reversible and irreversible process, electromotive force and its measurements, reversible electrodes potential, the galvanic cells, types of reversible electrodes , determination of activity coefficient, equilibrium constant, solubility product by e.m.f, concentration cells with and without junction potential types of over potential and its measurements. Electrolysis and electrolytes.

Teaching and Learning Methods

1 - Teaching and discussion

Students Assessment

Assessment Method	TIME	MARKS
Final Exam	2hr	50%
First mid Exam	1hr	20%
Second Exam	1hr	20%
Research		10%

Books and References

Essential books	Physical Chemistry, Eighth Edition © 2006 by Peter Atkins and Julio de Paula

CHEM2114 Practical Inorganic Chemistry(1)

Course type Major Needs **Level** 3 **hours (theoretical)** 0 **hours (practical)** 1

Course Objectives

1 - This course introduce students how to prepare transition complex compounds of some transition elements and how to identify the chemical properties and to identify it by spectroscopic methods

Course Contents

1 - This course is considered as applied practical course in inorganic chemistry, it contain how to prepare macro cyclic complexes for transition elements, where the student will study of the chemical and physical properties of these compounds throughout the semester

Teaching and Learning Methods

1 - Discussion on the blackboard and using projector when needed, and working practical experiment in the laboratory

Students Assessment

Assessment Method	TIME	MARKS
Attendance and working the experiments with reports + final practical exam		50 marks for the attendance with report + 50 marks for exam.

Books and References

Course note	Note: Project Acac

CHEM3317 Inorganic Chemistry(3)

Course type Major Needs **Level** 3 **hours (theoretical)** 3 **hours (practical)** 0

Course Objectives

1 - This course aims to:-
2 - To provide an understanding of the chemistry of the 3d and 4d elements and their increasingly
3 - To provide an understanding of the chemistry of the 4f and 5f elements and their increasingly
4 - To develop an appreciation of how occupancy of the 4f- and 5f-orbitals influences oxidation
5 - To develop an appreciation of how occupancy of the 3d- and 4d-orbitals influences oxidation
6 - An appreciation of the unique chemical, magnetic and spectroscopic properties of the
7 - To illustrate and emphasise the unique chemistry emerging from recent research of

Intended Learning Outcomes

Knowledge and Understanding	* To provide an understanding of the chemistry of the transition elements and inner transition elements and their increasingly technologically important compounds.

Course Contents

1 - Introduction to inorganic chemistry, The group 3_B: scandium,Yttrium, lanthanum, and actinium. The group 4_B: Titanium, zirconium, and hafnium The group 5_B: Vanadium, Niobium, and Tantalum The group 6_B: Chromium, Molybdenum and Tungsten The group 7_B: Manganese, Technetium and Rhenium, The group 8 B: Iron, Ruthenium and Osmium, The group 9 B: Cobalt, Rhodium and Iridium, The group 10 B: Nickel, Palladium and Platinum, The group 1 B: Copper, Silver and gold, The group 2 B: Zinc, cadmium and mercury, Introduction to lanthanides and actinides basic studies
2 - This course deals with transition elements (d-block elements), electronic structure, general characteristic of d-block elements, physical and chemical properties with particular emphasis on the first series of transition elements. This course also deals with the chemistry of lanthanides and actinides.

Teaching and Learning Methods

1 - Teaching using powerpoint
2 - Teaching on board
3 - students activities
4 - Asking and answering dusring the discussion

Students Assessment

Assessment Method	TIME	MARKS
mid term exam (1)	1h	20
mid term exam (2)	1h	20
quizes exam, homeworks and activities	Frequently	10
final exam	2h	50

Books and References

Recommended books	Concise of Inorganic chemistry, by: G.D. Lee
	Advance Inorganic Chemistry, By: Cotton and Welkenson

CHEM3220 Identification Of Organic Compounds

Course type Major Needs **Level** 3 **hours (theoretical)** 2 **hours (practical)** 1

Course Objectives

1 - To teach the student the systematic method of identification of the already described organic compounds.

2 - To give the student an idea bout the steps of identification of the hitherto undescribed organic compounds.

3 - To teach the student with the practical aspects of spectroscopic methods and their employment in structure determination.

Intended Learning Outcomes

Knowledge and Understanding

* The students are expected to have knowledge of chemical and spectral characterization methods of organic compounds, also how to handle chemicals safely.

Course Contents

1 - This course deals with the systematic identification of organic compounds through the determination of their physical, chemical and spectroscopic properties. This can be achieved by carrying out a series of chemical reactions related to the theoretical courses. The spectroscopic methods (NMR, IR, UV and M.S) Should be used in the structure determination.

Teaching and Learning Methods for the Disabled Students

1 -

Students Assessment

Assessment Method	TIME	MARKS
1- Quizzes and reports 45%		
2- Midterm 15%		
3- Final exam 40%		

Books and References

Recommended books The systematic identification of organic compounds, 6th. Ed. Ralph L. Shriner.

CHEM3223 Herterocyclis Chemistry

Course type Major Needs **Level** 3 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - To give the student good knowledge of all systems of nomenclature of heterocyclic compounds.

2 - To give the student good knowledge of the chemistry of five and six membered heterocyclic ring systems.

3 - To familiarize the student with all methods of synthesis of heterocyclic compounds

Intended Learning Outcomes

Knowledge and Understanding

* The student is expected to have good knowledge of reactions and all methods of preparation of heterocyclic compounds.
* The student is expected to have good idea of correlation between chemistry and structure

Course Contents

1 - This course offers extensive study of all methods of naming all types of heterocyclic compounds
2 - including all monocyclic systems , bridged alicyclic compounds, spiro alicyclic compounds, aromatic polynuclear systems.
3 - Extensive study of the chemistry of five and six membered heterocyclic compounds. And Study of types of cyclization reactions

Students Assessment

Assessment Method	TIME	MARKS
First midterm 20%		
second midterm 20%		
Quzzes and home works 10%		
Final exam. 50%		

CHEM3210 Computational Chemistry

Course type Major Needs **Level** 3 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - The key objective of this course is to impress upon all the course students, especially experimental and theoretical chemists alike, that being able to code, even a little bit, is very useful, it is important to know at a basic level what the Excel and origin packages actually do. This would help them understand what to make of the output data from the packages. Knowing to code would help them extract and process or organize data from instruments or other code efficiently, thereby becoming a useful tool in their everyday research. Know how to use chemdraw and chem3d software to draw and analyze the chemical compounds
2 - The course participants may use any useful website and books

Intended Learning Outcomes

Knowledge and Understanding

* The key objective of this course is to impress upon all the course students, especially experimental and theoretical chemists alike, that being able to code, even a little bit, is very useful, it is important to know at a basic level what the Excel and origin packages actually do. This would help them understand what to make of the output data from the packages. Knowing to code would help them extract and process or organize data from instruments or other code efficiently, thereby becoming a useful tool in their everyday research. Know how to use chemdraw and chem3d software to draw and analyze the chemical compounds

Course Contents

1 - The course consists of using excel and statistics and different drawing software and calculation software to apply them in chemistry Introduction to Excel, using of excel to represent the chemical results, using of linear regressions to estimate the linear equations Second part consists of using different tools os statistics to estimate the descriptive statistics and to estimate the errors of calculation Third part consists of using chemdraw and chem3d program to draw and calculate different properties of chemical compounds

Teaching and Learning Methods

1 - n lab, lectures and training using computers

Students Assessment

Assessment Method	TIME	MARKS
quizzes	2	10
homework	2	20
med term	1	30
final	1	40

Books and References

Course note	out hands

ISLM4113 Holy Quran (4)

Course type	UNIV Needs	**Level**	3	**hours (theoretical)**	1	**hours (practical)**	0

ISLM3201 Interpretation of Quran

Course type	UNIV Needs	**Level**	3	**hours (theoretical)**	2	**hours (practical)**	0

CHEM4240 Introduction to nano technology

Course type	Major Needs	**Level**	4	**hours (theoretical)**	2	**hours (practical)**	0

Course Contents

1 - The course focuses on the study of the basic concept of nano chemistry and changes of chemical and physical properties due size reduction, and the terminology related to science, nanomaterials and nanotechnology. The students will study the methods of nanoparticle preparation, the most recent tools of nanomaterials characterization, the applications and fictionalization of nanomaterials.

2 - The course focuses on the study of the basic concept of nano chemistry and changes of chemical and physical properties due to size reduction, and the terminology related to science, nanomaterials and nanotechnology. The students will study the methods of nanoparticle preparation, the most recent tools of nanomaterials characterization, the applications and functionalization of nanomaterials.

CHEM4228	Natural Chemistry						
Course type	Major Needs	**Level**	4	**hours (theoretical)**	2	**hours (practical)**	0

Course Objectives

1 - To give the student knowledge of natural product compounds.

2 - To give the student good knowledge all methods of separation and purification of natural products.

3 - To familiarize the student of all methods of structure elucidation both chemical and spectral

Intended Learning Outcomes

Knowledge and Understanding

* The student is expected to have good knowledge of the chemistry of terpenes, alkaloids and steroids .
* The student is expected to have good knowledge of structure elucidation of new compound natural or synthetic

Course Contents

1 - This course offers study of chemistry of natural product compounds with emphasis on three families of natural products including terpenes, alkaloids, and steroids, The study concentrate on methods of separation, and purification and also chemical methods of structure elucidation.

Students Assessment

Assessment Method	TIME	MARKS
First midterm 20%		
Second midterm 20%		
Quizzes and home works 10%		

CHEM4218	Organic synthesis lab.						
Course type	Major Needs	**Level**	4	**hours (theoretical)**	0	**hours (practical)**	2

Course Objectives

1 - 1. To teach the student the proper method of carrying out multi-step preparation techniques that give highest yield and highest purity.1-

2 - 2. to practice the safe handling of chemicals and equipment's.

3 - 3. To practice the student with monitoring the chemical reaction with tlc technique

Intended Learning Outcomes

Knowledge and Understanding

* the student is expected to have skills in carrying out organic peparations and carrying research in the field of organic chemistry

Course Contents

1 - This practical course offers selected organic multi-step synthesis of organic compounds.

2 - The selected experiments cover all topics covered in theoretical organic chemistry,

3 - extensive study of the mechanisms of the selected reactions.

Students Assessment

Assessment Method	TIME	MARKS
Reports quizzes and instructor evaluation 40%		
Final exam 40%		
Miderm 20%		

Books and References

Course note	Department lab. Manual.
Essential books	Vogel,s Textbook of Practical Organic Chemistry. Fifth edition.
Recommended books	. Unitized experiments in the organic chemistry.

CHEM4229 Analytical Chem.(Speacial Topics)

Course type Major Needs **Level** 4 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - Student will have knowledge about water sampling, liquid-liquid phase extraction, solid -Phase extraction and learning the principles of separationand determination methods.

Intended Learning Outcomes

Knowledge and Understanding	*	increase the knowledge and skills of students in special topics of analytical chemistry

Course Contents

1 - This course involves different topics in analytical chemistry including chemical separation such as gas chromatography, High performance liquid chromatography, Supercritical fluid chromatography, paper chromatography, thin layer chromatography, ion exchange chromatography, mass spectrometry and Nuclear magnetic resonance (NMR)

Teaching and Learning Methods

1 - lecture performance

Students Assessment

Assessment Method	TIME	MARKS
first midterm exam	1h	20%
second midterm exam	1h	20%
Homworks and presentations	-----	10%
final exam	2h	50%

Books and References

Course note	special topics in analytical chemistry - Dr. Mazen Hamada

CHEM4225 Colloidal Chemistry

Course type Major Needs **Level** 4 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - What are colloids, Types of colloidal systems., Properties of lyophitic and lyophobic colloids, Methods of preparation the colloids, Properties of colloids : optical , kinetic and electrical, Purification of colloids,Stability of sols, Application of sols, Theories of electric double layer, Interfacial phenomena, Wetting phenomena and application, Basic adsorpation Iso therm, Types of adsorption Isotherm, Theories of adsorpation

Intended Learning Outcomes

Knowledge and Understanding

* 1. Explain what is the meaning of colloids.
* 2. Explain the types and properties of colloids
* 3. Ability to prepare different types of colloid

Course Contents

1 - The following majer topics will be covered in the formal lectures. They are:

Books and References

Essential books

1. Principles of colloid and surface sciences" P.C. Hiemez, R. Rajagopalan, 3a, Ed., Mareel Dekker, New York, 1997
2. Hand book of Surface and colloid chemistry" Third Edition K.S. Birdi, CRC Press, Taylor Francis Group, 2009
3. Handbook of Applied Surface and colloid Chemistry" Volum 2 Krister Holmberge, Dinesh O. Shan, Milan J. Schwuger. John Wiely Sons Ltd. 2002
4. Colloid Science: Principles, Methods and Applications 2nd Edition Terence Gosgrove, Witey Blackwell, 2010
5. Introduction to Applied colloids and surface chemistry" Georgios M. kontogeorgis, Soren kiil, John Willy, Sons, Inc. 2012
6. Introduction to colloid and surface chemistry Fourth Edition Duncan Shaw, Elsevir ltd. 1992

CHEM4224 Catalysis Chemistry

Course type	Major Needs	Level	4	hours (theoretical)	2	hours (practical)	0

Course Contents

1 - Course content The course focuses on the study of important principles and the basic concept of catalysis. Topics are: • The study of the basic concepts, the principles of catalysis, classification the different types of catalysts . • Definition of catalysis, elementary reactions, and catalytic sequences. • Homogeneous catalysis and reaction mechanism. • Heterogeneous catalysis • Concepts and principles of adsorption, desorption, surface area and porosity. • Modern theories for surfaces and surface reactions. • Langmuir-Hinshelwood kinetics. • Kinetic modelling, including model fitting and data treatment.

GEOL3203	Environmental Sciences						
Course type	UNIV Needs	**Level**	4	**hours (theoretical)**	2	**hours (practical)**	0

Course Objectives

1 - The main aim of the course is to classify the components of the environment and its elements and effects (pollution) that affect the ecological balance.

Intended Learning Outcomes

Knowledge and Understanding	*	In this course the students can find out the environment and its elements and components, environmental balance, energy flow in the environment, the environmental envelops, and biogeochemical cycles affecting the ecological balance. As well as local and global pollution issues that lead to ecosystem degradation and the impact of pollution issues on human health. In addition the environmental of Palestine.

Course Contents

1 - Introduction to Environment and Ecology (1)
2 - Outline of earth envelops (2)
3 - Natural biogeochemical cycles in the environment (3)
4 - Environmental pollution (4)
5 - Human health and the environment (5)
6 - The environment of Palestine (6)

Teaching and Learning Methods

1 - Lectures presentation by Power Point Projector
2 - Shore research report on the subject of pollution topic

Students Assessment

Assessment Method	TIME	MARKS
Attendance and participation + short report and search on the subject of pollution + Final Exam		Attendance (10 marks) + report (10 marks) + Final Exam (80 marks)

Books and References

Course note	Lecture notes

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
(1) (Introduction to Environment and Ecology	first and second				
(2)Outline of earth envelops	Third and fourth				
(3)Natural biogeochemical cycles in the environment	Fifth and sixth				
(4)Environmental pollution	Seventh, eighth, ninth and tenth				
(5)Human health and the environment	Eleventh, twelfth, and thirteenth				
(6)The environment of Palestine	Fourteenth and fifteenth				

CHEM4250

Course type Major Needs **Level** 4 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - The objective of the course is learning, developing and using molecular modeling methodologies useful for research work in a variety of areas. The applications of the course range from computational modeling of biomolecules, drug discovery, to nanotechnology, depending on the system of interest.

Intended Learning Outcomes

Knowledge and Understanding
* using different chemistry software

Intellectual Skills
* improve skills

Course Contents

1 - Theoretical basis and practical applications of computational methods relevant to chemical and biochemical research problems. The objective of the course is learning, developing and using molecular modeling methodologies useful for research work in a variety of areas. The applications of the course range from computational modeling of biomolecules, drug discovery, to nanotechnology, depending on the system of interest. We will learn about theoretical concepts and techniques used in modern computational chemistry and biology that includes modeling of energetic interactions between atoms from polarizable to classical to statistical (knowledge-based) formulations that are applied to areas in drug design and discovery, nanotechnology, and other areas of molecular modeling and simulations taking into account the students background and interest.

2 - Introduction to molecular modeling theory, applications and machine learning Simulation methods: Monte Carlo, Molecular dynamics, Docking Force fields: Classical physics-based potentials, Statistical knowledge-based potentials Environment: Simple homogenous and complex molecular systems Interactions: Cheical environments - docking and drug design Machine learning introduction in the context of drug design

Teaching and Learning Methods

1 - Lectures and labs

Students Assessment

Assessment Method	TIME	MARKS
Quizzes	2	10
homework	2	20
med term	1	30
final	1	40

Books and References

Course note	hands out
Essential books	essential of computational chemistry

CHEM4247 NUCLEAR CHEMISTRY

Course type Major Needs **Level** 4 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - Objectives: Students should be able to: 1. Expand their knowledge of the basic information of nuclear chemistry and radiation, radioactive elements, synthesis of elements in nuclear labs., methods and their uses. 2. Be aware of the contributions of chemistry to society. 3. Improve their knowledge of types of radioactive decay, natural decay series, nuclear models, nuclear properties, Mass energy, relationships, nuclear reactions, rates of radioactive decay, interaction of radiation with matter. 4. Improve their knowledge of methods of separation of isotopes 5. Improve their knowledge of instrumentation and Introduction to health – physical applications in nuclear and radiochemistry.

2 - Technical Skills: 1. Access and navigate the internet, including downloading and reading files from websites 2. Use Redbird Mail, including attaching and downloading files from emails 3. Create, save and submit files in commonly used word processing program formats 4. Copy and paste text and other content on a computer Technical Requirements: 1. Computer that you can use for extended periods of time 2. Consistently updated browser (Firefox, Safari, Chrome, Explorer) 3. Up-to-date Flash and Java plug-ins

Intended Learning Outcomes

Knowledge and Understanding	* Learning Outcomes: Upon successful completion of this course the student should be able to: 1. Predict the stability of isotopes and describe their likely decay modes 2. Quantify mass-energy conversions that accompany nuclear reactions 3. Apply appropriate approximations to specific types of successive radioactive decay 4. Understand the similarities and differences be

Course Contents

1 - Course content • Introduction, Nuclear binding energy, Mass defect and binding energy, The average binding energy per nucleon. • Radioactivity, Nuclear emissions, Nuclear transformations, The kinetics of radioactive decay, Units of radioactivity, Artificial isotopes, Bombardment of nuclei by high-energy a-particles and neutrons, Bombardment of nuclei by ‘slow’ neutrons. • Nuclear reactions and their types • Nuclear fission, The fission of uranium, The production of energy by nuclear fission, Nuclear reprocessing, Syntheses of transuranium elements, The separation of radioactive isotopes. Chemical separation, The Szilard–Chalmers effect, • Nuclear fusion, Applications of isotopes, • Kinetic isotope effects, Radiocarbon dating,

2 - Learning Outcomes: Upon successful completion of this course the student should be able to: 1. Predict the stability of isotopes and describe their likely decay modes 2. Quantify mass-energy conversions that accompany nuclear reactions 3. Apply appropriate approximations to specific types of successive radioactive decay 4. Understand the similarities and differences between different types of radiation 5. Understand and communicate the interaction of radiation with matter

Teaching and Learning Methods

1 - Lectures in class, home works and seminars prepared and given by students

Students Assessment

Assessment Method	TIME	MARKS
med term	1	30
final	1	40
Quizzes	2	10
homework	2	20

Books and References

Course note	outhands
Essential books	Modern nuclear chemistry
Recommended books	Radiochemistry and Nuclear Chemistry, 4th Edition by Gregory Choppin, et al.; Academic Press; ISBN-13: 978-0124058972

CHEM3115 Practical Physical Chemistry(2)

Course type Major Needs **Level** 4 **hours (theoretical)** 1 **hours (practical)** 0

Course Objectives

1 - The objective of the physical chemistry laboratory (II) course is:
2 - to carry out experiments safely and carefully in the laboratory.
3 - to obtain data accurately and to manipulate the data correctly.
4 - Be proficient in techniques used by practicing chemist
5 - This course also complements and consolidates the theoretical knowledge acquired in the physical chemistry laboratory (II) lecture course.

Intended Learning Outcomes

Intellectual Skills	* Gain general basics and principles of physical chemistry. 2
Professional Skills	* Ability to interpret experimental results, perform calculations on these results, writing reports and draw reasonable conclusions
General Skill	* a. Ability to recognize and solve problems related to chemistry b. Ability to communicate with scientists and nonscientists. c. Demonstrate team-working ability through group projects. d. Demonstrate time-management skills. e. Ability to make effective use of the library and other information resources in chemistry, including the primary literature, tabulated data, and secondary sources such as the internet

Course Contents

1 - Preperaion of Galvanic cell
2 - Measuring of half cell
3 - Calculate the E.M.F of standard electrode.
4 - measuring the conductive solution of weak and strong electrolytes
5 - Electolytic conductance
6 - Refractive index
7 - Potentiometric titration
8 - polarometeric measuring of sucurose
9 - Kinetic studies
10 - Conductometric Titrations

Teaching and Learning Methods

1 - The lab work is organized as follows: 1- Preparing for the experiment. The students should read and understand the laboratory protocol and read suggested reference materials prior to the lab session. In addition, some lab session time will usually be devoted to a discussion of the theory concern the experiment. 2- Running the experiment. Each team is responsible for conducting each experiment under supervision of lecturer. 3- End of the experiment. Preliminary discussion of the experimental outcomes with lecturer. 4- Report.

Students Assessment

Assessment Method	TIME	MARKS
Mid Exam		20%
Attendance and discussion		10%
Homework and project reports		20%
Notebook		10%
Final Exam		40%

Books and References

Course note	Lab manual prepared by Dr Nasser Abu Ghalwa 2003

CHEM4311 Polymer Chemistry

Course type Major Needs **Level** 4 **hours (theoretical)** 0 **hours (practical)** 0

Course Objectives

1 - Polymer chemistry may be one of the most relevant of the sub-disciplines of chemistry for the modern citizen. Very few consumer goods are made without a significant contribution from the spectacular applications of polymers. Modern materials depend on large variety of properties available from polymers. Not only is polymer chemistry eminently practical, it is also fascinating from an academic viewpoint

Intended Learning Outcomes

Knowledge and Understanding

* Students will have a broad knowledge of the principles and concepts of contemporary polymer chemistry
* Students can discuss and define the basic concepts of polymer synthesis
* Students can elucidate the basic reactions in polymer chemistry
* Students can describe the physical properties of different polymers
* Students can describe the different experimental techniques used in the characterization of polymer solutions

Course Contents

1 - the course encompasses the basic concepts of polymer science, natural and synthetic polymers. types of polymerization, blends, copolymerization, polymer solutions, and analysis and characterization of polymers. This course emphasizes on chemistry of synthetic polymers such as fibers, plastics, resins, rubbers, adhesives and latex and study of their physical, chemical and typical applications

Teaching and Learning Methods

1 - The course of (36 hours) lectures and at the end of the semester (6 hours) seminas related to the topics of the course

Students Assessment

Assessment Method	TIME	MARKS
First Mid-Term	According to the academic calendar of the university	20/50
Second Mid-Term	According to the academic calendar of the university	20/50
Attendance and student activity	During the semester	10/50
Final Exam.	According to the academic calendar of the university	50/50

Books and References

Essential books	polymer science V.R.Gowariker
Recommended books	Polymer Science and technology 2nd ed Prentice-Hall 2003

CHEM4232 Environment Chemistry

Course type Major Needs **Level** 4 **hours (theoretical)** 2 **hours (practical)** 0

Course Objectives

1 - expand the knowledge of students in the field of air, soil and water pollution.

2 - students will expand their knowledge and awareness in the environmental issues

Course Contents

1 - This course covers air and water pollution including sources of air pollution, constituents of air atmosphere and air pollutants, photochemical oxidants, carcinogens and aeroallergens..etc. greenhouse effect, sampling air pollutants acid rain and ozone hole. Water pollution, types of environmental chemical analysis, choosing proper methods and conditions for environmental trace analysis, physical and chemical parameters for water quality including COD and BOD. Sources of water pollution including domestic, industrial, and agricultural waste water. Factors affect and allowed the degree of harmfulness. Toxicity and sources of pollution of some interesting elements. Study some cases of water pollutant. Advanced waste water treatment process.

Teaching and Learning Methods

1 - lecture performance

Students Assessment

Assessment Method	TIME	MARKS
Med-term exam	7th week of the course	40%
final exam	14th week of the course	60%

Books and References

Course note	environmental pollution chemistry - Dr. Mazen Hamada

CHEM4171 Seminar

Course type Major Needs **Level** 4 **hours (theoretical)** 1 **hours (practical)** 0

Course Objectives

1 - Give the student Knowledge about using the chemistry literature tools as web sites and research papers
2 - Give the student idea about advanced practical tools used in chemical research
3 - Give the student idea about scientific reasoning, how to solve research problems

Course Contents

1 - The student is given a research project and he is asked to collect the required resources by making a literature survey about this research point
2 - The student is asked to perform the research point practically in the lab
3 - The student give a short seminar about his work

Students Assessment

Assessment Method	TIME	MARKS
project report	3 months	70%
Seminar	30 minutes	30%

Books and References

Other References (Periodical, web sites, ... etc.)	All research resources as web sites , periodicals, advanced scientific books

CHEM4249

Course type	Major Needs	Level	4	hours (theoretical)	2	hours (practical)	0

Course Contents

1 - Polymer physical chemistry
2 - molecular weight distribution and types of polymerization as well as more advanced topics like viscosity
3 - polymer characterization
4 - phase behavior and bulk properties.
5 - Techniques for characterizing molecular weights of polymers
6 - polymer chain statics and solution thermodynamics,
7 - physical and chemical basis of mechanical
8 - thermal, electric and optical properties observed for polymers are also provided

CHEM4334 Spectroscopic and microscopic analysis of che

Course type	Major Needs	Level	4	hours (theoretical)	3	hours (practical)	0

Course Objectives

1	- 1. Provide students a general overview of molecular spectroscopy. Specifically, the underlying principles of spectroscopy are examined using quantum mechanics, the interaction of light and matter, and group theory as starting points. 2. The main focus of this course is the various forms of optical spectroscopy, including rotational, vibrational and electronic spectroscopy, as well as a brief look at photoelectron spectroscopy and lasers. 3. The course finishes with an introduction to radiofrequency spectroscopy techniques, including nuclear magnetic resonance and electron spin resonance.

Intended Learning Outcomes

Knowledge and Understanding	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
	* Final exam 50% Carry marks 30% Assignments 15% Attendance and participation 5%
	* Introduction to Spectroscopy 4th Edition, by Donald L. Pavia, Gary M. Lampman, George S. Kriz and James A. Vyvyan (Author)
Intellectual Skills	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
Professional Skills	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.
General Skill	* Proton magnetic resonance spectrometry .1H NMR, instrumentation and sample handling chemical shift, simple spin coupling of proton to other nuclei, chemical shift equivalence and magnetic equivalence AMX, ABX AND ABC systems with three coupling constant. Strongly and weakly coupled spin systems effects of a chiral center vicinal and germinal coupling in rigid systems spin decoupling shift regents. 13C NMR spectrometry, Interpretation, chemical shifts, spin coupling, peak assignment problem quantitative analysis. New dimensional in NMR (2D3D) 1H-1H connectivity, 1H-13C connectivity, 13C-13C connectivity ultraviolet spectrometry. Theory, sample handling characteristics absorption of organic compounds.

Course Contents

1 - 1. IR- spectroscopy 2. 1H-NMR spectroscopy 3. 13C-NMR spectroscopy 4. 31P-NMR spectroscopy 5. Mass spectroscopy

CHEM4203	Dyes And Dyes Technology						
Course type	Major Needs	Level	4	hours (theoretical)	2	hours (practical)	0

Course Objectives

1 - Knowning what is the meaning and the history of dye
2 - The types of dyes
3 - classification of dyes
4 - Teqnique of dyeing method
5 - Synthesis of dyes
6 - Physical chemistry of dyeing mechanism

Intended Learning Outcomes

Intellectual Skills	*	Ability to recognize and solve problems
Professional Skills	*	Writing research of type of dye and discuss it
General Skill	*	Write the mechanism of synthesis of dye

Course Contents

1 - This course is a natural continuation of dye Chemistry
2 - History of dye chemistry
3 - Basic operation of dyeing method
4 - Types and classification of fibers
5 - Types and classification of dyes based on uses and chemical structure
6 - Methods of dyeing
7 - Physical chemistry of dyeing mechanism
8 - Tecnology of dye

Teaching and Learning Methods

1 - Teaching and disscussion

Students Assessment

Assessment Method	TIME	MARKS
Mid Exam		20%
Secound Exam		20%
Research and discussion		10%
Final Exam		50%

Books and References

Course note	K. Hunger (Editor) Industrial Dyes Chemistry, Properties, Applications