



Signatures & Seals

Undergraduate Study Plan Of Department of Biochemistry

Head
of
Department of Chemistry

Dean
of
Faculty of Sciences

Director
of
Student Affairs

Vice President
of
University of Aleppo

This Document Contains 18 of 18 Pages

First Year

Course Title	T	P	Total
General Mathematics (1)	3	1	4
General Mathematics (2)	3	1	4
General Mathematics (3)	3	1	4
General Mathematics (4)	3	1	4
General Physics (1)	4	3	7
General Physics (2)	4	3	7
General Chemistry (1)	4	3	7
General Chemistry (2)	4	3	7
Foreign Language (1)	4	-	4
Foreign Language (2)	4	-	4
National Culture	4	-	4
Arabic Language	4	-	4
	44	16	60

Second Year

Course Title	T	P	Total
Organic Chemistry (1)	3	3	6
Organic Chemistry (2)	3	3	6
Inorganic Chemistry (1)	3	-	3
Physical Chemistry (1)	3	-	3
Physical Chemistry (2)	3	3	6
Analytical Chemistry (1)	2	4	6
Analytical Chemistry (2)	2	4	6
The Entry into Informatics	2	4	6
Vibrations & Waves	3	3	6
Quantum Chemistry	4	-	4
Physics of solid Material	4	-	4
Foreign Language (3)	4	-	4
	36	24	60

Third Year

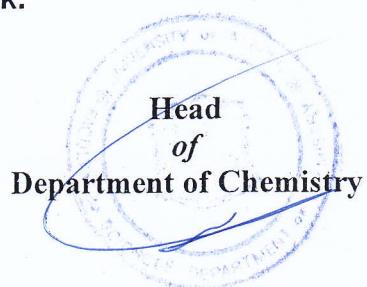
Course Title	T	P	Total
Biochemistry(1)	4	3	7
Biochemistry(2)	3	4	7
Biophysical Chemistry	3	3	6
Bioorganic Chemistry	3	3	6
Botanical and Zoological Cytology	3	3	6
Plant Physiology	3	3	6
Microbiology	3	3	6
Instrumental Analysis	2	4	6
Biotic Environmental Pollution	3	3	6
Foreign Language (4)	4	-	4
	31	29	60

Fourth Year

Course Title	T	P	Total
Biochemistry(3)	4	4	8
Bio analytical Chemistry	3	4	7
Histochemistry and vital Liquors	3	4	7
Molecular biology and principle of genetics	3	3	4
Biotic and alimentary Industries	3	4	7
Secondary Biotic Compounds	3	4	7
Biotechnology	3	-	3
Immunology	3	3	6
Physiology	3	3	6
Foreign Language (5)	4	-	4
	32	29	61

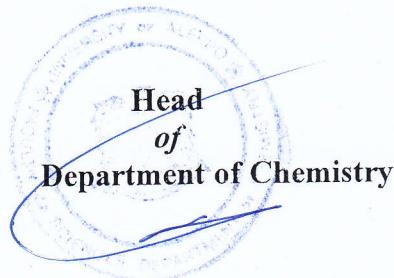
Abbreviations Used:

- T. Theoretical hours each week.
P. Practical hours each week

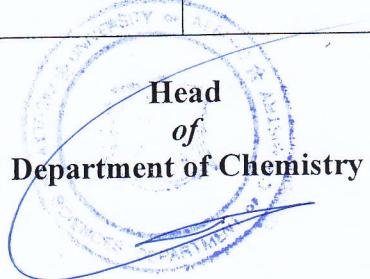


First Year

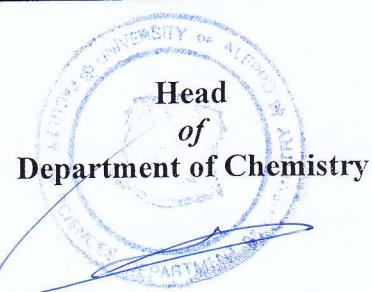
General Mathematics (1) Course Items	General Mathematics (3) Course Items
Algebra <ul style="list-style-type: none"> • Determinants • Matrices • Solution of Linear Systems • Idea about Quadratic Forms Statistics Introduction to Probability <ul style="list-style-type: none"> • Random Variables and Their Probability Distributions • Statistical Measurements of Data • Descriptive Distributions of Measurements 	<ul style="list-style-type: none"> • Indefinite Integrations • Definite Integrations • Applications of Integrations • Multiple and Curved Integrations • Differential Equations
General Mathematics (2) Course Items	General Mathematics (4) Course Items
Differential <ul style="list-style-type: none"> • Fundamentals of Differential • Limits and Functions Continuity • Derivation and Differential • Real Functions of Two or More Variables Analytical Geometry in Space <ul style="list-style-type: none"> • Vectors and Coordinates in Plane and Space • Straight-Line in Space • Plane in Space and Its Determination Methods • General Equation of Second-Degree Curves in Plane and Their Classification • Second-Degree Surfaces • Sphere and Ellipsoids 	<ul style="list-style-type: none"> • Sequences • Indefinite Series • Fourier's Series • Errors • Approximated Solutions of Algebraic Equations • The Solution of Linear Algebraic Equations Systems • Functions Approximation by Interpolation • Numerical Derivation and Integration • The Numerical Solution of Differential Equations



General Chemistry (1) Course Items:	General Chemistry (2) Course Items:
<p>Theoretical Part :</p> <p>Part one : The Principles of Structural Chemistry</p> <ul style="list-style-type: none"> • Atomic Structure • New Quantum Theory and the Atom Structure • Periodic Table and Periodic Properties of Elements • Chemical Bond; Covalent Bond • Orient Bonds and the Least Repulsion Rule; Hybrid Orbitals • Coordinate Bond and the Electronic Structure of Coordinate Compounds • Ionic and Metallic Bond. <p>Part two: General Chemistry</p> <ul style="list-style-type: none"> • Gases and Their Properties. • Principles of Chemical Thermodynamics • Kinetics of Chemical Reactions. • Reversible Reactions and Chemical Equilibrium • Liquids and Solutions • Ionic Equilibria in Solutions • Oxidation-Reduction Reactions • Electrochemistry. <p>Practical Part:</p> <ul style="list-style-type: none"> • Principles of Laboratory Work • Dealing with Tubes. • Determination Some Physical and Chemical Properties. • Matter Conservation Law. • Thermochemistry (Neutralization Heat- Solubility Heat). • Studying the Kinetic of the First-Order Reactions. • Studying the Relation among Reaction Velocity, Concentration and Temperature. • Chemical Equilibrium and • Le Chatelier's Principle. • The pH of Solutions and Buffers. • Salts Hydrolysis. • Ionic Equilibria in Heterogeneous Systems (Solubility Product Constant). • Volumetric Analysis 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Metallic and Hydrogen Bond and Van der Waals Forces. • Oxidation and Reduction. • Acids and Bases. • Hydrogen. • Oxygen. • Ozone. • Water. • Hydrogen Peroxide. • (IA- IIA- IIIA- IVA- VA- VIA- VIIA- VIIIA) Group Elements. • Principles of Nuclear Chemistry. <p>Practical Part:</p> <ul style="list-style-type: none"> • Oxidation-Reduction Reactions. • Oxidation-Reduction Titration. • (IA- IIA- IIIA- IVA- VA- VIA- VIIA) Group Elements. • Hydrogen. • Oxygen. • Hydrogen Peroxide. • Water Hardness. • Cations.

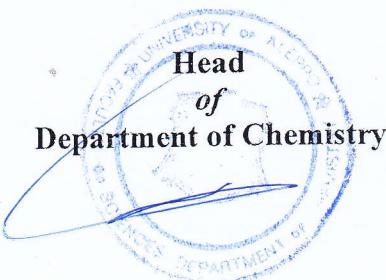


General Physics (1) Course Items	General Physics (2) Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Entry Into Measuring Systems • Vector Principles and Radical Analysis • Motion and Dynamics Work • Energy and Conservation Laws • Momentum Conservation of Isolated and In-isolated Systems • Angular Momentum and Inertia Moment of Bodies. • Motion in the Field of Central Forces • Primary Principles in Relativity Theory • Heat • Kinetic Theory • Matter Properties • Fluids Mechanics • Capillary Properties • Phenomena of Surface Tension <p>Practical Part:</p> <ul style="list-style-type: none"> • Free Fall- Projectile Motion. • The Translation Rectilinear. • Attwood's Machine- Friction Coefficient. • The Simple Pendulum • The Compound Pendulum. • The Spiral Spring. • The Connection of Spiral Springs. • Linear Expansion of Solids. • Specific Heat of Liquid by Cooling Method. • Latent Heat of Water Vaporization. • Thermal Conductivity of Good Conduction Matter. • Thermal Conductivity of Bad Conduction Matter. • Boyle-Marriott Law. • Cldment-Desormes Experiment. • Verification of the Exponential Law in Physics. • Viscosity Coefficient. • Surface Tension- Sound Velocity in Air. 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Vector Analysis • Entry into Electrical Physics • Fundamentals of Static Electricity • Electric Field and Potential of Point Charges • Electric Field and Potential of Continuous Charges Distribution • Capacitance and Capacitors • Direct Current • Fundamental of Static Magnetism • Electric Current in Semiconductors <p>Practical Part:</p> <ul style="list-style-type: none"> • Theoretical Principles. • The Parallel-Plate Capacitor • Cathode-Ray Oscilloscope. • Measuring of Unknown Capacitance Using Desauty Bridge. • Measuring of resistivity Using Side-Wire Wheatstone Bridge. • Ohm's Law. • Joule's Law. • Measuring the Thermal Resistance Coefficient of Metallic Conductor. • Measuring the E.M.F. and Internal Resistance of DC Generator. • Thermocouple. • Electrical Conductivity in Solutions. • Kirchhoff's Laws in Networks. • Tangent Galvanometer. • The Magnetic Field of a Straight Current-Carrying Conductor • The Magnetic Field of a Circular Coil Current-Carrying. • Measuring the Magnetic Induction in an Air Gap and Determination of Relative Permeability. • Faraday's Law of Induction. • The Dynamic Properties of Di-electrode Lamp.



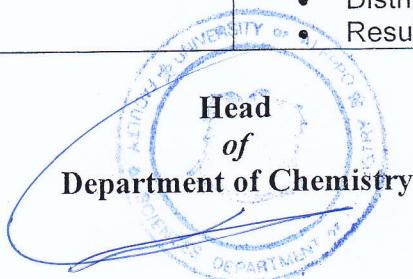
Second Year

Organic Chemistry (1) Course Items	Organic Chemistry (2) Course Items
<p>Theoretical Part:</p> <p>General Principles Alkanes Stereochemistry Alkenes Alkynes (Acetylenes) Benzene and Aromatic Hydrocarbons The Reaction of Aromatic Compounds Organic Halides Simple Oxygen-Organic Compounds</p> <ul style="list-style-type: none"> • Alcohol • Phenols • Ethers • Thiols and sulfides <p>Simple carbonyl Compounds</p> <ul style="list-style-type: none"> • Aldehydes • ketones <p>Carboxylic Acids Derivatives of Carboxylic Acids Amines</p> <p>Practical Part:</p> <p>Primary Instructions Purification by Crystallization Distillation Sublimation Physical Constants of Organic Compounds Extraction Chromatography Qualitative Elementary Detection Hydrocarbons, Preparation and Properties Functional Detection General Applications</p> <ul style="list-style-type: none"> • Amides hydrolysis • The oxidation of secondary alcohol to a ketone <p>Purification of Organic Solutions</p>	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Chemical Reactivity and Organic Reactions • Studying the Mechanisms of nucleophilic substitution Reaction • Nucleophilic Substitution in Organic Synthesis • The Reactions of aromatic Substitution Synthesis and Reactions of Aromatic Compounds • Nucleophilic Addition Reactions to the Carbonyl Group • Polar Addition Reactions of Carbon-Carbon Multiple Bonds • Molecular Rearrangement Reactions <p>Practical Part:</p> <ul style="list-style-type: none"> • Alkyl Halides • Williamson Synthesis of Ethers • Grignard Reaction • Aldehydes • Ketones • Reduction by Sodium Borohydride • Mixed Aldolic Condensation • Bromination of aromatic Hydrocarbons • Friedel-Crafts Reaction • Nitration of aromatic Compounds • Elimination Reactions of Alkenes • Electrophilic Addition to Alkenes • Pinacolone Rearrangement • Bnzylic Acid Rearrangement • Wagner-Meerwein Rearrangement



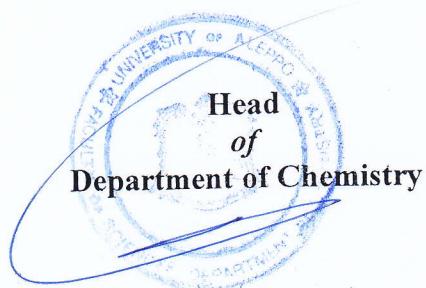
Physical Chemistry (1) Course Items	The Entry Into Informatics Course Items
<ul style="list-style-type: none"> • Definitions and Basic Concepts. • Gases Properties • The First Law of Thermodynamics. • Thermochemistry • The Second Law of Thermodynamics. • The Kinetic Theory of Gases • Statistical Thermodynamics 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Basic Structure of Computer and its Mechanism. • The Principles of Algorithms and Programming Languages. • The Principles of Basic Language • Some Applications of Informatics. <p>Practical Part:</p> <ul style="list-style-type: none"> • Operating system Win98 & Win9x • Microsoft Office

Inorganic Chemistry (1) Course Items	Physical Chemistry (2) Course Items
<p>Atomic Groups.</p> <ul style="list-style-type: none"> • Particle-wave concept of radiation • Particle-wave concept of particles. • Atomic spectra (absorption and emission). <p>Wave Mechanics</p> <p>Periodic Table and Electronic Structure.</p> <p>Molecular Structure</p> <ul style="list-style-type: none"> • Valence bond method • Molecular orbital method • Diatomic molecules • Tri-admit linear molecules • Trigonal molecules • Tetrahedral molecules • Bi-tetrahedral molecules. • Bonding in molecules of organic compounds <p>Crystalline Structure and Ionic Bond.</p> <ul style="list-style-type: none"> • The ionic bond • The ionic radii • The crystalline structure <p>Methods of Studying the Ionic and Molecular Structure in Solid State.</p>	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Liquid and Colloidal Systems • Physical Transformation of Pure Substances • Solutions • The Equilibrium of Solution-Gas, Solution-Solid and Solution • Solution Components • Gibbs Function and Equilibrium in Physico-Chemical Systems • Chemical Equilibrium in Different Systems. • Changes of State and the Phases Rule <p>Practical Part:</p> <ul style="list-style-type: none"> • Specific Masses of Liquids and Partial Molecular Volumes • Molecules Polarization and Refractive Index. • Liquids Viscosity • Surface Tension of Pure Liquids and Its Dependence on Temperature. "Heterogeneous Equilibria in One and Two Components Systems". • Thermochemistry • Saturated Vapor Pressure. • Completely Miscible Liquids. • Limited Miscible Liquids • Alloys; Thermal Analysis. "Heterogeneous Equilibria in Three Components Systems" • Limited Miscible Liquids • Distribution Law • Results Treatment



Quantum Chemistry Course Items	Vibrations & Waves Course Items
<ul style="list-style-type: none"> • Atom structure • Black mass releasing • Quantum theory • Thomson pattern • Rutherford pattern • Wavy Mechanic • Heisenberg principle • Schrödinger equilibrium • Born Theory • Wavelike equilibrium theory • Crystalline structure • Ionic and molecular structure 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Geometrical Optics. • Wave Theory of Light • The Interference between Two Beams of Light • Light Diffraction. • The Special Relativity Theory. • Electromagnetic Radiation. • Hydrogen Atom. • Optical Spectrum • X-ray <p>Practical Part:</p> <ul style="list-style-type: none"> • Measurements and Their Errors; Representation of Experimental Data. • Induced Potential. • Transformer. • Hysteresis Cycle. • Voltage Attenuator. • Ohm's Law of Alternating Current. • Measuring of Unknown Impedance by Bridge Method • Resonance on Series. • Resonance on Parallel. • Thin Lenses.

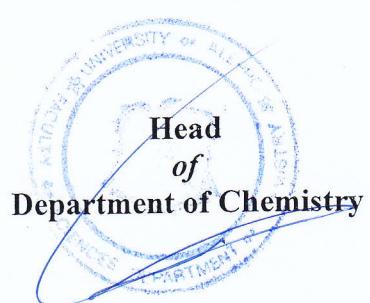
Physics of Solid Material Course Items
<ul style="list-style-type: none"> • Science of Crystals • X-ray diffraction in crystals and its usage in study of crystalline structure • Theory of free electrons • Theory of energy bands • Magnetism properties of solid material • Laser and its application on substance



Analytical Chemistry (1) Course Items	Analytical Chemistry (1) Course Items
Theoretical Part: Introduction to Analytical Chemistry. <ul style="list-style-type: none"> • Methods of analytical chemistry • Methods of carrying out analytical reactions • Reactions conditions. • Sensitivity and specificity of reactions • Fractional and systematic analysis. • Solutions concentrations Techniques of Qualitative Analysis <ul style="list-style-type: none"> • Drop method (spot test). • Microcrystalloscopic method • Optical spectroscopic methods • Separation methods. General Concepts of Chemical Equilibrium. <ul style="list-style-type: none"> • Chemical reactions; the rate concept. • Le Chatelier's principle. • Temperature effect on equilibrium constants. • Pressure effect on equilibrium constants. • Concentrations effect on equilibria. • Catalysts. • Completeness of reactions. • Equilibrium constants for dissociating species • Calculations using equilibrium constants. • The common ion effect. • Activity and activity coefficients. • Thermodynamics equilibrium constant Equilibrium in Heterogeneous Systems <ul style="list-style-type: none"> • Solubility of solid electrolytes; the solubility product. • Factors that affect on solubility. • Applications of solubility product; precipitation 	<ul style="list-style-type: none"> • The effect of various factors on completeness of precipitation. • Fractional precipitation. Acid-Base Equilibria: <ul style="list-style-type: none"> • Aqueous acid-base theories • Non-aqueous solvents. • Acid-base equilibria in water. • The pH scale. • Weak acids and bases. • Salts of weak acids and bases. • Buffers. • Polyrotic acids and their salts. • The diverse ion effect on acids: K_a° Complexes in Qualitative Analysis. <ul style="list-style-type: none"> • Inorganic complexes. • The stability of complexes. • The inner complexes. • Properties of inner complexes. Using of organic chelate detectors in detecting and separation of ions. Expression of Analytical Results. <ul style="list-style-type: none"> • Solid samples. • Liquid samples. Practical Part: Terms and Operations Used in Chemical Analysis. First Group Ions (Ag^+ , Pb_2^{2+} , Hg_2^{2+}). Second Group Ions (Hg^{2+} , Cu^{2+} , Cd^{2+} , Bi^{3+} , As^{3+} , As^{5+} , Sn^{2+} , Sn^{4+} , Sb^{3+}). Third Group Ions (Al^{3+} , Cr^{3+} , Fe^{3+} , Fe^{2+}). Fourth Group Ions (Co^{2+} , Ni^{2+} , Mn^{2+} , Zn^{2+}) Fifth Group Ions (Ca^{2+} , Sr^{2+} , Ba^{2+}). Sixth Group Ions (K^+ , Na^+ , NH_4^+ , Mg^{2+}). Qualitative Analysis of Anions. <ul style="list-style-type: none"> • First group anions (CO_3^{2-}, S^{2-}, $\text{S}_2\text{O}_3^{2-}$) • Second group anions (SO_4^{2-}, SO_3^{2-}, CrO_4^{2-}, PO_4^{3-}). • Third group anions (Cl^-, Br^-, SCN^-). • Fourth group anions (CH_3COO^-, NO_3^-)

Head
of
Department of Chemistry

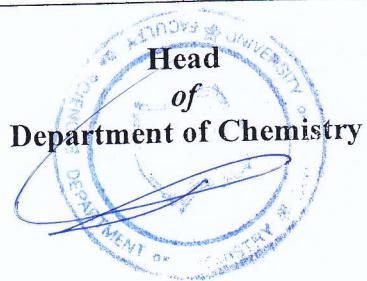
Analytical Chemistry (2) Course Items	Analytical Chemistry (2) Course Items
<p>Theoretical Part:</p> <p>Part One: The Basic Principles of Analytical Chemistry</p> <p>Part Two: Quantitative Volumetric Analysis:</p> <p>Fundamentals of Quantitative Volumetric Analysis:</p> <ul style="list-style-type: none"> • Reactions of volumetric analysis. • Principles of volumetric analysis and the law of volumetric titration. • Preparation of standard solutions. • Concentration determination in volumetric titrations. • The basic steps in volumetric analysis. <p>Neutralization Titration:</p> <ul style="list-style-type: none"> • The concept of neutralization titration. • The pH indicators. • The curves of neutralization titration. <p>Oxidation-Reduction Titration:</p> <ul style="list-style-type: none"> • Oxidation-reduction reactions and the standard potential. • Nernst equation. • Oxidation-reduction titration. <p>Precipitation Titration:</p> <ul style="list-style-type: none"> • The concept of precipitation titration and its basic conditions. • Methods of determination the end of precipitation titration. • The curves of precipitation titration. 	<p>Complexometric Titration:</p> <ul style="list-style-type: none"> • Basic conditions of Complexometric titration. • Titration by inorganic Complexometric titration. • Titration by organic Complexometric titration. • The curves of Complexometric titration. • Factors that affect on titration curves <p>Part Three: Quantitative Gravimetric Analysis</p> <ul style="list-style-type: none"> • The concept of gravimetric analysis. • Gravimetric analysis by vaporization. • Gravimetric analysis by precipitation <p>Practical Part:</p> <p>Part One: Principles of Laboratory Work</p> <p>Part Two: Quantitative Volumetric Analysis</p> <ul style="list-style-type: none"> • Principles of Quantitative Volumetric Analysis. • Preparation of Standard Solutions and Neutralization Titration. • Oxidation-Reduction Titration. • Precipitation Titration. • Complexometric Titration. <p>Part Three: Quantitative Gravimetric Analysis</p>



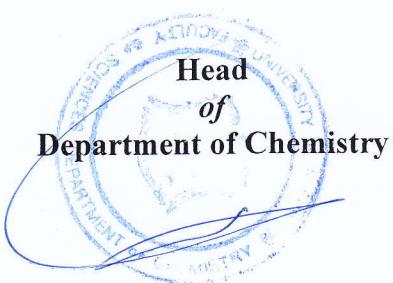
Third Year

Instrumental Analysis Course Items:	Botanical and Zoological Cytology Course Items:
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Electro-chemical analysis • Spectral analysis • Chromatographic analysis • Nucleic Radiographic analysis <p>Practical Part:</p> <ul style="list-style-type: none"> • Calibration by means of Differential Method • Calibration by means of Electric Conductivity Method • Calibration by means of Ph metric Method • Clinometric analysis • Polarization analysis • Visual Spectrum analysis of the colored and uncolored Compounds • Ultraviolet Spectrum analysis • Flames Spectrum analysis • Paper Chromatographic analysis • Analysis using thin Layers • Gas Chromatographic analysis 	<p>Zoological Cytology</p> <ul style="list-style-type: none"> • Introduction in cytology • Methods of cytology study • Chemical composition of the cell • Structure of the cell • Plasma membrane • Endoplasmic reticulum • Mitochondria • Lysosome • Peroxisomes • Ribosomes • Microfilaments and Microtubules • Centrosome <p>Botanical Cytology</p> <ul style="list-style-type: none"> • Cell wall • Prop last Plastids • Chloroplasts Plastids • Chromoplasts Plastids • Leucoplast Plastids • Golgi Apparatus • Organization of nuclear matter in Prokaryotic cells and Eukaryotic cells • Vacuoles in Botanical cells

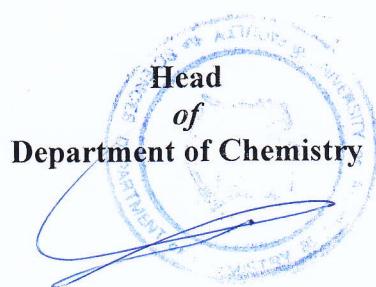
Plant Physiology Course Items:	Microbiology Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Plants and water • Soil, Water and Air • Alimentary Metabolism • Botanical dyes • Photosynthesis • Respiration • Dissolved materials' move in plants • Botanical Hormones • Seeds Germination 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Brief Survey of Micros History • The Development of optical equipments which are used in studying Micros • The structure of Eukaryotic cells Prokaryotic cell • Microbic Metabolism • Genetics in Microbes • Microbic growth and factors which affect it • Classification of Micros • Fungi • Viruses • Water and soil Microbiology



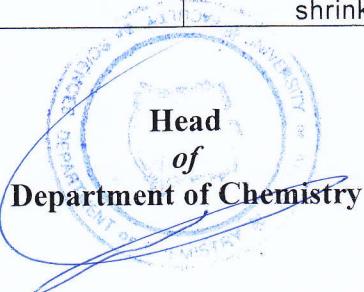
Biochemistry (1) Course Items	Biochemistry (2) Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • History summary of the evolution of bio chemistry • Molecular basics of the regulatory structure of organism • Major components of live matters • Water and regulating solution • Carbohydrates (saccharides) • Lipids (lipoid) • Proteins • Enzymes • Nucleic acids • Coenzymes • Vitamins • Biological membranes <p>Practical Part:</p> <ul style="list-style-type: none"> • Saccharides chemistry • Proteins and amino acids chemistry • Lipids chemistry • Enzymes chemistry • Nucleic acids • Vitamins chemistry • Blood biochemistry 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • General concept of materials metabolism and energy at the organisms • Biological oxidation • Saccharides metabolism • Lipids metabolism • Amino acids and proteins metabolism • Nucleic acids metabolism • Hydraulic and metallic metabolism • Regulative role of the biotic membrane • Hormones and their role in materials metabolism • Reciprocal relation and regulation of materials metabolism • Digestion, absorption and regulation of biotic activities <p>Practical Part:</p> <ul style="list-style-type: none"> • Quantum analysis • Digestion biochemistry • Energy metabolism (Bio-energy) • Saccharides metabolism (Saccharides quantum definition and results of their metabolism) • Lipids metabolism • Amino acids and proteins metabolism • Metabolism of materials containing non-protein nitrogen compounds • Hormones (materials metabolism regulators)



Biotic Environmental Pollution Course Items:	Bioorganic Chemistry Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Introduction about the Biotic Environmental Pollution • Chemical biotic circle of earth • Biotic Environmental changes and their importance • Air Pollution • Water Pollution • Soil Pollution • Radiological Pollution • Noise Pollution <p>Practical Part:</p> <ul style="list-style-type: none"> • Specifying Water Pollution by Heavy Elements • Specifying Water Pollution by Organic Compounds • Specifying Water Pollution by Contaminated Ions • Specifying Water Pollution by Spectrum Methods 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • The nomenclature of some new organic compounds. • Terpenes and their natural derivatives • Amino acids, Protein and Peptides • Nucleic Acids • Heterocyclic compounds • Biological membranes • Biotic regulators of low molecular weight <p>Practical Part:</p> <ul style="list-style-type: none"> • Preparing α-bromo propionic acid • Preparing acet anilide • Preparing aspirin • Preparing cinnamonic acid • Deils-Alder reaction • Friedel-Crafts reaction

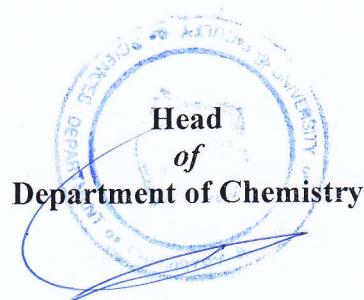


Biophysical Chemistry Course Items	Biophysical Chemistry Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Chemical interactions dynamics, catalyzing by acids and bases. • The effect of temperature on the speed of chemical reaction. • Enzymatic catalyzation, Mikhail's/Minten Relation, and sygmatic motion. • Emulative, non-emulative and coupling inhibition. • Thermodynamics and power transformation in live systems. • Biochemical interactions balance. • Ion balance in water solutions. • Ionization and linking actions of micro and macro particles. • Electrolyte solutions: Their conductivity, their fugitives activity and their accumulative properties. • Electrochemistry: Types and differentials of paths, galvanizing elements and their study thermodynamically. • Membrane balance, permeability of cells and tissues, and active transfer. • Biological membranes and their differentials, and explanation of the neural conductivity • Biological oxidation: Respiratory series, and bio-light operations • Surface activity, surface tension and surface phenomena • Surface active materials, surface membranes, and adsorption from solutions. • Dispersed systems: suspenders, emulsifiers, foam..... • Electrical properties of glutinous materials, and electrical transformation and its usage in Biology. • Vacuum form of proteins and its changes. 	<p>Practical Part:</p> <ul style="list-style-type: none"> • Polymers solutions and the most important molecular/Kinetic and spectral methods in the study of bio-polymers. • Metallic ions in bio-systems. <ul style="list-style-type: none"> • Chemical balance and stabilization constant definition. • Chemical movement and the effect of temperature on reactivity speed. • Dynamics of enzyme medium and inhibition. • Electric conductivity of electrolytic solutions. • Study of aqueous solutions and calibration of multi functions acids and the proteins. • Viscosity method for the study of biotic solutions, and specifying the electrical mildness point of proteins. • Solution pressure of biotic solutions and membrane balance. • Tissues permeability. • Bio-electrical differentials. • Electro-kinetic phenomena. • Surface active materials and surface tension. • Molecular/kinetic and spectral methods in studying the biologic systems. • Degree of turbidity and light dispersion in the polymers solutions and glutinous systems. • Light attraction level rotation as a method for studying the biological interactions. • Preparation of ideal glutinous solutions and biopolymer solutions and study of their stability. • Preparation of emulsifiers and foam and study of their properties. • Study of gelatin formation process • Study of tissues swelling and shrinking

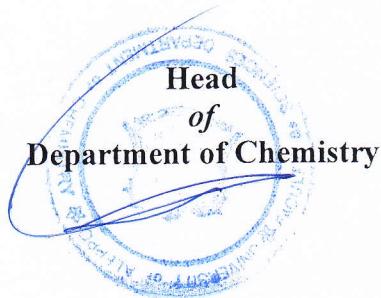


Fourth Year

Biotechnology Course Items	Molecular biology and principle of genetics Course Items
<p>Biochemical Technologies</p> <p>Molecular Markers</p> <p>Genetic Markers:</p> <ul style="list-style-type: none"> • RFLP (Restriction Fragment Length Polymorphism) • PCR (Polymerase Chain Reaction) • RAPD (Random Amplified Polymorphism) • AFLP (Amplified Fragment Length Polymorphism) • SSR (Simple Sequence Repeat) <p>Genetic Maps</p> <p>Genetic Engineering</p> <p>Enzymatic Processes in Industry</p> <p>Kinetic Bases of Microbiological Processes</p> <p>Molecular Genetics and biotic Construction of E.Coli</p> <p>Development of micro organism and Metabolism Processes</p> <p>Biotechnology of Pharmaceutical Products</p> <p>Biochemical Principles of Pharmaceutical forms technology</p> <p>Advance application in the field of Food Industry</p>	<p>• Introduction of Molecular biology and Genetics</p> <p>• Mendel's and Hybridization principles</p> <p>• Sex linkage genetics</p> <p>• Chromosomes and chemical Structure of genes</p> <p>• Gene expression and protein Synthesis</p> <p>• Blood Group type genetics</p> <p>• Genetics Diseases</p> <p>• Bacterial Genetics</p> <p>• Gene Mutation</p> <p>• Applied Sciences of Industrial Genes Synthesis</p> <p>• Cloning and Chromosome mapping</p>

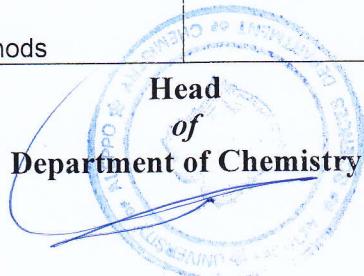


Immunology Course Items	Histochemistry and vital Liquors Course Items
<p>Immune system</p> <p>Unspecific Immunity</p> <ul style="list-style-type: none"> • Phagocytosis • Complement • Inflammatory <p>Specific Immunity</p> <ul style="list-style-type: none"> • Antibodies • Antigens • Humoral Immunity • Cell mediated Immunity <p>Immune Response</p> <ul style="list-style-type: none"> • Mechanism of Immune Response • Recognition of the self and not self • MHC and their importance in Immune system • Mechanism of MHC <p>Immune Diagnostic</p> <ul style="list-style-type: none"> • Direct Methods • Indirect Methods <p>Immune Diseases</p> <ul style="list-style-type: none"> • Hypersensitivity • Autoimmunity • Acquired and Connatal Immunodeficiency • Graft Rejection • Aids (Acquired Immune Deficiency Syndrome) • Immunity and Tumors <p>Practical Part:</p> <ul style="list-style-type: none"> • (ASO- CRP- Rf- C3- H.C.V- Hbs Ag) • Toxoplasma disease • Gruber- Widal test • Wright test • Hydatid disease • Pregnancy Test (HCG) 	<p>Histochemistry</p> <p>Bases of Histochemistry</p> <ul style="list-style-type: none"> • Preparatory procedures • Histochemical Reaction <p>Fixation</p> <ul style="list-style-type: none"> • methods of Fixation • Fixatives <p>Main Tissues</p> <ul style="list-style-type: none"> • Epithelial Tissue • Connective Tissue • Muscular Tissue • Nervous Tissue <p>Main chemical compounds of Tissues</p> <ul style="list-style-type: none"> • Proteins • Amino Acids • Carbohydrates • Fates • Enzymes • Nucleic Acids • Mineral Elements and Dyes <p>Vital liquors</p> <p>Main Lacunae Liquor</p> <ul style="list-style-type: none"> • Chemical Composition • Equilibrium of Water • Electro-Equilibrium • Xerosis <p>Gastrointestinal tract's Secreta</p> <ul style="list-style-type: none"> • Saliva • Gastric Juice • Pancreatic Juice • Intestinal Juice • Bilious Juice <p>Milk</p> <ul style="list-style-type: none"> • Secretion • Chemical Composition <p>Urea</p> <ul style="list-style-type: none"> • Secretion • Chemical Composition



Biochemistry (3) Course Items	Physiology Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Blood • Hormones • Pathological Chemistry for Water and Ions Metabolism • Pathological Chemistry for Carbohydrates Metabolism • Pathological Chemistry for Protein Metabolism • Pathological Chemistry for Fats • Pathological Chemistry for Nitrogen Compounds • Pathological Chemistry for Enzymes and its Clinical Significance • Pathological Chemistry for Minerals Metabolism <p>Practical Part:</p> <ul style="list-style-type: none"> • Ions Analysis • Electrophoresis • Protein in Urine 24\h • Creatinine in Urine 24\h 	<ul style="list-style-type: none"> • Physiology of Digestion • Physiology of Blood • Physiology of Cardiovascular System • Physiology of Respiration • Physiology of Urinary System • Thermoregulation • Physiology of nervous cell • Physiology of Muscles • Physiology of senses • Physiology of nervous System

Secondary Biotic Compounds Course Items	Biotic and alimentary Industries Course Items
<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Hydro-aromatic Compounds • Phenolic Compounds • Steroids • Terpenes • Gum and Rubber • Alkaloids • Tannins Compounds • Plants growth and development regulators • Herbicides • Antivitamins • Insecticides • Antibiotics • Pheromones • Organic Acids <p>Practical Part:</p> <ul style="list-style-type: none"> • Producing penicillin and lemon acid in Whey • Pectin materials • Chlorophyll estimation • Carotenes extraction • Amygdalins detection • Lignin detection • Tannins detection methods 	<p>Theoretical Part:</p> <ul style="list-style-type: none"> • Water • Lipids • Protein • Carbohydrate • Metallic Elements • Color • Flavor • Consistency • Vitamins • Enzymes • Additives <p>Practical Part:</p> <ul style="list-style-type: none"> • Moisture- Viscosity- Density • Yogurt • starch • Oils and fats • Honeys • Gluten • yeasts • Scientific Trips



Bio analytical Chemistry Course Items

Theoretical Part:

- Expressions of Analytical Results
- Data Handling
- Contemporary Instruments in the Clinical Laboratory
- Photometric Method , Fluorometry, Atomic Absorption, Nephelometry and Turbidimetry
- An Introduction to Clinical Laboratory Immunodiagnostic
- Immunoassay
- Chromatography and Capillary Electrophoresis
- Electrochemistry
- Electrophoresis
- Measurement of Osmolality and Specific Gravity
- Kinetic Methods of Analysis
- Radioimmunoassay
- The Plasma Proteins
- Glucose and Carbohydrates
- Lipids and Lipoproteins
- Calcium, Magnesium and Phosphate in Blood
- Toxicology Testing in the Clinical Laboratory
- Drug Analysis

Practical Part:

- Laboratory Principles and Equipment
- Carbohydrates and Nitrogen Compounds
- Photo-Spectral analysis of Glucose, Urea, Uric acid, creatinine, Ammonia and Protein.... etc.
- Inorganic elements and Blood Gases
- Photometric Spectral analysis of Calcium, Magnesium, Inorganic Phosphorus, Iron, Copper and Zinc
- Sodium, Potassium and Lithium analysis by means of Flame
- Blood Gases analysis
- Specifying the Fats, Cholesterol, Icterus and liver Function tests
- Specifying the Topological material in Blood
- Drug Analysis
- Detection of Treatment Drug in Blood
- Specifying some Medicative Compounds in pharmaceutical Products

