# اللائحة الدراسية:

أ - إلزامى : المستوى الأول / السنة الأولى : يلتزم 60 وحدة موزعة على النحو التالى :
إلزامى 60 انتقالى 0 اختيارى 0

| كود أو رقم المقرر | اسم المقرر | عدد الوحدات | عدد الساعات الأسبوعية | | | الفرقة والمستوى | الفصل الدراسى |
|---|---|---|---|---|---|---|---|
| | | | نظرى | تمرين | عملى | | |
| 101ك | كيمياء عامة غير عضويه / كيمياء عامه | | 4 | 0 | 4 | الفرقة الأولى | الأول |
| 101ف | ضوء- كهربية | | 4 | 1 | 4 | | |
| 101ر | تفاضل وتكامل | | 3 | 2 | 0 | | |
| 102ر | هندسة- استاتيكا | | 4 | 2 | 0 | | |
| 102 ك | كيمياء عامة | | 2 | 0 | 4 | | الثانى |
| 103ك | كيمياء عضوية | | 2 | 0 | 0 | | |
| 102ف | حرارة وخواص مادة - مغناطيسية | | 4 | 1 | 4 | | |
| 103ر | تفاضل عالي - جبر | | 4 | 3 | 0 | | |
| 104ر | ديناميكا | | 3 | 2 | 0 | | |
| 102ل | لغة انجليزية | | 2 | 1 | 0 | | |

المستوى الثانى / السنة الثانية : يلتزم 68 وحدة موزعة على النحو التالى :
إلزامى 68 انتقالى 0 اختيارى 0

| كود أو رقم المقرر | اسم المقرر | عدد الوحدات | عدد الساعات الأسبوعية | | | الفرقة والمستوى | الفصل الدراسى |
|---|---|---|---|---|---|---|---|
| | | | نظرى | تمرين | عملى | | |
| 201ك | الديناميكا الحرارية الكيميائية والاتزان الصنفي | | 3 | 1 | 4 | الفرقة الثانية | الأول |
| 202ك | كيمياء عضوية | | 2 | 1 | 2 | | |
| 201ف | ديناميكا حرارية | | 2 | 0 | 2 | | |
| 205ف | دوائر كهربية وكهراستاتيكية | | 3 | 1 | 4 | | |
| 207ر | رياضيات | | 2 | 1 | 0 | | |
| 201ج | بللورات وبصريات | | 1 | 0 | 2 | | |
| 203ك | كيمياءغير عضوية وتحليلية | | 3 | 1 | 2 | | الثانى |
| 204ك | كيمياء عضوية | | 2 | 1 | 4 | | |
| 203ف | جوامد والكترونيات | | 2 | 1 | 4 | | |
| 206ف | فيزياء ذرية وضوء فيزيائي | | 3 | 1 | 2 | | |
| 208ر | علوم الحاسب | | 1 | 0 | 2 | | |
| 202ج | جيوكيمياء | | 1 | 0 | 2 | | |
| 202ل | لغة انجليزية | | 2 | 1 | 0 | | |
| بدون | حقوق الانسان والمبادئ القانونيه العامه | | 2 | 0 | 0 | | |

**المستوى الثالث / السنة الثالثة : يلتزم 67 وحدة موزعة على النحو التالى :**
**إلزامى 67 انتقالى 0 اختيارى 0**

| كود أو رقم المقرر | اسم المقرر | عدد الوحدات | عدد الساعات الأسبوعية | | | الفرقة والمستوى | الفصل الدراسى |
|---|---|---|---|---|---|---|---|
| | | | نظرى | تمرين | عملى | | |
| 301ك | فيزيائية الكم والكهربية | | 4 | 1 | 0 | الفرقة الثالثة | الأول |
| 302ك | فيزيائية (كيناتيكا التفاعلات والغازات) | | 2 | 0 | 0 | | |
| 303ك | غيرعضوية (العناصرالانتقالية والمتراكبات) | | 3 | 1 | 4 | | |
| 304ك | عضوية( فيزيائية وفراغية) | | 3 | 1 | 4 | | |
| 305ك | عضوية (حلقية متجانسة) | | 2 | 0 | 4 | | |
| 338ر | احتمالات واحصاء | | 1 | 1 | 0 | | |
| بدون | حاسب | | 1 | 0 | 2 | | |
| 306ك | فيزيائية(السطوح والخفز والغرويات) | | 3 | 0 | 0 | | الثانى |
| 307ك | تحليلية (كمية ووزني وخامات) | | 2 | 1 | 4 | | |
| 308ك | طيفيه (الطيف الجزيئي - التحليل الطيفي) | | 3 | 1 | 4 | | |
| 309ك | عضوية (حلقية غير متجانسة وتحليل دقيق) | | 3 | 1 | 2 | | |
| 310ك | عضوية (فلزية - البترول ـ كربوهيدات) | | 3 | 0 | 2 | | |
| 339ر | احتمالات واحصاء | | 1 | 0 | 0 | | |
| 302ل | لغة انجليزية | | 2 | 1 | 0 | | |

**المستوى الرابع / السنة الرابعة : يلتزم 69 وحدة موزعة على النحو التالى :**
**إلزامى 57 انتقالى 0 اختيارى 12**

| كود أو رقم المقرر | اسم المقرر | عدد الوحدات | عدد الساعات الأسبوعية | | | الفرقة والمستوى | الفصل الدراسى |
|---|---|---|---|---|---|---|---|
| | | | نظرى | تمرين | عملى | | |
| 401ك | كيمياء (فيزيائية ضوئية والجوامد) | | 2 | 0 | 8 | الفرقة الرابعة | الأول |
| 402ك | كيمياء غير عضويه (نظرية الترابط وكيمياء المغنطة) | | 2 | 1 | 0 | | |
| 403ك | كيمياء غير عضوية (متقدمه) | | 2 | 0 | 0 | | |
| 404ك | كيمياء عضوية (اصباغ ومنتجات طبيعية ) | | 3 | 0 | 4 | | |
| 405ك | كيمياء عضوية فيزيائية- كيمياء حيوية | | 3 | 1 | 4 | | |
| 406ك | كيمياء فيزيائية (ديناميكا حرارية احصائية وتاكل المعادن) | | 2 | 1 | 4 | | الثانى |
| 408ك | كيمياء غير عضوية (نووية وتطبيقية) | | 2 | 1 | 0 | | |
| 410ك | كيمياء عضوية (طيف المركبات العضويه وبوليمرات ) ـ كيمياء عضوية منتجات طبيعي | | 4 | 1 | 4 | | |
| بدون | بحث او مقال | | 2 | 0 | 0 | | |
| 402ل | لغة انجليزية | | 2 | 1 | 0 | | |
| بدون | حاسب | | 1 | 0 | 2 | | |

# المحتوى العلمى:

**كود أو رقم المقرر :** 101ك
**أسم المقرر : كيمياء عامة غير عضويه / كيمياء عامه**
**المحتويات :**

**Part I: Physical Chemistry (2h/ w);** Introduction of Physical Chemistry, Gaseous state, ThermoChemistry, Chemical equilibria, Solutions, Problems in physical Chemistry, Part II: **Part II: Inorganic Chemistry (2h/ w**); Introduction of Inorganic Chemistry, Chemical Calculations, Atomic spectra and atomic structures, Electronic configuration of atoms, Periodic table and the general prosperities of representitive elements, Oxidation states – types of chemical bonds;
**Part III: (Practical Chemistry) (4h/ w).**

**كود أو رقم المقرر :** 101ف
**أسم المقرر :** ضوء- كهربية
**المحتويات :**

Nature of light, Refraction through lenses, Optical instruments, Dispersion, Photometry,
Charge and matter,Electric current, Electric field for a group of point, Electric field of continuous charges, Electric potential and applications, Condensers, Coulomb's law,Electric field, Electric dipole , Electric field flux and Gauss's law and its applications, transient current.

**كود أو رقم المقرر :** 101ر
**أسم المقرر :** تفاضل وتكامل
**المحتويات :**

Limits and the continuity, Differential trigonometric functions, inverse trigonometric, Limited integration and unlimited, Logarithmic and exponential functions, Hyperbolic functions, Roll Theory and the average value and L'Hopital's rule, Applications Calculus maxima and minima and drawing the curves, Calculation of integration and its applications in the calculation of areas and volumes.

**كود أو رقم المقرر :** 102ر
**أسم المقرر :** هندسة- استاتيكا
**المحتويات :**

Polar and kartezip coordinates in the level systems, A straight line, Operations on the axes of coordinates, Pairs of lines , The circle, Cuttings cone: A – Parabola , The ellipse, Hyperbolic.

**كود أو رقم المقرر :** 102 ك
**أسم المقرر :** كيمياء عامة

**المحتويات :**

**Part I: Physical Chemistry (1h/ w);** Physical Chemistry, The Phenomena of electrolysis, Faraday's laws, Electrical Conductance, EMF وElectrode Potential, Chemical and electrical energy, Cell reaction and electrochemical series, Solid state and crystallographic systems.
**Part II: Inorganic Chemistry (1h/ w);** The VSEPR model, Lewis acid structure and formal charge, Theories of bonding – valence shell electron pair repulsion (VSEPR), valence bond theory (VB), molecular orbital theory (MO) and molecular geometry, Oxidation- reduction reactions.
**Part III: Practical Part(4h/w)**

**كود أو رقم المقرر :** 103ك
**أسم المقرر : كيمياء عضوية**
**المحتويات :**

Introduction to organic chemistry, Nomenclature, preparation and reactions of alkanes, Nomenclature, preparation and reactions of alkenes, Nomenclature, preparation and reactions of alkynes, Nomenclature, preparation and reactions of alcohols, Nomenclature, preparation and reactions of aldehydes and ketones, Nomenclature, preparation and reactions of ethers, Nomenclature, preparation and reactions of carboxylic acids, 9- Nomenclature, preparation and reactions of carboxylic acid derivatives, Nomenclature, preparation and reactions of amines.

**كود أو رقم المقرر :** 102ف
**أسم المقرر :** حرارة وخواص مادة - مغناطيسية
**المحتويات:**

**Part I: Properties of Matter**: Temperature and thermometers, Heat estimation, Thermal expansion, Change of phase, Heat transfer , Kinetic theory of gases, Units and dimensions Fundamental units - Derived units - Dimension theory and its applications Scaler and vectors -Linear motion - Planer motion - Newton`s second law, Simple harmonic motion -SimpMonent of inertia for some bodies- Simple pendulum - Some experiments, Hook`s law-Elasticity modulii-Relation between elasticity modulii-Stress-Strain curves-Some exp, Pressure-Pascal`s rule-Archimede`s rule- Bernoulli`s equation - Surface tension-Some exp., Bernoulli`s equation - Viscosity Poiseuill`s formula- Stokes law-Some experiments.
**Part II; magnetism**; Magnetic elements,angle of dip, The Biot-Savart law, Ampere's law , Applications of magnetic field:i-magnetic field due to a current in a straight conductor , Magnetic field of circular conductor,iii- magnetic field of a solenoid, Magnetic field of a toriod. The force between two complete circuits, Magnetic dipole, Tangent and Helmoholtz galvanometers, Charged particles in magnetic fields, Orbits of charged particles in magnetic fields,applications on motion particles in magnetic fields, i-Cyclotron,ii-q/m of electrons,iii-Hall effect,iv-mass spectrograph, Motion of a conductor in a magnetic field,Faraday law,Self iand mutual nductance, Inductors connection.

**كود أو رقم المقرر :** 103ر
**أسم المقرر :** تفاضل عالي - جبر
**المحتويات :**

Polar coordinates and its applications, The function of two variables, continuity, the derivation and applications, Study of duo integration in different coordinates , Ailing integration , Leibniz's, Taylor and Maclaurin theories.
Introduction to set theory, Relations and mapping functions, Introduction to mathematical logic, Mathematical induction, Partial fractions, Matrices and applications, Complex numbers.

**كود أو رقم المقرر :** 104ر
**أسم المقرر :** ديناميكا
**المحتويات :**

Kinematics of a Particle Rectilinear Motion, Simple Harmonic Motion, Motion of a Variable Mass Particle, Motion in a Resisting Medium, Projectiles Motion, Principle of Virtual Work and Equilibrium Stability.

**كود أو رقم المقرر :** 102-101ل
**أسم المقرر :** لغة انجليزية
المحتويات :

Types of common rocks,Writing paragraph + topic sentence ,Countable and non-countable nouns , Animal cell structure,Punctuation ,The use and non-use of articles + using a Relvative clause, Solar energy - Cohesion + signaling ,Subject verb agreement + Quit & Rather , Lightining

**كود أو رقم المقرر :** 201ك
**أسم المقرر : الديناميكا الحرارية الكيميائية والاتزان الصنفي**
**المحتويات:**

**Chemical Thermodynamics (2h/ w);** The first law of thermodynamic, reversible and irreversible processes, The second law of thermodynamics, carnot cycle, quantitative measurement and entropy, The third law of thermodynamics, free energy function, Helmoholty and Gibbs free energy. Vant Hoff equation – Clapeyren and Clausius – Clapeyron equations.
**Phase rule (1h/ w);** Introduction of phase rule, 2- Gibbs phase rule and phase diagrams, Phase diagrams in one component system, Binary phase diagrams – Binary eutectic systems, Solid solution binary phase diagrams, 6- Phase diagrams of three component system.
**Part II: Practical (4h/ w).**

**كود أو رقم المقرر :** 202ك
**أسم المقرر :** كيمياء عضوية

**المحتويات :**

**Aromatic Compounds (2hr/ w);** Nomenclature of aromatic compounds, Methods for preparation of benzene and it's derivatives, Reaction of benzene ring, Phenols, Aromatic alcohols, Aromatic aldehydes and ketones, Aromatic carboxylic acids, Aromatic amines. **Bi-functional compounds (L1h/ w);** Introduction and classification, Nomenclature of the bi-functional compounds, Diol, preparation and properties, Diketones, preparation and proprieties, Hydroxy aldehydic compounds, preparation and proprieties, 6- Hydroxy acid compounds, preparation and proprieties, Dicarboxylic acid compounds, preparation and proprieties, Diamine compounds, preparation and proprieties, 9- β-keto ester compounds, preparation and proprieties.
**Part II: Practical Part (2h/ w).**

**كود أو رقم المقرر :** 201ف
**أسم المقرر :** ديناميكا حرارية
**المحتويات:**

Fundamental concepts of thermodynamics such as : thermodynamic systems , thermodynamic equilibrium , equation of state, internal energy, work, heat, heat capacity and heat enthalpy and ets., First law of thermodynamics, Second law of thermodynamics, Reversible and Kelvin , Entropy, Combined first and second laws of temperature scale thermodynamics , Engines and heat pumps, Third law of thermodynamics.

**كود أو رقم المقرر :** 205ف
**أسم المقرر :** دوائر كهربية وكهراستاتيكية
**المحتويات :**

Inductor-Capacitance-Series-parallel combination-Natural response of RL and RC circuits. Step response of RL and RC circuits-Natural and step response of parallel and series RLC circuits, Induced emf in a rotating coil, Phase and phase difference, Average value, root mean square value,Resistance-capacitance-inductance in AC circuit, Series connections: RC-RL-RLC square value, Resistance-capacitance-inductance in AC circuit, Series connections: RC-RL,-RLC series circuits, Parallel Ac Circuits, Types of filters: Low -pass and high -pass filters- Band-pass and band-stop filters, Power and corrections of power factor, R-L-C resonance in series circuits-quality factor, AC bridges: Wheatston-Owen-Maxwell-Robison-Mutual inductance bridge-Shering bridge, Mutual inductance bridge-She Circuits. Step response of RL and RC circuits-Natural and step. Response of parallel and series RLC circuits.ring bridge, Transient current in electric circuits, Complex impedance and solutions of AC circuits. Vector algebra-Gradient-Vector differen tiation and integration-Divergence,curl ,Coulomb’s law, Electric field-Electrostatic potential,Gauss’s law-Electricin dipole- Multipole expansion of electri, Poisson’s and Laplac eqs. and their solutions,Zonal harmonics, Electrostatic images, Gauss’s law in dielectric, Electric displace ment and susceptibility, Electrostatic energy.

**كود أو رقم المقرر :** 207ر
**أسم المقرر :** رياضيات
**المحتويات :**

Definition of differential equations and basic concepts, First order differential equations part 1, First order differential equations part 2, Second order linear differential equations part 1, Second order linear differential equations part 2, Second order linear differential equations part 3, Systems of differential equations part 1, Systems of differential equations part 2, Laplace transformation part 1, Laplace transformation part 2, Laplace transformation part 3, Series solutions part 1, Series solutions part 2, Series solutions part 3.

**كود أو رقم المقرر :** 201ج
**أسم المقرر :** بللورات وبصريات
**المحتويات :**

**Part I (1h/w) Crystalography** : Introduction of crystalization process and crystal element, study of semetry elment and classification of crystal , Miller idices band crystal forms ,Study of cubic , tetragonal , orthorhombic monoclinic and triclinic systems
**Part II (1h/w) Mineralogy:** Physical Mineralogy, Chemical Mineralogy, Mineral, Chemical formulae of minerals, Hand specimens, Thin sections, X-Ray reflection. Physical Properties of Minerals, Optical ،-Cohesive-, Electrical-, Magnetic-, Thermal-, Radioactivity- properties. Density and Specific Gravity, Taste, Odour, Feel ،Isomorphism, Polymorphism, Pseudomorphism. Origin of Minerals, Classification of Minerals ،Chemical Classification, Silicates Subclasses, Determinative of some Minerals . Rocks, Rock cycle, Igneous-, Sedimentary ،-Metamorphic- rocks, Minerals and Gemstones . Review and open discussions .
**Part III : Practical parts(2h/w)**

**كود أو رقم المقرر :** 203ك
**أسم المقرر :** كيمياءغير عضوية وتحليلية

**المحتويات :**

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| **Part I: Inorganic Chemistry (2h/ w);** Chemistry of S, P- Block elements ( Chemistry of group **I** to **VII** and **O**).<br>**Part II: Analytical Chemistry;** Neutralization Titrations, Oxidation-Reduction Titrations, Precipitation Titrations, Complexation Titrations.<br>**Part III: Practical part.** |

**كود أو رقم المقرر :** 204ك
**أسم المقرر :** كيمياء عضوية
**المحتويات :**

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| **Physical Organic (2h/ w);** Bond Polarity and Inductive Effect, Resonance Effect and Hyperconjugation, Aromaticity, Hydrogen Bonding, Electrophilic Addition, Free Radical Addition, Acidity of carboxylic acids, Acidity of Phenols, Acidity Carbon Acids, Organic Bases, Nucleophilic substitution, Elimination Of Haloalkane, Dehydration of Alcohol.<br>**Part II: Practical (4h/ w)** |

**كود أو رقم المقرر :** 203ف
**أسم المقرر :** جوامد والكترونيات
**المحتويات :**

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| Introduction, The structure of Atom,Band Theory of Solids. Intrinsic Semiconductor, The Doping of Semiconductors, P- and N- Type Semiconductors .P-N Junction , Light emitting diodes, The Zener Effect, Some other diodes, Rectification Introduction and Half wave rectifier , Rectification Full wave rectifier, Filters Capacitor Filter, Transistors Construction and Operation, The Common-Emitter Circuit , The Common-Emitter Amplifier , The Common-Collector Amplifier, Transistor Bias. |

**كود أو رقم المقرر :** 206ف
**أسم المقرر :** فيزياء ذرية وضوء فيزيائي
**المحتويات :**

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| Cathode ray, Electromagnitic radiation, Atomic models, Atomic hydrogen spectra, Bohr theory& hydrogen atom, Summerfield theory, Fine Structure , Fine structure Spectra of hydrogen like ions, spectra of alkali atom, Schrodinger wave equation, Simple one-electron atom model, Photo elctric effect**.** Simple harmonic motion, Interference, Diffraction of light, Polarization of ligh**.** |

**كود أو رقم المقرر :** 208ر
**أسم المقرر :** علوم الحاسب

**المحتويات :**

writing a program and Variables in an OOP , Flow Control and more variables, Functions and Debugging , Intro to OOP and Classes , Class members and More Classes , Events and Using Windows and Controls.

**كود أو رقم المقرر :** 202ج
**أسم المقرر :** جيوكيمياء
**المحتويات :**

Introduction & History of the earth. The relation between the Earth and the Universe ،Interior structure of the Earth. Crystal Chemistry, REE (Rare Earth Elements (chemistry). Geochemistry of igneous rocks and age dating. Geochemistry of atmosphere. Weathering Process. Introduction of Surface and subsurface features. Revisions.

**كود أو رقم المقرر :**201- 202ل
**أسم المقرر :** لغة انجليزية
**المحتويات:**

Introduction. Reading Comprehension Passages. Vocabulary Building. Grammar Section.Translation Passages. Revision.

**كود أو رقم المقرر :** بدون
**أسم المقرر :** حقوق الانسان والمبادئ القانونيه العامه
**المحتويات :**

Identification of human rights and its international importance,Types of human rights
Human rights in Islam religion and comparative legislation,Mechanisms of human rights protection.

**كود أو رقم المقرر :** 301ك
**أسم المقرر :** فيزيائية الكم والكهربية
**المحتويات :**

**Part I: Quantum chemistry (2h/ w);** Introduction of quantum chemistry – Schrodinger equation, Approximate methods of quantum chemistry, Many electron atoms, Angular momentum of many – particle systems – spin – electron interaction, Molecules and chemical bonding, Molecular and valency bond theories, Directed valence and hybridization in simple polyatomic molecules – scattering theory.
**Part II: Electrochemistry (2h/ w);** Introduction of electrochemistry, Reversible galvanic cells – electromotive force EMF and it's measurements, Types of electrochemical cells, Application of EMF measurements.

**كود أو رقم المقرر :** 302ك
**أسم المقرر :** فيزيائية (كيناتيكا التفاعلات والغازات)

**المحتويات :**

**Part I: Chemical kinetics (1h/ w);** Rate of reaction, The determination of the reaction order, Kinetics of simultaneous reactions, Energy of activation, Arrhenius equation, A theoretical approach & chemical kinetics.

**Part II: Kinetic theory of gases (1h/ w);** Kinetic theory of gases, ideal and non-ideal gas model, Liquifaction of gas – critical parametic, Boyl's temperature and Joule Thomson effect, Virial coefficient and law of correspondence, Mean free path and collision frequencies.

**كود أو رقم المقرر :** 303ك

**أسم المقرر :** غيرعضوية (العناصرالانتقالية والمتراكبات)

**المحتويات :**

**Transition metal chemistry (2h/ w);** General properties of transition metal (d-block elements), Chemistry of scandium, titanium, vanadium, chromium, magnanese, iron, cobalt, nickel, copper and zinc groups in term of their electronic configuration, different oxidation states, Physical and chemical properties of the elements and their compounds. Structure of some important compounds – isolation of elements – uses and applications.

**Coordination Chemistry (1h/ w);** Classification of ligands and complexes, Nomenclature – coordination number and stereochemistry of complexes, Preparation and detection of complexes, nature of metal – ligand bonding in complexes, Werner theory of coordination chemistry- Isomerism and coordination numbers of metal complexes.

**Practical part (4h/ w)**

**كود أو رقم المقرر :** 304ك

**أسم المقرر :** عضوية( فيزيائية وفراغية)

**المحتويات :**

**Physical Organic (2h/ w); Unsaturated Conjugated Systems:** Allylic Cation, Allylic Free Radical Alkadienes. **Free Radical Reactions:** Substitution Reactions, Halogenation of Alkanes, Selectivity of Bromine, Halogenation of Benzene, Free radical Addition Reactions.

**Acid-Base Catalyzed Reactions**; Homogenous Catalysts, Acidic Formation and Hydrolysis of Esters, Acidic Formation of Esters, Acidic Hydrolysis of Esters, Tautomerization and Enolate Chemistry, Tautomers, Reaction at α-Carbon, The Aldol Condensation, Hodoform Reaction. **Correlation of Structure with reactivity,** Hammet equation, Hammet Substitution constant, Hammet Brown Constant, Hammet Reaction Constant. **Rearrangement Induced by Cationic or Electron Deficient Heteroatoms:** Cationic Rearrangement, Rearrangement of Electron Deficient Heteroatoms, Rearrangement of Cationic Oxygen, Rearrangement of Cationic Nitrogen,Rearrangement of Acyl nitrene to

Isocyanate, Rearrangement of Acyl Carbenes.
**Steorochemistry (1h/ w);** Introduction of stereochemistry of organic compounds, Chirlity's resolution and analysis of enantiomers and diastereomers, Conformational isomerism and geometrical isomerism, Introduction to stereo selective synthesis and drug design, Stereo selectivity in nature and spectroscopic determination of relative and absolute chirality's.
**Practical part (4h/ w).**

**كود أو رقم المقرر :** 305ك
**أسم المقرر :** عضوية (حلقية متجانسة)
**المحتويات :**

Introduction. Nomenclature of cyclic hydrocarbons. Strain energy of alicyclic hydrocarbons. Bonding in cycloalkanes – angle strain and torsional strain. Consequences of angle strain for cyclic compounds. Stereochemistry and cyclic hydrocarbons. Conformations of cyclohexanes. Axial and equatorial hydrogens in cyclohexane. Conformational equilibria for monosubstituted cyclohexanes. Drawing structures of cyclohexane. Disubstituted cyclohexanes. Reactions of cyclic hydrocarbons. Preparations of cyclic hydrocarbons- small-ring cycloalkanes. Preparation of cyclohexanes - the Diels - Alder reaction

**كود أو رقم المقرر :** 338ر
**أسم المقرر :** احتمالات واحصاء
**المحتويات :**

Descriptive statistics: frequency tables - measures of central tendency - measures of dispersion - standards sprains and kurtosis - regression and correlation - introduction to probability theory - the definition of probability - probability axioms - fundamental principles of harmonic analysis - the conditional probability and independence - the law of total probability and Bayes.

**كود أو رقم المقرر :** بدون
**أسم المقرر :** حاسب
**المحتويات :**

Introduction to database concepts. Create tables and Identify keys, relationships between tablesm, deleting with different queries1, deleting with different queries2, deleting with forms, deleting with reports, deleting with macros. Dealing with SQL part 1. Dealing with SQL part 2. Dealing with SQL part 3. Apply Visual Basic modules part1. Apply Visual Basic modules part 2. Apply Visual Basic modules part 3. Explain and demonstrate Internet features of Access.

**كود أو رقم المقرر :** 306ك
**أسم المقرر :** فيزيائية(السطوح والخفز والغرويات)

**المحتويات :**

**Surface Chemistry (1h/ w);** Liquid interface, surface tension and surface free energy, measurement of surface and interfacial tension, adsorption at liquid interface – surfactants. Liquid – gas interface and liquid – liquid interface. The importance of interfacial free surface science (wetting, detergency, micelle formation, emulsions, microemulsions, foam stability, one flotation……etc.).

**Catalysis (1h/ w);** Heterogonous catalysis, kinetics and mechanisms, absolute rate of surface reaction – surface heterogeneity. Homogeneous catalysis, enzyme catalysis – acid base catalysis.

**Colloidal Chemistry (1h/ w);** Introduction of colloidal chemistry – polydispersity in colloidal system. Osmotic pressure, light scattering (tyndall effect) and sedimentation methods for measuring particale size and particale weight. Preparation and stability of colloidal solutions.

**كود أو رقم المقرر :** 307ك

**أسم المقرر :** تحليلية (كمية ووزني وخامات)

**المحتويات :**

**Analytical chemistry;** Solvent extraction, Chromatography, Efficiency of separation, Potentiometry, Reference electrodes, Membrane indicator electrodes, Potentiometric techniques and applications, Principles of electrolysis, Coulometry.

**Electrochemistry;** Potentiometry - Reference electrodes - Indicator electrodes. Membrane indicator electrodes - measuring electrode potential. Potentiometric techniques and applications - Potentiometric titrations. Principles of electrolysis - Applies voltage required for electrolysis. Predicting electrode reactions - Current voltage behavior during electrolysis. Electrodeposition (Electrogravimetry - Separation at Mercury cathode. Coulometry - The faraday constant - Constant potential coulometry. Polarography (Polarograms - Properties of the dropping mercury electrode). Applications of electroanalytical techniques.

**Practical part**

**كود أو رقم المقرر : 308ك**

**أسم المقرر :** طيفيه (الطيف الجزيئي - التحليل الطيفي)

**المحتويات :**

**Molecular spectroscopy (2h/ w);** Nature and general principle of light. Vibration spectra – electronic spectra, solvent effects on electronic spectra. Basic theory of spectral techniques – infrared, ultraviolet/ visible spectroscopy, nuclear magnetic resonance, mass spectroscopy, Mossbauer spectroscopy and Raman spectra. Applications in determining the structure and bonding of molecular compounds. Spectral interpretation skills for the elucidation of structure.

**Spectroscopic analysis (1h/ w);** Overview of spectroscopic theory and techniques ultra – violet and visible spectroscopy. Atomic absorption and emission. X-ray fluorescence spectroscopy. Infrared spectroscopy application, Raman spectroscopy and it's applications.

**Practical Part (4h/ w).**

**كود أو رقم المقرر :** 309ك

**أسم المقرر :** عضوية (حلقية غير متجانسة وتحليل دقيق)

**المحتويات :**

**Heterocyclic Chemistry (2h/ w);** Common name of different heterocycles synthesis and reaction. Five membered heterocycles with one heteroatom (furan ,pyrrole and thiophene). Synthesis and reaction of five membered. Synthesis and reaction of six membered rings with one heteroatoms (pyran, pyrone and pyridine). Heterocycles with two heteroatoms (pyrazole ,imidazole, thiazole, oxazole and isoxazole). Heterocycles fused to benzene ring (indole ,benzofurane and benzothiophene). Synthesis and reaction of six membered rings with two heteroatoms (pyridazine , pyrimidine and pyrazine).

**Microanalysis (1h/ w);** Introduction of microanalysis. Determination of oxygen function. Determination of nitrogen function. Determination of sulfur function. Determination of unsaturated function. Determination of other function.

**Practical Part.**

**كود أو رقم المقرر :** 310ك

**أسم المقرر :** عضوية (فلزية - البترول ـ كربوهيدات)

**المحتويات :**

**Carbohydrate (1h/ w);** (Monosaccharides) Structure and Nomenclature, Stereochemistry and Configuration, Fisher Projection Formulas, D- and L-Monosaccharides, Amino Sugars, Physical Properties, Modified Monosaccharides, Ketoses, Structure and Stereochemistry of glucose, The Cyclic Structure of Monosaccharides, Mutarotation, Size of the Ring, Haworth Projections, Coformational Representations of Pyranoses, Ascorbic Acid, Conformation Representations, Reactions of Monosaccharides, Condensation Products of Monosaccharides.

**Organometallic Chemistry (1h/ w);** Introduction of organometallic chemistry. Methods for preparation of organometallic compounds. Utilization of

organometallic compounds in organic synthesis. Organometallic compounds of transition metals. **Petroleum Chemistry (1h/ w);** Introduction. What is crude oil and natural gas. Genesis of oil, Biogenic and inorganic theories, Oil deposits and their development. Physical properties of petroleum and its products, (Specific and API gravity-Refractive index-Molecular weight-Flash and fire points - Sulpher content-Aniline point-Diesel index and Cetane number- Octane number) Chemical constituents of oil. Manufacturing processes (Separation processes-Conversion processes-Treating processes). Distillation basics - solvent treatment- absorption –adsorption. Cracking –Reforming. Oil refining. Main oil products ( Liquefied petroleum gases-Gasoline-Kerosine-Gas oil-Lubricating oil-Bitumen and asphaltic material).

**Practical Part**

**كود أو رقم المقرر 339 ر**

**أسم المقرر :** احتمالات واحصاء

**المحتويات :**

Discrete random variables - the cumulative distribution function and its properties - mass function and its properties - mathematical mean and variance and its properties - some discrete distributions such as bernoulli –binomial- poisson - geometric and hyper geometric continuous random variable and its distribution regular - exponential standard normal - $\chi^2$ distribution - t distribution- f distribution.

**كود أو رقم المقرر :** 301 - 302ل

**أسم المقرر :** لغة انجليزية

**المحتويات :**

The migration of birds (Reading),Coral reefs (Reading),Smuggling of Nuclear materials (Reading), Chemical Reactions (Reading),Enquiry (Reading), Argument (Reading); Roots (Vocabulary),Prefixes (Vocabulary), Suffix (Vocabulary),Relative Clauses. (Grammar); Adjectives and Adverbs. (Grammar),Writing A summary (Writing),Summarizing process (Writing), The summary Report (Writing),Cause and Effect Research Paper (Writing)

**مقرر التدريب الصيفى فى معامل القسم و شركات وهيئات خارجية لمدة ثمانية أسابيع**

**كود أو رقم المقرر :** 401ك

**أسم المقرر :** كيمياء (فيزيائية ضوئية والجوامد)

**المحتويات :**

**Solid State Chemistry (1h/ w);** Types and structural types of crystals, packing and coordination number. Crystal defects, nonstoichiometry, solid solutions, crystal structure of solids. Fundamental types of lattices, simple crystal structure, glasses, crystal diffraction by x-rays. Theories of conduction.

**Photochemistry (1h/ w);** Interaction of light with matter, Quantum theory for the absorption of electromagnetic radiation. Fluorescence and phosphorescence. Electronic transitions states. Kinetics of photochemical processes. Flash photolysis. Quenching processes, Stern-Volmer equation, photosenitization rate of energy transfer. Photoragmentation reactions.

**Practical part**

**كود أو رقم المقرر :** 402ك

**أسم المقرر :** كيمياء غير عضويه (نظرية الترابط وكيمياء المغنطة)

**المحتويات :**

**Group theory (1h/ w);** Valency bond, crystal field theory and molecular orbital theories. Applications.

**Magnetochemisty (1h/ w);** Magnetic properties of elements and compounds. Magnetic susceptibility – paramagnetism – diamagnetism – ferromagnetism and antiferres magnetism. Measurement of magnetic moments – the effect of temperature on the magnetic moments – Orbital contribution. The anomalous values of magnetic moments and stereochemistry of complexes – application.

**كود أو رقم المقرر :** 403ك

**أسم المقرر :** كيمياء غير عضوية (متقدمه)

**المحتويات :**

**Advanced Inorganic chemistry (1h/ w);** Symmetry elements and symmetry operations. The point groups for any molecule. Point groups, Infinity groups and High symmetry groups. Multiplications of symmetry operations. Group theory and symmetry in vibrational spectroscopy (IR & NMR). The main characters of lanthanides and actinides. The separation and extractions of lanthanides. The reasons for their position in periodic table and understanding their electronic configurations. The lanthanide contraction and synthesis the lanthanide elements and their binary compounds. The coordination chemistry of lanthanides. The electronic and magnetic properties of lanthanides. The main characters of actinides. Extraction of thorium element. The meaning of enrichment of uranium its isotopes.

**كود أو رقم المقرر :** 404ك

**أسم المقرر :** كيمياء عضوية (اصباغ ومنتجات طبيعية )

**المحتويات :**

**Natural Products (2h/w);** Classes of natural products- biosynthesis of:- Isoprene, monoterpenes sesquiterpenes, diterpens, triterpenes, Carotenoides, Elucidation of the structures and biosynthesis. Steriodes , Elucidation of the structures and Biosynthesis. Sex hormones- Shikimates- ligans- flavone and flavonol.

**Dyes (1h/w);** Relation between color and chemical constitution. Synthesis and application of azo-dyes. Synthesis and application of Desparse dyes. Synthesis and application of Diphenylmethane dyes. Synthesis and application of Triphenylmethane dyes. Synthesis and application of vat dyes.

**Practical Part (4h/w).**

**كود أو رقم المقرر :** 405ك

**أسم المقرر :** كيمياء عضوية فيزيائية- كيمياء حيوية

**المحتويات :**

**Physical Organic (2h/ w);** Orbital symmetry theory. Concerted and stepwise reactions. Molecular orbital theory. General rules for pericyclic reactions. Woodward and selection rules. Frontier Orbital Approach (HOMO & LOMO concepts). The aromatic transition state concept (aromaticity and aromatic character of three, four, five, six, seven, eight and larger carboxylic rings systems, heterocyclic ring systems, non benzenoid aromatics). Electrocyclic reactions. Cycloaddition reactions. Sigmatropic and chelotropic rearrangement.

**Biochemistry (1h/ w);** Lipids, Amino acids, Proteins, Enzymes, Nucleic acid, Haemoproteins.

**Practical Part (4L/ w).**

**كود أو رقم المقرر :** 406ك

**أسم المقرر :** كيمياء فيزيائية (ديناميكا حراريةاحصائية وتاكل المعادن)

**المحتويات :**

**Corrosion Chemistry;** Corrosion defination - Types of corrosion- Thermodynamic principles of corrosion -Pourbaix diagrams. Kinetics of electrochemical corrosion. Measurement of corrosion rate. Cathodic reactions in corrosion of metals. Protection against corrosion.

**Statistical thermodynamics;** Introduction of statistical thermodynamic. Postulates- partition function and thermodynamic statistical mechanics of independent particles. Distribution function in Maxwell-Boltzman. Fermi-Dirac and Bose-Einstein. Classical statistical mechanics – Liouvilles theorem – Intermolecular interaction – application to imperfect gases – Debye – Hukel theory.

**Practical Part.**

**كود أو رقم المقرر :** 407ك

**أسم المقرر :** كيمياء فيزيائية (مقرر اختياري)

**المحتويات :**

**Electrochemistry (1h/ w);** Irreversible process – types lower potential and measurements. Electrode kinetics – tofel equation. Storage cell – fuel cell. Polarograghy theory and applicartion.
**Physical Polymers (1h/ w);** Characterization of monomers and polymers. Kinetics of copolymerization. Reactivity ratios and measurements. Physical properties of polymer. Thermal analysis and degradation of polymers.
**Practical Part (4h/ w).**

**كود أو رقم المقرر :** 408ك
**أسم المقرر :** كيمياء غير عضوية (نووية وتطبيقية)
**المحتويات :**

**Nuclear chemistry (1h/ w);** Properties of nucleus, stability of nucleus. Natural radio reactivity and radioactive series, theory of radioactive distintigation – rate of radioactive decay. Mass and nuclear binding energy. Nuclear reactions. Nuclear fission and fusion. Isotopes – application of radiation chemistry.
**Applied chemistry (1h/ w);** Cement industries, Glass and ceramic industries, sugar industries. Forestry industries, raw materials, major unit operations and the flow of materials through and change with them. Chemicals industries. Iron industries. Water treatment.

**كود أو رقم المقرر :** 409ك
**أسم المقرر :** كيمياء عضوية(مقرر اختياري)
**المحتويات :**

**Heterocyclic Chemistry (2h/ w);** IUPAC name of one ring heterocycles, IUPAC name of fused heterocycles. Synthesis and reaction of fused azole (e.g. fused pyrazole). Synthesis and reaction of benzofused heterocycles. Benzene fused to six membered heterocycles with one heteroatom(quinoline and isoquinoline), Benzene fused to six membered heterocycles with two heteroatoms (quinazoline, quinoxaline, cinnoline and phthalazine).
**Practical part (4h/ w).**

**كود أو رقم المقرر :** 410ك
**أسم المقرر :** كيمياء عضوية (طيف المركبات العضويه وبوليمرات ) ـ كيمياء عضوية منتجات طبيعي
**المحتويات :**

**Polymer Chemistry (1h/ w);** Basic Principals: Introduction, Definitions, Polymerization Processes. Free Radical Vinyl Polymerization: Kinetics of the free radical vinyl polymerization, Free Radical Initiators, Mechanism of the free radical polymerization, Monomer reactivity, Chain transfer, Autoinhibation, Polymerization of Dienes, Copolymerization, Kinetics of the free radical vinyl copolymerization. Ionic Vinyl Polymerization: Cationic Polymerization, Cationic Initiators, Mechanism and Reactivity in Cationic Polymerization. Anionic Polymerization, Anionic Initiators, Mechanism and Reactivity in Anionic Polymerization, Stereochemistry of Anionic Polymerization of Dienes.

Polymerization Techniques: Bulk polymerization, Solution polymerization, Suspension polymerization, Emulsion polymerization. Ring –Opening Polymerization: Cationic Polymerization of Epoxides. Cationic Polymerization of other cyclic Ethers. anionic Polymerization of Epoxides. Polymerization of Lactams. Reaction of Vinyl Polymers : Introduction of New Functional Groups. Conversion of Functional Groups. Ring-Forming Reactions. Cross linking.
**Spectroscopy of organic compounds (1h/ w);** Introduction, overview of spectroscopic theory and techniques. Infrared spectroscopy. Nuclear magnetic resonance spectroscopy (NMR) chemical shift – spin spin coupling – coupling constant – functional groups. Recognition of structural fragments by NMR. $C^{13}$-NMR and $N^{15}$NMR – chemical shifts – problems – application of one – dimensional $H^{1}$NMR spectra – temperature dependent $H^{1}$ and $N^{13}$NMR spectra. Application of $H^{1}$ and $C^{13}$NMR spectra to different macromolecules. Mass spectroscopy, Isotopes, relative abundance mass spectra of organic compounds.
**Natural products (1h/ w);** Introduction to alkaloids. Classification of alkaloids. β-phenylethylamine alkaloids adrenaline, noradrenaline, thyroxine. piperidine alkaloids. pyridine – pyrrolidine alkaloids nicotine. Quinoline alkaloids, quinine and cinchonine. **Practical part (4h/ w).**

**كود أو رقم المقرر :** بدون
**أسم المقرر :** بحث او مقال
**المحتويات :**

Introduction to an essay - Choosing the subject of the essay - Main topics of the essay - Collecting materials - Revisions of the collected materials - Collection of references in the essay - Writing the essay

**كود أو رقم المقرر :** 402-401 ل
**أسم المقرر :** لغة انجليزية
**المحتويات :**

Meteorology,Physics, Chemistry, Matter, Mass and Molecules,For & Against Essays
Opinion Essays, Providing Solutions to Problems Essays, Assessing Good and Bad Points, Gerund and Infinitive, Noun Clauses , Conjunctions and prepositions ,Linking ideas , Structure and cohesion

**كود أو رقم المقرر :** بدون
**أسم المقرر :** حاسب
**المحتويات :**

Introduction to WORLD WIDE WEB (WWW). Internet basics: Internet Protocols
and Internet Services –USENET, GOPHER, WAIS, ARCHIE and VERONICA, IRCWORLD WIDE WEB. HTML Basics: - Introduction to HTML elements, Basic tags, Attributes, creating HTML page, formatting, HTML links, List types and its tags. Creating HTML tables, adding pictures. HTML and page accessibility, colors & background. Advance HTML: - Use of Frames and

Forms in web pages, formatting web pages by using GIF, JPEG getting web and clip arts. Use of interlinks. Introduction to Dreamweaver. More Features of Dreamweaver. Different applications to build homepages using HTML and Dreamweaver.