متطلبات المقررات الدراسية لدرجة البكالوريوس بقسم الكيمياء

1- متطلبات الكلية (13 وحدة دراسية)

رقم المقرر	اسم المقرر	الوحدات	متطلبات المقرر
0010	اللغة العربية	3	....
0101	اللغة الانجليزية 1	3	.....
0102	اللغة الانجليزية2	3	0101
8100	علم الاحياء	4	....

2- متطلبات المقررات الإجبارية العامة (20 وحدة دراسية)

رقم المقرر	اسم المقرر	الوحدات	متطلبات المقرر
1100	رياضيات عامة I	4	.....
1101	رياضيات عامةII	4	1100
2002	الإحصاء العام	4	.....
4101	الفيزياء العامة I (نظري)	3	.....
4102	معمل الفيزياء العامة I	1	....
4103	الفيزياء العامة II (نظري)	3	....
4104	معمل الفيزياء العامة II	1	....

3 - المقررات الداعمة (10 وحدات دراسية)

رقم المقرر	اسم المقرر	الوحدات	متطلبات المقرر
1206	معادلات تفاضلية	3	1101
4208	الضوء	2	4103 – 4101
4216	الكترونات	2	4101 - 4103
9103	علم الحاسوب	3	....

4- متطلبات المقررات الإجبارية (70 وحدة دراسية)

رقم المقرر	اسم المقرر	الوحدات	متطلبات المقرر
5103	الكيمياء العامة I	3	.....
5104	معمل الكيمياء العامة I	1	5103
5105	الكيمياء العامة II	3	5103
5106	معمل الكيمياء العامة II	1	5104 - 5105
5212	كيمياء تحليلية I	3	1101 -5105
5214	كيمياء تحليلية II	3	5212
5215	معمل كيمياء تحليلية I	1	5212
5216	معمل كيمياء تحليلية II	1	5212
5222	كيمياء غير عضويةI	3	5105
5223	كيمياء غير عضويةII	3	5222
5231	كيمياء عضوية I	3	5105
5232	كيمياء عضوية II	3	5231
5233	معمل كيمياء عضوية I	1	5231
5241	كيمياء فيزيائية I	3	5105 -1101
5242	كيمياء فيزيائية II	3	5241
5243	معمل كيمياء فيزيائية I	1	5241
5262	كيمياء حيوية I	3	5232
5263	معمل كيمياء حيوية I	1	5262
5313	كيمياء تحليلية III	3	5214-4208
5314	معمل كيمياء تحليلية III	1	5313-4216
5322	كيمياء غير عضوية III	3	5223
5323	معمل كيمياء غير عضوية I	1	5223
5331	كيمياء عضوية III	3	5232
5332	معمل كيمياء عضوية II	1	5233-5232
5342	كيمياء فيزيائية III	3	1206-4208-5242
5343	معمل كيمياء فيزيائية II	1	5243-5242-5342
5347	كيمياء فيزيائية IV	3	1206-5342
5363	كيمياء حيوية II	3	5262
5425	كيمياء غير عضوية IV	3	5342-5223
5437	كيمياء عضوية IV	3	5342-5331
5438	معمل كيمياء عضوية III	1	5332-5331

5447	معمل كيمياء فيزيائية III	1	5347-5342-5343-5242

4- متطلبات المقررات الاختيارية ينجز منها الطالب (18 وحدة دراسية)

رقم المقرر	اسم المقرر	الوحدات	متطلبات المقرر
5344	كيمياء فيزيائية V	2	5242-5342
5345	كيمياء فيزيائية VI	2	5242-5347
5448	كيمياء فيزيائية VII	2	5347-5242
5449	كيمياء فيزيائية VIII	2	5347-5242-5342
5315	كيمياء تحليلية IV	2	5214
5412	كيمياء تحليلية V	2	5214
5416	كيمياء تحليلية VI	2	5214
5414	كيمياء تحليلية VII	2	5214
5324	كيمياء غير عضوية V	2	5223
5426	كيمياء غير عضوية VI	2	5223
5423	كيمياء غير عضوية VII	2	5223
5424	كيمياء غير عضوية VIII	2	5223
5333	كيمياء عضوية V	2	5232
5436	كيمياء عضوية VI	2	5232
5439	كيمياء عضوية VII	2	5232
5336	كيمياء عضوية VIII	2	5232
5365	كيمياء حيويةIII	2	5262
5463	كيمياء حيوية IV	2	5262
5464	كيمياء حيوية V	2	5262
	مشروع بحث التخرج	4	7382

توصيف المقررات الدراسية قسم الكيمياء

General Chemistry-I 5103

Theory of qualitative analysis, including semi microanalysis and spot tests. Introduction to organic chemistry, bonding in organic compounds. Structure and nomenclature of different classes of organic compounds. General inorganic chemistry: atomic structure, periodic table and chemical bonds

Practical General Chemistry-I 5104

Qualitative Analysis.

General Chemistry-II 5105

a) Chemical equilibria: reversible and irreversible reaction, the law of mass action and it applications, Le Chatelier's principle. Fundamental concepts about:
   i) Structure and reactivity. ii) Organic reactions

Practical General Chemistry-II 5106

Introduction to volumetric analysis. Simple organic analysis.

Analytical Chemistry- I 5212

Introduction, evaluation of analytical data, methods and theories of different types of titration including, neutralization, precipitation and complex metric titrations, redox titration, solvent extraction and factors affecting it.

Practical Analytical Chemistry I 5215

Laboratory work includes methods of volumetric analysis, with emphasis on acid-base titrations, precipitation titrations, Redox titration, and standardization

Analytical Chemistry II 5214

Basic principles in gravimetric and electrochemical analysis includes: types, methods, and steps of gravimetric and electrochemical analysis

Practical Analytical Chemistry II 5216

Techniques of gravimetric analysis; *Subject:* Laboratory work for selected examples for gravimetric analysis by precipitation.

Inorganic Chemistry-I 5222

General properties, hydrogen, alkali metals and alkaline earth metals

Inorganic Chemistry-II 5223

Coordination compounds, isomerism, hydrides, bonding theories in coordinated compounds. Introduction to molecular orbital theory.

Organic chemistry I 5231

Structure, nomenclature, methods of preparations, and chemical reactions of alkanes, alkenes and alkynes. Dienes (stability and 1.4- addition). Aromatic compounds (aromaticity and electrophilic substitution reactions). Introduction to stereochemistry

Organic chemistry II 5232

Chemistry of cyclic and polycyclic compounds, alkyl halides, alcohols, ethers, epoxides, carbonyl compounds, carboxylic acids and their derivatives

Practical organic chemistry I 5233

Laboratory techniques for organic chemistry; *Subject*: Some techniques for purification of organic compounds and measurement of their physical constants. Preparation of some simple organic compounds.

Physical chemistry I 5241

Orientation and background; Introduction to the kinetic theory of matter; Integrated review on the properties of gaseous; Intermolecular forces; Integrated review on the properties of liquids; Types, properties and basic structures of solids; Essential aspects in solution and colloidal states; Special topics in matter and its aggregation

Physical chemistry II 5242

Definitions in chemical thermodynamics; First law of thermodynamics work and heat; Internal energy and enthalpy; Second and third laws of thermodynamics; Gibbs and Helmholtz energies; Chemical equilibrium; Phase equilibrium; Equilibrium electrochemistry; Special topics in chemical thermodynamics

Practical physical chemistry I 5243

Orientation and background; Calibration of pipette and burette; Verification of Beer Lambert law; Polarization of solutions; Molar refraction; Heat of fusion; Colorimetric determination of pH; Viscosimetric measurements; Determination of some colligative properties; Special topics on experiments in physical properties and structures

Practical biochemistry I 5263

Identification of carbohydrates, lipids and proteins. Isolation of some natural compounds

Biochemistry I 5264

Topics include the structure and function of proteins, carbohydrates, lipids, nucleotides and nucleic acids (RNA, DNA).

Analytical Chemistry III 5313

Spectroscopic and chromatographic Instrumental Analysis; Subject: Basic principles and applications of spectroscopic and chromatographic techniques in chemical

Practical Analytical Chemistry III 5314

Laboratory exercises in methods of instrumental analysis include: paper, Column, and gas chromatography, flame photometer, spectro-photometers, colorimetric and conductometric titration, potentiometric titration

Analytical Chemistry IV 5315

Electrochemical Analysis; *Subject*: Introduction to electrochemical cells, ion selective electrodes, colorimetric methods, electrogravimetric methods, potentiometry, voltammetry and amperiometry

Inorganic Chemistry-III 5322

Symmetry and group theory, formation of molecular orbital, Metals, group theory approach to molecular orbital. Racemization

Practical Inorganic Chemistry 5323

Laboratory work in preparation of different inorganic complexes and analysis of their radicals

Inorganic Chemistry –V 5324

Organic ligands, the 18-electrons Rule, square planer complexes, ligands in organometallic chemistry, carbonyl complexes, ligands of extended Pi-systems, spectral analysis of organometallic complexes

Organic chemistry III 5331

Chemistry of carbanions, aryl halides, phenols, amines, saturated and unsaturated heterocyclic compounds, polyromantic hydrocarbons

Practical organic chemistry II 5332

Identification of organic compounds by: solubility groups, functional groups, preparation of derivatives, and separation of mixtures.

Organic chemistry V 5333

Stereochemistry and its role in reaction mechanism, chirality and optical activity, optical isomerism, geometrical isomerism. Effect of stereoisomer on chemical and biological activity

Organic chemistry VIII 5336

A study of atomic and molecular orbitals with reference to conjugated π systems, orbital symmetry effects in thermal and photochemical pericyclic reactions, specially electrocyclic, cycle addition reactions and sigmatropic rearrangement

Physical chemistry III 5342

Rates of chemical Determination of heat of vaporization; reactions; Collision and transition state theories; Reaction mechanism; Catalysis; Electrochemical conductance and ionic mobility; Transport numbers; Diffusion; Viscosity; Special topics in chemical dynamics

Practical physical chemistry II 5343

Measurement of heat of formation using Hess law; The emf and solubility product; Eo for Zinc and Cupper; Determination of distribution coefficient between immiscible solvents; Colorimetric determination of stability constant for a complex; Phase diagram for two component system; Determination of boiling point and vapor constituents in mixtures; Special topics on experiments in thermodynamics

Physical chemistry V 5344

Introduction to metal alloys and corrosion thermodynamic Corrosion current; Corrosion potential; Kinetics of corrosion; Types of corrosion; Inertness of metals; Common examples of corrosion; Chemical and electrical needs for prohibition; Corrosion inhibitors; Special topics in metal alloys and corrosion

Physical chemistry VI 5345

Solutions and ways of expressing their concentrations review; Vapor pressure solutions; Elevation of boiling point of the solution; Depression of freezing point of the solution; Osmosis and osmotic pressure; Electrolysis and its relation with mass and molar mass; Electrolysis and its relation with time and currant; Electrolysis and its relation with concentration; Special topics in solutions.

Physical chemistry IV 5347

Electromagnetic waves and photons; Wave properties of mater; Applications of Schrödinger's equation; Hydrogen atom; Many electrons atoms; Introduction to chemical bond; Principles of molecular spectroscopy; Molecular distributions and statistical methods; Special topics in matter in Isolation.

Biochemistry II 5363

Biological energy, metabolism of carbohydrates, proteins, lipids, nucleotides and nucleic acids with emphasis on intermediate to metabolic processes

Biochemistry III 5365

Enzymes: Nomenclature, properties and enzymic reaction of special biological processes. Enzymes and clinical diagnosis

Analytical Chemistry V 5412

Spectroscopic Analysis Principles, instrumentation and application of molecular and atomic spectroscopic methods in analytical chemistry

Analytical Chemistry VI 5416

Pollution Analysis; *Subject*: Introduction, types of pollutants, sampling and methods of analysis

Analytical Chemistry VII 5414

Topics in Industrial Analytical Chemistry; *Subject*: One or more topics selected by the professor from such areas as food, water, oil, etc, it may be offered concurrently by different instructors for different groups of students

Analytical Chemistry VIII 5420

Food analysis; *Subject*: Lectures and discussions on principles, techniques and applications in food analysis.

Analytical Chemistry IX 5421

Lectures and discussions on principles, techniques and applications in soil analysis

Inorganic Chemistry-VII 5423

The kinetic model, complexes-Ligand substitution reactions, racemization reactions, mechanism of redox reactions, photochemical reactions

Inorganic Chemistry-VIII 5424

Chemistry of f-block elements, position in the periodic table and properties, oxidation states, Lanthanides and actinides contraction and methods of separation, applications

Inorganic Chemistry-IV 5425

Introduction to transition elements, electronic spectra of complexes, spectroscopic terms, La.Bort rule, spin selection rule, analytical applications of complexes, determination of microstates, molecular orbital theory

Inorganic Chemistry-VI 5426

Energy sources for life, essential elements; alkali and alkali earth metals, zinc, copper, cobalt and iron. Nitrogen fixation, environmental applications

Organic chemistry VI 5436

Study of selected natural products, with particular reference to terpenes, steroids, alkaloids, and vitamins, emphasizing modern techniques of extraction and purification structure proofs, and mechanistic concepts

Organic chemistry IV 5437

Discussion concerning the chemical and spectroscopic identification of organic compounds with emphasis on the interpretation of IR, UV, NMR, and mass spectroscopic data.

Practical organic chemistryIII 5438

Synthesis of organic compounds representing different organic reaction mechanisms such as electrophilic and nucleophilic substitution reactions, elimination, oxidation, rearrangement reactions

Organic chemistry VII 5439

Synthetic methods for organic compounds-protection of various functional groups and methods of inter conversion between different functional groups- percentage yield and the suitable method of preparation.

Inorganic Chemistry-IX 5442

Introduction, Structure of solids, Basics of structures, Simple close packed structures: metals, Basic structure types (structure of simple salts), more structures that are complex, Complex structures, Structure of nanomaterials

Inorganic Chemistry-X 5443

General properties of solvents as compared to water, factors affecting the solubility of compounds, types of reactions in non-aqueous solvents, non-aqueous techniques in inorganic synthesis

Practical physical chemistry III 5447

Conductance of electrolyte solutions; The limiting Debye-Huckel-Onsager law ; Intrinsic viscosity of polymer solutions; Effect of solvent on exited state of solutions Photolysis of some acids; Activation energy of a catalyzed ionic reaction; Saponification of ethyl acetate; Halogenation of acetone; Special topics on experiments in chemical dynamics

Physical chemistry VII 5448

Essential aspects in the models of polymer chain; Thermodynamic considerations for polymers in solution; Dynamic consideration- one for polymers in solution; Intrinsic properties of polymers and polyelectrolytes in solution; Conformation analysis of polymers in solution; Orientation and background review on the heterotic solutions; Basic principles and applications of colloids; Basic princ- iples and applications of Surfactants; Special topics in polymeric and heterotic solution.

Physical chemistry VIII 5449

Photochemical principles; Rates of intramolecular processes and Intermolecular processes; Energy transfer; Photochemical reactions and their quantum yields; Photochemistry in nature; Applied photochemistry; Femtosecond transition- state spectroscopy ; Special topics in photochemistry

Organic chemistry IX 5461

Chemistry of carbohydrates, preparation and reactions

Practical biochemistry II 5462

Quantitative analysis of cell components and measurement of enzyme activity. Separation and purification of cell component

Biochemistry IV 5463

Vitamin supplement, water-soluble and fat soluble vitamins

Biochemistry V 5464

Hormone action and characteristics of different hormones

Biochemistry VI 5465

Advances in steroid biochemistry, biosynthesis of cholesterol, and phytosterols. Mechanism of formation and elimination of bile salts. Steroid hormones. Implication of cholesterol in coronary heart disease

Physical chemistry IX 5482

Reversible electrode processes; Nernst equation; Measurement of electromotive force; Application of electromotive force; Irreversible electrode processes; Tafel,s equation; Special topics in electrochemistry.

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