



محتويات مقررات برنامج

Courses' Content

ج: الكيمياء الصناعية والتطبيقات

Industrial and Applied Chemistry



كلية العلوم

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	-	2

١٥ م ج	لغة انجليزية (1)
UR015	English Language (1)

1- Listening & Speaking:

A- (Listening): This part of the course aims at training the students for listening and understanding audio-visual material

B- (Speaking): This part helps the students to speak simple and correct short sentences fluently.

2- Reading:

This part aims at training students for correct reading, building up vocabulary and promoting grammatical structures.

3- Writing:

This part helps the students to spell English words correctly and to use the punctuation marks.

4- Grammar:

This part aims at providing the students with knowledge of the grammar of the target language, and its basic structures.

5- Translation:

This part aims at developing the students' abilities in translating scientific texts both into and from English.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	0	-	

٥٠ م ج	قضايا مجتمعية
UR050	Societal Issues

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	-	2

١٢ م ج	تاريخ العلوم
UR012	History of Science

The importance of studying history of science

An overview on the science of ancient scientists

Presentation of the history of most prominent theories in mathematics and physics

Presentation of the history of the most important developments of biological sciences (embryogenesis, photosynthesis, genetic engineering, reproduction).

Philosophical reflections of modern biology.

Means of honoring scientists

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	-	2

١٤ م ج	التفكير العلمي
UR014	Scientific Thinking

The nature of scientific thinking

Characteristic of scientific thinking

The importance of scientific thinking for the renaissance of societies

Obstacles of scientific thinking practices

Science and non-science

Distinguish between facts and myths

Scientists' personality

Using scientific thinking to identify and solve problems

Different scientific approaches to solving the problems

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	2	2/-	2

١٠٠ رك	الحاسب الالى
MC100	Computer Sciences



محتويات مقررات برنامج

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ج: الكيمياء الصناعية والتطبيقات

Material and Applied Chemistry



كلية العلوم

Fundamentals of programming and computer languages - Algorithm and Flowcharts - Elements of Language under case - Basic Instructions in Language under case - Control Instructions - Arrays and dimension statement - Subprograms - Some applications.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	3	-/2	2

ر ١٠٠ رياضيات عامة (1)

Mathematics (1) M100

Calculus: Functions of one variable - Limits and Continuity - Derivatives - Applications of Differentiation - Taylor and McLaurin series, Indefinite and definite integrals.

Algebra: Mathematical induction - series - Partial fractions - Matrices and systems of linear equations - Approximate solutions of non-linear equations.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	3	-/2	2

ر ١٠٥ رياضيات عامة (2)

Mathematics (2) M105

Calculus: Techniques of integration - Definite integrals and their properties- improper integral - numerical integration - Applications of definite integrals.

Geometry: Coordinate systems in the plane - Straight lines and circles in general forms - Conic sections - Geometric transformations in the plane - Coordinate systems in the space - The plane and the straight lines in the space and surfaces of revolution of second order.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

ف ١٠٠ فيزياء عامة (1)

Physics (1) P100

Physical quantities - Units and dimensional analysis - Vectors - The laws of motion in one- and two- dimensions and its applications - Newtown's second Law of motion and its applications. Work and energy - Heat and heat conduction - The kinetic theory of gases - Specific heat of gases - First law of thermodynamics. 12 Experiments related to the above topics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

ف ١٠٥ فيزياء عامة 2

Physics (2) P105

The nature and propagation of light - Reflection and refraction at plane surface - Lenses & Mirrors, Eye's structure and camera - Microscopes and Telescopes - Coulomb law and electrostatic fields - Electrostatic potential- Capacitance and dielectrics- Electric current, DC circuits and Krichhoff's Rules-Magnetic field and magnetic force - Electromagnetic induction.

12 Experiments related to the above topics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

ك ١٠٠ كيمياء عامة (1)

Chemistry (1) C100

(A):Atomic Spectra - Electron Orbital and Quantum Numbers - Quantum Energy Levels in Atoms - Basic Concepts of Bonding Electronegativities - Lewis Structure - The Octat Rule - Dipolemoment - Resonance Hybridization in Molecules - Geometrics of Molecules - Orbital Configuration for Diatomic Molecules.

(B):State of Matter - Introduction in Surface and Colloids Chemistry - Electrolytic Cell - Electrochemical Cells - Potential of Electrode (Selected practical experimentals)

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

ك ١٠٥ كيمياء عامة (2)

Chemistry (2) C105



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Industrial and Applied Chemistry



كلية العلوم

(A): Chemical Equilibrium – Ionic Equilibrium – Basic of Qualitative Analysis – Solution Chemistry.
(B): Introduction on Organic Chemistry-Bonding in Organic compounds – Hybridization in Carbon Compounds – Physical Properties of Org. Compounds – Nomenclature, Synthesis and Chemical Reactions of alkanes, alkenes and alkynes
(Practical: Selected practical experiments)

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

اساسيات الجيولوجيا	ج ١٠٠
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Principles of Geology	G100
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Origin of Planet Earth: Constituents of the Earth's crust (crystals, minerals, rocks) – Classification of rocks
Internal Processes: Dynamics, structures and plate tectonics – Development of structural traps and ore deposits
External Processes: Weathering – Erosion – Wind action – Geological work of waters (surface, groundwater, seas and oceans) – Formation of hydrocarbons and sedimentary ores – Development of stratigraphic traps
Time scale: Geologic timescale and fossil records

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

حيوان عام	ج ١٠٠
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General Zoology	Z100
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Protoplasm - Organization and function of animal cell - Study of the animal tissues - Life functions - Introduction to early development of animals - Characters and classification of the major animal phyla

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

نبات عام	ج ١٠٠
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General Botany	B100
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Cell structure – plant tissues – Anatomy of primary plant organs – Classification of plant kingdom – General aspects of virus, bacteria, algae and fungi – Flower structure, inflorescences and fruits – Selected families of flowering plants

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	-	2

اخلاقيات وأداب المهنة والسلامة المهنية	F٣٠٠
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Scientific Ethics&Safety	F300
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Definition of Ethics and Professional Ethics- Sources of the ethical principles- Benefits- Common mistakes about the professional ethics- Ethics of university teaching , research and authoring and supervising - Citation and Plagiarism-Intellectual property Ethics teacher pre-university- Ethics and the ethics of practicing the profession of medical laboratory- Biological ethics - Ethics of Computer and multimedia- Ethics in works in general- Professional Reports-Role models– Ethics and behavior- Vocational training- Training on the preparation and issuance of the Code of ethics in the work - Code of Ethics for certain related professions. Occupational Safety: Public safety conditions - signs extension - scientific laboratory safety –Securing facilities from fire hazards– First aid - safety in industrial buildings - a list of conditions of safety and prevention-Crisis and emergency management.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2		2

لغة انجليزية	UR٠١٥
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English language	UR015
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Characteristics of technical English language, revision of grammar, rules of style and features of the sentence, common mistakes in writing the technical English sentence, building-up paragraphs, kinds of paragraphs, explaining the main idea in a text, developing skills of communication through reading and analyzing extracts of technical writing in the various branches of chemistry and engineering.



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Industrial and Applied Chemistry



كلية العلوم

الدرجات					الساعات			Quality assurance	UR.٢٠
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	Quality assurance	UR020

In this course, students examine the practice standards in relation to various fields pertaining to construction and environmental law, supervision and management, students learn to identify the requirements for various standards, relate how quality assurance practices are integral to codes and standards interpretation, understand international competition opportunities, and assess quality assurance requirements for implementation.

الدرجات					الساعات			Accounting and finance	UR.٢١
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	Accounting and finance	UR021

Account and the formula of debit and credit, entry and posting, trial balance and adjustment, financial statement, balance sheet, sales, journal, a statement of basic accounting theory, cash, accounting control and administrative control, bank reconciliation, short-term investment, inventory.

الدرجات					الساعات			Teams and work groups	UR.٢٢
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	Teams and work groups	UR022

Teams as a concept, types of teams and their functions, team building, team effectiveness, team measurements.

الدرجات					الساعات			History of science and technology	UR.٢٣
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	History of science and technology	UR023

Definition of arts, sciences and engineering technology, cultures development and its relation to natural and human sciences and society, history of technology and engineering, historical interrelation between science and technology, relations between the engineering and environmental development socially, economically and civilization.

الدرجات					الساعات			Academic English for science students	UR.٢٤
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	Academic English for science students	UR024

English language skills, science concepts and IT skills are integrated through a project-based approach. The aims are: to motivate students to use their English, to build confidence in using English in written and spoken forms, to highlight problem areas, to point to sources of information, to recommend improvement through the use of English language skills rather than mastery of a corpus of rules.

الدرجات					الساعات			مهارات الاتصال	UR.٢٥
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	Communication skills	UR025

Basic principles of communication theory, theory and practice of speech communication, preparation, presentation, communication interaction, and evaluation of different speech situations and negotiations, aspects in intercultural communication, English communication skills applied in the situations of introduction, clarifying meaning, job preferences, hotel check-in, office routines, making appointments, recent experiences, locations, directions, describing processes, complaints, giving advice, asking for permission, future plans.



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Industrial and Applied Chemistry



كلية العلوم

الدرجات					الساعات			Management of energy resources	UR ٠٢٦
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	2		2	Management of energy resources	UR026

Energy resources and their distribution, solar thermal energy systems, biomass energy conversion systems, biogas production systems, nuclear energy systems, wind energy systems, conventional thermal power plants, economics of power plants, heat recovery systems, management of different energy resources.

الدرجات					الساعات			كيمياء عضوية 1	٢٠١ ك ص
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	10	20	50	3	3/-	2	Organic chemistry I	Chem 201

Introduction Isomerism, optical and geometrical isomerism, difunctional organic compounds (diolefines, diketones, dicarboxylic acids), chemistry of aromatic compounds (aromaticity, chemistry of benzene and its derivatives) organic reaction mechanism (Type of organic reactions, addition elimination, nucleophilic, substitution reactions chemistry of free radicals and concerted reactions. Alcohol, aldehydes, nitrites, ketones, carboxylic acids. Amines, amides.

Conducting laboratory experiments related to the above topics.

الدرجات					الساعات			كيمياء عضوية 2	٢٠٢ ك ص
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	10	20	50	3	3/-	2	Organic chemistry II	Chem 202

Introduction. Electrophilic attack on benzene, Nitration, Halogenation, Sulphonation, Friedel-Crafts Reactions. Diazo coupling and Electrophilic attack on C Electrophilic substitution of other aromatic species-Heterocyclic chemistry-Carbanions and their reactions-Radicals and their reactions.

Conducting laboratory experiments related to the above topics

الدرجات					الساعات			كيمياء فيزيائية	٢٠٣ ك ص
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	30	0	50	3	0	3	Physical chemistry	Chem 203

- Chemical kinetic: introduction, determination of order and constant of reaction, activation energy.
- Solid state chemistry: the growth and form of crystals, lattices and crystal structures, semiconductors, defects, electrical conductivity.
- Catalysis and catalysts: general aspects of catalysis, definition synthesis of catalysts, characterization of catalysts poisoning and regeneration of catalysts

الدرجات					الساعات			كيمياء تحليلية	٢٠٤ ك ص
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	10	20	50	2	3/-	1	Analytical chemistry	Chem 204

Quantitative Inorganic analysis : 1,11,111 and IV cation groups, anions, buffers and complex ions. Quantitative Inorganic analysis : Sampling, Sample treatment accuracy and precision, Gravimetric analysis, Titrimetric analysis, Analytical and Volumetric instruments, Techniques and reagents, Conducting Laboratory experiments related to the above topics.

الدرجات					الساعات			طرق التحليل الصناعية	٢٠٥ ك ص
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L		
10	10	10	20	50	3	3/-	2	Industrial method of analysis	Chem 205

pH metry: Introduction and determination of pH, applications. Potentiometric titrations: introduction, types of titration, advantages of potentiometric titrations. Conductometric measurements : Introduction, some important laws, definition and relations, effect of dilution, applications of conductance measurements, types of titrations, advantages and disadvantage .



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كلية العلوم

chromatography: introduction, classification and application
paper chromatography: Experimental details for qualitative analysis, Experimental details for quantitative analysis. Thin layer chromatography: superiority of TLC over the other techniques, Experimental details, theory of development , factors affecting column efficiency.
HPLC and GC : Introduction, instruments involved, Sampling method, Experimental details and application.
Visible spectrophotometry and colourimetry: introduction, Theory of spectrophotometry and colorimetry, deviation from Beers law, Instrumentation, applications. Ultraviolet spectroscopy: introduction, origin and theory of ultraviolet spectra, Choice of solvent, Instrumentation, applications

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

كيمياء غير عضوية	٢٠٧ ك ص
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Inorganic chemistry	Chem 207
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Transition and non-transition metals, electronic structure, compounds and properties, coordination compounds and organometallics and their preparations, industrial applications.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

ديناميكا حرارية	٢٠٨ ك ص
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Thermodynamics	Chem 208
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Thermodynamics concepts, states, properties, systems, control volume, processes, cycles, units, tables of properties, work and heat, first law, internal energy and enthalpy, conservation of mass, steady-state and uniform state processes, second law, heat engines and refrigerators, reversible processes, Carnot cycle, entropy, Clausius inequality, principle of the increase of entropy, efficiencies, irreversibility and availability, Helmholtz and Gibbs functions, vapor, air power and refrigeration cycles, mixtures of gas and vapor, psychrometry, combustion, enthalpy of formation, heat of reaction, compressible flow. Measurement of specific heat ratio, heat pump, bomb calorimeter, conversion of work to heat, single stage air compressor, air cooler, Marcet boiler, flash and fire points.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	2	2	2

كيمياء كهربائية	٢٠٩ ك ص
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Electrochemistry	Chem 209
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Principles of corrosion- Electrochemical characteristics, (electrochemical reactions, polarization and passivity) – Environmental effects – forms of corrosion – anodic and cathodic protection – corrosion inhibitors – inhibition and environments.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

كيمياء حيوية	٢١٠ ك ص
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Biochemistry	Chem 210
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Amino acids and proteins, bioenergetics and high energy compounds, enzymes and kinetics of enzymic reactions, roles of kinetics reactions, carbohydrates mechanism, Krebs and glyoxalin cycles, biological oxidations, photosynthesis, photo systems and Calvin cycle, biochemistry of connecting tissues, nucleic acids, biological membranes, metabolism of amino acids and protein, metabolism of important minerals, integration of metabolism.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

مقدمة للبوليمرات	٢١١ ك ص
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Introduction to polymers	Chem 211
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Introduction and history of polymeric materials. Different schemes of classification of polymers, polymer nomenclature, molecular forces and chemical bonding in polymers, Texture of polymers. Functionality and its importance, criteria for synthetic polymer formation, classification of polymerization processes, relationships between functionality, extent of reaction and degree of polymerization Bi-functional systems, Poly-functional systems.



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Kinetics of polymerization: Mechanism and Kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic).

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

عمليات التصنيع الكيميائية ٢٠٤ هـ

Chemical manufacturing process Eng 204

An introduction to the chemical process industries and the invention of processes for the large scale processing of materials such as chemicals, petroleum products, food, drug and wastes. Discussion of chemical process steps, the transformation of raw materials into desired end products, process flow diagrams, processing equipment, optimum solution and schematic representation of physical and chemical processes interconnections to carry out the overall transformation, evaluation of economic performance of different manufacturing options, evaluation of environmental, health, and safety criteria involving different manufacturing steps. Students will work in teams and will interact with industrial partners for special projects, participate in field trips, and other learning activities. Oral presentations and written reports will be required.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Material and energy balance ٢٠٥ هـ

Material and energy balance Eng 205

Systems of units and measurement scales, steady state mass balances, mass balances for continuous and batch processes, industrial applications of mass balances, principles of energy conservation, enthalpy, standard reaction heat, fuels and combustion process, unsteady state mass and energy balances, applications of mass and energy balances to industry.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

مخاطر الإدارة وتحليلها ٢٠٣ ج

Risk in management and assessment Comm 203

Risk detention, Risk management, Risk assessment, reducing risk. Conducting laboratory experiments related to the above topics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Systems and creative thinking ٢٠١ ج

Systems and creative thinking Comm 201

Introduction, Internal systems, Memory, Frontiers of creativity, Barriers to creativity, Barriers to innovation.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Marketing research ٢٠٤ ج

Marketing research Comm 204

The students examine the principles and procedures associated with the collection and analysis of relevant information in the context of solving practical marketing problems, students have the opportunity to apply these principles at each stage of marketing research process: problem definition, research design, data collection, data analysis, and report preparation.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Technology Management for Scientists ٢٠٦ ك

Technology Management for Scientists Chem 206

The unit consists of four units as follows: Unit 1: Technology and Project Assessment, including ideas generation and risk assessment; Unit 2: Technology and Project Management, including cost-benefit



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Industrial and Applied Chemistry



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analysis and software tools; Unit 3: Financial Management, including profit and loss statements and management reporting; Unit 4: Communication and Presentation Skills, including teamwork and negotiation skills.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	3	0	3

صناعة الفوسفات والأسمدة	Chem 300
Phosphorous, nitrogen and potassium fertilizer industry	Chem 300

Phosphate rock, superphosphate, wet process phosphoric acid, electric furnace phosphorus and phosphoric acid, phosphates and multicomponent technologies, backing powders, retardant chemicals, handling, storage, mixing, Physico-chemical backgrounds of synthesis gas and ammonia technologies, synthesis gas and ammonia process; time, ammonium sulfate, ammonium phosphates, ammonium nitrate, urea, nitrogen solutions, Raw materials, potash materials, mixed fertilizers.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

عمليات التحكم	Eng 300
Instrumentation process control	Eng 300

Types of process control. Automatic/semiautomatic control process. Two position, proportional and integral control. Combined proportional and integral control. Integral and derivative modes. Open loop & closed loop systems as applied in ceramic industry. Flow measuring instruments. Pilots tub, venturimeter, Foxboro & flow raters (rotameters). Pressure relief valve. Compressed air pressure cultivation techniques , Growth and non-growth associated product formation, principles and mechanism of media sterilization – thermal and membrane filtration, batch and continuous sterilization of media, Air sterilization – principle and design , characteristics of biological fluids.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

كيمياء نووية واشعاعية	Chem 301
Nuclear. and radiation chemistry	Chem 301

Classification of nuclides, nuclear stability, binding energy and nuclear models. Characteristics of radioactive decay, decay kinetics, parent-daughter decay growth relationships, detection and measurement of radioactivity, advances in the solid and liquid scintillation counting techniques, methods for the determination of half life period of single and mixed radionuclids. Nuclear fission, nuclear fuels and nuclear reactors, nuclear fuel reprocessing, fast breeder reactors, radiological safety aspects and radioactive waste managements. Interaction of radiation with matter, effect of ionizing/ non-ionizing radiation on water, aqueous solutions and on organic compounds, radiation dosimetry. Preparation and separation of radioactive isotopes, application of radioisotopes and radiations in various fields, isotopic dilution techniques, neutron activation analysis and its applications.

Conducting laboratory experiments related to the above topics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

التآكل	Chem 302
Corrosion prevention technology	Chem 302

Thermodynamic basis of corrosion and electrochemical corrosion theory. Problems in corrosion prevention in process industry.

Conducting laboratory experiments related to the above topics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

غرويات وكيمياء السطوح	Chem 303
Colloids and Surface chemistry	Chem 303

Thermodynamic formulation of surface. Surface tension, surface energy and surface films. Adsorption isotherms. Surfaces and electric double layer. Colloids and emulsions. Research methods of macromolecules. Electrokinetic phenomena-Absorption isotherm, BET equation, porosity.



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الدرجات						الساعات			البوليمرات الصناعية	Chem
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L			
10	10	10	20	50	3	3/-	2		304	
									Polymer industry	Chem 304

Organic polymers: preparation, properties, classification, structure property relationship (thermoplastic and thermosetting)
Natural and Synthetic fibers , fiber processing , antiwrinkle and flame retardant. Comparison of natural and synthetic polymers, relation between molecular structure and properties. Polymer processing moulding compounding blending polymer designing : packaging certification and process evaluation
Inorganic polymer : classification, preparation, properties and used of boron containing polyers, phosphorus containing polymers, silicon containg polymers , silicones (fluid , elastomers and resins) and sulphur containing polymers (SN).

الدرجات						الساعات			التقيب والمعادن والصخور الصناعية	Chem
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L			
10	10	30	0	50	2	0	2		305	
									Mineral prospection and industrial minerals and rocks	Chem 305

Chem 305 Mineral prospection and industrial minerals and rocks
Mineral Prospection:- Classification of prospecting methods - Geochemical Methods - Geophysical Methods (Gravity-Magnetic- Electric & Seismic Methods).
Industrial minerals and rocks:- Industrial minerals and rocks used in the following purposes: Catalysts - Abrasives - Fluxes - Ceramics - Fillers - Insulators - Pigments - Fertilizers - Building materials - Cement materials Pharmaceuticals - Transistor.

الدرجات						الساعات			كيمياء الازباغ	chem
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L			
10	10	10	20	50	3	3/-	2		307	
									Dyes chemistry	Chem 307

Colour and colour measurement – what is colour – colour vision – the measurement of colour – Electronic Absorption Spectroscopy – Qualitative Colour – Structure Relationships Chemical Classification – Reactive dyes – Nitroso Dyes – Nitro Dyes – Azo Dyes – Azoic Dyes – Mordant Dyes – Disperse- Azo dyes – Diarymethane Dyes – Triarylmethance Dyes –Xanthene Dyes – Acridine Dyes – Quinoline Dyes – Azine Dyes – Indigo Dyes – Anthraquinone and related Vat Dyes – phthaloeyanine pigments and Dyes – Sulphur Dyes – Food colors.
Conducting laboratory experiments related to the above topics.

الدرجات						الساعات			الزيوت والصابون والمنظفات	Chem
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L			
10	10	10	20	50	3	3/-	2		309	
									Oils, Soap and detergents	Chem 309

Refining of edible oils, manufacturing of soap, detergents, liquid soaps.manufacturing of fatty acids and glycerol, greases from fatty acids, turkey-red oil

الدرجات						الساعات			صناعة الزجاج	Chem
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L			
10	10	30	0	50	2	0	2		310	
									Glass industry	Chem 310

Introduction, physical & chemical properties of Glass, characteristics, raw materials, chemical reactions, methods of manufacture of Glass & Uses.

الدرجات						الساعات			Technical writing	Eng
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L			
10	10	30	0	50	2	0	2		301	
									Technical writing	Eng 301



محتويات مقررات برنامج

Courses' Content

ج: الكيمياء الصناعية والتطبيقات

Industrial and Applied Chemistry



كلية العلوم

Stages of preparation of scientific reports (define the object-information gathering- studies preparation-runny experiments- writing drift of report), studying the styles of writing reports, use of word processing, spread electronic sheets, electronic mail, data presentation in tables, figures and, charts, (case studies, technical letters, design reports, final reports), conducting laboratory experiments and writing their reports. use of email to write short reports and technical letters, Conducting field studies and preparing posters, working in groups of students.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

صناعة السيراميك	Chem 311
Ceramics Industry	Chem 311

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

عمليات الفصل	Chem 312
Separation techniques	Chem 312

Application of separation techniques in pharmaceutical science: Chromatographic techniques, modern techniques in mass spectrometry (Secondary ion M.S., continuous-flow fast atom bombardment M.S), techniques based in electrophoresis, combination of separation techniques. Conducting laboratory experiments related to the above topics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	0

صناعة التخمر	Bot 314
Fermentation industries	Bot 314

Aerobic and anaerobic fermentation . production of Ethyl alcohol and citric acid, antibiotics, penicillin, cephalosporin, chloromycetin and streptomycin in lysine, glutamic acid vitamin B2, vitamin B12 and vitamin C.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Industrial pollution, its control and industrial safety	Chem 400
Industrial pollution, its control and industrial safety	Chem 400

Atmosphere, Eco-system and air pollution

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Unit process in fertilizer industry	Eng 400
Unit process in fertilizer industry	Eng 400

A- Unit processes (I)

The study of unit operations in chemical engineering is started with a thorough consideration of fluid flow and heat transfer by conduction and convection. Particular attention is given to equipment design.

B- Unit processes (II)

Radiation heat transfer and mass transfer applied to the design of fired heaters, evaporators, and distillation and extraction equipment. The principles of fluid flow, heat transfer, thermodynamics, and mass transfer applied to cooling towers, drying, gas absorption, and crystallization.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

Industrial catalysis	Chem 401
Industrial catalysis	Chem 401



محتويات مقررات برنامج

Courses' Content

ج: الكيمياء الصناعية والتطبيقات

Industrial and Applied Chemistry



كلية العلوم

introduction, homogeneous and heterogeneous catalysis, Role of catalytic reactions in the chemical industry, Importance of catalysis in the national economy, Modern methods of studying catalysts, supported catalysts, nanocatalysts, specific catalytic industrial reactions.

Conduct experiments related to catalysis, Surface chemistry and thermodynamics.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Graduation project I	Chem 402
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Graduation project I	Chem 402
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The course provides an introduction to research methodology, ways of making literature review, the manner of writing technical reports, and specifying topic of graduation project, in addition, this course is mainly a study and an analysis of a specific problem in a field determined jointly by the student and his/her advisor.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Graduation project II	Chem 403
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Graduation project II	Chem 403
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الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Textile chemistry	Chem 404
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Textile chemistry	Chem 404
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الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Cement raw material	Chem 405
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Cement raw material	Chem 405
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Cement is a manufactured product made by blending different raw materials and firing them at a high temperature in order to achieve precise chemical proportions of lime, silica, alumina and iron in the finished product, known as cement clinker. Cement is therefore essentially a mixture of calcium silicates and smaller amounts of calcium aluminates that react with water and cause the cement to set.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Cement making	Chem 406
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Cement making	Chem 406
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Cement clinker is manufactured by heating the blended and ground raw material (typically limestone and clay or shale and other materials) to partial fusion. The clinker burning takes place at a temperature of 1450°C in kilns, which are normally inclined rotating cylinders lined with heat-resistant bricks. Clinker emerges from the kiln after several hours as granulated spherical pebbles. Afterwards, the clinker is finely ground by ball milling with a small amount (typically 5%) of Gypsum/anhydrite to give Portland cement.

Gypsum/anhydrite is introduced to control the initial rate of reaction with water. Blended cements are produced by intergrinding cement clinker with materials like fly ash, granulated blastfurnace slag, limestone dust, natural or artificial pozzolanas, in addition to gypsum/anhydrite.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
1	10	10	20	50	3	3/-	2

Concrete technology	Chem 407
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Concrete technology	Chem 407
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chemistry



محتويات مقررات برنامج

Courses' Content

ج: الكيمياء الصناعية والتطبيقات

Material and Applied Chemistry



كلية العلوم

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	3	0	3

Petroleum chemistry & Petroleum industry	Chem 408
Petroleum chemistry & Petroleum industry	Chem 408

Origins of oil and gas – Chemical composition of petroleum – Types of crude oil pretreatment – Crude oil distillation catalytic cracking – thermal cracking – hydro-cracking .

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Material recycling	Eng 401
Material recycling	Eng 401

Storage, collection, transport, separation, treatment, processing, recycling, and disposal of solid wastes. Planning assistance, technical assistance, and financial assistance for solid waste management. Resource recovery systems. Efficient and proper methods of managing solid waste. Development of waste reduction and recycling programs through planning assistance and other incentives. Development and implementation of source separation, resource recovery, or recycling programs.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Characteristics of energy consumption	Eng 408
Characteristics of energy consumption	Eng 408

chemistry

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

معالجة المياه	Chem 410
Waste water treatment	Chem 410

Treatment introduction to water and waste water characteristics, basic design methodology and operational features, common physical, chemical and biological processes for the treatment, waters and waste waters, consideration of industrial process modifications and waste water treatment options.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Cement specification	Chem 412
Cement specification	Chem 412

chemistry

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	0

Fuel cell technology	Chem 415
Fuel cell technology	Chem 415

Fundamentals and classification of fuel cells, thermodynamic efficiency. Electromotive force of fuel cells : standard electrode potentials, Effect of concentration, nerst equation. Rate of electrode processes: types of polarization, surface reactions, oxygen electrodes, hydrogen electrodes, overall performance. Low temperature fuel cells: hydrogen-oxygen fuel cells-alkaline and polymeric membrane types, Active catalyst and its dispersion, Heat and mass transfer, construction and design, limiting problems, low temperature fuel cells of other types-methanol fuel cell, hydrocarbon fuel cell. High temperature fuel cells: advantages, Molten electrolyte fuel cell, solid electrolyte fuel cell, construction. Air depolarized cells, biochemicals fuel cells, regenerative cells, micro fuel cells. Fuel cell operation: supply of fuel, electrical arrangement, removal of products materials for battery construction, production and purification of fuels.



محتويات مقررات برنامج

Courses' Content

ج: الكيمياء الصناعية والتطبيقات

Industrial and Applied Chemistry



كلية العلوم

Full cell operation : supply of fuel , electrical arrangement, removal of products, materials for battery construction, production and purification of fuels.

Application of fuel cell systems : large scale power generation , power plant for vehicles, domestic power, fuel cells in space.

Fuel cell economics, future trends in fuel cells.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	10	20	50	3	3/-	2

Clinical chemistry and drug analysis	Med
	٤١٦

Clinical chemistry and drug analysis	Med
	416

Refining of edible oils, manufacturing of soap, detergents, liquid soaps.manufacturing of fatty acids and glycerol, greases from fatty acids, turkey-red oil

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Pulp and paper industries	Chem
	٤١٩

Pulp and paper industries	Chem
	419

Introduction – manufacture of pulp sulphate pulp – soda pulp – rag pulp – beating, refining, filling , sizing and coloring – manufacture of paper.

الدرجات					الساعات		
oral	ACT	Mid_T	Prac	Wr.	CH	P/T	L
10	10	30	0	50	2	0	2

Project economics	Comm
	٤٠١

Project economics	Comm
	401

An overview, the role of projects in economic development, economic environment, determinants of project efficiency and its indicators, kinds of efficiency – industry viz project, technical viz economic, determinants of efficiency, indicators of efficiency (productivity & profitability), pricing methods in theory & practice, demand analysis, project appraisal (financial and commercial studies), cases.