Course Description

Legend

Course Title [A – B – C]	Course #:	Prereq.:

A: Theoretical hrs
B: Practical hrs
C: Credit hrs

Surveying [3 – 0 – 3]	Course #:0902209	Prereq.:0300101

The course covers basic definitions in Surveying, recording field data and notes, Error types and sources, units of measurements Metric and English systems, plotting and map scale, linear and angular measurements, surveying equipment and instruments, leveling and contours principles, Angles Azimuths and Bearings, Coordinate systems and traverse principles, area and volume Calculations.

Surveying Lab. [0 – 3 – 1]	Course #:0902210	Prereq.:0902209*

The course covers the following experiments: Measurement of distance by ranging and tapes and EDM. Measurement of distance by pacing. Slope Distance measurements by tapes and ranging rods. Scale Measurements and representing of building on drawing. Tachometry Distance Measurements. Height of building measurements by using ranging rods. Determination of elevation of various points with level by HI method and rise & fall method. Contour lines and formation of contour map. Compass and Azimuth measurements. Measurement of horizontal and vertical angles with Theodolite instrument. Height of building measurements by using theodolite instrument. Open and closed Traverses and Coordinate calculations.

Statics [3 – 0 – 3]	Course #:0902221	Prereq.: 0300121

Equilibrium of a particle, force vectors, operations on vectors, force components, force system resultants, moment of a force, couple system, equilibrium of rigid bodies, analysis of trusses, frames, machines, distributed load, shear force and bending moment diagrams in beams, center of gravity and centroid, moment of inertia.

Concrete Technology [3 – 0 – 3]	Course #:0902231	Prereq.:0902221*

The course introduces concrete as used in the construction industry; advantages and disadvantages of concrete; cement production, properties and types of cement, hydration of cement, aggregate properties, property of water using in concrete water, mixing and placement of concrete, and compaction,fresh concrete properties, types and applications of admixtures and additives,strength and durability of hardened concrete, concrete mix design.

Concrete Technology lab. [0 – 3 – 1]	Course #:0902233	Prereq.:0902231*

Testing of cement (fineness of cement by the sieve, specific gravity of cement, determination of setting time of standard cement paste, compressive strength test of mortar cement, tensile strength test of mortar cement, Testing of aggregate (sieve analysis of coarse and fine aggregate, flakiness and elongation index of coarse aggregate, specific gravity of fine aggregate, determination of bulk density and voids of aggregate, aggregate abrasion value test, aggregate impact value test, Testing of fresh concrete (Slump test, compaction factor test), Testing of hardening concrete (compressive strength of concrete cubs, split tensile strength of concrete), Nondestructive testing of concrete (Rebound hammer test).

Engineering Geology [**3** – **0** – **3**]	Course #:0902262	Prereq.:0300121

Physical processes that shape the Earth's surface and interior; study of rocks, minerals, and fossils; plate tectonics and the formation of mountains, rift valleys, and ocean basins: natural disasters (earthquakes, volcanoes, and tsunamis); the processes of erosion, weathering and mass movement ; soil physical properties, mass-volume relationships, and groundwater.

Engineering Statistics [**3** – **0** – **3**]	Course #:0902305	Prereq.:0300102

The course covers the role of statistics in engineering, probability, Discrete and Continuous random variables and probability distribution, Normal distribution, Descriptive statistics, Confidence Statistical Intervals, Tests of Hypotheses, Simple Linear Regression and Correlation, Multiple Linear Regression.

Building Construction [**3** – **0** – **3**]	Course #:0902332	Prereq.:0902221

This course provides a comprehensive overview on building site and environment, building systems, structural elements, loads on buildings and various materials used in construction. Groundwork and foundation systems, Stair's fundamentals, technical terms and geometric design. Concrete construction including site cast and pre-cast. Finish works. Building and Planning Regulations for the City of Amman. Reading plans, drawing sections and details of different components and works.

Reinforced concrete 1[**3** – **0** – **3**]	Course #:0902348	Prereq.:0902343

Properties of concrete and steel, Working design method, Ultimate design method, singly and doubly reinforced concrete beams, T-sections, flexural design, shear force design, development length, design of one-way solid and ribbed slabs, concentrically loaded short columns, short columns interaction diagrams.

Structural Analysis (1) [**3** – **0** – **3**]	Course #:0902343	Prereq.:0905213

Types of structures and loads, stability and determinacy, types of supports, equilibrium equations, analysis of statically determinate beams and trusses, shear and moment diagrams for beams and frames, analysis of cables and arches, influence lines for beams and trusses, deflection, double integration method, moment-area theorems, conjugate beam method, virtual work method.

Structural Analysis (2) [**3** – **0** – **3**]	Course #:0902345	Prereq.:0902343

Analysis of statically indeterminate structures, force method, slope-deflection equation, moment distribution method, stiffness matrix.

Fluid Mechanics for Civil Engineering	Course #:0902335	Prereq.: 0902221

Fluid properties; hydrostatic pressure; fluid dynamics and kinematics; conservation of mass and continuity equation; conservation of energy and Bernoulli equation; analysis of pressurized pipe and head loss calculation; open channel flow calculation; analysis of hydraulic structures (gates, weirs, orifices and culverts.

Fluid Mechanics for Civil Engineering lab.	Course#:0902336	Prereq.: 0902335*

Experiments include: Fluid density, viscosity, fluid specific gravity, Buoyancy force using Archimedes principle, calibration of pressure gauge, mercury barometer, aneroid and digital barometers, Centre of pressure, Reynolds No. demonstration, pipes losses, velocity measurements using weir, velocity measurements using orifice, and hydraulic jumps.

Geotechnical engineering [3 – 0 – 3]	Course #:0902364	Prereq.:0902262+0905213 092335
Review of minerals, rocks, soil formation, soil physical properties, and mass-volume relations; grain size distribution; soil consistency and phase limits; soil classification; soil compaction; principle of effective stress; geostatic stresses; stresses due to external loading; stress distribution; soil hydraulic conductivity; seepage analysis; consolidation theory and settlement analysis; shear strength and its laboratory testing; introduction to lateral earth pressure theory.		
Geotechnical engineering Lab [0 – 3 – 1]	Course #:0902365	Prereq.:0902364*
Experiments include: natural moisture content density, specific gravity, coarse soil particles (sieve analysis), fine soil particles (hydrometer analysis), Atterburg limits tests, Lab compaction test (standard Proctor), Lab compaction test (modified Proctor), Field density (sand cone method), hydraulic conductivity test (constant head); hydraulic conductivity test (falling head); consolidation test, shear strength test (direct shear box, unconfined compression, tri-axial.		
**Practical Training for Civil Engineering	Course #:0902400	115 cr.h
A practical engineering training for a period of 280 hours period in an engineering institute (firm, factory, etc.) approved by the department.		
Civil engineering Drawing [0 – 3 – 1]	Course #:0902405	Prereq.:0905103
Providing civil engineering with the basic techniques of engineering drawing while the emphasis is placed on using the Auto CAD software in different civil engineering applications. Blueprint reading. Structural floor plans of projects. Detailing for typical reinforced concrete structural members: planes and details of foundations, walls, elevatores, columns, beams, slabs and staircase. Detailing of steel structures: foundations layout, steel section types, composite sections.		
Reinforced Concrete (2) [3 – 0 – 3]	Course #:0902442	Prereq.: 0902348
Design of two way solid slabs, flat slabs, direct design method and equivalent frame method,torsion in beams,slender columns, biaxial bending in columns,design of single and combined footings,design of raft foundation,moment redistribution,analysis of slabs using yield line theory,deflection and crack control,design of retaining walls.		
Steel Structure [3 – 0 – 3]	Course #:0902444	Prereq.:0902343
Steel Properties, Load and Resistance Factor Design (LRFD) method, Allowable Stress Design method, analysis and design of rolled and built-up tension members, analysis and design of compression members, analysis and design of flexural members including shear and deflection, members subjected to bending and axial stress (Beam-Column), simple bolted and welded connections.		
Hydrology [3 – 0 – 3]	Course #:0902459	Prereq.:0902335
This course is designed to present the principles underlying surface water hydrology and demonstrate their application to solve hydrologic problems. The topics covered include an introduction to the hydrologic cycle and water balance, precipitation, abstractions from precipitation (including evaporation, transpiration, interception, depression storage and infiltration), streamflow measurement, runoff estimation, hydrographs and their use in hydrology, floods, flood routing and frequency analysis.		

Update Date:

31/1/2024

Wastewater and sanitary Engineering [**3** – **0** – **3**]	Course #:0902455	Prereq.:0902555*
Sources of wastewater; quantities and quality. collection of domestic wastewater. Wastewater treatment, design of treatment unit operations and processes, primary treatment unit (screening, grit removal and primary sedimentation), secondary unit processes (activated sludge). Attached growth processes (trickling filters), Secondary sedimentation, disinfection. Treated wastewater reuse.		
Highway Engineering [**3** – **0** – **3**]	Course #:0902471	Prereq.:0902209
This covers characteristics of the driver, the pedestrian, the vehicle, and the road. Geometric design of highway facilities, Highway functional classification, Highway design standards, Design of horizontal and vertical alignment, Special facilities in steep grades. Preparation of highway plans. Calculations of area and volumes and cross sections. Earthwork calculations cut and fill and Mass Haul Diagram MHD. Intersection design, Types of at-grade intersections, interchanges types. highway drainage, surface drainage, introduction of highway drainage .		
Pavement Design [**3** – **0** – **3**]	Course #:0902474	Prereq.:0902471
This covers the concepts of pavements performance and serviceability. Soil for pavements. Basic engineering properties of Soil. Classification of soil for highway use. Soil compaction. Bituminous materials and testes. Asphalt Mixture. Marshall Mix Design Method. super pave mix design method. Design of flexible pavements. Structural components of fixable pavements. Asphalt institute design method. AASHTO design method. Design of rigid pavements.		
Highway and Asphalt Lab. [**0** – **3** – **1**]	Course #:0902476	Prereq.:0902474*
The course convers the asphalt binder characteristics testing: penetration, viscosity, ductility, softening point, flash and fire points, determination of asphalt content in the asphalt mix by extraction, Marshall mix design including aggregate proportioning and determination of optimum asphalt content.		
Traffic Engineering [**3** – **0** – **3**]	Course #:0902477	Prereq.:0902471
The course covers: Characteristics of the driver, the pedestrian, the vehicle, and the road. Fundamental principles of traffic flow: Traffic flow elements, Flow-Density relationships. Traffic engineering studies: Spot speed studies, Volume studies, Travel time and delay studies, Parking studies. Intersection control: Types of intersection control, Signal timing for different phases. Capacity and level of service for highway segments: two lane highways, multilane highways, and freeway segments. Capacity and level of service at signalized intersections. Introduction to highway safety.		
Project Management [**3** – **0** – **3**]	Course #:0902501	Prereq.:0902332 *
The course covers: Planning, construction management concepts, Network-analysis using arrow techniques, Network analysis using precedence technique, overlapping networks, project monitoring, project control, time-cost trade off, resource leveling, PERT method.		
Quantity Measurement and Specifications [**3** – **0** – **3**]	Course #:0902505	Prereq.:0902348
Introduction to the construction industry and construction projects, types of contracts,contracts general and special conditions and technical specifications, methods of quantity measurements for civil engineering works (earthwork, roads, and buildings).		

Update Date:

31/1/2024

Water Supply Engineering [3 – 0 – 3]	Course #:0902443	Prereq.:0902335+0902222

Sources of drinking water (surface, ground, and rainwater), water quality (physical, chemical and biological water quality parameters), water quantity, Water treatment (selection and design of treatment units, coagulation & flocculation, sedimentation, filtration (slow and rapid sand filtration), Brackish water treatment. Water distribution methods and distribution systems, design of distribution system network, design of green water treatment plant.

Water and Environment Lab. [3 – 0 – 3]	Course #:0902458	Prereq.: 902455*

This is an introductory course in water and wastewater analysis. The intent of this course is to enrich the students of civil Engineering with the basic parameters that should be tested in water and wastewater including: pH, Alkalinity, acidity, chloride, chlorine, dissolved oxygen, BOD (biochemical oxygen demand), solids, coagulation and flocculation (jar testing), water hardness. Spectrophotometer, sludge volume index, turbidity.

Foundation Engineering [3 – 0 – 3]	Course #:0902562	Prereq.:0902348 + 0902364

In-depth treatment of shear strength and consolidation principles; site investigation and estimation of soil properties; evaluation and design of shallow foundations including settlement and bearing capacity calculation; bearing capacity for special cases of foundations; introduction to deep foundation, and retaining structures.

Airport and Railways Engineering [3 – 0 – 3]	Course #:0902574	Prereq.:0902474*

The course covers the Nature of Civil Aviation and Airports. Aircraft Characteristics Related to Airport Design. Air Traffic Management. Airport Planning Studies. Forecasting for Airport Planning. Geometric Design of the Airfield: Runway orientation and length. Structural Design of Airport Pavements. Introduction to Railway Engineering.

Graduation Project (1)for civil Engineering	Course #:0902582	Prereq.:115

Students (individually or in teams) are assigned engineering problems which may be theoretical, experimental or both and contains a major design component. The students study the problem assigned and its theoretical background, set the approach, conduct a literature review, make the problem analysis and preliminary design and write a proposal including a cost estimate and time table for implementation over the second semester.

Graduation Project (2) for civil Engineering	Course #:0902589	Prereq.:0902582+0902400

Continuation of Project (1). The students carry out detailed design, construction and testing (if any), write a comprehensive report on the work as per the format posted on the department web site. The report should include, where applicable, economical and environmental assessments. The project work is presented by the students to an examination panel who judge the work.

Introduction to Environmental Engineering [3 – 0 – 3]	Course #:0902457	Prereq.:0902455*

Environmental systems; global environment; biosphere; environmental pollution; water pollution sources (domestic, industrial, agricultural); Solidwaste generation, storage, collection, transfer and transport, and disposal. Air pollution, classification of air pollutants sources and impacts of air pollutants; global warming; acid rains; advanced wastewater treatment.

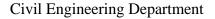| Project Planning and Scheduling **[3 – 0 – 3]**	Course #:0902504	Prereq.: 0902501
This course aims to expose students to the basic planning techniques and principles, both in theory and in practice, that are useful for the management of projects. It also aims to instill greater awareness of the planning at the design phase and project control at the implementation phase for successful implementation of projects. The course content comprises main body of knowledge in project planning and management with essential components in management principles, overview of government regulations, project planning and control techniques, financial management, time-cost trade off, cost estimating, scheduling and resources management and risk analysis.		
Construction methods**[3 – 0 – 3]**	Course #:0902506	Prereq.: 0902501
Analysis of equipment costs, factors affecting equipment productivity, heavy construction methods, types and usage of construction equipment, equipment selection and their productivity.		
Computer Application in Civil Engineering **[3 – 0 – 3]**	Course #:0902507	Prereq.:1501119 +0902442
Analysis and design of steel and reinforced concrete structures using STAAD Pro and ETABS, analysis and design of beams,columns,frames,footings,retaining walls, slabs,trusses,seismic analysis using ETABS.		
Construction Management**[3 – 0 – 3]**	Course #:0902508	Prereq.:0902501
Scientific methods of project management,Network analysis using arrows, nodes,Critical activities and critical path,Activity duration and project duration,Project time and cost control,Resource allocation and resource leveling.		
Remote Sensing**[3 – 0 – 3]**	Course #:0902510	Prereq.:0902209
Introduction to RS, radiation and interaction with the atmosphere and targets, RS Systems, image acquisition, processing and classification, RS applications with lab exercises.		
Advanced Surveying**[3 – 0 – 3]**	Course #:0902512	Prereq.: 0902471
The course covers: Principles of photogrammetry, aerial cameras systems, photo scale, scale distortion, Ground and satellite measurements, digital elevation and surface models, triangulated irregular network, stereoscopic vision, image displacements, stereo plotters, Georeferencing and rectification, Applications of digital photogrammetry.		
Introduction to Engineering and Professional Ethics. **[3 – 0 – 3]**	Course #:0902100	Prereq.:-----
This course is an introduction to engineering, engineering design, profession practice, exploration of the ethical issues that a practicing engineer might encounter course of his or her professional practice, issues in engineering ethics, codes of ethics for engineers, understanding ethical problems, and ethical theories.		
Geographic Information Systems GIS**[3 – 0 – 3]**	Course #:0902514	Prereq.: 0902209
Basic concepts of GIS and geographic data, storage and management of data, projections, vector and raster data, visualization, processing and analysis techniques. Real world modeling and applications, practical exercises using GIS software packages, design a project of best location of site using ARC GIS, Spatial data , modeling .		

Prestressed and precast Concrete [**3 – 0 – 3**]	Course #:0902542	Prereq.:0902348
Introduction to pre-stressed concrete, basic concepts of pre-stressing,flexural strength ,analysis and design based on strength requirements and serviceability requirements, cambering, deflection,crack control,loss of pre-stressing force,bond,development lengths,anchorage zone design,shear,composite sections.		
Bridge Engineering[**3 – 0 – 3**]	Course #:0902544	Prereq.: 0902442
Types of bridges, loads on bridges, analysis and design of reinforced concrete structural elements in bridges according to AASHTO provisions, pre-stressed concrete bridge, steel bridges, substructure design, construction details.		
Earthquake Engineering[**3 – 0 – 3**]	Course #:0902545	Prereq.: 0902442
Seismology, nature of earthquakes their causes and effects ,seismic waves, introduction to dynamic analysis of structures, single and multiple degrees of freedom systems, seismic response of linear elastic structures, modal analysis, response spectrum, equivalent lateral force method, requirements of the Jordanian code for earthquake resistant buildings,lateral load resisting systems,frames and shear walls,detailing of members for resisting earthquakes,foundations for shear walls.		
Water Resources Engineering[**3 – 0 – 3**]	Course #:0902553	Prereq.:0902459
Sources of water (surface, groundwater, non-conventional (treated wastewater, desalination)); water quality standards; water demands and economics; dams and reservoirs rain water harvesting; storm sewer system design.		
Advanced Geotechnical Engineering[**3 – 0 – 3**]	Course #:0902563	Prereq.: 0902364
Advanced treatment of shear strength of soil and consolidation theories. Lateral earth pressure and stability of retaining structures. Slope stability analysis, and soil improvements.		
Geo-environmental Engineering[**3 – 0 – 3**]	Course #:0902565	Prereq.: 0902364
Review of soil composition and mineralogy; types and characteristics of contaminants; subsurface flow; integrated waste management; landfill engineering (design, construction, operation and monitoring).		
Advanced Foundations Engineering[**3 – 0 – 3**]	Course #:0902566	Prereq.: 0902562
In depth soil exploration and reporting including field testing. Soil stabilization and ground improvement. Deep foundation evaluation and design. Design of earth retaining structures.		
Traffic Safety[**3 – 0 – 3**]	Course #:0902572	Prereq.:0902477
The course covers: fundamental principles of traffic and transportation safety. Crashes or accidents, causes of crashes, factors involved in crashes. Collecting and analysis of crash data, Identifying and prioritizing hazardous locations and elements, determining possible causes of crashes, conducting engineering studies, Crash reduction capabilities of countermeasures, Establishing project priorities, implementation, and evaluation. Effectiveness of safety design features, Summary of research results on safety effectiveness of highway design features, Access control, alignment, cross-sections, and intersections. Pedestrian safety and pedestrian facilities.		

Railways Technology for Civil Engineering [**3 – 0 – 3**]	Course #:0902575	Prereq.:0902471
The course covers: Rail transportation, Railway types. Railway geometric design: Cross sections, horizontal and vertical alignments, super elevation. Rail sections, joints and crossings. Trains speed and high speed railways. Railway traffic control and management. Railroad services, passenger services, fright services, railroad planning. Railway safety and signage.		
Transportation Planning and Engineering [**3 – 0 – 3**]	Course #:0902576	Prereq.:0906402+0902471
The course covers the concept of transportation (engineering and planning), transportation filed mobility and accessibility, modes of transportation, transportation system management, transportation planning process, forecasting travel demand steps, evaluation of transportation alternatives.		
Public Transportation Engineering[**3 – 0 – 3**]	Course #:0902578	Prereq.:0902471
The course covers: basic definitions and classifications of urban public transportation systems. Urban passenger transportation modes, land, air, and water. Highway transportation modes. Transit system performance. Environmental impact that includes air, noise, and energy impacts. Public transportation systems and modes.		
Highway Maintenance and Rehabilitation [**3 – 0 – 3**]	Course #:0902579	Prereq.:0902474
This course discusses the importance and principles of pavement maintenance management system, subjective and objective pavement evaluation procedures, types and causes of pavement distresses, methods of maintenance and repair (M&R), determination of M&R needs and priorities. Typical maintenance procedures. Strengthen existing pavements. Flexible and rigid overlays over flexible and rigid pavements.		
European Climate Change Experience [**3 – 0 – 3**]	Course#:0902580	100 Cr. Hrs.
Fundamentals of climate change science, environmental, economic, and humanitarian climate change, EU regulations and legislation to address climate change and its effects, international climate agreements.		
Special Topics in Civil Engineering[**3 – 0 – 3**]	Course #:0902587	100 Cr. Hrs.
Special advanced topics selected from various subjects in Civil Eengineering.		
[**3 – 0 – 3**] Environmental Chemistry	Course #:0902222	0300131
Atmospheric chemistry and atmospheric pollution (H2S, SOx, NOx, CO, CO2, CH4) , acid rain, global warming. Soil pollution sources (sodium adsorption ratio, salinity, heavy metals). Introduction to organic pollutants; Definition of pollutants limit standards and units (US standards, molarity, normality, molality); chemical and biological Indicators of water quality (acidity, alkalinity, hardness, fluoride, TOC, COD, BOD, DS, TKN, Phosphorus), Eutrophication, Aerobic and anaerobic reactions, Solubility effect of pollutants, sedimentation-solubility reactions, oxidation and reduction reactions, absorption and adsorption reactions.		

Courses taught in other department

Engineering Economics and Management[3 – 0 – 3]	Course #:0906402	Prereq.: **90 cr.hr**

Foundations of engineering economy, factors accounting for time value of money (TMV), combining factors, nominal and effective rates, present and future worth analysis, annual worth analysis, rate of return analysis Single and multiple projects, Principles of engineering management.

Numerical analysis [3 – 0 – 1]	Course #:0904304	Prereq.: 0905201

Error analysis. Solution of equations in one variable. Numerical solution of a set of linear and nonlinear equations. Curve fitting and interpolation. Numerical integration and differentiation. Numerical solution of ordinary differential equations.

Technical Writing and Communication Skills [2 – 0 – 2]	Course #:0904306	Prereq.: 0200106

Why engineers need writing skills, engineers writing fields, writing noise, punctuation marks, common grammar mistakes, technical writing for business letter, technical writing for memorial letter, technical writing for special cases such as telling no, admitting a mistake, inform unpleasant news, …., ets.,
technical reports, and common vocabulary mistakes. Job interview and oral presentations as additional skills.

Calculus (1) [3 – 0 – 3]	0300101	-----------

Functions: Domain and range, Operations on functions (Geometric and Algebraic), Graphs of functions, Trigonometric functions. Limits: Limits and computational techniques, Limits at infinity, Infinite limits, Vertical and horizontal asymptotes. Continuity. Limits and continuity of trigonometric functions. Derivatives: The derivative and techniques of differentiation, Derivatives of trigonometric functions, The chain rule, Implicit differentiation. Analysis of functions: Increase and decrease, Concavity, Extrema values, Graphs of functions. Applications of the derivative: Roll's theorem, The mean value theorem, L'Hopital's rule. Integration: The indefinite integral, Integration by substitution, The definite integral, The fundamental theorem of calculus. Applications of the definite integral: Area between curves, Volumes, Length of a plane curve, Area of a surface of revolution.

Calculus (2) [3 – 0 – 3]	0300102	0300101

Inverse function, Logarithmic and exponential functions, Inverse trigonometric functions, Hyperbolic functions, Inverse of hyperbolic functions. Integration by parts, Trigonometric integrals and reduction formulas, Trigonometric substitutions, Integrating rational functions by partial fractions. L'Hopital's rule, Indeterminate forms. Improper integrals. Sequences, Monotone sequences, Infinite Series, Geometric series, Convergence Tests, Alternating series, Taylor and Maclaurin series, Power series. Polar coordinates.

General Physics (1) [3 – 0 – 3]	0300121	--------

Physics and Measurement; Motion in One Dimension; Motion in Two Dimension, Newton's Law of Motion and friction; Circular Motion and other Applications of Newton's Law, Work, Energy and Power system, potential energy and conservation of energy, Momentum and Collisions; Rotational Motion (Angular position Velocity, and Acceleration), Torque, Moments of Inertia, Rotational kinetic energy.

General Physics (2) [3 – 0 – 3]	0300122	0300121

Electric charge, Electric Force, Electric Field, Gauss law, Electric potential, Capacitance and dielectrics, Current and resistance, Ohm's law, Electromotive Force, DC Circuits, Kirchhoff's law, Magnetic field, Sources of Magnetic fields.

General Chemistry (1) [3 – 0 – 3]	0300131	--------

This course teaches the basics of modern chemistry. It covers the following topics: atomic masses and molecular masses, the mole concept, chemical reactions and stoichiometry, acid-base reactions, oxidation-reduction reactions, metathesis reactions, ideal gas law, properties and reactions of gases, electronic configuration of elements. the periodic properties of the elements, types of chemical bonding and the theories of bonding.

General Chemistry Laboratory (1) [1 – 0 – 1]	0300133	0300131

This course provides experiments to supplement topics taught in General Chemistry I. It covers safety rules in the laboratory, chemical observation, stoichiometry, volumetric analysis, thermochemistry, metathesis reactions, application of the ideal gas law and qualitative analysis of some cations and anions.

Physics Laboratory (1) [1 – 0 – 1]	0302111	0300121

This course includes ten experiments in mechanics, covering the experimental aspect of the theoretical content that the student studies in the general physics course 1, the student conducts one experiment every week in a three-hour session, and these experiments include: experimental errors and data analysis, practical measurements and accuracy Experimental, vector and equilibrium of forces Newton's second law, projectile motion, collision in two dimensions, friction, simple harmonic movement - simple pendulum, hook law and elasticity, mechanical energy conservation, rotational motion.

Physics Laboratory (2) [1 – 0 – 1]	0302112	0300122

This course includes ten experiments in electrical and magnetic science, covering the experimental aspect of the theoretical content that the student studies in the general physics course 2, the student conducts one experiment every week in a three-hour session, and these experiments include: mapping the electric field, Ohm's law, Kirchhoff's Rules, electrical resistivity of a conductor, resistance to temperature change, Whetstone's bridge, capacitor charging and discharging, electrical power, geomagnetic field measurement, electrochemical equivalent of copper.

Engineering Workshop[0 – 3 – 1]	0905105	-----------

Safety in the workshop, hand skills, development of basic skills in fields of carpentry, manual sheet metal fabrication, welding processes and household electrical circuits, turning and milling.

Engineering Drawing[0 – 6 – 2]	0905103	------------

Basic engineering operations. Engineering text input. Types of engineering drawing lines. Symbols used in engineering drawing. Geometric projection. Free models. Drawing perspectives. Multi view sketching (projection method) and drawing with instruments. Pictorials. Sectional views. Dimensioning. Auxiliary views and cutting plane.
Parallel: Introduction to computer drawing, drawing aids, Geometrical construction, and the appropriate commands of text, editing, plotting, sections, layers, pictorial views, and dimensioning. Auxiliary views.

Advanced Engineering Mathematics[6 – 0 – 3]	0905201	0300102

This course covers the ordinary differential equations (ODEs): first, second, and higher ODEs, systems of ODEs. Phase plane. Qualitative methods, Laplace Transforms. Linear algebra: matrices, vectors, and determinants. Linear systems.

Mechanics of Materials[3– 0 – 3]	0905213	0902221
Introduction to mechanics of deformable bodies, concepts of stress and strain, mechanical properties of materials, axially loaded members, torsion of circular shafts and tubes, bending and shearing stresses in beams, stresses in thin-walled members and pressure vessels, combined loadings, stress and strain transformations, beam deflection (method of integration) and concept of buckling of columns.		
Mechanics of Materials lab[0 – 3 – 1]	0905214	0905213
Measurements of stresses and strains, tensile test, compression test, hardness test, creep test, fatigue tests, impact test, torsion test, buckling of columns test, deflection of beams test, deflection of plates test and strain gauge measurements.		
Dynamics[3 – 0 – 3]	0905311	0902221
Kinematics of particles, planar kinematics of rigid bodies, kinetics of particles and planar rigid bodies, equations of motion, work and energy, impulse and momentum.		