



" عراقة وجودة" "Tradition and Quality"

	Brief Course De	Q	F09/0409-3.0E			
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]	Faculty	Faculty of Engineering and Technology	Academic Department	Civil and Infrastruct Engineeri	l ure ng	Number of the course plan
	Number of Major requirement courses	33	Date of plan approval	28/11/202	23	(2023-1)

This form is just for the major requirement courses

Major Mandatory Requirements

Course number	Credit	Title of the course	Prerequisite-co-	
	hours		requisite	
0908206	3	Statics	General Physics I	
Force vectors and resultant. Free-body diagram of forces and equilibrium of particles and rigid bodies.				
Moment of a force about a point and about an axis. Analysis of trusses and frames. Shear force and				
bending moment diagrams. Centroids and moment of inertia of an area.				

Course number	Credit	Title of the course	Prerequisite-co-requisite			
	hours					
0908221	3	Engineering Geology	General Chemistry for Engineering Students			
Silicate minerals and non-silicate minerals, physical properties of minerals, rock types and their formation, engineering properties of rocks, as construction materials, topographic maps, plate tectonics,						
earthquakes and ea and folding, subsur	earthquakes and earth movements, landslides, subsidence, liquefaction, eras, faults and types of faults and folding, subsurface exploration.					

Course number	Credit	Title of the course	Prerequisite-co-requisite	
	hours			
0908224	3	Engineering Geology Laboratory	Co. Engineering Geology	
Determination of the water content and density of rocks and soils; Absorption and specific gravity of				
rocks and soils; Particle size analysis (mechanical method); Compressive strength of rock cores; Rock				
Quality Designation-RQD; Physical properties of minerals (color, streak, cleavage, fracture, hardness				
and specific gravity); Descriptions and identifying characteristics of different types of rocks (Igneous,				
Sedimentary and Metamorphic Rocks); Effect of acid reacting with calcite; Geological and topographic				
map, Introducing the g	geological	featurism map scale.		

Course number	Credit	Title of the course	Prerequisite-co-
	hours		requisite
0908341	3	Surveying	Calculus I
Principles of surveying, units of measurements, plotting scale and map scale, linear measurements,			
leveling, directions (measurement of angles and its tools), plane coordinates system, contour lines,			
traversing, errors and adjustments, areas and volumes, introduction to GIS.			





Brief Course Description - Course Plan Development and Updating Procedures	OE00/0400 2 0E
Department of Civil and Infrastructure Engineering	QF09/0409-3.0E

Course number	Credit hours	Title of the course	Prerequisite-co- requisite	
0908342	1	Surveying Laboratory	Co. Surveying	
Surveying equipment, pacing and taping, leveling, differential leveling, measurement of horizontal				
angles, measurement of vertical angles, traverse layout, contour lines, topographic mapping, and total				
station.				

Course number	Credit hours	Title of the course	Prerequisite-co- requisite
0908359	3	CAD in Civil Engineering	Engineering Drawing
Basic principles of engineering drawing and interactive computer graphics, computer-aided drafting, 2-			
and 3D modeling, descriptive geometry and visualization in modern CAD systems, use of modern CAD			
platforms as design tool	s in civil	and infrastructure engineering applications.	

Course number	Credit	Title of the course	Prerequisite-
	hours		co-requisite
0908205	3	Probability and Statistics for Engineers	Calculus I
09082053Probability and Statistics for EngineersCalculus ICounting rules, conditional and independent probabilities, random variables, discrete and continuous densities and distribution functions, exponential, standardizing, statistical sample distribution parameters, Gaussian, Binomial, Poisson and hyper-geometric distributions, central limit theorem, statistical estimation, hypothesis testing, statistical tests, mean and sample proportion for small and			

Course number	Credit	Title of the course	Prerequisite-co-	
	hours		requisite	
0908207	3	Dynamics	Statics	
Kinematics of particles: rectilinear continuous and erratic motion, general curvilinear motion and its				
components; translating and rotating coordinate systems; Kinetics of particles: force-acceleration,				
Newton's Laws of Motion, equations of motion, principle of work and energy, linear momentum and				
angular momentum; planar kinematics of rigid bodies: rigid body motion, translation and rotation,				
relative motion analysis,	relative motion analysis, acceleration; introduction to structural dynamics.			

Course number	Credit	Title of the course	Prerequisite-	
	hours		co-requisite	
0908203	3	Strength of Materials	Statics	
Stress and strain, mechanical properties of materials, Hook's Law, stress and strain under axial loading,				
thermal stresses, torsion, analysis and design of beams, stresses and strains under the influence of				
bending, composite sections, combined stresses, plane stresses and strains and analysis, buckling of				
columns.				





" عراقة وجودة" "Tradition and Quality"

Brief Course Description - Course Plan Development and Updating Procedures Department of Civil and Infrastructure Engineering	QF09/0409-3.0E
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Course number	Credit	Title of the course	Prerequisite-co-requisite	
	hours			
0908204	1	Strength of Materials Laboratory	Co. Strength of Materials	
Tension test, torsion test, deflection of beams, creep test, hardness test, fatigue test, and thin cylinder				
test, buckling of columns, impact test.				

Course number	Credit hours	Title of the course	Prerequisite- co-requisite
0908345	3	Linear Algebra	Calculus I
Matrices and vectors, operations on matrices, determinants, system of linear equations and methods for			
solving them, vectors in spaces, linearly dependent and independent, linear transformations, kernel and			
span, Eigen values and I	Eigen vec	tors, applications in civil engineering.	

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908326	2	Material Science	Engineering Geology
Understanding the structure of materials in term of crystal geometry, structural disorder, and solid			
solution and phase diagram. Material classification: metals, polymers, ceramics, glass, and composites.			
Material properties (med	chanical,	thermal, chemical, optical, and electrical).

Course number	Credit	Title of the course	Prerequisite-
	hours		co-requisite
0908337	3	Fluid Mechanics for Civil Engineering	Statics
Fluid properties and definitions. Hydrostatics and stability of floating bodies. Fluid flow, energy and			
continuity relationships. Force and momentum relationship. Dimensional analysis and similarity. Flow			
in conduits, laminar and turbulent flows, frictional and minor losses, piping systems. Introduction to			
turbomachinery.			

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908331	3	Structural Analysis I	Strength of Materials

Classifications of structures, loads on structures, static determinacy and indeterminacy, external and internal instability, equilibrium and support reactions, principle of superposition, analysis of plane and space trusses, analysis of beams and frames, shear, bending moment and qualitative deflected shape, deflection of beams and frames by geometric and energy methods, deflection of trusses by virtual work method, influence lines for beams, frames and trusses by equilibrium method, application of influence lines.





Brief Course Description - Course Plan Development and Updating Procedures	OF00/0400 3 0F
Department of Civil and Infrastructure Engineering	QI03/0403-3.0L

Course number	Credit	Title of the course	Prerequisite-co-
	nours		requisite
0908310	3	Applied Mathematics	Linear Algebra
This course focuses on a variety of mathematical topics and its engineering applications. The student			
will be introduced to important mathematical concepts such as: complex numbers; linear algebra;			
calculus; matrix analysis	s; vector a	analysis; Cartesian, spherical, and cylindrical coord	linates.

Course number	Credit	Title of the course	Prerequisite-co-requisite	
	hours			
0908311	1	Applied Mathematics Laboratory	Co. Applied Mathematics	
The application of computer software in solving problems related to topics of applied mathematics in				
the area of civil engineering such as: complex numbers; linear algebra; calculus; matrix analysis; vector analysis; Cartesian, spherical, and cylindrical coordinates.				

Course number	Credit	Title of the course	Prerequisite-co-
	hours		requisite
0908227	3	Concrete Technology	Material Science
Aggregates: properties a	and tests.	Cement: properties, manufacturing, hydration	, types and tests. Mixing
water: properties and t	tests. Fre	sh concrete: workability, segregation, mixir	ng, and tests. Hardened
concrete: strength of	concrete,	durability and tests. Concrete mix design	n, concrete blocks and
admixtures. Computer a	pplication	ns and case studies.	

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908328	1	Concrete Technology Laboratory	Co. Concrete Technology
Aggregate tests: sieve analysis, specific gravity, unit weight, abrasion, strength, impact. Cement tests:			
normal consistency, sett	ing time.	Mortar tests: flowability, strength. fresh c	oncrete tests: workability,
strength. Destructive and	d non-des	tructive hardened concrete, brick tests, ste	el tests, concrete mix design.

Course number	Credit	Title of the course	Prerequisite-
	hours		co-requisite
0908332	3	Structural Analysis II	0908331
Analysis of statically	indetermi	nate structures, method of consistent deformations,	three moment
equation, evaluation of fixed end moments, slope-deflection equations, moment distribution method and			
drawing influence lines	of statica	lly indeterminate structures.	





Brief Course Description - Course Plan Development and Updating Procedures	OE00/0400 3 0E
Department of Civil and Infrastructure Engineering	QF09/0409-3.0E

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908353	3	Hydraulics	Fluid Mechanics for Civil Engineering
Basic principles of hydraulic engineering, hydraulics of pipe networks, water hammer. Flow in ope			
channels: uniform	and non-u	niform flows and flow measuren	nent devices. Hydraulics machines: pumps
and turbines.			

Course	Credit	Title of the course	Prerequisite-co-requisite		
number	hours				
0908361	3	Geotechnical Engineering	Strength of Materials		
Formation, composition and structure of soils, index properties of soils, soil classification, soil					
compaction, flow in porous media, one dimensional and two dimensional flows. Soil stresses: geostatic					
and effective stresses. Distribution of stresses due to surface applied loads, consolidation theory and					
time-rate of conso	time-rate of consolidation, shear strength of soils and shear strength tests.				

Course	Credit	Title of the course	Prerequisite-co-requisite
number	hours		
0908362	1	Geotechnical Engineering Laboratory	Co. Geotechnical Engineering
Visual classification of soil, moisture content, organic content, sieve analysis, hydrometer test,			
Atterberg limits, c	ompaction	n, in-situ field density, permeability, conso	lidation, direct shear test, tri-axial
test.			

Course	Credit	Title of the course	Prerequisite-co-requisite
number	hours		
0908433	3	Reinforced Concrete I	Structural Analysis I
Flexural analysis rectangular beam analysis and desig	Flexural analysis and design of beams: singly reinforced rectangular beams, doubly reinforced rectangular beams, T-beams, shear and diagonal tension, bond, anchorage and development lengt analysis and design of one-way slabs, design of compression members.		gular beams, doubly reinforced horage and development length,

Course number	Credit	Title of the course	Prerequisite-co-
0908457	3	Water and Environmental Engineering	Hydraulics
Drinking water engineer water, physical, chemic flocculation, sedimentat pipes and analysis of wa	ring: wate cal, and ion, filtra iter distrib	er demand estimation, design period, population es biological quality of water. Drinking water trea tion, disinfection, and softening. Removal of tast pution networks. Computer applications.	stimation, sources of atment: coagulation, e and odor. Flow in





Brief Course Description - Course Plan Development and Updating Procedures	
Department of Civil and Infrastructure Engineering	QF09/0409-3.0E

Course	Credit	Title of the course	Prerequisite-co-requisite			
number	hours					
0908458	1	Water and Environment Laboratory	Co. Water and Environmental Engineering			
Properties of fluids, hydrostatic principles, open channel flow, pipe losses, pumps, flocculation and						
coagulation, conductivity test, turbidity test, biochemical oxygen demand (BOD), chemical oxygen						
demand (COD	demand (COD), residual chlorine, chloride, acidity, alkalinity.					

Course number	Credit	Title of the course	Prerequisite-co-
	hours		requisite
0908441	3	Traffic and Transportation Engineering	Surveying
Concepts, fundamental parameters of traffic engineering, fundamentals of transportation engineering, basics			
of highway capacity and level of service, traffic control devices, basics of highway safety, introduction to			
the application of su	the application of supervised and unsupervised machine learning for predicting traffic and accident patterns.		

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908462	3	Foundation Engineering	Geotechnical Engineering
Review of rock types investigation), shallow design on rocks, foundat deep foundations.	and or foundation tion settle	igin of soil, review of soil mechanic ons, bearing capacity, special cases in for ement (elastic and consolidation), lateral es	s, subsoil exploration (site oundation design, foundation arth pressure, retaining walls,

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908434	3	Reinforced Concrete II	Reinforced Concrete I
Analysis and design of RC columns; analysis and design of shallow foundations; analysis and design of two-way slabs; analysis and design of staircases.			

Course number	Credit hours	Title of the course	Prerequisite-co- requisite
0908454	3	Engineering Hydrology	Hydraulics
Hydrologic cycle and hydrological processes: precipitation, evaporation, infiltration, and generation of			
surface runoff, rainfall-runoff analysis and synthetic flood hydrograph. Groundwater hydrology and			
wells hydraulics, statisti	cal hydro	logy, hydrologic analysis and design. Computer an	d AI applications.
3			11





Brief Course Description - Course Plan Development and Updating Procedures	
Department of Civil and Infrastructure Engineering	QF09/0409-5.0E

Course	Credit	Title of the course	Prerequisite-co-requisite	
number	hours			
0908547	3	Highway and Pavement Design	Traffic and Transportation Engineering	
Horizontal and vertical alignment, cross section elements and super-elevation, pavement types and				
structural design, stress and strain calculations, design of flexible pavements, pavement materials,				
physical prope	physical properties and tests, volumetric analysis and design of asphalt mixes using Marshall's method.			

Course	Credit	Title of the course	Prerequisite-co-requisite		
number	hours				
0908548	1	Highway and Pavement Laboratory	Co. Highway and Pavement Design		
Sieve analysis of coarse aggregates, coarse and fine aggregates tests: specific gravity and absorption,					
asphalt cement: ductility, penetration, softening point, flash and fire point, viscosity, Hot Mix Asphalt					
(HMA) design	(HMA) design by Marshall skid resistance, asphalt extraction from cores.				

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908435	3	Steel Structures Design	Structural Analysis II
Fundamentals of steel structures, design of tension members, design of compression members, design of beams, design of beam-columns, and design of connections.			

Course	Credit	Title of the course	Prerequisite-co-requisite	
number	hours			
0908401	3	Engineering Practical Training	Passing 115 Credits for 8 weeks (280 Hrs.)	
The student has to spend at least 280 hours of civil engineering training at recognized companies and				
establishments during one semester.				

Course number	Credit	Title of the course	Prerequisite-co-requisite		
	hours				
0908571	3	Specifications and Quantity Survey	Reinforced Concrete I		
Introduction to specifications, contracts and quantity survey, types of construction contracts and their					
obligations to project parties (FIDIC), building items, general and particular technical specifications of					
building items, prepa	building items, preparation of engineering quantity surveying.				

Course number	Credit	Title of the course	Prerequisite-co-requisite
	hours		
0908501	1	Graduation Project I	Passing Engineering Practical Training
A supervised project in groups of normally three to five students aimed at providing practical			
experience in some aspect of civil and infrastructure engineering. Students are expected to complete a			
literature survey, project specification, critical analysis, and to acquire the necessary material needed for			
their intended end p	product.		





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Brief Course Description - Course Plan Development and Updating Procedures Department of Civil and Infrastructure Engineering	QF09/0409-3.0E
Department of ervir and infrastracture Engineering	

Course number	Credit hours	Title of the course	Prerequisite-co- requisite
0908502	2	Graduation Project II	Graduation Project I
This is a continuity of the final Graduation Project I, consequently the students are expected to			
successfully accomplish the final year project in the specified field of Graduation Project I.			

Faculty Requirements

Course	Credit	Title of the course	Prerequisite-co-requisite	
number	hours			
0908201	2	Technical Writing and Professional Ethics	Communication skills in English	
Practice in writing technical reports, resume, presentation of technical data, effective communication,				
introduction to engineering ethics, professionalism and codes of ethics, rights and responsibilities of				
engineers, risks safety and accidents.				

hours	The of the course	Prerequisite-co- requisite	
3	Projects Management and Value Engineering	Engineering Economics	
Principles and characteristics of engineering project management, business management and organization structure, introduction to value engineering, leadership principles and professional licensure, contract administration, cost management, project planning and scheduling (manually and using software), resource allocation and leveling, delay and alaims, risk management.			
	hours 3 haracteris ture, intr administ source all	hours Projects Management and Value Engineering a Projects Management and Value Engineering haracteristics of engineering project management, busi ture, introduction to value engineering, leadership prince administration, cost management, project planning and sc source allocation and leveling, delay and claims, risk management	

Major Elective Requirements

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908503	3	Special Topics	Project Management and Value Engineering
Vary with nature of selected topic that is of special interest to undergraduates. May be repeated for maximum 6 credits if topics are substantially different, which is subjected to departmental approval.			

Course	Credit	Title of the course	Prerequisite-co-requisite
number	hours		
0908523	3	Infrastructure Systems	Project Management and Value Engineering
Introduction to infrastructure systems, including energy systems, water and wastewater infrastructure transportation systems, waste disposal, and resource conservation. The stages of an infrastructure project lifecycle. Infrastructure sustainability including social, economic and environmental aspects.			





" عراقة وجودة" "Tradition and Quality"

Brief Course Description - Course Plan Development and Updating Procedures	OE00/0400 3 0E
Department of Civil and Infrastructure Engineering	QF09/0409-3.0E

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908533	3	Pre-Stressed Concrete	Reinforced Concrete I
Basic principles, s	hort- and long-ter	m properties of constituent materials, pa	artial pre-stressing. Flexural
behavior, analysis	and design of pr	e-stressed concrete beams, classes, cra-	cking, pre-tensioning, post-
tensioning, service	load design, load	l balancing, strength design, strain limit	s, flexural efficiency, Bond,

transfer and development lengths, anchorage zone design, Shear and diagonal tension, Evaluation of immediate and long-term losses, Composite construction and design, shear-friction theory, Deflection calculation using approximate single time step approach.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
0908535	3	Flood Risk Management	Engineering Hydrology
Introduction to flood	risk, flood prob	ability and the consequences of the	ne flood. Estimation of runoff
flood peak-flow, desi	gn flood probab	ility and return period. Engineering	g structural and non-structural
measures to reduce a	and mitigate flo	od risk. Flood protection structure	es and detention ponds, flood
routing. Flood early managing flood risk.	warning and res	ponse systems. Economic, enviro ations and case studies.	nmental and social aspects in

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Course	Credit	Title of the course	Prerequisite
number	hours		
0908539	3	Introduction to Earthquake Engineering	Reinforced Concrete I
Origin and char	racteristics o	f earthquake, structural dynamics; vibration cl	naracteristics of building,
periods and mo	de shapes, re	sponse spectrum, earthquake-induced forces an	d displacements, inelastic
behavior, force	reduction and	I ductility requirements for concrete and steel m	naterial, Jordanian seismic
code and intern	ational build	ing seismic codes, seismic design and provisio	ns of reinforced concrete
frames and shear	r walls accord	ling to ACI code.	

Course number	Credit hours	Title of the course	Prerequisite- co-requisite
0908545	3	Highway Maintenance	0908547
Management procedure	s for hig	hway maintenance projects: project level and networ	k level, paved
networks and their bran	nches, se	ctions and sample units to prioritize and manage ma	aintenance and
rehabilitation processes, overview of maintenanc	, distress e and reh	survey of paved areas, Pavement Condition Index so abilitation methods.	coring method,





Brief Course Description - Course Plan Development and Updating Procedures	OE00/0400 2 0E
Department of Civil and Infrastructure Engineering	QF09/0409-3.0E

Course number	Credit	Title of the course	Prerequisite-
	hours		co-requisite
0908552	3	Water and Wastewater Network Design	0908452
Application of fundamental engineering science to the design of comprehensive water supply and sewer			
systems. Design criteria	a, Water	demand for domestic and industrial water supplies. I	Pipe networks,
water distribution system	n design.	Waste and storm water networks design. Computer appl	lications.

Course number	Credit	Title of the course	Prerequisite-co-requisite
	hours		
0908563	3	Advanced Geotechnical Engineering	Geotechnical Engineering
Soil exploration, sh	ear streng	th theory and testing, lateral earth pressu	re theory, external stability
analysis of retaining	g structure	s, fundamentals of geo-synthetic reinforce	d retaining structures, slope
stability analysis, pr	oblematic	soil, soil improvement techniques, deep fou	ndations, introduction to soil
dynamics.			

Course	Credit	Title of the course	Prerequisite-co-requisite
number	hours		
0908586	3	Building Maintenance	Reinforced Concrete I
Investigation of	of the natura	l and industrial environmental factors that lead	to damage of construction
elements, effect	ctive detection	on and maintenance plans, techniques and mate	rials for maintenance,
preventive met	hods, repair	and replacement techniques, non-destructive te	esting techniques, field
application and	l case studie	es	

Course	Credit	Title of the course	Prerequisite-co-requisite
number	hours		
0908587	3	Geographic Information System (GIS)	Surveying
GIS basics, int	roduction to	ArcGIS, exploring the data structure for ArcC	HS, working with tabular data,
managing map	layers, wor	king with coordinate systems, and GIS applicat	ions in civil engineering.

Course	Credit	Title of the course	Prerequisite-co-requisite
number	hours		
0908588	3	Advanced Construction Management	Project Management and Value
			Engineering
Project ma projects, p productivi types of co	anagement lanning ar ty and resonant	in the context of construction projects. Cland procurement of materials and equipment ource use, project key performance indications such as project logs, reports, submittations such as project logs, r	haracteristics and phases of construction it, planning of operations and processes, ators, and project control, and different ls, meetings, and close out.





Brief Course Description - Course Plan Development and Updating Procedures	OE00/0400 2 0E
Department of Civil and Infrastructure Engineering	QF09/0409-3.0E

Course	Credit	Title of the course	Prerequisite-co-requisite				
number	hours						
0908589	3	Intelligent Transportation System (ITS)	Traffic and Transportation				
			Engineering				
Basics of intelligent transportation systems (ITS), the impact of ITS on the environment and the							
economy, exploring the advanced traveler information systems, investigating the different smart							
payment systems and public transportation technologies, transportation planning in ITS, basics of							
transportation modeling and simulation, and computer and AI applications in simulation.							

Course	Credit	Title of the course	Prerequisite-co-requisite					
number	hours							
0908593	3	Green Buildings and Sustainable	Project Management and					
		Construction	Value Engineering					
Key aspects of sustainability in construction engineering, trends in green building design and construction various international building rating systems such as Leadership in Energy and								
Environmental Design (LEED), which assesses green building design, construction, operation, and maintenance across various categories: Location and Transportation Sustainable Sites Water								
Efficiency, E Innovation, an	nergy and d Regional l	Atmosphere, Materials and Resources, Inc Priority.	loor Environmental Quality,					

Approved by	Dr. Hesham Rabayah	Date of approval	19/12/2023
department council			