

Brief Course Description - Course Plan Development and Updating Procedures Department of Civil and Infrastructure Engineering	QF09/0409-3.0E
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Faculty	Faculty of Engineering and Technology	Academic Department	Civil and Infrastructure Engineering	ID Number of Course Plan (20191)
Number of Major Requirement Courses	44	Date of Plan Approval	30/8/2018	

This form is just for the major requirement courses

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908201	2	Technical Writing and Professional Ethics	0420121

Practice in the 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.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908461	3	Project Management and Value Engineering	0909404

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 claims, risk management.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908202	3	Engineering Mechanics	0120131+ 0911102

Force systems: components, resultants of force in 2D (planner) and 3D (space), moment about a point and about a line, equilibrium of particles and rigid bodies. Structural analysis: trusses and frames. Internal forces: shear force diagram normal force and bending moment diagrams in beams, center of gravity and centroid, moment of inertia. Kinematics of particles. Rectilinear and curvilinear motion in various coordinate systems. Kinetics of particles. Newton's second law.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908203	3	Strength of Materials	0908202

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.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908204	1	Strength of Materials Laboratory	Co.:0908203

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	Course Name	Prerequisite-Co-requisite
0908205	3	Probability and Statistics for Engineers	N/A

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Counting 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 large samples, method of least squares correlation and regression.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908221	3	Geology	2nd year
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 earth movements, landslides, subsidence, liquefaction, eras, faults and types of faults and folding, subsurface exploration.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908222	3	Construction Materials	2nd year
Aggregates: properties and tests. Cement: properties, manufacturing, hydration, types and tests. Mixing water: properties and tests. Fresh concrete: workability, segregation, mixing, tests. Hardened concrete: strength of concrete, durability and tests. Concrete mix design, masonry units, concrete blocks, admixtures.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908223	1	Construction Materials Laboratory	Co.:0908222
Aggregate tests: sieve analysis, specific gravity, unit weight, abrasion, strength, impact. Cement tests: normal consistency, setting time. Mortar tests: flowability, strength. fresh concrete tests: workability, strength. Destructive and non-destructive hardened concrete, brick tests, steel tests, concrete mix design.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908225	3	Principles of Electrical Communications	0905111
Fundamentals of communications systems, analog modulation/demodulation systems(AM, FM), digital data transmission, fundamentals of networking, Local Area Networks (LAN) and Ethernet, Internet technologies, basics of tele-communication systems, basics of optical communications system, and cell phone technologies.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908334	3	Communication Networks and Electrical Wiring	0905111
Introduction to power analysis for AC circuits, power factor in single and three phase circuits, electrical power transmission lines, electrical luminance systems, types of luminaires, basics of electrical wiring technologies, electrical wiring techniques, and fundamentals of earthing systems.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908336	1	Communication Networks and Electrical Wiring Laboratory	Co.: 0908334
Graphic representation of the electric facilities, planning and design of electrical wiring systems in buildings, power loading calculations of an installation, low-voltage switch boards and distribution systems, electrical installation equipment, overcurrent protection, grounding systems, protection against			

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electric shock, earthing schemes, low current systems installation (fire alarm systems, telephony systems, and CCTV).			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908331	3	Structural Analysis I	0908203
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.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908332	3	Structural Analysis II	0908331
Analysis of statically indeterminate structures, method of consistent deformations, three moment equation, evaluation of fixed end moments, slope-deflection equations, moment distribution method and drawing influence lines of statically indeterminate structures.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908341	3	Surveying	0120121
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.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908342	1	Surveying Laboratory	Co.: 0908341
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	Course Name	Prerequisite-Co-requisite
0908352	3	Environmental Science	0201143
Environmental systems: mass balance and reactors. Water and wastewater: sources, types of water pollution, treatment. Air: sources, air pollution and control. Hazardous and non-hazardous solid waste: sources, collection, treatment, disposal. Environmental impacts and alternatives.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908353	3	Hydraulics	0908202
Basic principles of fluid mechanics applied to practical problems in hydraulic engineering, hydraulics of pipe networks, water hammer, and open channels in uniform and non-uniform flows, reservoirs and flow measurement devices, hydraulics machines: pumps and turbines.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908355	3	CAD in Civil Engineering	0909101 Departmental

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Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
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 tools in civil and infrastructure engineering applications.			
0908356	1	Water and Environment Laboratory	Co.:0908452
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, residual chlorine, chloride, acidity, alkalinity.			
0908361	3	Geotechnical Engineering	0908221+ 0908203
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 consolidation, shear strength of soils and shear strength tests.			
0908362	1	Geotechnical Engineering Laboratory	Co.:0908361
Visual classification of soil, moisture content, organic content, sieve analysis, hydrometer test, atterberg limits, compaction, in-situ field density, permeability, consolidation, direct shear test, tri-axial test.			
0908401	3	Engineering Practical Training	Passing 115 Credits for 8 weeks (280 Hrs.)
The student has to spend at least 250 hours of civil engineering training at recognized companies and establishments during one semester.			
0908433	3	Reinforced Concrete I	0908331
Flexural analysis and design of beams: singly reinforced rectangular beams, doubly reinforced rectangular beams, T-beams, shear and diagonal tension, bond, anchorage and development length, analysis and design of one-way slabs, design of compression members.			
0908434	3	Reinforced Concrete II	0908433
Analysis and design of RC columns; analysis and design of shallow foundations; analysis and design of torsion in beams; analysis and design of two-way slabs; analysis and design of staircases.			
0908435	3	Steel Structures Design	0908332

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Fundamentals of steel structures, design of tension members, design of compression members, design of beams, design of beam-columns, and design of connections.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908441	3	Traffic and Transportation Engineering	0908341

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, and basic of data needed for road design.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908451	3	Engineering Hydrology	0908353

Hydrologic cycle and the hydrologic budget, soil moisture, groundwater, Darcy's law, well hydraulics, runoff processes, hydrographs, watershed characteristics, applications in water resources and environmental engineering.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908452	3	Wastewater Engineering	0908352

Application of chemical, biological, and physical principles to the analysis and design of treatment processes for drinking water, industrial process water, municipal wastewater, and water reuse applications.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908462	3	Foundation Engineering	0908361

Review of rock types and origin of soil, review of soil mechanics, subsoil exploration (site investigation), shallow foundations, bearing capacity, special cases in foundation design, foundation design on rocks, foundation settlement (elastic and consolidation), lateral earth pressure, retaining walls, deep foundations.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908501	1	Capstone Design Project I	0908401

A supervised project in groups of normally 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 product.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908502	2	Capstone Design Project II	0908501

This is a continuity of the final Capstone Design Project I, consequently the students are expected to successfully accomplish the final year project in the specified field of Capstone Design Project I.

Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908547	3	Highway and Pavement Design	0908441

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 properties and tests, volumetric analysis and design of asphalt mixes using Marshall's method.

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Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908548	1	Highway and Pavement Design Laboratory	Co.:0908547
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, HMA design by Marshall skid resistance, asphalt extraction from cores.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908571	3	Specifications and Quantity Surveying	0908433
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, preparation of engineering quantity surveying.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908503	3	Special Topics	Department Approval
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 department approval.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908533	3	Pre-stressed Concrete	Co. 0908434
Concepts, advantages and methods of concrete pre-stressing; desired properties of concretes and pre-stressed steel; degrees of pre-stressing; strains in concrete and allowable of strain; design of beams for flexure at service and ultimate methods; design of beams for shear; computation of pre-stressed losses; stresses and reinforcement in the anchorage zones.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908531	3	Bridge Engineering	0908434 + 0908435
Types of Bridges, materials of bridge construction, bridge loads and design philosophy, design of slab for bridge deck, influence lines and application of live loads, T-Beam and slab bridge design, and design of pre-stressed hollow box girder bridge.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908545	3	Highway Maintenance	0908547
Management procedures for highway maintenance projects: project level and network level, paved networks and their branches, sections and sample units to prioritize and manage maintenance and rehabilitation processes, distress survey of paved areas, Pavement Condition Index scoring method, overview of maintenance and rehabilitation methods.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908539	3	Introduction to Earthquake Engineering	Reinforced Concrete II
Origin and characteristics of earthquake, structural dynamics, vibration characteristics of building, periods and mode shapes, response spectrum, earthquake-induced forces and displacements, inelastic			

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behavior, force reduction and ductility requirements for concrete and steel material, seismic design and provisions of reinforced concrete frames and shear walls according to ACI code.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908552	3	Water and Wastewater Networks Design	0908452
Application of fundamental engineering science to the design of comprehensive water supply and sewer systems of domestic and industrial water supplies (both sanitary sewer and storm drain), including all necessary pump station design.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908563	3	Advanced Geotechnical Engineering	0908361
Soil exploration; shear strength theory and testing; lateral earth pressure theory; stability analysis of retaining structures; slope stability analysis; soil improvement techniques, and introduction to soil dynamics.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908538	3	Railway Engineering	0908547
Introduction to railway engineering , railway planning, railway design, subgrade and soil study, railway elements design, rail sections and stresses, rail joints, rail geometry and layout.			
Course Number	Credit Hours	Course Name	Prerequisite-Co-requisite
0908549	3	Photogrammetric Surveying and Remote Sensing	0908341
Photogrammetric surveying includes: angle measurement; choice of stations and the use of towers; electronic distance measurement, leveling, geodesy and the figure of the earth. Remote Sensing includes: principles of remote sensing, image interpretation, land observation using satellite system, and active microwave remote sensing, applications in image enhancement, digital analysis, and image preprocessing.			

Approved by Department Council	Dr. Rana Alhorani	Date of Approval	May 27, 2019
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