Study Plan: Master, Higher Diploma, High specialization		
	Form Number	EXC-01-03-04A
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	Number of Pages	5

	School	Engineering
1.	Department	Civil Engineering
2.	Degree title (Arabic)	ماجستير الهندسة المدنية/انشاءات
3.	Degree title (English)	Master of Science in Civil Engineering /Structure
4.	Track	Non-Thesis

Plan Number	Specialization #	Degree	Department #	School #	Year	Track
2025	**13**	**8**	**01**	**09**	**2025**	Non-Thesis

First: General Rules & Conditions:

1. This plan conforms to the valid regulations of the programs of graduate studies.

2. Specialties of Admission:

- The First Priority: Bachelor of Civil Engineering.
- The Second Priority: Bachelor of Highway and Bridge Engineering

Second: Special Conditions: None

Third: Study Plan: Studying (33) Credit Hours as following:

1. Obligatory Courses (24) Credit Hours:

Course No.	Course Title	Credit Hrs	Theory	Practical	Pre/Co-requisite
0941731	Numerical Methods	3	3	-	-
0941732	Advanced Mechanics of Materials	3	3	-	-
0931733	Matrix Structural Analysis	3	3	-	-
0941734	Structural Dynamics	3	3	-	-
0941736	Plastic Design of Steel Structures	3	3	-	-
0951744	Structural Stability	3	3	-	-
0941737	Prestressed Concrete	3	3	-	-
0951755	Research Methodology	3	3	-	-

2. Elective Courses: Studying (9) Credit hours from the following:

Course No.	Course Title	Credit Hrs	Theory	Practical.	Pre/Co-requisite
0911721	Rehabilitation of Structures	3	3	-	-
0941735	Behavior of Reinforced Concrete Elements	3	3	-	-
0941739	Bridge Engineering	3	3		
0931741	Earthquake-Resistant Structures	3	3	-	-
0951742	Composite Structures	3	3	-	-
0951745	Finite Element Methods	3	3	-	-
0961746	Plates and Shells	3	3	-	-
0901791	Special Topics in Civil Engineering	3	3	-	-

3. A comprehensive Exam (0901798).
4. Arabic Language Exam for Graduate Studies

Course Description

0911721 Rehabilitation of Structures Face-to-Face (3 credit hours)
Causes of structural deterioration (environmental, design, construction, usage), diagnosis and assessment of structural conditions, visual inspections, destructive and non-destructive testing, determination and classification of damage severity, types of repair materials and criteria for their selection, traditional and advanced repair methods and techniques, environmental and sustainability considerations, and analysis of real case studies and applied projects.

0941731 Numerical Methods Face-to-Face (3 credit hours)
Solution of linear and nonlinear systems, approximation theory and interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations (ODE), initial and boundary values, numerical solution of partial- differential equations (PDE). Finite differences characteristics, Boundary value problem and Eigenvalue problem, Finite Element method, Fourier approximation, computer applications and case studies.

0941732 Advanced Mechanics of Materials Face-to-Face (3 credit hours)
Tensor algebra, theory of elasticity, stress functions, stress-strain relationships, the torsion problem, non-symmetric bending, curved beams, elastically supported beams, failure theories.

0931733 Matrix Structural Analysis Face-to-Face (3 credit hours)
Matrix formulation of the force and displacement methods, direct stiffness method, special considerations in formulation including non-prismatic members, rigid offsets and flexible ends.

0941734 **Structural Dynamics Blended (3 credit hours)**
Differential equation of motion of SDFS subjected to different excitations, modal analysis of MDFS, numerical methods in dynamic analysis, deterministic analysis of MDFS subjected to earthquakes, response spectra.

0941735 **Behavior of Reinforced Concrete Elements Face-to-Face (3 credit hours)**
Material properties, beam behavior, requirements of equilibrium, compatibility and stress-strain relationships, code assumptions, ductility of rectangular and flanged sections, shear, beam- columns, load-moment-curvature curves, triaxial stresses in concrete, influence of cyclic loading, time-dependent deflections at service-loads, torsion.

0941736 **Plastic Design of Steel Structures Face-to-Face (3 credit hours)**
Introduction to Theory of Plasticity. Failure criteria. Limit analysis theorems; lower bound, upper bound, and uniqueness. Application in one-dimensional steel elements, trusses, beams, beam- columns, and frames. Extension to two-dimensional elements (plates). Mechanisms, deflection, and second-order effect at ultimate state.

0941737 Prestressed Concrete Online (3 credit hours)
Materials, prestressing systems and methods, loss of prestress, analysis and design of sections for flexure, and axial tension. ultimate strength, camber, deflections, cable layout of pre- tensioned beams, shear, design of composite sections, bonded and unbonded beams, end anchorages.

0941739 Bridge Engineering Face-to-Face (3 credit hours)
Classification of bridges superstructures and substructures, AASHTO standards, highway loads and other bridge loading, transverse and longitudinal distribution, RIC and prestressed concrete design requirements, steel bridges, bearing systems.

0931741 Earthquake-Resistant Structures Face-to-Face (3 credit hours)
Characteristics of earthquakes. Linear and nonlinear dynamic response to earthquakes. Hysteresis models. Behavior of structures under earthquake excitation; force reduction, ductility demand and capacity, energy dissipation. Seismic isolation. Design of earthquake-resistant structures. Buildings; structural systems, diaphragms, codes (UBC,ACI). Bridges, structural systems, codes (AASHTO).

0951742 Composite Structures Face-to-Face (3 credit hours)
Design and behavior of steel members under tension and compression, bending and lateral buckling of beams, torsion in beams, beam-columns, buckling of plates, composite construction, design and analysis of composite beams, columns and beam columns.

0951744 Structural Stability Face-to-Face (3 credit hours)
Equilibrium paths and critical points, bifurcation and energy approach. Elastic and inelastic buckling of columns, stability functions, coupled buckling modes. stability of structural systems by matrix formulation, 3D analysis of line elements, flexural torsional buckling, lateral torsional buckling, plate buckling, post buckling behavior.

0951745 Finite Element Methods Blended (3 credit hours)
Theory of finite element, formulation for frame, plane stress, plane strain, axi-symmetric and solid elastic element, isoparametric formulation of implementation, plate and shell elements, application of the method using ready software packages.

0961746 Plates and Shells Blended (3 credit hours)
Bending Theory of rectangular and circular thin plates on elastic subgrade, contact pressure, introduction to shell theories, membrane theory of shells of revolution, bending theory of shells of revolution loaded axi-symmetrically, membrane theory of cylindrical shells, analysis of shallow spherical shells.

0951755 Research Methodology Blended (3 credit hours)
Skills required to conduct scientific research Data collection, resource survey, analysis and discussion of information and formulation of conclusions. Styles of technical writing with application to research papers and reports.

0901791 Special Topics in Civil Engineering Online (3 credit hours)
Structured presentation of new and developing areas of knowledge in civil engineering offered by the faculty in their specialized areas of expertise to augment the formal courses available.

Inclusion rates in the program:

A. Courses that will be taught on the principle of full online:

Total hours that will be taught on the principle of full online in this program: (3 hour).

The percentage achieved for the subjects that will be taught on the principle of full online in this program: (09.0 %)

B. Subjects to be taught on the blended learning principle:

The total number of hours that will be taught on the principle of blended learning in this program: (9 hour)

Percentage achieved for subjects that will be taught on the principle of blended learning in this program: (27.2 %)

C. Face-to-face learning courses:

Number of hours of face-to-face education: (21 hour).