

STUDY PLAN

MASTER IN (Civil Engineering/Structures) (Thesis Track)

Plan Number			2005	T
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I. GENERAL RULES CONDITIONS:

1. These requirements shall conform with the regulations of the general frame of the program of Graduate Studies.
2. Background requirements for Master program:
 - Bachelor Degree in Civil Engineering.

II. SPECIAL CONDITIONS:

The Teaching Language of the Program is English.

III. THE STUDY PLAN : Studying (33) Credit Hours as follows:

1. Obligatory courses: (18) Credit Hours:

Course No.	Course Title	Credit hrs.	Theory	Prac.	Pre-request
0901731	Advanced Numerical Methods	3	3	-	-
0901732	Advanced Mechanics of Materials	3	3	-	-
0901733	Matrix Structural Analysis	3	3	-	-
0901734	Structural Dynamics	3	3	-	-
0901735	Behavior of Reinforced Concrete Elements	3	3	-	-
0901736	Plastic Design of Steel Structures	3	3	-	-

2. Elective Courses: Studying (6) Credit hours from the following:

Course No.	Course Title	Credit hrs.	Theory	Prac.	Pre-request
0901737	Prestressed Concrete	3	3	-	-
0901738	Structural Analysis with Computer	3	3	-	-
0901739	Bridge Engineering	3	3	-	-
0901740	Multi-story Structures	3	3	-	-
0901741	Earthquake-Resistant Structures	3	3	-	-
0901742	Composite Structures	3	3	-	-
0901743	Behavior of Reinforced Concrete Structures	3	3	-	-
0901791	Special Topics in Civil Engineering	3	3	-	-

3. Thesis: 9 Credit hours (0901799).

STUDY PLAN

MASTER IN (Civil Engineering/Structures) (None Thesis Track)

Plan Number			2005	N
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IV. GENERAL RULES CONDITIONS:

1. These requirements shall conform with the regulations of the general frame of the program of Graduate Studies.
2. Background requirements for Master program:
 - Bachelor Degree in Civil Engineering.

V. SPECIAL CONDITIONS: None.

The Teaching Language of the Program is English.

VI. THE STUDY PLAN : Studying (33) Credit Hours as follows:

1. Obligatory courses: (21) Credit Hours:

Course No.	Course Title	Credit hrs.	Theory	Prac.	Pre-request
0901731	Advanced Numerical Methods	3	3	-	-
0901732	Advanced Mechanics of Materials	3	3	-	-
0901733	Matrix Structural Analysis	3	3	-	-
0901734	Structural Dynamics	3	3	-	-
0901735	Behavior of Reinforced Concrete Elements	3	3	-	-
0901736	Plastic Design of Steel Structures	3	3	-	-
0901737	Prestressed Concrete	3	3	-	-

2. Elective Courses: Studying (12) Credit hours from the following:

Course No.	Course Title	Credit hrs.	Theory	Prac.	Pre-request
0901738	Structural Analysis with Computers	3	3	-	-
0901739	Bridge Engineering	3	3	-	-
0901740	Multi-story Structures	3	3	-	-
0901741	Earthquake-Resistant Structures	3	3	-	-
0901742	Composite Structures	3	3	-	-
0901743	Behavior of Reinforced Concrete Structures	3	3	-	-
0901791	Special Topics in Civil Engineering	3	3	-	-

3. A comprehensive exam (0901798).

Course Description

- 0901731 Advanced Numerical Methods (3 credit hours)**
Mathematical preliminaries, computer precision, loss of significance, error propagation, interpolating polynomials, numerical differentiation and integration, numerical solution of differential equations (ODE), initial and boundary values, linear and nonlinear systems, approximation theory, direct methods, iterative techniques (Eigenvalues), characteristics and boundary integral equation methods, curve fitting, least squares, Spline, Fourier approximation, discrete and fast Fourier transforms, numerical algorithms for advanced engineering problems.
- 0901732 Advanced Mechanics of Materials (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.
- 0901733 Matrix Structural Analysis (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.
- 0901734 Structural Dynamics (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.
- 0901735 Behavior of Reinforced Concrete Elements (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.
- 0901736 Plastic Design of Steel Structures (3 credit hours)**
Linear and non-linear behavior of beams and columns in flexural and torsional buckling modes, joint behavior, warping analysis of open thin sections, applications of failure theories, design for combined effect of axial loads, torsion and moment, plastic design of industrial and multi-story structures.
- 0901737 Prestressed Concrete (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.
- 0901738 Structural Analysis with Computers (3 credit hours)**
Familiarity with ready structural analysis packages, programming the direct stiffness method, computer graphics, numerical methods in the storage and

solution of the large and sparse equations of motion, strategies for software development.

- 0901739 Bridge Engineering (3 credit hours)**
Classification of bridges superstructures and substructures, AASHTO standards, highway loads and other bridge loading, transverse and longitudinal distribution, R/C and prestressed concrete design requirements, steel bridges, bearing systems.
- 0901740 Multi-Story Structures (3 credit hours)**
Modeling aspects of buildings for gravity loading and lateral loads, 3D analysis of buildings, computer idealization, twist in irregular buildings, temperature effect, relative settlement, raft analysis, beam on elastic foundations, use of finite elements in buildings structural analysis, tall buildings, transfer floors.
- 0901741 Earthquake-Resistant Structures (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).
- 0901742 Composite Structures (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.
- 0901743 Behavior of Reinforced Concrete Structures (3 credit hours)**
Limit Analysis, effects of creep and shrinkage on indeterminate structures, connections, deep beams, strut-and-tie models, Schlaich's design approach, concrete structural systems for seismic resistance, dual systems, issues of modeling and design requiring engineering judgment.
- 0901791 Special Topics in Civil Eng. (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.