

## Courses Description

**College:** Engineering

**Department:** Civil Engineering

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**Course ID:** 401716      **Description:** Experimental Techniques in NDE

**Full Course Description:** NDE techniques: ultrasonic measurements of elastic constants, flaw detection, eddy current, magnetic particle testing, visual/optical method, dye penetrant testing.

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**Course ID:** 401729      **Description:** NDE of Structures

**Full Course Description:** Non destructive evaluation of structures using Rebound Hammer, Ultrasonic Pulse Tester, Pull-Out Tester, half-cell potential, loading, crack inspection and propagation, density and percent compaction using nuclear gauge, pump integrator, Benkelman Beam, friction tester.

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**Course ID:** 401770      **Description:** Seminar

**Full Course Description:** This course allows the student to select one of the topics in the field of NDE to study and present.

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**Course ID:** 401797      **Description:** Special Topics in NDE

**Full Course Description:** This course allows selecting one of the recent topics in the field of NDE and teaching it to the students.

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**Course ID:** 401799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 3401799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 6401799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 9401799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 2104011701      **Description:** Finite Element Method in Structural Engineering

**Full Course Description:** Finite Element Method in Structural Engineering, 3 Cr. Hrs (3+0).□  
Theory of finite element, virtual work, formulation for trusses, beams and frames, plane stress problems, plane strain, axisymmetric and solid elastic elements, isoparametric formulation and implementation, plate and shell elements, application of the method using ready software packages.□

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**Course ID:** 2104011702      **Description:** Plastic Behavior and Design of Steel Structures

**Full Course Description:** Plastic Behavior and Design of Steel Structures, 3 Cr. Hrs (3+0).□  
General concepts of plasticity; plastic bending; collapse of structures; lower and upper bound theorems; limit analysis; deflection, rotation capacity; joint behavior; plastic design of multi-story structures; seismic requirements in steel structures.□

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**Course ID:** 2104011703      **Description:** Advanced Structural Dynamics

**Full Course Description:** Advanced Structural Dynamics, 3 Cr. Hrs (3+0).□  
Analysis of single and multi-degree-of-freedom structures subjected to various types of excitations and initial conditions; computational aspects of dynamic analysis; introduction to approximate methods of analysis; finite element formulation of equations of motion; advanced analysis techniques for discrete parameter systems; investigation of damping; analysis of continuous systems; applications to civil engineering structures.□

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**Course ID:** 2104011704      **Description:** Advanced Theory of Concrete Structures

**Full Course Description:** Advanced Theory of Concrete Structures, 3 Cr. Hrs (3+0).□  
Inelastic theory of structural concrete members under flexure; axial load; combined flexure and axial compression; shear and torsion; yield line theory of slabs; limit analysis of beams and frames of reinforced and pre-stressed concrete.□

## Courses Description

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**Course ID:** 2104011705      **Description:** Earthquake Structural Engineering

**Full Course Description:** Earthquake Structural Engineering, 3 Cr. Hrs (3+0). □  
Prerequisite (190401703) □  
Effects of earthquakes on structures and of design of structures to resist earthquake motions; earthquake mechanisms and ground motions; response of structures to earthquake motions; behavior of materials, structural elements and assemblages subjected to earthquakes; principles of earthquake-resistant design practice; soil-structure interaction; and special topics. □

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**Course ID:** 2104011706      **Description:** Advanced Numerical Analysis

**Full Course Description:** Advanced Numerical Analysis, 3 Cr. Hrs (3+0). □  
Computer precision, loss of significance; error propagation; linear and nonlinear systems of algebraic equations; interpolating polynomials; numerical differentiation and integration; numerical solution of ordinary differential and partial-differential equations; initial and boundary value problems; linear and nonlinear systems; approximation theory; iterative techniques (Eigen values); finite differences; boundary integral equation; Fourier approximations. □

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**Course ID:** 2104011707      **Description:** Theory of Plates and Shells

**Full Course Description:** Theory of Plates and Shells, 3 Cr. Hrs (3+0), . □  
Bending theory of rectangular and circular thin plates; approximate methods of plate analysis, plates on elastic foundation; introduction to shell theories, Membrane theory of shells of revolution; bending theory of shell of revolution loaded axi-symmetrically; membrane theory of cylindrical shells; approximate bending methods for any type of shells of revolution; analysis of shallow spherical shells □

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**Course ID:** 2104011708      **Description:** Theory of Elasticity

**Full Course Description:** Theory of Elasticity, 3 Cr. Hrs (3+0). □  
Equations of equilibrium and compatibility; stresses and strains in beams; flexure and torsion theories for solid and thin-walled members; Energy principles and variational methods. □

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**Course ID:** 2104011709      **Description:** Geotechnical Aspects of Earthquake Engineering

**Full Course Description:** Geotechnical Aspects of Earthquake Engineering, 3 Cr. Hrs (3+0). □  
Overview of Earthquake Engineering; ground motion parameters; seismic Hazard Analysis; determining seismic design parameters; dynamic soil properties; ground response analysis; evaluation of liquefaction hazard; seismic design of foundations (Shallow and Deep); seismic design of retaining walls; seismic slope stability; ground improvement for redemption of seismic hazards. □

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**Course ID:** 2104011710      **Description:** Structural Stability

**Full Course Description:** Structural Stability, 3 Cr. Hrs (3+0). □  
Equilibrium paths and critical point, Bending of structural members subjected to axial and lateral loads. Buckling of compression members (columns) and frames in elastic range, lateral buckling of beams, Buckling of Plates. □

## Courses Description

**College:** Engineering

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**Course ID:** 2104011711      **Description:** Bridge Engineering

**Full Course Description:** Bridge Engineering, 3 Cr. Hrs (3+0).  
Classification of bridges superstructures and substructures; bridge loadings according to AASHTO standards and other standards; transfer and longitudinal distribution; modeling and analysis of bridge decks; orthotropic plate theory and its application; composite bridges; girder slab and multi-beam types pre-stressed concrete bridges; design of reinforced and pre-stressed concrete bridges; bearing systems; software applications in bridge analysis

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**Course ID:** 2104011712      **Description:** Advanced Foundation Engineering

**Full Course Description:** Advanced Foundation Engineering, 3 Cr. Hrs (3+0).  
Site investigation, general concept of foundation design, foundation design in relation to ground movement, spread foundations, control of groundwater in excavations, shoring and underpinning, foundation construction, structural aspects in the design of foundations, foundations on difficult soils, foundation remediation, behavior of deep foundation under axial and horizontal loading, grouped piles, deep foundation field tests, installation, inspection, and settlement.

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**Course ID:** 2104011713      **Description:** Composite Structures

**Full Course Description:** Design and behavior of steel under tensile and compressive loading, bending and lateral buckling of beams, torsion in beams, beam - columns, buckling of plates, composite construction, design and behavior of composite beams and columns and beam –columns.

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**Course ID:** 2104011714      **Description:** Advanced Concrete Technology and Materials

**Full Course Description:** Advanced Concrete Technology and Materials, 3 Cr. Hrs (3+0).  
Hydration and pore structure; uni-, bi- and tri-axial strength; special concretes and materials (properties and mix design): no slump concrete; roller compacted concrete; mass concrete; high-strength and ultra-high strength concrete; lightweight concrete; self-compacting concrete; pumped concrete; shotcrete.

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**Course ID:** 2104011715      **Description:** Advanced Special Topics in Civil Engineering

**Full Course Description:** Special Topics in Civil Engineering, 3 Cr. Hrs (3+0).  
A course to be given at the discretion of the faculty in which topics of current interest in civil engineering will be presented.

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**Course ID:** 2104011797      **Description:** Seminar

**Full Course Description:** Seminar, 1 Cr. Hrs (1+0).  
Research presentations. □  
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**Course ID:** 2104011799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 2104013799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 2104016799      **Description:** Thesis

**Full Course Description:**

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**Course ID:** 2104019799      **Description:** Thesis

**Full Course Description:**