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Department of Civil Engineering	
Computer Application in Structures (61517)	
Total Credits	**3**
major elective	
Prerequisites	P1 : Structural Analysis Lab. (61318) OR Structural Analysis II (61316)

Course Contents

Modeling of structures, Three dimensional static response to lateral forces, Dynamic response to gradual, step and periodic forces, Earthquake response of linear systems, Earthquake response according to IBC2006 code, Earthquake design through a detailed example

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	Analyze structures statically for lateral forces	A	20 %
2	Analyze structures dynamically for simple loadings.	E	20 %
3	Analyze structures for earthquake loads using: Time history analysis, Response spectrum analysis, Equivalent static analysis using IBC .	K	50 %
4	Design and detail structures for earthquake response .	C	10 %

Textbook and/ or Refrences

1. Anil K. Chopra, Dynamics of Structures, Pearson Prentice Hall, third edition 2007. 2. James K. Wight and James G. MacGregor, Reinforced Concrete Mechanics and Design, fifth edition, Prentice Hall, 2009. 3. ASCE, "Minimum Design Loads for Buildings and Other Structures", ASCE/SEI 7-05, 2006. 4. Structural Analysis and Design Program Manuals SAP2000, version 14, Computers and structures, 2009.

Assessment Criteria	Percent (%)
First Exam	30 %
Projects	20 %
Laboratory Work	30 %
Final Exam	20 %

Course Plan

Week	Topic
1	1. Modeling of structures: 1D, 2D and 3D elements and structures
2	1. Three dimensional static response to lateral forces 2.1 -implicit modeling 2.2 -rigidity of diaphragms
3	2.3 -coincidence of center of mass and center of rigidity 2.4 -P-delta effects
4	1. Understanding the dynamic behavior of structures to simple loadings. 1.1 1D mathematical spring model analogy 1.2 Dynamic response to gradual loadings
5	1.1 Dynamic response to step loadings 1.2 Dynamic response to periodic loadings
5	First Hour Exam
6	1. Earthquake response of linear systems 1.1 1D response to ground acceleration 1.2 3D response to ground acceleration
7	4.3 Modal response and modal mass participation ratio of two storey structures
8	1.1 Formation of response spectrum curves
9	1. Earthquake response 1.1 Time history analysis
10	1.1 Earthquake response according to IBC2006 code -response spectrum -equivalent static
11	Presentation and discussion of student projects

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13	1. Earthquake design through a detailed example
14	Effect of damping
15	Current areas of research and development/final exam practical
16	Final exam