

## MS in Civil and Environmental Engineering (Structural Emphasis)

An MS degree is comprised of a minimum of 45 units of 400/500 level coursework. The following flowchart suggests courses consistent with a Structural Emphasis within the CE/ENVE department. The flowchart contains department required courses, structural/earthquake engineering specific requirements, advanced seismic analysis of concrete/steel systems, optional tracks in either Nonlinear Structural Analysis (Track 1) or Finite Element Analysis (Track 2), and structural (and geotechnical) design course recommendations. *For students on the **Comprehensive Exam option, two additional courses are required** beyond the minimum requirements below to complete the required 45 units.* These additional courses may be selected from the list below or may selected in consultation with an academic advisor.

	Fall	Winter	Spring
<b>Select <u>ALL</u> courses in this grouping:</b>			
<b>M.S Department Requirements</b>	CE 591 (1) - Graduate Seminar I	CE 592 (1) - Graduate Seminar II	CE 596 (1) - Comprehensive Exam OR CE 599 (9) <sup>1</sup> - Master's Thesis
<b>Core Analysis and Structural Earthquake Engineering</b>	CE 501 <sup>2</sup> (4) - Matrix Structural Analysis	CE 407 <sup>2</sup> (4) - Structural Dynamics	CE 557 (4) - Seismic Analysis and Design
<b>Choose <u>at least</u> one of the following two:</b>			
<b>Core Seismic Design Courses</b>	-	CE 553 <sup>4</sup> (4) - Ductile Design of Steel Structures	CE 552 (4) - Analysis and Seismic Design of Reinforced Concrete
<b>Choose <u>at least</u> one row from the following two tracks:<sup>6</sup></b>			
<b>TRACK 1: Nonlinear Structural Analysis Track</b>	ARCE 502 <sup>2,4</sup> (3) - Nonlinear Structural Behavior I	ARCE 503 (3) - Nonlinear Structural Behavior II	-
<b>TRACK 2: Finite Element Track</b>	CE/ME/BMED 404 (4) - Applied Finite Element Analysis (Course is offered Fall and Winter)		CE 504 (4) - Finite Element Analysis
<b>Structural Design Electives - Select <u>at least</u> 8 units of Structural Design electives:</b>			
<b>Structural Design Electives</b>	CE 455 (4) - Design of Timber Structures	CE 454 <sup>3</sup> (4) - Capstone Structural Analysis and Design	CE 457 <sup>5</sup> (4) - Bridge Engineering
		CE 559 (4) - Prestressed Concrete Design	-
<b>Optional Complementary Coursework:</b>			
<b>Geotechnical Engineering Supplemental Courses</b>	CE 481 (4) - Shallow Foundations (Course is offered Fall, Winter, and Spring)		
	CE 488 (4) - Engineering Risk Analysis	CE 583 <sup>7</sup> (4) - Geotechnical Earthquake Engineering	ARCE 570/1 (1-4) - Selected Advanced Topics and Laboratory
		CE 586 <sup>7</sup> (4) - Analysis and Design of Deep Foundations	

1 - If taking the thesis option, thesis units must be spread out over two quarters

2 - CE 406 (Structural Analysis) or equivalent required as a prerequisite

3 - CE 355 (Concrete Design) and CE 356 (Steel Design) or equivalents required as prerequisites. CE 455 (Timber Design) strongly recommended.

4 - CE 356 (Steel Design) is a prerequisite

5 - CE 356 (Steel Design) strongly recommended as a prerequisite but may be taken concurrently

6 - Choose at least one of the two analysis tracks. Student may also take CE 404 along with Track 1 or ARCE 502 along with Track 2.

7 - CE 481 (Design of Shallow Foundations) or equivalent is strongly advised as a prerequisite