



California State University, Los Angeles

COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY

Master of Science in Civil Engineering

DEPARTMENT OFFICE

ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY, ET A212

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The objective of the Master of Science in Civil Engineering at California State University, Los Angeles is to prepare graduate students for careers in design, research, industry, and education, and for further study toward the doctoral degree in civil engineering.

The graduate program is specifically designed to accommodate the needs of students working full time, so all courses are offered during both daytime and evening hours.

Located at the intersection of the San Bernardino and Long Beach Freeways at the eastern limits of Los Angeles, Cal State L.A. is accessible by freeways or major surface streets from all parts of the city and surrounding areas.

Admission to the program in classified graduate standing requires possession of a degree equivalent to Cal State L.A.'s Bachelor of Science in Civil Engineering, and a minimum 2.75 grade point average in the last 90 quarter units attempted for the baccalaureate. Applicants who lack full preparation or the required grade point average, but who have a minimum 2.5 grade point average in their last 90 units, may be admitted to postbaccalaureate unclassified standing until prescribed prerequisites (or qualifying courses of at least 14 units as approved by the graduate advisor) have been completed with a minimum 3.0 grade point average. Applications of students with lower than a 2.5 grade point average will be reviewed by a graduate committee.

Degree Requirements: A total of 45 units is required, including at least 24 units of graduate (500-level) courses and a thesis or comprehensive examination. MATH 402A is required of all students if not taken as part of their undergraduate program. Students must attain at least a 3.0 grade point average in all courses in the approved degree program, as well as in their area of specialization. The advice and approval of a civil engineering graduate advisor must be obtained before enrolling in any course. A writing proficiency examination is required of all students. The program is organized as follows:

Area of Specialization (24-41 units): Select a minimum of 24 units in 500-level engineering courses. At least 20 units must be in civil engineering courses to comprise a coherent group of courses that fulfills the student's objectives.

Electives in Engineering (0-17 units) Selected from 400 and 500 level courses.

Electives in Related Fields (4-21 units) Select a minimum of 4 units, other than civil engineering, related to this program. MATH 402A (4 units) must be included in these electives unless already completed.

Comprehensive Examination or Thesis (0, 4 units)

CE 596 Comprehensive Examination (0) or CE 599 Thesis (4)

Students who select the comprehensive examination (CE 596) should expect to take it the quarter they complete all coursework in their program, and must comply with school and departmental requirements.

Graduate Courses in Civil Engineering (CE)

Advanced Topics

554 Advanced Topics in Civil Engineering (4)

Prerequisites: Department approval required. Advanced topics in Civil Engineering. May be repeated to a maximum of 8 units as subject matter changes.

Structural Engineering

560 Structural Mechanics III (4)

Prerequisites: CE 460. Column analogy, moment distribution applied to non-prismatic members, elastic energy method applied to arches and curved members, influence lines for indeterminate structures and secondary stresses.

561 Advanced Steel Design (4)

Prerequisites: CE 460 and CE 461. Emphasis on LRFD method, Unsymmetrical bending and torsion of beams, composite beams, nonprismatic beams, plate girders, beam-columns, frames and connections.

562 Reinforced Concrete Design II (4)

Prerequisites: CE 462. Creep and plastic flow of concrete. Theory and practice of ultimate strength design. Prestressed concrete structures.

563 Matrix Computer Analysis of Structures (4)

Prerequisites: CE 460. Matrix methods applied to statically determinate and indeterminate structures, flexibility and stiffness methods, digital computer applications.

564 Numerical Methods in Structural Analysis (4)

Prerequisites: CE 460. Finite difference and finite-element methods for structures; free and forced vibrations; bending, buckling of beams and plates; special applications.

565 Dynamics of Structures (4)

Prerequisites: CE 460. Free vibrations, forced vibrations and transient response of structures and structural components having one and many degrees of freedom; damping and inelastic action, earthquakes and nuclear blasts; dynamic resistance of structures; limit design; design for dynamic loads.

572 Plates and Shells (4)

Prerequisites: CE 460. Equations of bending of thin elastic plates, energy method; approximate and numerical methods; theory of shells with application to tanks, roofs, and pressure vessels.

577 Bridge Engineering (4)

Prerequisites: CE 461 and CE 462. Design of steel, concrete, and timber bridges, piers, and abutments; American Association of State Highway and Transportation Officials (AASHTO) specifications; criteria for earthquake resistant design of bridges; geometry, safety, economics, and aesthetics.

Geotechnical Engineering

566 Soil Mechanics II (4)

Prerequisite: CE 467. Stress and strain in soil mass, equilibrium and movement of soil water, soil consolidation, settlement, and soil strength.

567 Foundations II (4)

Prerequisites: CE 467. Earth-pressure problems and problems of deep excavation; design of anchored bulkheads, cofferdams, piles under lateral loads, underpinning.

569 Earth Structures (4)

Prerequisites: CE 467. Factors influencing design, explorations for foundations and construction processes, compactions, stability analysis, seepage control, earth dams.

570 Soil Dynamics (4)

Prerequisites: CE 467. Dynamic properties of soils, vibratory effects on foundations, earthquake effects on foundations, dynamic stability of earth structures.

Highway and Transportation Engineering

571 Highway Design (4)

Prerequisites: CE 471. Practical application of American Association of State Highway and Transportation Officials (AASHTO) policy on design controls; capacity analysis for uninterrupted flow, weaving section and ramps; functional design procedures in development of an interchange.

574 Traffic Flow Analysis (4)

Prerequisites: CE 370. Measurements and analysis of traffic flow characteristics; speed, density, flow, headway; statistical data analysis, time-space diagrams, traffic flow models, queuing theory, shock wave analysis, traffic model's applications.

575 Urban Transportation Planning (4)

Prerequisites: CE 370. Travel forecasting, data requirements, collection methods, trip generation and distribution models; modal split analysis, trip assignment, plan alternatives, and evaluation methodology.

Hydraulic and Water Resources Engineering

581 Modeling Techniques in Hydraulic Engineering (4)

Prerequisites: CE/ME 303. Dimensional analysis: Similarity law and hydraulic, coastal, and estuarine models; mathematical models.

582 Statistical Hydrology (4)

Prerequisites: CE 483, CE/ME 210, and CE/ME 211. Statistical and probability analysis of hydrologic processes. Application of correlation and regression method to hydrologic variables. Elementary time series analysis of hydrologic data.

583 Hydrology II (4)

Prerequisites: CE 483. Space-time characteristics and mechanics of rainfall, surface runoff and infiltration. Theory of drainage basin dynamics. Low stream flow.

586 Open Channel Hydraulics (4)

Prerequisites: CE 387 and Math 215. Flow types, flow profile computations; design of channels and transition structures; unsteady flow.

587 Hydraulics II (4)

Prerequisites: CE 387. Unsteady flow in pipes, and sediment transportation.

588 Hydraulic Structures (4)

Prerequisites: CE 387. Hydraulic structures for impounding, conveying, and controlling water.

589 Coastal Engineering (4)

Prerequisites: CE 387. Fundamentals of water waves and their effects. Diffraction, reflection, and refraction; impulsively generated waves; effect of waves on coastal structures.

Environmental Engineering

579 Environmental Mass Transfer (4)

Prerequisites: CE 384 or Equivalent. Study the fate of contaminants in the environment. Emphasis on the fundamentals of mass transfer including: sorption/desorption, contaminant retardation, vaporization and dissolution of Nonaqueous Phase Liquids (NAPL), and other phenomena.

580 Environmental Transport (4)

Prerequisites: CE 384 or Equivalent. Transport in water and air emphasizing exchanges across boundaries such as sediment-water and air-water; particles, droplets, and bubbles; effect of reactions on transport; linkages between physical, chemical, and biological processes.

Comprehensive Examination, Thesis

596 Comprehensive Examination (0)

597 Graduate Research (1-5)

598 Graduate Directed Study (1-4)

599 Thesis (1-4)

Faculty and Areas of Specialization

Anjan Bhaumik, Ph.D.	University of Minnesota Structural Engineering; Computer Applications
Hassan Hashemian, Ph.D.	University of California, Berkeley Registered Professional Civil Engineer Transportation; City Planning
Raymond I. Jeng, Ph.D.	Colorado State University Registered Professional Civil Engineer Hydraulic Engineering; Water Resources
Irving Kett, D. Eng. Sc.	New York University Registered Professional Civil Engineer and Licensed Land Surveyor Transportation; Surveying
Crist Khachikian, Ph.D.	University of California, Los Angeles Environmental Engineering
Young C. Kim, Ph.D.	University of Southern California Coastal Engineering; Hydraulic Engineering
Rupa Purasinghe, Ph.D.	Case Western Reserve University Registered Professional Civil Engineer Structural Engineering. Computer Aided Structural Analysis and Design; Finite Element Method
Narendra Taly, Ph.D.	West Virginia University Registered Professor Civil Engineer Structural Engineering; Bridge Design
Mark R. Tufenkjian, Ph.D.	University of California, Los Angeles Registered Professor Civil Engineer Geotechnical Engineering



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M.S. DEGREE IN CIVIL ENGINEERING PREREQUISITES CHECKLIST

*For graduate students pursuing a Master of Science degree in Civil Engineering
 and whose Bachelor degree is not in Civil Engineering.*

Department & Course # (CSULA)	Required Courses	Equivalent Course - Institution
MATH 206-209		
MATH 215		
PHYS 211-212		
CE/ME 201		
CE 202		
CE/ME 205		
CE/ME 211		
CE 290		
CE/ME 303		

ELECTIVES

<i>Category A: Any 4 Courses</i>		
CE 360		
CE 361		
CE 366		
CE 370		
CE 384		
CE 387		
<i>Category B: Any 1 Lab Course</i>		
CE/ME 312		
CE/ME 313		
CE 364		
CE 368		