Architectural Engineering Program Educational Objectives

Within a few years of graduation, alumni of the Texas A&M University-Kingsville undergraduate architectural engineering program have distinguished themselves in the following areas:

1. Professional practice in one of the areas appropriate to the interdisciplinary field of architectural engineering (construction management, building systems engineering, or structural engineering).
2. Leadership, in areas such as career advancement, community service, and professional society activity.
3. Professional ethics with attitudes of respectfulness and a reputation for trustworthiness.
4. Licensure and certification within the architectural engineering profession.
5. Continuing education, through formal graduate education and/or professional development opportunities.

Civil Engineering Program Educational Objectives

Within a few years of graduation, alumni of the Texas A&M University-Kingsville undergraduate civil engineering program have distinguished themselves in the following areas:

1. Ethics, being recognized for professionalism and responsibility.
2. Licensure, having gained extensive professional practice in the civil engineering field.
3. Leadership, in areas such as career advancement, community service, and professional society activity.
4. Continuing education, having furthered their knowledge through formal graduate education and/or professional development opportunities.

Faculty

Department Faculty

Aguiniga, Francisco  Professor, Department of Civil and Architectural Engineering; Chair; B.S., University of Michoacan (Mexico); M.S., University of Illinois at Urbana-Champaign; Ph.D., Texas A&M University.

Al-Hamdan, Osama  Assistant Professor, Department of Civil and Architectural Engineering; B.Sc., Jordan University of Science and Technology (Jordan); M.Sc., University of Alabama in Huntsville; Ph.D., University of Alabama in Huntsville.

Bailey, Breanna  Associate Professor, Department of Civil and Architectural Engineering; B.S., Texas A&M University; M.S., University of Illinois at Urbana-Champaign; Ph.D., Texas A&M University.

Choi, Jong-Won  Assistant Professor, Department of Civil and Architectural Engineering; B.S., Korea University (South Korea); M.S., Georgia Institute of Technology; Ph.D., Georgia Institute of Technology.

Faruqi, Mohammed A  Professor, Department of Civil and Architectural Engineering; B.S.C.E., Texas A&I University; M.S.C.E., Texas A&I University; M.Eng., Pennsylvania State University; Ph.D., University of Arkansas.

Glusing, James  Associate Professor, Department of Civil and Architectural Engineering; B.Arch., University of Houston; M.Arch., University of Houston.

Hessami, Amir  Assistant Professor, Department of Civil and Architectural Engineering; B.S., Fedowsi University (India); M.S., Sharif University of Technology (Iran); Ph.D., Texas A&M University.

Leelani, Pat T  Professor, Department of Civil and Architectural Engineering; B.S.C.E., Chulalongkorn University (Thailand); M.S.C.E., The University of Akron; Ph.D., The University of Akron.

Liu, Xiaoyu  Assistant Professor, Department of Civil and Architectural Engineering; B.S., Nanjing University of Science and Technology (China); M.S., Tongji University (China); Ph.D., University of Nebraska-Lincoln.

Sai, Joseph O  Professor, Department of Civil and Architectural Engineering; B.S.C.E., University of Ghana (Ghana); M.S., University of California, Davis; Ph.D., Texas A&M University.
Shen, Hui  Assistant Professor, Department of Civil and Architectural Engineering; B.S., East China Jiaotong University (China); M.S., Tongji University (China); Ph.D., Purdue University.

Sun, Dazhi  Professor, Department of Civil and Architectural Engineering; B.S., Tongji University (China); M.S., Tongji University (China); Ph.D., University of Illinois at Urbana-Champaign.

Courses

Architectural Engineering (AEEN)

**AEEN 1310  Computr Graphics and Applicatn  3 SCH (2-3)**
Introduction to procedures in computer-aided drafting and computer applications with a programming language element. Required of all freshman in Civil and Architectural Engineering.

**AEEN 2325  Intro to Developmt in Archit  3 SCH (3-0)**
Introduction to topics which influence the development of architectural designs including: building codes, building elements, major building systems and their selection, and materials and methods of construction. Prerequisite: AEEN 1310.

**AEEN 3303  Structural Analysis  3 SCH (3-0)**
Statically determinate structures. Moving loads. Analysis of statically indeterminate structures by consistent deformation, slope-deflection and moment-distribution. Prerequisite: CEEN 3311. (Credit may not be obtained in both AEEN 3303 and CEEN 3303.)

**AEEN 3304  Reinforced Concrete Design  3 SCH (3-0)**
Mechanics, behavior and design of reinforced concrete members subject to axial loads, bending, torsion and shear. Prerequisites: AEEN 3303 and C or higher in CEEN 3311. (Credit may not be obtained in both AEEN 3304 and CEEN 3304.)

**AEEN 3316  Architectural Design  3 SCH (1-6)**
Development of schematic architectural designs requiring the evaluation of alternative systems for selection and integration in multi-system building design. Modern constraints and standards are addressed through physical and virtual three-dimensional studies. Six laboratory hours a week. Prerequisite: AEEN 2325.

**AEEN 3320  Sustainable Construction & Mat  3 SCH (3-0)**
Introduction to ecological design of buildings and infrastructure, including the study of green buildings, LEED standards, sustainable landscapes and low impact development of the built environment. Prerequisite: junior standing.

**AEEN 3325  Design Codes and Ordinances  3 SCH (3-0)**
Design codes and municipal ordinances and their integration in design. Including zoning occupancy, construction classification, building constraints, fire resistant construction, egress, accessibility and plumbing. Prerequisite: AEEN 2325.

**AEEN 3331  Building Construction  3 SCH (3-0)**
Discussion of properties of construction materials and components; fabrication and construction technologies, methods and processes; engineered systems characteristic of commercial buildings such as foundation, structural, building envelope, mechanical and electrical systems. (Credit may not be obtained in both AEEN 3331 and ITEN 3331.)

**AEEN 3335  Environmntal Sys for Buildings  3 SCH (3-0)**
Fundamentals of heating, ventilation and air conditioning systems; moist air properties; analysis of different psychrometric processes; thermal comfort and air quality; infiltration and ventilation; psychrometric tools; and basic heat transfer. Prerequisites: a grade of C or higher in AEEN 3346 and credit or enrollment in CEEN 3392.

**AEEN 3337  Electrical Systems-Buildings  3 SCH (3-0)**
An introduction to electrical systems for buildings and their applications, including electrical system components, load calculation, and basic design principles. Prerequisite: EEEN 3331.

**AEEN 3346  Thermal Analysis  3 SCH (3-0)**
Properties of gases, vapors, and liquids; the first and second laws of thermodynamics; and power and refrigeration cycles. Prerequisites: MATH 2414, CEEN 2301.

**AEEN 3347  Heat Transfer in Buildings  3 SCH (3-0)**
Three heat transfer mechanisms: conduction, convection and radiation are explored. Solar radiation, heat gain through windows, infiltration and natural ventilation in buildings. Heating and cooling load calculation. Prerequisites: AEEN 3346 and PHYS 2326.

**AEEN 3348  Building Physics  3 SCH (3-0)**
Theories and mathematical models of heat and mass transfer in buildings. Steady-state conductive heat transfer together with convection and radiation as applied to building materials; heat transfer equipment; evaporation and moisture transfer. Prerequisite: AEEN 3346.

**AEEN 3350  Facility Management  3 SCH (3-0)**
Introduction to concepts of facility management, including links between assets and users; owner’s perspective; and life cycle costs. Prerequisite: approval of the instructor.
AEEN 4279  Senior Design Project I  2 SCH  (1-3)
Applications of engineering concepts covered in the upper division courses to architectural engineering problems including design of building structural and services systems, with emphasis on teamwork. Introduction to practical aspects of construction and professional ethics. Prerequisites: AEEN 3304 or AEEN 4316, AEEN 3316, and credit or enrollment in AEEN 4320.

AEEN 4289  Senior Design Project II (WI)  2 SCH  (1-3)
Application of engineering concepts covered in the upper division courses to architectural engineering problems including design of building structural and services systems, with an emphasis on teamwork. Introduction to practical aspects of construction and professional ethics. Prerequisite: AEEN 4279.

AEEN 4310  Computer Modeling  3 SCH  (2-3)
Introduction to three-dimensional computer modeling. Includes 3d wire frame construction in AutoCAD, extrusion and Boolean for AutoCAD and Viz, basic application of skins, lighting and rendering techniques. Prerequisite: AEEN 1310.

AEEN 4316  Structural Steel Design (WI)  3 SCH  (3-0)
AISC specifications for the design of axially loaded members, beams, columns and connections. Introduction to plastic design. Prerequisite: AEEN 3303. (Credit may not be obtained in both AEEN 4316 and CEEN 4316.)

AEEN 4320  Building Services Engineering  3 SCH  (3-0)
Analysis and design of different types of secondary systems; flow, pumps and piping system; fans, ductwork and building air distribution; and HVAC equipment. Prerequisites: AEEN 3335 with a C or higher and CEEN 3392.

AEEN 4326  Construction Engineering  3 SCH  (3-0)
Construction methods and management of earthwork with heavy equipment and others. Construction estimating, planning and control. Network theory and critical path methods. Prerequisite: credit or registration in CEEN 3317. Credit may not be obtained in both AEEN 4326 and CEEN 4326.

AEEN 4333  Real Design and Construction  3 SCH  (2-3)
Real-world design/build course with projects emphasizing development of design, implementation of best practice construction, field experience, and government work. Prerequisites: AEEN 1320, AEEN 2325.

AEEN 4336  Selected Topics  1-3 SCH  (1-3)
One or more topics of architectural engineering. May be repeated when topic changes. Prerequisite: junior standing.

AEEN 4340  Eng Proj Est, Plan & Control  3 SCH  (3-0)
Develop cost estimates and schedules for construction projects. Analysis of cost components including labor, materials and equipment. Estimating techniques applied to project development. Integration of time and cost to track work progress. Use of modern computer tools for cost estimation and scheduling. Prerequisite: Senior standing in engineering. (Credit may not be obtained in both AEEN 4340 and CEEN 4340).

AEEN 4346  Building System Management  3 SCH  (3-0)
Basic concepts in building energy systems. Electrical, heating, ventilation and air conditioning (HVAC) systems; design skills development and implementation in computer programs. Prerequisites or registration in: AEEN 3337 and AEEN 4320.

Civil Engineering (CEEN)

In addition to the listed prerequisite for the following 4000 series courses, a student must have an overall grade point average of 2.0 or higher.

CEEN 1201  Civil Engineering as a Career  2 SCH  (1-3)
Orientation course covering the history of engineering, its disciplines and professional practice with emphasis on social responsibility and ethical behavior. Introduces students to the profession of civil and architectural engineering; provides basic skills, tools and techniques applied to problem solving, teamwork and communication necessary for academic and professional success. A laboratory component will stimulate the student's interest in engineering. Required of all entering civil and architectural engineering freshmen and transfer students with fewer than 16 hours.

CEEN 2113  Surveying Lab  1 SCH  (0-3)
Engineering field surveying and practices of taping, leveling, traversing, error adjustments, stadia, earthwork and highway curves. Corequisite: CEEN 2212.
Fee: $5.00

CEEN 2212  Surveying  2 SCH  (2-0)
Engineering principles and practices of plane surveying, taping, leveling, traversing, surveying errors, topographic stadia, earthwork, highway curves and construction surveys. Prerequisite: AEEN 1310 and credit or registration in MATH 2413.

CEEN 2301  Mechanics I  3 SCH  (3-0)

CEEN 3143  Geotechnical Eng Lab  1 SCH  (0-3)
Principles and practices of geotechnical engineering laboratory with emphasis on the related ASTM and AASHTO testing standards. Corequisite: CEEN 3342.
Fee: $5.00
CEEN 3145 Construction Materials Lab 1 SCH (0-3)
Engineering principles and practices for testing construction materials based on ASTM testing standards. Prerequisite: Credit for or registration in CEEN 3244.
Fee: $5.00

CEEN 3167 Hydraulics/Fluid Mechanics Lab 1 SCH (0-3)
Open-channel-flow visualization and measurement, hydraulic machinery characteristics and water and wastewater analysis. Corequisite: CEEN 3365.
Fee: $7.00

CEEN 3244 Construction Materials 2 SCH (2-0)
Engineering properties of materials for design and construction. Related ASTM test specifications of construction materials such as concrete, asphalt, timber, steel, synthetic materials, etc. Prerequisite: CEEN 3311.

CEEN 3303 Structural Analysis 3 SCH (3-0)
Statically determinate structures. Moving loads. Analysis of statically indeterminate structures by consistent deformation, slope-deflection and moment-distribution. Prerequisite: CEEN 3311.

CEEN 3304 Reinforced Concrete Design 3 SCH (3-0)
Mechanics, behavior and design of reinforced concrete members subject to axial loads, bending, torsion and shear. Prerequisites: CEEN 3303 and C or higher in CEEN 3311. (Credit may not be obtained in both AEEN 3304 and CEEN 3304.)

CEEN 3311 Strength of Materials 3 SCH (3-0)
Hooke's Law; stress and strain at a point; Mohr's circle; axial stresses; torsion; shear, moment and deflection in beams; shear center; unsymmetrical bending; columns; theories of failure; introduction to fatigue; and statically indeterminate members. Prerequisites: MATH 2414 and a grade of C or higher in CEEN 2301.

CEEN 3317 Engineering Economy 3 SCH (3-0)
Principles of economic analysis applied to engineering; evaluation of engineering alternatives; economic significance of engineering proposals. Cash flow diagrams, equivalence of cash flow patterns, interest, rate of return comparison, inflation, time value of money, income tax and depreciation, benefit/cost comparison, break even analysis, fixed costs, operating costs and other costs. Prerequisite: junior standing in engineering.

CEEN 3342 Geotechnical Engineering 3 SCH (3-0)
Principles of geotechnical engineering, soil composition, classification, flownet, compaction, consolidation, effective stress, bearing capacity and slope stability. Prerequisite: CEEN 3311.

CEEN 3356 Environmental Engineering 3 SCH (3-0)

CEEN 3389 Structural Vibration 3 SCH (3-0)

CEEN 3392 Hydraulic and Fluid Mechanics 3 SCH (3-0)
Fluid statics, flow of fluids through pipes and open channels, hydraulic machines. Prerequisite: a grade of C or higher in CEEN 2301.

CEEN 4279 Design in Civil Engineering I 2 SCH (1-3)
Engineering concepts integrated from the topics taught in sequences of upper division courses to produce practical, efficient and feasible solutions of civil engineering problems. Computer applications are included. Prerequisites: credit or registration in CEEN 3143, CEEN 3342, CEEN 4316, and CEEN 4362.

CEEN 4289 Design in Civil Engineering II 2 SCH (1-3)
Engineering concepts integrated from the topics taught in sequences of upper division courses to produce practical, efficient and feasible solutions of civil engineering problems. Computer applications are included. Prerequisites: CEEN 4279.

CEEN 4314 Matrix Methods and Struc Analys 3 SCH (3-0)
Formulation and application of the direct stiffness method to truss, beam and frame structures; introduction to the finite element method for 2-D problems; and use and interpretation of computer structural analysis programs. Prerequisite: CEEN 3303.

CEEN 4316 Structural Steel Design (WI) 3 SCH (3-0)
AISC specifications for the design of axially loaded members, beams, columns and connections. Introduction to plastic design. Prerequisite: CEEN 3303. Credit may not be obtained in both AEEN 4316 and CEEN 4316.

CEEN 4317 Computer Methods in Civil Engi 3 SCH (3-0)
Applications of computer methods to solution of civil engineering problems, including the use of mathematical modeling, error analysis, optimization, solution of algebraic and differential equations and integration pertaining to infrastructure system analysis. Prerequisite: CEEN 3303.

CEEN 4326 Construction Engineering 3 SCH (3-0)
Construction methods and management of earthwork with heavy equipment and others. Construction estimating, planning and control. Network theory and critical path methods. Prerequisite: credit or registration in CEEN 3317. Credit may not be obtained in both CEEN 4326 and AEEN 4326.
**CEEN 4336** Selected Topics  1-3 SCH  (0-0-1-3)
One or more topics of civil engineering. May be repeated when topic changes. Prerequisite: senior standing.

**CEEN 4340** Eng Proj Est, Plan & Control  3 SCH  (3-0)
Develop cost estimates and schedules for construction projects. Analysis of cost components including labor, materials and equipment. Estimating techniques applied to project development. Integration of time and cost to track work progress. Use of modern computer tools for cost estimation and scheduling. Prerequisites: Senior standing in engineering. (Credit may not be obtained in both AEEN 4340 and CEEN 4340).

**CEEN 4350** Professional Preparation  3 SCH  (3-0)
Preparation for the Civil Engineering Fundamentals of Engineering (FE) Examination, including computation skills, fundamental topics listed in the FE exam, and training in resume writing and interviewing skills. Corequisite: Registration in CEEN 4279 or CEEN 4289.

**CEEN 4359** Prin of Transportation Eng  3 SCH  (2-3)
Principles of transportation engineering, profession of transportation engineering, system and organization, system characteristics, traffic engineering studies, traffic flow, intersection control and capacity, highway alignment and capacity. Prerequisite: senior standing in engineering.
Fee: $5.00

**CEEN 4362** Hydrology  3 SCH  (3-0)

**CEEN 4364** Dsgn Wtr and Wstwrt Convey Sys  3 SCH  (3-0)
Water and wastewater flows and measurement, design of water transportation systems, design of gravity-flow sanitary sewers and stormwater drainage systems, pumps and pump systems, design of pumping stations. Prerequisite: CEEN 3392.

**CEEN 4367** Intro to Geoenviron Enginrng  3 SCH  (3-0)
Soil-water-contaminant interaction processes, conduction phenomena, hydraulic conductivity and contaminant transport phenomena, effects of contaminants on soil properties, site characterization and soil remediation techniques; design aspects of waste containment systems such as landfills, seepage barriers and cutoff walls. Prerequisites: CEEN 3342 and CEEN 3365.

**CEEN 4368** Foundation Engineering  3 SCH  (3-0)

**CEEN 4369** Transportation Eng Design  3 SCH  (3-2)
Engineering design concepts used to produce practical, efficient, economical and feasible solutions to problems in such transportation areas as highways, traffic freight and materials movement, railroads and air transport. Computer applications are included. Prerequisite: CSEN 2304 and CEEN 3311.
Fee: $5.00

**CEEN 4399** Civil Engineering Internship  1-3 SCH  (1-3)
Internships in industry, government or consulting companies in career-based practical activities to broaden the skills obtained through curricular education. Prerequisite: senior standing.

**Degree Requirements**

**Majors**

- Architectural Engineering, B.S. (https://catalog.tamuk.edu/undergraduate/engineering/civil-architectural/architectural-engineering-bs/)
- Civil Engineering, B.S. (https://catalog.tamuk.edu/undergraduate/engineering/civil-architectural/civil-engineering-bs/)

In addition to meeting all course requirements, students must earn a cumulative GPA of 2.0, a math/science GPA of 2.25, and an engineering GPA of 2.25. Students must earn a 'C' or higher in one Writing Intensive course.

Students majoring in Architectural Engineering (AEEN) or Civil Engineering (CSEN) must receive a grade of C or better in all engineering courses (AEEN, CEEN, ITEN, EEEN, etc.).