

# AREN - ARCHITECTURAL ENGR (AREN)

## AREN 175/COSC 175 Construction Graphics Communication

**Credits 3. 3 Lecture Hours.** Visualization, interpretation and communication of graphical geometry in construction design and engineering; graphical analysis of problems; sketching applications, computer aided design and fundamentals of information modeling software; introduction to common quantitative tools in construction. **Prerequisite:** AREN and COSL majors only. **Cross Listing:** COSC 175/AREN 175.

## AREN 200 Architectural Engineering Foundations

**Credits 2. 2 Lecture Hours.** Introduction to the broad field and professional practice of architectural engineering, architectural engineering systems, and the role of the architectural engineer; emphasis on professional engineering design services, design and construction processes and documents, building envelope and materials, structural systems, mechanical systems, lighting systems, building systems integration, building codes and standards, fire safety, professional attributes of architectural engineers, and issues of human performance requirements and sustainability at relates to building system design. **Prerequisite:** Sophomore classification or approval of instructor.

## AREN 210 Fundamentals of Building Information Modeling for Architectural Engineering

**Credits 3. 2 Lecture Hours. 3 Lab Hours.** Application of the fundamentals of engineering design, document production, and interdisciplinary coordination utilizing design and drafting software; application of software to model shapes, structures, and systems in 3D with parametric accuracy, precision, and ease; topics include streamline documentation work, with instant revisions to plans, elevations, schedules, and sections as projects change; and introduction of specialty toolsets; production of structural and mechanical-electrical-plumbing systems in a 3-D model.

## AREN 289 Special Topics in...

**Credits 1 to 4. 1 to 4 Other Hours.** Selected topics in an identified area of architectural engineering. May be repeated for credit.

## AREN 300 Architectural Engineering Systems

**Credits 3. 3 Lecture Hours.** Analysis and application of the engineering design process to solve problems associated with the design and operation of building systems, specifically related to HVAC, electrical power and lighting, and structural integrity; communication of solutions to technical problems of building systems, through writing, presentations, and team interactions, typical of architectural engineers in the building industry; emphasis on the engineering design process in architectural engineering, structural systems for buildings, mechanical systems for heating, ventilation, and air-conditioning, electrical lighting for buildings, building fire safety, building acoustics, building codes and standards, interface issues among different building systems, and sustainability aspects of building systems. **Prerequisites:** Grade of C or better in AREN 200; junior classification or approval of instructor.

## AREN 320 Lighting Engineering for Buildings

**Credits 3. 3 Lecture Hours.** Reinforces the fundamentals of illuminating engineering for building interiors; focuses on the design and analysis of electrical lighting systems, including the integration between the lighting design process and the technical foundations of building lighting; emphasis on the fundamentals of lighting engineering and basic engineering methods for building lighting systems, lighting design criteria, lighting calculations, and power budgets. **Prerequisites:** Junior or senior classification; major in engineering or approval of instructor.

## AREN 330 Mechanical Systems for Buildings

**Credits 3. 3 Lecture Hours.** Introduction to qualitative and quantitative engineering concepts of mechanical systems for buildings for architectural engineers, including HVAC systems, control of indoor air pollutants and fire suppression systems; emphasis on thermal behavior of buildings and building envelopes, human comfort requirements and psychometrics, thermal load calculations, HVAC systems/equipment, design of space air-conditioning and its relationship to architectural design, mechanical systems for indoor air quality and for fire suppression. **Prerequisite:** Grade of C or better in MEEN 315 or MMET 370.

## AREN 399 High Impact Experience for Architectural Engineers

**Credits 0. 0 Other Hours.** Participation in an approved high-impact learning experience; reflection on professional outcomes from the National Society of Professional Engineers' Engineering Body of Knowledge; documentation and self-assessment of learning experience at mid-curriculum point. **Prerequisite:** Junior or senior classification.

## AREN 401 Architectural Engineering Design I

**Credits 3. 2 Lecture Hours. 3 Lab Hours.** Instruction and practice in the design process applied to an architectural engineering design project; application of establishing customer need, determining requirements in terms of function and performance, developing alternative design concepts, performing trade-off studies among performance, cost and schedule, embodiment and detail design and the iteration of the above steps; major architectural engineering design project. **Prerequisites:** Grade of C or better in AREN 300, AREN 330, and CVEN 345.

## **AREN 402 Architectural Engineering Design II**

**Credits 3. 2 Lecture Hours. 3 Lab Hours.** Application and extension of fundamentals of engineering design, product detail, and design development process, including case studies; emphasis on project management, marketing considerations, manufacturing detailed design specifications, failure modes, applications of codes and standards, selection of design margins, product (component) development guidelines, intellectual property, product liability and ethical responsibility; major architectural engineering design project. **Prerequisite:** Grade of C or better in AREN 401.

## **AREN 440 Architectural Engineering Heating, Ventilating and Air Conditioning Design**

**Credits 3. 3 Lecture Hours.** Project-based design course; select and develop the mechanical system for a building, from the programming phase to the design development and working documents; emphasis on the application HVAC principles in the design and analysis of a mechanical system in a real building, including review of building thermal load calculations & energy analysis, HVAC design goals and schematic design, system selection and system design, HVAC design development, HVAC design documents, and energy, environmental, and human comfort considerations in HVAC design. **Prerequisites:** Grade of C or better in AREN 300 and AREN 330.

## **AREN 485 Directed Studies**

**Credits 0 to 6. 0 to 6 Other Hours.** Directed individual study within architectural engineering. **Prerequisites:** Junior or senior classification and approval of architectural engineering director or delegate.

## **AREN 489 Special Topics in...**

**Credits 1 to 4. 1 to 4 Other Hours.** Selected topics in an identified area of architectural engineering. May be repeated for credit. **Prerequisites:** Junior or senior classification.