ARCHITECTURAL ENGINEERING - MASTER OF SCIENCE (MS)

Graduate studies in architectural engineering are offered through the Department of Civil, Environmental and Architectural Engineering. The department offers a Master of Science degree with study emphases in several major areas:

- Building systems engineering
- Illumination engineering
- Materials and carbon
- Construction engineering and management

For more information, visit the department's Graduate Studies webpage.

Bachelor's–Accelerated Master's Degree Program

Students may earn this degree as part of the Bachelor's–Accelerated Master's (BAM) degree program, which allows currently enrolled CU Boulder undergraduate students the opportunity to earn a bachelor's and master's degree in a shorter period of time.

For more information, see the Accelerated Master's tab for the associated bachelor's degree(s): Architectural Engineering - Bachelor of Science (BS) [https://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/civil-environmental-architectural-engineering/architectural-engineering-bachelor-science-bsare/#acceleratedmasterstext]

Requirements

For a Master of Science (MS) degree in architectural engineering, students may undertake Plan I (with a thesis) or Plan II (with a project).

Up to 6 credits of independent study may be taken, where an individual course of study is worked out between the student and a faculty member. Up to 9 credits of graduate courses can be transferred from another institution. Students are allowed up to 6 credits in total of non-technical coursework for the MS/PhD degree.

Degree Plans

Plan I: Thesis Option
Plan I requires 24 credits of coursework, plus 6 credits of thesis work. The thesis is a formal research report that discusses an organized research topic. Experience has shown that it takes a student from 24 to 30 months to complete this plan. Financial support is generally limited to exceptionally well-qualified students selecting Plan I.

Plan II: Non-Thesis Option
Plan II requires 27 credits of coursework, plus 3 credits of MS project work. The 3-credit Master's Report (AREN 6960) is related to an applied research AREN topic. It can be successfully completed in 18–24 months by a diligent student. Note that one-half of the coursework must be taken in the CEAE Department (an exception may be made if the relevant courses were taken as part of an undergraduate degree).

With the approval of the advisor, non-CEAE courses at the 4000 level may be used for graduate credit up to a maximum of 6 credits.

Course Requirements

Courses offered in the architectural engineering graduate program may be separated into four tracks, one specific to the Construction Engineering & Management discipline and three related to the Building Systems Engineering discipline. Students may decide to concentrate in one of these track areas, or they may wish to take a broad selection from the courses; there is no requirement for picking any specific track under the general track option.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>AREN 5001</td>
<td>Building Science and Engineering I</td>
<td>6</td>
</tr>
<tr>
<td>AREN 5002</td>
<td>Building Science and Engineering II</td>
<td>6</td>
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<tr>
<td>AREN 5890</td>
<td>Sustainable Building Design</td>
<td>(Suitable for any focus area)</td>
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<tr>
<td>AREN 5990</td>
<td>Comp Fu Dynamics (CFD) Analysis for Built/Natural Envmnts</td>
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<tr>
<td>AREN 5830</td>
<td>Architectural Engineering Special Topic (Building Systems Modeling and Simulation)</td>
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<tr>
<td>AREN 5030</td>
<td>Data Science for Energy and Buildings</td>
<td></td>
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<tr>
<td>CVEN 5836</td>
<td>Special Topics for Seniors/Grads (Construction Engineering Fundamentals)</td>
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Focus Area: Building Energy Engineering

- AREN 5010 Energy System Modeling and Control
- AREN 5020 Building Energy Audits
- AREN 5060 Distributed Electricity Generation
- AREN 5080 Computer Simulation of Building Energy Systems
- AREN 5110 HVAC System Design
- AREN 5570 Building Electrical Systems Design 1
- AREN 5830 Architectural Engineering Special Topic (Modeling and Simulation of Community Energy Systems)
- AREN 5090 Optimizing Grid Connected Systems
- ECEN 5007 Special Topics (Data Analytics and Decision-making for Power Systems)
- ECEN 5007 Special Topics (Renewable Energy Future of Power Grid)
- ECEN 5007 Special Topics (Power Systems Planning and Optimizations)

Focus Area: Illumination Engineering

- AREN 5830 Architectural Engineering Special Topic (Illumination 2)
- AREN 5130 Optical Design for Illumination and Solid State Lighting
- AREN 5560 Luminous Radiative Transfer
- AREN 5580 Daylighting
- AREN 5620 Adaptive Lighting Systems
**Focus Area: Materials and Carbon**

- **AREN 5650** Forensic Engineering
- **CVEN 5835** Special Topics for Seniors/Grads (Design of Wood Structure)
- **AREN 4315** Design of Masonry Structures (must enroll in CVEN 5849, independent study, to receive graduate credit)
- **AREN 5660** Embodied Carbon in Buildings
- **CVEN 5831** Special Topics (Construction Materials)

**Focus Area: Construction Engineering & Management**

- **CVEN 5246** Legal Aspects of Construction
- **CVEN 5276** Engineering Risk and Decision Analysis
- **CVEN 5226** Construction Safety
- **CVEN 5346** Managing Construction and Engineering Projects and Organizations
- **CVEN 5836** Special Topics for Seniors/Grads (Infrastructure Asset Management)

**Graduate Certificate in Global Engineering**

Students admitted to the Graduate Certificate in Global Engineering program (https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/civil-engineering/engineering-developing-communities-graduate-certificate/) must fulfill the coursework and practicum requirements of that program. For AREN students, up to 6 credits of the required certificate coursework can count as coursework needed for the PhD degree.