

ARCHITECTURAL ENGINEERING (OMAHA)

Description

Website: <http://engineering.unl.edu/durhamschool/architectural-engineering/>

The architectural engineering (BSAE) undergraduate program is a four-year program requiring 128 credit hours. A one-year master of architectural engineering (MAE) program of 30 credits is also offered. The Architectural Engineering (MAE) program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Architectural and Similarly Named Engineering Programs. Virtually all of our BSAE graduates continue to complete the MAE degree.

Educational Objectives

The following are the BSAE/MAE program educational objectives (PEOs):

1. Professional Accomplishment: Our AE graduates will become licensed professional engineers a few years after graduation.
2. Career Accomplishment: Our AE graduates will contribute to society by working in an occupation related to the built environment a few years after graduation.

Architectural engineering (AE) is the engineering design of buildings. Students have the option to specialize in the design of:

1. Building structural systems
2. Building mechanical systems and acoustics
3. Building lighting and electrical systems

The first three years are common to all three fields of specialization and include the math and science courses common to all engineering programs. Students take an introductory course in AE in their first semester where they learn about the materials and systems that comprise a building, visit a construction site, and interact with their industry mentors. It provides a preview of the work they can expect to perform after graduation. This introductory course helps students decide if AE is the career path they wish to pursue.

In the third semester, the AE student begins the first of a three-course sequence of courses in AE Design and Simulation Studio. These courses familiarize the engineering student with building information technology (BIM), building systems, and how they support the design process of architects. The AE degree is keenly focused on integrating engineering concepts with architectural features to deliver aesthetic and high performing buildings. Exposure to construction is an important part of the AE student's education. It develops creativity and constructability where AE graduates enjoy a special ability to work effectively with all professionals on the design and construction team.

The AE program develops breadth and depth by requiring a good understanding of all the systems that comprise a building while also providing specialized education in one of the areas listed above. Breadth is provided in the fifth and sixth semesters, where all students take courses in each of the three areas of specialization. Depth is provided in the seventh and eighth semesters where courses are taken primarily in one of the three specialization tracks.

A one-year master of architectural engineering (MAE) degree follows the four-year undergraduate program. This fifth year continues the specialized education in each of the three option areas and provides the professional practice topics that architectural engineers need later in their careers.

The MAE year features a major interdisciplinary design project. The project requires students to practice the design skills and understanding of building systems previously developed. Student teams complete a significant building design in a manner that closely simulates professional practice. Industry and faculty members serve as consultants to the students. Typically, students enter this design into the national Architectural Engineering Institute competition. Traditionally, our students do very well at this competition. Additionally, students complete an individual mastery project on a topic of their choice.

Career Opportunities

Architectural engineering graduates normally enter the building design industry and become registered professional engineers. There are only about 20 accredited architectural engineering programs in the country, so there is a large unfulfilled demand for engineers educated in building design. In Nebraska, the home of several large architectural and engineering design firms, this is especially true.

Architectural engineering is accredited by the EAC-ABET, Inc. The accreditation is attached to the one-year master of architectural engineering degree.

Major Department Admission

Students must complete at least 43 credit hours in the AE program before applying for professional admission to the degree program in AE. Transfer students must have all transfer hours accepted before applying for professional admission. Professional admission in the BSAE program requires a minimum of a 2.8 GPA and allows students to enroll in 300-level AREN courses. The number of admitted students will depend on the availability of space, faculty, and other academic resources. Students are not permitted to register for more than 61 credit hours of courses listed in the AE curriculum until they have been professionally admitted into the degree program.

College Requirements

College Admission

College Entrance Requirements

Students must meet both the University and College of Engineering entrance requirements. The following includes both the University and College of Engineering entrance requirements.

Students must have high school credit for (one unit is equal to one high school year):

1. Mathematics – 4 units: 2 of algebra, 1 of geometry, and 1 of precalculus and trigonometry
2. English – 4 units
3. Natural sciences – 3 units that must include 1 unit of physics and 1 unit of chemistry (chemistry requirement waived for students in construction management or computer science)
4. Foreign language – 2 units of a single foreign language
5. Social studies – 3 units
6. Students having a composite ACT score of 28 or greater (or equivalent SAT score) will be admitted to the College of Engineering even if they lack any one of the following: trigonometry, chemistry, or

physics. Students without test scores who are missing a full unit of trigonometry/pre-calculus/calculus or chemistry or physics will be evaluated through College Review.

- Students having an ACT score of 19 or less in English (or equivalent SAT score) or a grade lower than B in high school English, must take ENGL 150 Writing and Inquiry or ENGL 151 Writing for Change.

A total of 16 units is required for admission.

Engineering requires that student performance meet one of the following standards: composite ACT of 24, SAT of 1180, ACT Math subscore of 24, SAT Math subscore of 580, or a 3.5 cumulative GPA.

Any domestic first-year student who does not gain admission to Engineering but does gain admission to the University of Nebraska-Lincoln (UNL) will be reviewed through College Review. College Review is conducted through the College Review Committee which considers factors beyond standardized testing. Any first-year student who is not admitted through college review is placed in Pre-Engineering (PENG) with the Exploratory and Pre-Professional Advising Center (Explore Center). Students in the Explore Center can transfer to the College of Engineering once college admission requirements are met.

Students for whom English is not their language of nurture must meet the minimum English proficiency requirements of the University.

Students who lack entrance units may complete precollege training by Independent Study through the University of Nebraska–Lincoln Office of On-line and Distance Education, in summer courses, or as a part of their first or second semester course loads while in the Explore Center or other colleges at UNL.

Students should consult their advisor, their department chair, or Engineering Student Services (ESS) if they have questions on current policies.

Other Admission Requirements

Students who transfer to the University of Nebraska–Lincoln from other accredited colleges or universities and wish to be admitted to the College of Engineering (COE) must meet COE first-year student entrance requirements, have a minimum cumulative GPA of 2.5, and be calculus-ready. Students not meeting either of these requirements must enroll in the Explore Center or another University college until they meet COE admission requirements. Students transferring from UNO, UNL, or UNK to the College of Engineering must be in good academic standing with their institution.

The COE accepts courses for transfer for which a C or better grade was received. Although the University of Nebraska–Lincoln accepts D grades from the University of Nebraska Kearney and the University of Nebraska Omaha, not all majors in the COE accept such low grades. Students must conform to the requirements of their intended major and, in any case, are strongly encouraged to repeat courses with a grade of C- or less.

Students who were previously admitted to COE and are returning to the College of Engineering must demonstrate a cumulative GPA of 2.5 to be readmitted to COE.

College Degree Requirements

Grade Rules

Grade Appeals

In the event of a dispute involving any college policies or grades, the student should appeal to their instructor, and appropriate department

chair or school director (in that order). If a satisfactory solution is not achieved, the student may appeal their case through the College Academic Appeals Subcommittee.

Catalog Rule

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at Nebraska in the College of Engineering. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Students who have transferred from a community college may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with the student's College of Engineering academic advising team (e.g., ESS professional advisor and the chief faculty advisor for the student's declared degree program). The chief faculty advisor has the final authority for this decision. Eligibility is based on a) enrollment in a community college during the catalog year the student wishes to utilize, b) maintaining continuous enrollment of at least 12 credit hours per semester at the previous institution for at least 2 semesters, and c) continuous enrollment at the University of Nebraska-Lincoln within 1 calendar year from the student's last term at the previous institution. Students must complete all degree requirements from a single catalog year and within the timeframe allowable for that catalog year.

Learning Outcomes

Graduates of architectural engineering will develop:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- An ability to communicate effectively with a range of audiences.
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global economic, environmental, and societal contexts.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The Architectural Engineering (MAE) program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Architectural and Similarly Named Engineering Programs.



Major Requirements

All course numbers reflect the University of Nebraska Omaha catalog system, as this program is only completed on the Scott Campus in Omaha.

First Semester

AREN 1010	Introduction to Architectural Engineering	1
CMST 1110	Public Speaking Fundamentals	3
MATH 1950	Calculus I	5
CHEM 1180	General Chemistry I	3
CHEM 1184	General Chemistry I Lab	1
ACE 9 Elective		3
ENGR 10	Freshman Engineering Seminar	0
AREN 1000	DSAEC Seminar	0
Credit Hours Subtotal:		16

Second Semester

MATH 1960	Calculus II	4
PHYS 2110	General Physics 1-Calculus Level	4
PHYS 1154	General Physics Lab I	1
ACE Elective (SLO 5 or 7)	One of ACE 5 or 7 must include ART 3770 (5 or 7) or ART 3780 (5 only)	3
CIST 1600	Introduction to Programming Using Practical Scripting	3
AREN 1000	DSAEC Seminar	0
Credit Hours Subtotal:		15

Third Semester

ECEN 211	Elements of Electrical Engineering	3
MATH 1970	Calculus III	4
PHYS 2120	General Physics—Calculus Level	4
PHYS 1164	General Physics Lab II	1
MECH 223	Engineering Statics	3
AREN 1030	AE Design & Simulation Studio I	3
AREN 1000	DSAEC Seminar	0
Credit Hours Subtotal:		18

Fourth Semester

MECH 200	Engineering Thermodynamics	3
MATH 2350	Differential Equations	3
MECH 325	Mechanics of Elastic Bodies	3
MECH 373	Engineering Dynamics	3
AREN 3070	Mechanics of Materials Lab	1
AREN 2030	AE Design & Simulation Studio II	3
AREN 1000	DSAEC Seminar	0
Credit Hours Subtotal:		16

Fifth Semester

AREN 3200	Lighting I: Fundamentals for Design	3
AREN 3300	Building Acoustics Fundamentals	3
CONE 211	Construction Business Methods	3
CIVE 310	Fluid Mechanics	3
CIVE 310L	Hydraulics Laboratory	1
CIVE 341	Structural Analysis Fundamentals	3
CIVE 342	Structural Design Fundamentals	1
AREN 1000	DSAEC Seminar	0
Credit Hours Subtotal:		17

Sixth Semester

AREN 3220	Electrical Systems for Buildings I	3
AREN 3100	HVAC Fundamentals	3
CIVE 441	Steel Design I	3
AREN 4040	Building Envelopes	3
STAT 3800	Applied Engineering Probability & Statistics	3
AREN 3030	AE Design & Simulation Studio III	3
AREN 1000	DSAEC Seminar	0
Credit Hours Subtotal:		18

Seventh Semester

All Options

Technical Elective	Elective must be selected from list of approved courses	3
CONE 206	Engineering Economics	3
ENGR 220 / JGEN 200 or ENGL 3980	Technical Communication I	3
AREN 1000	DSAEC Seminar	0
Select one of the following three options		9

Lighting and Electrical Option

AREN 4200/8206	Lighting II: Theory, Design & Application	
AREN 4120	Building Energy II: Primary & Secondary Systems	
PSYC 1010	Introduction to Psychology I (satisfies ACE SLO 6)	

Mechanical and Acoustics Option

AREN 4120	Building Energy II: Primary & Secondary Systems	
ACE Elective (SLO 6)		
General Elective	Elective must be approved by adviser	

Structural Option

CIVE 440	Reinforced Concrete Design I	
CIVE 443	Advanced Structural Analysis	
ACE Elective (SLO 6)		
Credit Hours Subtotal:		18

Eighth Semester

All Options

ACE Elective (SLO 5 or 7)	One of ACE 5 or 7 must include ART 3770 (5 or 7) or ART 3780 (5 only)	3
AREN 1000	DSAEC Seminar	0
Select one of the following three options:		7

Lighting and Electrical Option

AREN 4250	Lighting Design	
PSYC 4210	Sensation & Perception	

Mechanical and Acoustics Option

AREN 4150	HVAC Design	
AREN 4300/8306	Advanced Noise Control	

Structural Option

AREN 4550	Structural Design	
CIVE 444	Structural Design and Planning	

Credit Hours Subtotal:	10
Total Credit Hours	128

Additional Major Requirements

AREN 1000 DSAEC Seminar Requirement

Undergraduate Architectural Engineering majors are required to complete this zero-credit-hour course every semester they are in the major.

Grade Rules

C- and D Grades

Architectural engineering students must earn a grade of C or better in math, science, computer programming, and engineering courses to obtain credit for that course toward graduation. Additionally, all courses that are prerequisites for engineering courses must be passed with a grade of C or better.

Catalog To Use

Because of rapid technical developments, the AE curriculum is continually reviewed and upgraded. Students currently enrolled are expected to modify their programs to take advantage of such revisions. Students who do not maintain continuous progress toward the degree through enrollment in applicable coursework will be considered as new students upon re-entering the program and will be subject to the requirements of the undergraduate catalog current at the time of their re-entry.

ACE Requirements

The AE program follows the University of Nebraska–Lincoln Achievement Centered Education (ACE) requirements. Because of the specific needs of the program, most of these courses are specified in the curriculum.

Please contact durhamschool@unl.edu, if you are interested in more information about this program.

Career Information

The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.

Jobs of Recent Graduates

- Electrical Engineer, Alvine Engineering - Omaha NE
 - Acoustical Consultant, Veneklasen Associates - Santa Monica CA
 - Structural Engineer, Schemmer Associates - Omaha NE
 - Electrical Engineer, Henderson Engineers, Inc. - Lenexa KS
 - Mechanical Engineer, WSP USA - San Francisco CA
 - Electrical/Lighting Designer, HDR, Inc. - Dallas TX
 - Mechanical Engineer, Schnackel Engineers, Inc. - Omaha NE
 - Architect, RDG Planning & Design - Omaha NE
 - Electrical Engineer, Specialized Engineering Solutions - Omaha NE
 - Mechanical Designer, WSP USA - Dallas TX
- ### Internships
- Structural Engineering Intern, Olsson Associates - Omaha NE
 - Lighting Design Intern, HGA - Minneapolis MN
 - Mechanical Engineering Intern, EYP - Maitland FL
 - Acoustical Intern, Threshold Acoustics - Chicago IL
 - Electrical Engineer Intern, HDR, Inc. - Dallas TX
 - Commissioning Intern, LEO A DALY - Omaha NE
 - Mechanical Engineering Intern, Specialized Engineering Solution - Omaha NE
 - Structural Engineering Intern, DLR Group - OMAHA NE
 - Acoustics Intern, Alvine Engineering - Omaha NE
 - Structural Intern, BSE Structural Engineers - Lenexa KS
 - Mechanical Engineering Intern, Girard Engineering - Falls Church VT
 - Structural Intern, HDR, Inc. - Omaha NE
 - Lighting Design Intern, HGA - Minneapolis MN
 - Energy Intern, Ezenics, Inc. - Omaha NE
 - Mechanical Engineering Intern, Smith Seckman Reid - Nashville TN
 - Electrical Engineer Intern, Affiliated Engineers Inc. - Madison WI
 - BIM Design Intern, MFEC Consulting Engineers - Overland Park KS
 - Electrical Engineering Intern, ME Engineers - Denver CO
 - Lighting Design Intern, SmithGroupJJR - Detroit MI
 - Mechanical Intern, Schmidt & Stacy Consulting Engineers - Dallas TX
 - Electrical Engineering Intern, Specialized Engineering Solutions - Omaha NE
 - Assistant Exterior Project Manager, McCarthy Building Companies - St. Louis MO
 - Mechanical Intern, Morrissey Engineering - Omaha NE
 - Architectural Lighting Design Intern, Schuler Shook - Chicago IL
 - Project Management Intern, Omaha Electric Service/Iowa Electric - Omaha NE
- Electrical Engineer, SmithGroupJJR - Chicago IL
 - Structural Designer, DLR Group - Omaha NE
 - Mechanical Engineer, HDR, Inc. - Dallas TX
 - Lighting Designer/Engineer, HGA - Minneapolis MN
 - Acoustics and Technology Specialist, Henderson Engineers - Lenexa KS
 - Entry-Level Electrical Engineer, Affiliated Engineers, Inc. - Madison WI
 - Mechanical Engineer, LEO A DALY - Omaha NE
 - Energy Analyst, Energy Studio Inc. - Omaha NE
 - Technology Engineer, BG Buildingworks - Avon CO
 - Structural Engineer, Black & Veatch - Overland Park KS
 - Acoustician, HDR, Inc. - Minneapolis MN
 - Civil Engineer, Nebraska Public Power District - Brownville NE
 - Electrical Engineer, Schmidt & Stacy Consulting Engineers - Dallas TX
 - Mechanical Engineer, Morrissey Engineering - Omaha NE
 - Structural Engineer, Olsson Associates - Omaha NE