

ARCHITECTURAL ENGINEERING (OMAHA)

Description

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

The architectural engineering (BSAE) undergraduate program is a four-year program requiring 130 credit hours. A one-year master of architectural engineering (MAE) program of 36 credits is also offered. The MAE degree is accredited by ABET, and almost 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: The AE program will prepare graduates to become licensed professional engineers a few years after graduation.
2. Career Accomplishment: The AE program will prepare graduates to 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 either the design of:

1. building structural systems;
2. building mechanical systems and acoustics; or
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 the students 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 the student to decide if AE is the career path he/she wishes to pursue.

In the second semester, the AE student begins the first of a four-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 a 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 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 the student 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.

Career Opportunities

Architectural engineering graduates normally enter the building design industry and become registered professional engineers. There are 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. The students must have a minimum of 3.0 GPA over a pre-determined set of 43 credit hour freshman and sophomore level courses to be professionally admitted to the AE program and continue to take 300-level AE courses. A spreadsheet for calculation of AE professional admittance GPA is provided on the AE website. 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 accepted into the degree program in AE.

College Requirements

College Admission

College 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, 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)
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.
7. Students having an ACT score of 19 or less in English (or equivalent SAT score) must take ENGL 150 Writing and Inquiry or ENGL 151 Writing and Argument.

A total of 16 units is required for admission.

Students must have an ACT (enhanced) score of 24 or greater (or equivalent SAT). Students who lack entrance requirements may be admitted based on ACT scores, high school rank and credits, or may be admitted to pre-engineering status in the Exploratory and Pre-Professional Advising Center. Pre-engineering students are advised within the College of Engineering.

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 Exploratory and Pre-Professional Advising Center or other Colleges at Nebraska.

Students should consult their advisor, their department chair, or Engineering Student Services 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 freshman entrance requirements and 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 at Kearney and at 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.

All transfer students must adopt the curricular requirements of the undergraduate catalog current at the time of transfer to the COE—not that in use when they entered the University of Nebraska–Lincoln. Upon admission to Nebraska, students wishing to pursue degree programs in the COE will be classified and subject to the policies defined in the subsequent section.

Students who were previously admitted to COE and are returning to the College of Engineering must demonstrate a cumulative GPA of 2.5 in order 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 his/her instructor, and appropriate department chair or school director (in that order). If a satisfactory solution is not achieved, the student may appeal his/her case through the College Academic Appeals Committee on his/her campus.

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.

Learning Outcomes

Graduates of architectural engineering will develop:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. 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.
3. An ability to communicate effectively with a range of audiences.
4. 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.
5. 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.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The above student outcomes have been approved by the ABET Engineering Area Delegation for use beginning with the 2019-20 academic year, and have been adopted by the faculty of the Department of Architectural Engineering.

Major Requirements

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

First Semester

AE 1000	DSAEC Seminar	0
AE 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
DSGN 1100	Design Thinking	3

Credit Hours Subtotal:

16

Second Semester

AE 1000	DSAEC Seminar	0
AE 2250	Construction Graphics & Design Process	3
MATH 1960	Calculus II	5
PHYS 2110	General Physics 1-Calculus Level	4
PHYS 1154	General Physics Lab I	1
DSGN 1110	Design Making	4

Credit Hours Subtotal:

17

Third Semester		
AE 1000	DSAEC Seminar	0
MENG 2000	Engineering Thermodynamics	3
CIST 1400	Introduction to Computer Programming	3
MATH 1970	Calculus III	4
PHYS 2120	General Physics–Calculus Level	4
PHYS 1164	General Physics Lab II	1
MENG 2230	Engineering Statics	3
Credit Hours Subtotal:		18

Fourth Semester		
AE 1000	DSAEC Seminar	0
ECEN 2110	Elements of Electrical Engineering	3
AE 2400	Building Systems	3
MENG 3730	Engineering Dynamics	3
MATH 2350	Differential Equations	3
AE 3070	Mechanics of Materials Lab	1
MENG 3250	Mechanics of Elastic Bodies	3
Credit Hours Subtotal:		16

Fifth Semester		
AE 1000	DSAEC Seminar	0
AE 3200	Lighting I: Fundamentals for Design	3
AE 3300	Building Acoustics Fundamentals	3
CIVE 310/MENG 3100	Fluid Mechanics	3
CIVE 319	Hydraulics Laboratory	1
CIVE 341	Introduction to Structural Engineering	4
ENGL 3980	Technical Writing Across the Disciplines (ENGR 3000 is an accepted equivalent for ENGL 3980)	3
Credit Hours Subtotal:		17

Sixth Semester		
AE 1000	DSAEC Seminar	0
AE 3220	Electrical Systems for Buildings I	3
AE 3100	HVAC Fundamentals	3
CIVE 441	Steel Design I	3
MENG 4200/MENG 8206	Heat Transfer	3
STAT 3800/STAT 8805	Applied Engineering Probability & Statistics	3
ACE Elective (from ACE SLO 9)		3
Credit Hours Subtotal:		18

Seventh Semester		
AE 1000	DSAEC Seminar	0
<i>All Options</i>		
ART 3770	History of Architecture to 1850 (satisfies ACE SLO 5) (AE 3770 is an accepted substitute for ART 3770 and satisfies ACE SLO 5)	3
CONE 2060	Engineering Economics	3
CIVE 440	Reinforced Concrete Design I	3
Select one of the following three options:		9

Lighting and Electrical Option

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

Mechanical and Acoustics Option

AE 4120	Building Energy II: Primary & Secondary Systems	
ACE Elective (from ACE SLO 6)		
General Elective (should be approved by your advisor)		

Structural Option

CIVE 443	Advanced Structural Analysis	
ACE Elective (from ACE SLO 6)		
General Electives (should be approved by your advisor)		
Credit Hours Subtotal:		18

Eighth Semester

AE 1000	DSAEC Seminar	0
<i>All Options</i>		
ART 3780	History of Architecture Since 1850 (satisfies ACE SLO 7)	3
Select one of the following three options:		7

Select one of the following three options:

Lighting and Electrical Option

AE 4250	Lighting Design	
PSYC 4210	Sensation & Perception	

Mechanical and Acoustics Option

AE 4150	HVAC Design	
AE 4300/AE 8306	Advanced Noise Control	

Structural Option

CIVE 334	Introduction to Geotechnical Engineering	
CIVE 444	Structural Design and Planning	
Credit Hours Subtotal:		10

Total Credit Hours	130
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Additional Major Requirements

Grade Rules

C- and D Grades

AE students must earn a grade of C or better in math, science, and engineering courses to obtain credit for that course toward graduation. All courses that are prerequisites for AE, CIVE, or MENG courses must be passed with a grade of C or higher to obtain entry into the subsequent course.

Catalog To Use

Because of rapid technical developments, the AE curriculum is continually reviewed and upgraded. Currently enrolled students 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 Melissa Hoffman at melissa.hoffman@unl.edu or 402-554-4482, 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, 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
- 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