

# BACHELOR OF SCIENCE IN ARCHITECTURAL ENGINEERING

Architectural engineering is a building-oriented discipline that offers students an opportunity to obtain an engineering education specializing in building science, building systems integration, building construction, and structural and computer-aided design.

Professional architectural engineers are concerned with the structural integrity of buildings; the design and analysis of heating, ventilating, and air-conditioning (HVAC) systems; plumbing, fire protection, electrical, and lighting systems; acoustics; energy conservation; building energy and environmental performance; and the management of construction resources and schedules. Graduates of the architectural engineering program will be well prepared for careers as consulting engineers, building contractors, construction managers, structural engineers, and knowledgeable specialists in related areas of building design and analysis.

The objective of the architectural engineering program is to prepare graduates to enter and be successful in the architectural engineering profession. Graduates are expected to become licensed professional engineers, and to reach responsible positions in a wide range of professional settings, including consulting firms, industry, or government. This program will prepare students to begin and successfully complete graduate studies in engineering and/or post-baccalaureate education in a professional degree program. The architectural engineering program provides breadth in core sub-disciplines and depth in areas of specialization. This degree program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Architectural engineering shares much in common with civil, environmental and mechanical engineering but is distinct in its exclusive concentration on building projects. Architectural engineering students should have an aptitude in and an appreciation of the following areas of knowledge: basic principles of mathematics; physics and chemistry; manual and computer-aided drafting and design; surveying; construction materials; engineering mechanics; structural analysis and design; building science and building systems integration; and professional practice and ethics.

Architecture students who plan to pursue a Master of Engineering in Architectural Engineering degree should take the following courses:

CAE 208	Thermodynamics	3
or MMAE 320	Thermodynamics	
CAE 302	Fluid Mechanics	3
or CAE 209	Fluid Mechanics and Heat Transfer	
or MMAE 313	Fluid Mechanics	

Students should consult the Master of Engineering in Architectural Engineering curriculum for additional details.

## Required Courses

Code	Title	Credit Hours
<b>Architectural Engineering Requirements</b>		<b>(50)</b>
CAE 100	Introduction to Engineering Drawing and Design	2
CAE 101	Introduction to AutoCAD Drawing and Design	2
CAE 105	Surveying	2
CAE 110	Professional Practice I	1
CAE 111	Professional Practice II	1
CAE 208	Thermodynamics	3
or MMAE 320	Thermodynamics	
CAE 302	Fluid Mechanics	3
or CAE 209	Fluid Mechanics and Heat Transfer	
or MMAE 313	Fluid Mechanics	
CAE 303	Steel Structures I	3
CAE 304	Structural Analysis I	3
CAE 307	Concrete Structures I	3
CAE 315	Materials of Construction	3
CAE 331	Building Science	3
CAE 383	Electrical and Electronic Circuits	3
CAE 461	Plumbing and Fire Protection Design	3
CAE 464	HVAC Systems Design	3

CAE 466 or CAE 323	Building Electrical/Lighting Systems Design <sup>1</sup> Introduction to Geotechnical Engineering	3
CAE 468	Architectural Design	3
CAE 470	Construction Methods and Cost Estimating	3
CAE 471	Construction Planning and Scheduling	3
CAE 496	Fundamentals of Engineering Preparation	0
<b>Capstone Design Requirement</b>		<b>(3)</b>
CAE 495	Capstone Senior Design	3
<b>CAE Technical Electives</b>		<b>(9)</b>
Select nine credit hours <sup>2</sup>		9
<b>Mathematics Requirements</b>		<b>(21)</b>
CAE 312	Engineering Systems Analysis	3
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
<b>Physics Requirements</b>		<b>(8)</b>
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4
<b>Chemistry Requirement</b>		<b>(4)</b>
CHEM 124	Principles of Chemistry I with Laboratory	4
<b>Computer Science Requirement</b>		<b>(2)</b>
CS 104 or CS 105	Introduction to Computer Programming for Engineers Introduction to Computer Programming	2
<b>Engineering Course Requirements</b>		<b>(6)</b>
CAE 286	Theory and Concept of Structural Mechanics	3
CAE 287	Mechanics of Structural Materials	3
<b>Humanities Requirements</b>		<b>(3)</b>
AAH 119 or AAH 120	History of World Architecture I History of World Architecture II	3
<b>Interprofessional Projects (IPRO)</b>		<b>(6)</b>
See Illinois Tech Core Curriculum, section E		6
<b>Humanities and Social Sciences Requirements</b>		<b>(18)</b>
See Illinois Tech Core Curriculum, sections B and C		18
<b>Total Credit Hours</b>		<b>130</b>

<sup>1</sup> Students who intend to take electives in structural engineering should take CAE 323 (CAE 466 can still be taken as a technical elective if desired).

<sup>2</sup> All technical electives must be CAE, EG, or ENVE courses at the 400-level or above. Students are limited to only one EG elective course.

All architectural engineering students are required to register for the Fundamentals of Engineering (FE) examination during their senior year. The examination is offered by the National Council of Examiners for Engineering and Surveying (NCEES) throughout the year.

## Bachelor of Science in Architectural Engineering Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 100	2	CAE 101	2
CAE 110	1	CAE 111	1
CAE 105	2	CS 104 or 105	2
CHEM 124	4	PHYS 123	4
MATH 151	5	MATH 152	5
Humanities 200-level Course	3	Humanities or Social Sciences Elective	3
<b>17</b>		<b>17</b>	
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 208 or MMAE 320	3	CAE 287	3
CAE 286	3	CAE 302, 209, or MMAE 313	3
PHYS 221	4	CAE 312	3
MATH 251	4	MATH 252	4
AAH 119	3	Humanities or Social Sciences Elective	3
<b>17</b>		<b>16</b>	
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 304	3	CAE 303	3
CAE 315	3	CAE 307	3
CAE 331	3	CAE 464	3
CAE 383	3	CAE 466 or 323 <sup>1</sup>	3
I PRO Elective I	3	I PRO Elective II	3
		Humanities or Social Sciences Elective	3
<b>15</b>		<b>18</b>	
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 461	3	CAE 471	3
CAE 468	3	CAE 495	3
CAE 470	3	CAE 496	0
CAEE Technical Elective <sup>2</sup>	3	CAEE Technical Elective <sup>2</sup>	3
Humanities or Social Sciences Elective	3	CAEE Technical Elective <sup>2</sup>	3
		Humanities or Social Sciences Elective	3
<b>15</b>		<b>15</b>	

**Total Credit Hours: 130**

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<sup>2</sup> All technical electives must be CAE, EG, or ENVE courses at the 400-level or above. Students are limited to only one EG elective course.

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## Professional Specializations in Architectural Engineering

Students who select an area of specialization must take a minimum of nine credit hours from the following technical electives listed under the respective area of specialization. Other 400- or 500-level courses may be used towards a specialization with the prior approval of the student's adviser.

### Building SYSTEMS ENGINEERING

Code	Title	Credit Hours
Select a minimum of nine credit hours from the following courses:		
CAE 405	Applications of Computational Fluid Dynamics in Engineering	3
CAE 438	Control of Building Environmental Systems	3
CAE 453	Measurement and Instrumentation in Architectural Engineering	3
CAE 454	Building Commissioning	3
CAE 462	Introduction to Sustainable Building Design	3
CAE 463	Building Enclosure Design	3
CAE 465	Energy Conservation in Buildings	3
CAE 466	Building Electrical/Lighting Systems Design	3
CAE 467	Lighting Systems Design	3

### Construction and Engineering Management

Code	Title	Credit Hours
CAE 472	Construction Site Operation	3
CAE 473	Construction Contract Administration	3
CAE 474	Introduction to Building Information Modeling	3

### Structural Engineering

Code	Title	Credit Hours
Select a minimum of nine credit hours from the following courses:		
CAE 411	Structural Analysis II	3
CAE 431	Steel Structures II	3
CAE 432	Concrete Structures II	3
CAE 436	Design of Masonry and Timber Structures	3