Date Submitted: 01/30/24 10:13 pm

# Viewing: BS-ARCE : Bachelor of Science in Architectural Engineering

Last approved: 03/15/23 4:39 pm

Last edit: 01/30/24 10:13 pm

Changes proposed by: bstephe5

| | |
|---|---|
| Catalog Pages Using this Program | Bachelor of Science in Architectural Engineering |

| | | | | |
|---|---|---|---|---|
| Program Status | Active | | | |
| Requestor | Name | Brent Stephens | E-mail | bstephe5@iit.edu |
| Origination Date | 2024-1-30 ~~2023-2-5~~ | | | |
| Is this an interdisciplinary program? | No | | | |
| Academic Unit | Civil Archl Environ Engrg | | College | Armour College of Engineering |
| Program Title | Bachelor of Science in Architectural Engineering | | | |
| Effective Academic Year | 2024 ~~2023~~ - 2025 ~~2024~~ | | Effective Term | Fall 2024 |
| Academic Level | Undergraduate | | | |

*If all courses in a subject in your department are required, please enter each subject followed by the number ranges in the "Quick Add" field in the pop up box when you click the green plus button below. For example: ARCH 100-499.*

| | |
|---|---|
| What courses will factor the major GPA? | |
| Program Type | Degree |
| Degree Type | Bachelor of Science (BS) |
| CIP Code | 14.0401 - Architectural Engineering. |
| Is there more than one Academic Unit proposer? | No |
| Program Code | BS-ARCE |
| Program Attribute | |
| Total Program Credit Hours | 130 |
| Please provide a summary and rationale for the requested program revision. | Updated elective possibilities, updated structures specialization to allow 3 of 4 courses to give more flexibility, and removed fire protection and life safety specialization since we haven't offered those courses in several years ~~updating a couple course requirements and also the study plan grid to align with current offerings~~ |

## In Workflow

1. CAEE Chair
2. Academic Affairs
3. Undergraduate Academic Affairs
4. AC Dean
5. Undergraduate Studies Committee Chair
6. Faculty Council Chair
7. Academic Affairs

## Approval Path

1. 01/30/24 10:25 pm Brent Stephens (bstephe5): Approved for CAEE Chair
2. 01/31/24 11:41 am Ayesha Qamer (aqamer): Approved for Academic Affairs
3. 01/31/24 4:02 pm Joseph Gorzkowski (jgorzkow): Approved for Undergraduate Academic Affairs
4. 01/31/24 4:16 pm Kevin Cassel (cassel): Approved for AC Dean

## History

1. Oct 18, 2017 by clmig-jwehrheim
2. Oct 18, 2017 by clmig-jwehrheim
3. Oct 18, 2017 by clmig-jwehrheim
4. Nov 3, 2017 by Sarah Pariseau (sparisea)
5. Apr 27, 2018 by Sarah Pariseau (sparisea)
6. Mar 16, 2021 by Brent Stephens (bstephe5)
7. Mar 15, 2023 by Brent Stephens (bstephe5)

## Program Narrative and Justification

Narrative description of how the institution determined the need for the program. For example, describe what need this program will address and how the institution became aware of that need. If the program is replacing a current program(s), identify the current program(s) that is being replaced by the new program(s) and provide details describing the benefits of the new program(s). If the program will be offered in connection with, or in response to, an initative by a governmental entity, provide details of that initiative.

Narrative description of how the program was designed to meet local market needs, or for an online program, regional or national market needs. For example, indicate if Bureau of Labor Statistics data or State labor data systems information was used, and/or if State, regional, or local workforce agencies were consulted. Include how the course content, program length, academic level, admission requirements, and prerequisites were decided; including information received from potential employers about course content; and information regarding the target students and employers.

Narrative description of any wage analysis the institution may have performed, including any consideration of Bureau of Labor Statistics wage data related to the new program.

Narrative description of how the program was reviewed or approved by, or developed in conjunction with, one or more of the following: a) business advisory committees; b) program integrity boards; c) public or private oversight or regulatory agencies (not including the state licensing/authorization agency and accrediting agency); and d) businesses that would likely employ graduates of the program. For example, describe the steps taken to develop the program, identify when and with whom discussions were held, provide relevant details of any proposals or correspondence generated, and/or describe any process used to evaluate the program.

### Admission Entry Details

What are the enrollment estimates?

| Year 1 | Year 2 | Year 3 |
|---|---|---|

Attach Additional Program Justification Document(s)

## Academic Information

### Advising

Since quality advising is a key component of good retention, graduation, and career placement, how will students be mentored? What student professional organizations will be formed? How will the department work with the Career Services office to develop industry connections?

### Program Resources

Which program resources are necessary to offer this program?

### Proposed Bulletin Entry

Admission Requirements

Course Requirements

# Required Courses

| | |
|---|---|
| Architectural Engineering Requirements | (50) |

| | | |
|---|---|---|
| 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 | Building Electrical/Lighting Systems Design [1] | 3 |
| or CAE 323 | Introduction to Geotechnical Engineering | |
| 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 |
| **Capstone Design Requirement** | | **(3)** |
| CAE 495 | Capstone Senior Design | 3 |
| **CAE Technical Electives** | | **(9)** |
| Select nine credit hours [2] | | 9 |
| **Mathematics Requirements** | | **(21)** |
| 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 |
| **Physics Requirements** | | **(8)** |
| PHYS 123 | General Physics I: Mechanics | 4 |
| PHYS 221 | General Physics II: Electricity and Magnetism | 4 |
| **Chemistry Requirement** | | **(4)** |
| CHEM 124 | Principles of Chemistry I with Laboratory | 4 |
| **Computer Science Requirement** | | **(2)** |
| CS 104 | Introduction to Computer Programming for Engineers | 2 |
| or CS 105 | Introduction to Computer Programming | |
| **Engineering Course Requirements** | | **(6)** |
| CAE 286 | Theory and Concept of Structural Mechanics | 3 |

| | | |
|---|---|---|
| CAE 287 | Mechanics of Structural Materials | 3 |
| **Humanities Requirements** | | **(3)** |
| AAH 119 | History of World Architecture I | 3 |
| or AAH 120 | History of World Architecture II | |
| **Interprofessional Projects (IPRO)** | | **(6)** |
| See Illinois Tech Core Curriculum, section E | | 6 |
| **Humanities and Social Sciences Requirements** | | **(18)** |
| See Illinois Tech Core Curriculum, sections B and C | | 18 |
| Total Credit Hours | | 130 |

[1] 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).

[2] 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.

Sample Curriculum/Program Requirements

# 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 |
| | 17 | | 17 |
| **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 |
| | 17 | | 16 |
| **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[1] | 3 |
| IPRO Elective I | 3 | IPRO Elective II | 3 |
| | | Humanities or Social Sciences Elective | 3 |
| | 15 | | 18 |
| **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[2] | 3 | CAEE Technical Elective[2] | 3 |
| Humanities or Social Sciences Elective | 3 | CAEE Technical Elective[2] | 3 |
| | | Humanities or Social Sciences Elective | 3 |
| | 15 | | 15 |

Total Credit Hours: 130

[1]

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).
2
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.
This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).
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.

Specialization Requirements

# 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

| | | |
|---|---|---|
| Select a minimum of nine credit hours from the following courses: | | 9 |
| 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 ~~Fire Protection and Life Safety~~

| | | |
|---|---|---|
| ~~CAE 422~~ | ~~Sprinklers, Standpipes, Fire Pumps, Special Suppression, and Detection Systems~~ | ~~3~~ |
| ~~CAE 424~~ | ~~Introduction to Fire Dynamics~~ | ~~3~~ |
| ~~CAE 425~~ | ~~Fire Protection and Life Safety in Building Design~~ | ~~3~~ |
| CAE 472 | Construction Site Operation | 3 |
| CAE 473 | Construction Contract Administration | 3 |
| CAE 474 | Introduction to Building Information Modeling | 3 |

## Structural Engineering

| | | |
|---|---|---|
| Select a minimum of nine credit hours from the following courses: | | 9 |
| 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 |

### Program Outcomes and Assessment Process

What are the learning goals for this program?

In what semesters will the data be collected to assess this learning goal, and by whom?

Provide the name of the rubric that will be used to assess the extent to which students are achieving this learning goal.

How often and by whom will the data be analyzed? What benchmarks or targets will be used to interpret your results?

Briefly describe the process that will be used to share the results with faculty and use these to motivate program improvement.

Attach Additional Assessment Document(s)

## Undergraduate Program Requirements

What courses will factor the major GPA?

### Undergraduate Degree Requirements

| | |
|---|---|
| Minimum credit hours | 130 |
| Specialization required? | Optional |
| Notes about specialization requirement | |
| Minor required? | No |

### Proposed General Curriculum

| | |
|---|---|
| Degree credit hours required | 130 |
| Specialization credit hour requirement | 9 |

List Major Course Requirements

List Mathematics Requirements

List Science Requirements

List Computer Science Requirements

List Humanities and Social Sciences Requirements

List Interprofessional Project (IPRO) Requirements

List Technical Elective Course Options

List Free Elective Credit Hours (if applicable)

Semester-by-semester plan of study for the degree program

## Specialization

Report to Faculty Council

Reviewer Comments

Key: 8