# Computer Engineering 445005BS with Co-Op

The following information has official approval of the **College of Engineering**, but is intended only as a supplemental guide. Official degree requirements are established at the time of admission to the degree-granting college. The transfer process is completed through an appointment with your academic adviser**.**

*Italicized* courses fulfill General Education requirements. Unless a course is specified, refer to the General Education guide at http://www.uakron.edu/advising/docs/General_Education_Guide.pdf

| **1st Year** | **Fall Semester** | Credit Hours | Prerequisites |
|---|---|---|---|
| 3150:151 | *Principles of Chemistry I (Lecture and Recitation)(Natural Science Requirement)* | 3 | Placement into 3450:149 (Precalculus) or higher |
| 3150:152 | *Principles of Chemistry I Lab (Natural Science Requirement)* | 1 | 3150:151 corequisite |
| 3450:221 | *Analytic Geometry-Calculus I (Mathematics Requirement)* | 4 | Placement Test or 3450:149 (Precalculus) |
| 4450:101 | Tools for Computer Engineering (Lect and Lab) | 3 | 3450:149 (Precalculus) or higher, corequisite |
| | *Physical Education Requirement* | 1 | |
| | *English Composition I Requirement* | 3 | Appropriate placement by advisor |
| **Total** | | **15** | |

| **1st Year** | **Spring Semester** | | |
|---|---|---|---|
| 3450:208 | Discrete Math | 4 | 3450:145 (College Algebra) or 3450:149 (Precalculus ) with C- or better |
| 3650:291 | *Elementary Classical Physics I (Lecture and Lab) (Natural Science Requirement)* | 4 | 3450:221 |
| 3450:222 | Analytic Geometry-Calculus II | 4 | 3450:221 with C- or better |
| 4450:220 | Digital Logic Design (Lecture and Lab) | 4 | 4400:101 or 4450:101 |
| | *English Composition II Requirement* | 3 | 3300:111 or equivalent |
| **Total** | | **19** | |

| **1st Year** | **Summer Semester** | | |
|---|---|---|---|
| | Optional Internship | | |

| **2nd Year** | **Fall Semester** | | |
|---|---|---|---|
| 3450:223 | Analytic Geometry-Calculus III | 4 | 3450:222 with C- or better |
| 3650:292 | Elementary Classical Physics II (Lab) | 4 | 3650:291 |
| 4400:230 | Circuits I Lab | 1 | 4400:231 corequisite |
| 4400:231 | Circuits I | 3 | 4400:230, 3450:223, 3650:292 corequisites |
| 3460:209 | Computer Science I | 4 | 3450:145 (College Algebra) or 3450:149 (Precalculus), or 3450:208 or 3450:215 (Concepts of Calculus), or 3450:221 or 3450:222 with a C- or better |
| | *Speech/Oral Communication Requirement* | 3 | |
| **Total** | | **19** | |

| **2nd Year** | **Spring Semester** | | |
|---|---|---|---|
| 3460:210 | Computer Science II (Lecture and Lab) | 4 | 3450:208 and 3460:209 with a C- or better |
| 4450:320 | Computer Systems | 3 | 3460:209 or 4450:208(Programming for Engineers), 4450:220 (Digital Logic Design) or 3450:208 |
| 3450:335 | Introduction to Ordinary Differential Equations | 3 | 3450:223 with C- or better |
| 4400:330 | Circuits II Lab | 1 | 4400:332 corequisite |
| 4400:332 | Circuits II | 3 | 4400:231 prerequisite<br>4400:330, 3450:335 corequisites |
| 3400:210 | *Humanities in the Western Tradition* | | 32 credit hours and 3300:112 equivalent |

| | | | |
|---|---|---|---|
| **or**<br>3400:211 | ***-OR-***<br>*Humanities in the World since 1300* | 4 | 32 credit hours and 3300:112 equivalent |
| **Total** | | **18** | |

| **2nd Year** | **Summer Semester** | | |
|---|---|---|---|
| | Optional Co-Op | | |

| **3rd Year** | **Fall Semester** | | |
|---|---|---|---|
| 4400:340 | Signals & Systems | 4 | 4400:332, 4450:208, 3460:209, 3450:335 |
| 4450:325 | Operating Systems Concepts | 3 | 4450:320 and 3460:210 |
| 4400:360 | Physical Electronics | 3 | 4450:220, 4400:332 |
| 4450:422 | Embedded Systems Interfacing (Lect and Lab) | 3 | 4450:208 or 3460:209 prerequisites<br>4400:360 corequisite |
| | *Social Science Requirement* | 3-4 | |
| **Total** | | **16-17** | |

| **3rd Year** | **Spring Semester** | | |
|---|---|---|---|
| | Co-Op Assignment I | | |

| **3rd Year** | **Summer Semester** | | |
|---|---|---|---|
| 3470:401 | Probability and Statistics for Engineering | 2 | 3450:222 |
| | *Area Studies/Cultural Diversity Requirement* | 2-3 | |
| | *Social Science Requirement* | 3 | |
| **Total** | | **7-8** | |

| **4th Year** | **Fall Semester** | | |
|---|---|---|---|
| | Co-Op Assignment II | | |

| **4th Year** | **Spring Semester** | | |
|---|---|---|---|
| 4450:309 | Design Project Seminar | 1 | 64 credits and permission |
| 4450:367 | VLSI Design | 3 | 4400:360 |
| 4450:420 | Computer System Design | 3 | 4450:320 |
| 4450:427 | Computer Networks | 3 | 4450:320, and 4450:325 or 3460:426 |
| 4450:440 | Digital Signal Processing | 3 | 4400:340 |
| **Total** | | **13** | |

| **4th Year** | **Summer Semester** | | |
|---|---|---|---|
| | Co-Op Assignment III | | |

| **5th Year** | **Fall Semester** | | |
|---|---|---|---|
| 4450:401 | Senior Design Project I | 2 | 96 credits, 4450:309. Completion of 4450:367, 4450:420, 4450:427 and 4450:440 with a combined average grade of 2.0 or higher |
| | Computer Engineering Electives (Note a) | 3 | |
| | Computer Engineering Electives (Note a) | 3 | |
| | Computer Engineering Electives (Note a) | 3 | |
| | *Humanities Elective Requirement* | 3 | |
| **Total** | | **14** | |

| **5th Year** | **Spring Semester** | | |
|---|---|---|---|
| 4450:402 | Senior Design Project II | 3 | 4450:401 |
| | Computer Engineering Electives (Note a) | 3 | |
| | Computer Engineering Electives (Note a) | 3 | |
| | Computer Engineering Electives (Note a) | 3 | |
| | *Humanities Elective Requirement* | 3 | |
| **Total** | | **15** | |

| | | | |
|---|---|---|---|
| | **Minimum Total Credits for Degree** | **137** | |

**ALERT: 1) By the end of your first 48 credit hours attempted, you should have completed your General Education English, Math, and Oral Communication (Speech) requirements; 2) By the end of your first 48 credit hours attempted, you should have declared a major and transferred to (been accepted by) a degree granting college at The University of Akron.**

**NOTES:**

a. The BS in Computer Engineering requires 18 credits of technical elective. The elective courses must be chosen so as to meet:
   1. Breadth requirement: The electives must include at least three credits each from three of the following four computer engineering areas of specialization.
   2. Depth requirement: The electives must include at least six credits from a single area of specialization.

**Computer Engineering Areas of Specialization**

**Analog and Digital Hardware (AD)**
Fa 4450:462 Analog IC Design Fa
4450:465 Programmable Logic
Fa 4450:467 VLSI Circuits & Systems
Sp 4400:361 Electronic Design

**Communications and Sig. Proc. (CM)**
Fa 4400:441 Digital Communication
Sp 4400:341 Intro to Comm. Systems
Sp 4400:445 Wireless Communication
Sp 4400:451 Electromagnetic Compatibility

**Numerical Computation (NC)**
Fa 3450:427 Applied Numerical Methods I
Fa 4450:410 Embedded Sci. Computing
Sp 3450:428 Applied Numerical Methods II
Sp 4450:415 System Simulation

**Software and Algorithms (SW)**
3460:316 Data Structures
3460:453 Computer Security
3460:457 Computer Graphics
3460:460 AI and Heuristic Programming
3460:477 Intro. Parallel Processing

**Remaining electives may be any courses listed in the areas of specialization or included in the following list:**

**Computer Engineering Open Electives**
Fa 4400:353 Electromagnetics I
Fa 4400:381 Energy Conversion
Fa 4400:453 Antenna Theory
Fa 4400:472 Control Systems II
Fa 4400:481 Modern Power Systems
Fa 4400:483 Power Electronics I
Fa 4400:489 Electric and Hybrid Vehicles
4400:498 Special Topics in EE
4450:498 Special Topics in CpE
Su 4400:469 Intro to Sensors and Actuators
Sp 4400:354 Electromagnetics II
Sp 4400:371 Control Systems I
Sp 4400:434 Active Circuits
Sp 4400:448 Optical Comm. Networks
Sp 4400:461 Optical Elect & Photonic Dev.
Sp 4400:485 Electric Motor Drives
4450:301 Undergrad. Research I CpE
4450:302 Undergrad. Research II CpE
4450:303 Undergrad. Research III CpE

**Of the 18 total credits of technical elective chosen from the above boxes, at least nine credits must be from the ECE department. All course prerequisites must be met.**

**Faculty Advisor:** Dr. Abbas Omar, e-mail aomar@uakron.edu 330-972-7483, ASEC Room 157

**IN GENERAL:** Computer engineering applies computer technology along with traditional engineering science to address systems in which computing is an essential function. Such systems include the smart device or instrument, the flexible manufacturing system, and communication systems that characterize the information age. Computer engineering covers a demanding range of science and technology, combining software with hardware, and the discrete with the continuous.

3300:112 English Composition II is preferred, however 2020:222 Technical Report Writing will be accepted.

**SALARY LEVEL:** Starting salary offers for new graduates range from $44,000 to $67,000 per year. The average is $56,000.

**COOPERATIVE EDUCATION:** Students can choose between a five-year program, which includes up to four semesters of co-op experience, or a four-year program without co-op experience. The Co-op Program provides an opportunity to gain real-world, relevant experience while working toward a bachelor's degree. Students who participate in the Co-op Program earn money to help fund their education, graduate with 12 or more months of career-related experience, and often receive a higher starting salary after graduation. More information about the Co-op Program can be found at engineering.uakron.edu/coop.

**TRANSFER TO COLLEGE OF ENGINEERING:** To be admitted to the college, the student must:

- Complete at least 30 semester hours of coursework post high school
- Complete Calculus 2 with a C- or higher
- Have a 2.3 grade point average in at least three of the following categories:
    - in all coursework
    - in all engineering coursework
    - in all required mathematics coursework
    - in all required science coursework (chemistry, physics, computer science, biology)

Admission of students who do not meet the above requirements will be considered by the dean or representative only if the request originates by an Engineering department head or representative.

Students can arrange inter-college transfers through an appointment with their academic advisor; advisor contact information is listed in "My Akron."

**WOMEN AND MINORITY ENGINEERS:** Eligible students are invited to register into the applicable engineering course elective. There are two options; 4100:110, Women in Engineering Seminar & Peer Group (Contact: Heidi Cressman, 330-972-7701, or hec9@uakron.edu). This course provides beginning women students an overview of the career opportunities for women in engineering. The course introduces relevant topics in engineering, an overview of career opportunities, student led discussion groups and an opportunity to meet with professionals in various engineering disciplines. The other option is 4100:120, Minority Engineering Seminar and Peer Groups (Contact: Julie Zhao, 330-972-2823, or zhao1@uakron.edu). This course provides an overview of disciplines and opportunities in engineering. It also reinforces educational/ career choices and provides role models of successful minority engineers.

**PLACEMENT:** The Engineering Co-op and Placement Office, ASEC 203, Akron, Ohio 44325 assists all graduates with full-time placement.

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