

COMPUTER ENGINEERING, CO-OP OPTION, BS

Bachelor of Science in Computer Engineering with Co-op (445005BS)

This option of the undergraduate program in Computer Engineering includes a cooperative education component.

The following information has official approval of the **Department of Electrical and Computer Engineering** and **The College of Engineering and Polymer Science**, but is intended only as a supplemental guide. Official degree requirements are established at the time of transfer and admission to the degree-granting college. Students should refer to the Degree Progress Report (DPR) which is definitive for graduation requirements. *Completion of this degree within the identified time frame below is contingent upon many factors, including but not limited to: class availability, total number of required credits, work schedule, finances, family, course drops/withdrawals, successfully passing courses, prerequisites, among others.* The transfer process is completed through an appointment with your academic advisor.

Requirements Summary

Code	Title	Hours
	General Education Requirements (https://bulletin.uakron.edu/undergraduate/general-education/)*	28
	Science	12
	Mathematics and Statistics	21
	Computer Science	8
	Electrical Engineering	15
	Computer Engineering	28
	Capstone Design Project	7
	Computer Engineering Electives	18
	Total Hours	137

* Several courses required for the major also satisfy General Education requirements. The University minimum of 34 credits are required for General Education and credit for these courses will apply to both.

General Education Courses

Code	Title	Hours
Students pursuing a bachelor's degree must complete three tiers of General Education coursework. Tiers I and II provide students with foundational skills and breadth of disciplinary knowledge. Tier III courses require students to integrate knowledge, understand diverse perspectives, and think critically about complex issues. Courses tagged for Tier III may also fulfill major or Disciplinary Area requirements.		
Tier I: Academic Foundations		12
	<i>Quantitative Reasoning: 3 credit hours</i>	
	<i>Speaking: 3 credit hours</i>	
	<i>Writing: 6 credit hours</i>	
Tier II: Disciplinary Areas		22
	<i>Arts/Humanities: 9 credit hours</i>	

Natural Sciences: 7 credit hours

Social Sciences: 6 credit hours

Tier III: Tagged Courses

Select one class from each of the following subcategories:

Complex Systems

Critical Thinking

Domestic Diversity

Global Diversity

Review the General Education Requirements page for detailed course listings.

Total Hours 34

Science

Code	Title	Hours
3150:151	Principles of Chemistry I	3
3150:152	Principles of Chemistry I Laboratory	1
3650:291	Elementary Classical Physics I	4
3650:292	Elementary Classical Physics II	4
	Total Hours	12

Mathematics and Statistics

Code	Title	Hours
3450:208	Introduction to Discrete Mathematics	4
3450:221	Analytic Geometry-Calculus I	4
3450:222	Analytic Geometry-Calculus II	4
3450:223	Analytic Geometry-Calculus III	4
3450:335	Introduction to Ordinary Differential Equations	3
3470:401	Probability and Statistics for Engineers	2
	Total Hours	21

Computer Science

Code	Title	Hours
3460:209	Computer Science I	4
3460:210	Computer Science II	4
	Total Hours	8

Electrical Engineering

Code	Title	Hours
4400:230	Circuits I Laboratory	1
4400:231	Circuits I	3
4400:330	Circuits II Laboratory	1
4400:332	Circuits II	3
4400:340	Signals & Systems	4
4400:360	Physical Electronics	3
	Total Hours	15

Computer Engineering

Code	Title	Hours
4450:101	Tools for Computer Engineering	3
4450:220	Digital Logic Design	4
4450:320	Computer Systems	3

4450:325	Operating Systems Concepts	3
or 3460:426	Operating Systems	
4450:367	VLSI Design	3
4450:420	Computer Systems Design	3
4450:422	Embedded Systems Interfacing	3
4450:427	Computer Networks	3
4450:440	Digital Signal Processing	3
Total Hours		28

Capstone Design Project

Code	Title	Hours
4450:309	Design Project Seminar - Computer Engineering	1
4450:401	Senior Design Project I - Computer Engineering	3
4450:402	Senior Design Project II - Computer Engineering	3
Total Hours		7

Computer Engineering Electives

Code	Title	Hours
Select 18 credits from the following list, according to departmental Breadth and Depth requirements, and with at least 9 credits from the 4400 or 4450 subject areas:		18

4450:301	Undergraduate Research I: Computer Engineering	
4450:302	Undergraduate Research II: Computer Engineering	
4450:303	Undergraduate Research III: Computer Engineering	
4450:410	Embedded Scientific Computing	
4450:415	System Simulation	
4450:462	Analog Integrated Circuit Design	
4450:465	Programmable Logic	
4450:467	VLSI Circuits & Systems	
4450:498	Special Topics: Computer Engineering	
4400:341	Introduction to Communication Systems	
4400:353	Electromagnetics I	
4400:354	Electromagnetics II	
4400:361	Electronic Design	
4400:371	Control Systems I	
4400:381	Energy Conversion	
4400:434	Active Circuits	
4400:441	Digital Communication	
4400:445	Wireless Communications	
4400:447	Random Signals	
4400:448	Optical Communication Networks	
4400:451	Electromagnetic Compatibility	
4400:453	Antenna Theory	
4400:455	Microwaves	
4400:461	Optical Electronics & Photonic Devices	
4400:469	Introduction to Sensors and Actuators	
4400:472	Control Systems II	
4400:481	Modern Power Systems	
4400:483	Power Electronics I	
4400:485	Electric Motor Drives	
4400:486	Dynamics of Electric Machines	
4400:487	Electromagnetic Design of Electric Machines	

4400:488	Control of Machines	
4400:489	Electric and Hybrid Vehicles	
3450:427	Applied Numerical Methods I	
3450:428	Applied Numerical Methods II	
3460:316	Data Structures	
3460:421	Software Design	
3460:435	Algorithms	
3460:440	Compiler Design	
3460:453	Computer Security	
3460:457	Computer Graphics	
3460:460	Artificial Intelligence & Heuristic Programming	
3460:475	Database Management	
3460:477	Introduction to Parallel Processing	
Total Hours		18

Recommended Sequence

1st Year

Fall Semester	Hours	
3150:151	Principles of Chemistry I ¹	3
3150:152	Principles of Chemistry I Laboratory	1
3300:111	English Composition I ^{1,2}	3
3450:221	Analytic Geometry-Calculus I ¹	4
4450:101	Tools for Computer Engineering	3
Hours		14

Spring Semester

3300:112	English Composition II ^{1,5}	3
3450:208	Introduction to Discrete Mathematics	4
3450:222	Analytic Geometry-Calculus II ¹	4
3650:291	Elementary Classical Physics I ¹	4
4450:220	Digital Logic Design	4
Hours		19

2nd Year

Fall Semester

3450:223	Analytic Geometry-Calculus III ¹	4
3460:209	Computer Science I	4
3650:292	Elementary Classical Physics II ¹	4
4400:230	Circuits I Laboratory	1
4400:231	Circuits I	3
General Education or Honors Distribution ⁴		3
Hours		19

Spring Semester

3450:335	Introduction to Ordinary Differential Equations	3
3460:210	Computer Science II	4
4400:330	Circuits II Laboratory	1
4400:332	Circuits II	3
4450:320	Computer Systems	3
General Education or Honors Distribution ⁴		3
Hours		17

Summer Semester

4100:300	Cooperative Education Work Period (Possible)	0
Hours		0

3rd Year**Fall Semester**

4400:340	Signals & Systems	4
4400:360	Physical Electronics	3
4450:325 or 3460:426	Operating Systems Concepts or Operating Systems	3
4450:422	Embedded Systems Interfacing	3
	General Education or Honors Distribution ⁴	3
4450:301	Undergraduate Research I: Computer Engineering (Optional)	
Hours		16

Spring Semester

4100:301	Cooperative Education Work Period	0
Hours		0

Summer Semester

3470:401	Probability and Statistics for Engineers	2
	General Education or Honors Distribution ⁴	3
4450:302	Undergraduate Research II: Computer Engineering (Optional)	
Hours		5

4th Year**Fall Semester**

4100:302	Cooperative Education Work Period	0
Hours		0

Spring Semester

4450:309	Design Project Seminar - Computer Engineering	1
4450:367	VLSI Design	3
4450:420	Computer Systems Design	3
4450:427	Computer Networks	3
4450:440	Digital Signal Processing	3
4450:303	Undergraduate Research III: Computer Engineering (Optional)	
Hours		13

Summer Semester

4100:403	Cooperative Education Work Period	0
Hours		0

5th Year**Fall Semester**

4450:401	Senior Design Project I - Computer Engineering	3
	Computer Engineering Elective	3
	Computer Engineering Elective	3
	Computer Engineering Elective	3
	General Education or Honors Distribution ⁴	3
Hours		15

Spring Semester

4450:402	Senior Design Project II - Computer Engineering	3
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Computer Engineering Elective	3
Computer Engineering Elective	3
Computer Engineering Elective	3
General Education or Honors Distribution ⁴	3
General Electives	4
Hours	19
Total Hours	137

¹ Honors sections may be available; check the schedule of classes.

² The Electrical and Computer Engineering Department recommends that English Composition I be used to satisfy writing course requirement but other choices are available. See the General Education Program for details.

³ Check General Education Program or Honors Distribution to find courses that satisfy the second writing course requirement.

⁴ Credit hours shown for General Education or Honors Distribution are general guidelines only. These courses should be chosen in accordance with the appropriate General Education curriculum guide (for non-honors students) or Honors Distribution (for honors students). Honors students must also ensure that their course selections meet additional requirements not shown on this curriculum guide.

⁵ While 3300:112 English Composition II is preferred, 2020:222 Technical Report Writing is accepted to fulfill the English composition elective.

Notes:

- Up to three credits of undergraduate research in Computer Engineering may be applied to program requirements as Computer Engineering Electives. Students may take at most one credit of undergraduate research in a semester.
- See Electrical and Computer Engineering Departmental Office for Approved Computer Engineering Electives (including Breadth and Depth requirements)