THE OHIO STATE UNIVERSITY

College of Engineering

Undergraduate Education & Student Services

122 Hitchcock Hall
2070 Neil Avenue
Columbus, OH 43210-1278

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engineering.osu.edu

Memo

To: Randy Smith, Vice Provost for Academic Programs
From: Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment
Date: Feb 14, 2024
Re: Informational Item - Program Change to the Computer Science and Engineering UG Program

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On February 12, 2024, the College of Engineering Committee for Academic Affairs reviewed and approved the proposal to revise the Computer Science and Engineering undergraduate curriculum.

- Replace the requirement for ECE 2020 with ECE 2360 effective Autumn of 2024

The rationale for this change is detailed in the attached proposal.

Thank you,

Rosie Quinzon-Bonello

THE OHIO STATE UNIVERSITY

College of Engineering

Jeremy Morris
Assistant Professor of Practice
Dept. of Computer Science & Engineering

395 Dreese Labs
2015 Neil Avenue
Columbus, OH 43210-1277

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morris.343@osu.edu

January 31, 2024

To: Boyd Panton, CCAA Chair

Re: Change to CSE Program

We are requesting the following change to the CSE program, effective Summer 2024:
Replace ECE 2020 with ECE 2360

The CSE faculty unanimously approved this change on 1/30/2024.

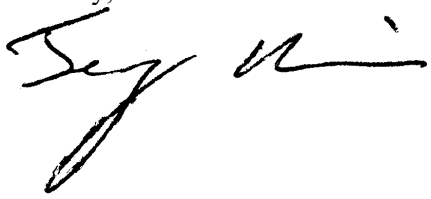
Currently students in our CSE program are required to take ECE 2020. During our recent ABET accreditation review our program was found to have a shortcoming in our students' ability to analyze complex electronics and electronic devices. For a few years ECE has been piloting a new course to replace ECE 2020 for our CSE majors – ECE 2360. Our evaluator expressed an opinion during our evaluation that this course would be more suitable for this curricular requirement for our students than ECE 2020 is. To deal with this shortcoming we would like to replace the requirement for ECE 2020 with ECE 2360 effective Autumn of 2024.

Both courses are 3 credit hours, so this program change is credit hour neutral.

I have included both the new and current curriculum sheets for our CSE program with changes highlighted.

If you have any further questions, please contact me at morris.343@osu.edu.

Sincerely,



Jeremy Morris
Assistant Professor of Practice
Computer Science & Engineering
CSE Undergraduate Studies Committee Chair

THE OHIO STATE UNIVERSITY

Effective Term: Summer 2024

Bachelor of Science in Computer Science and Engineering
Computer Science and Engineering

Students in this major will complete a minimum of 126 credit hours as outlined below.

General Education Requirements		
Requirement	**Course Options**	**Hours**
GE Launch Seminar	GENED 1201	1
Foundations: Writing and Information Literacy	***Student Choice***	3
Foundations: Mathematical & Quantitative Reasoning/Data Analysis	***Math 1151***	Overlap w/ College requirement
Foundations: Literary, Visual and Performing Arts	***Student Choice***	3
Foundations: Historical & Cultural Studies	***Student Choice***	3
Foundations: Natural Science	***Physics 1250***	Overlap w/ College requirement
Foundations: Social & Behavioral Sciences	***Student Choice***	3
Foundations: Race, Ethnic and Gender Diversity	***Student Choice***	3
Theme: **Citizenship for a Diverse & Just World**	***Student Choice***	4
Theme: **Student Choice**	***Student Choice***	4
GE Reflection	Program required capstone	Embedded into Major Core Capstone
	General Education Credit Hours:	**24**

College/Degree Requirements		
Requirement	**Course Options**	**Hours**
Math 1151, 1172, (Math & Quantitative Reasoning / Data Analysis)		10
Physics 1250 (Nat Sci)		5
ENGR 1181.0x, 1182.0x		4
ENGR 1100.01		1
	Credit Hours:	**20**

General Education Requirements	**24**
College/Degree Requirements	**20**
Major Core	**42-45**
Required Non-Major Courses	**23**
Technical/Directed/Targeted Electives; Career Courses	**17**
Minimum Total Credit Hours	**126**

Course	Title	Hours
Major Core		
CSE 2221 and 2231	Software 1 and 2	8 (4+4)
CSE 2321 and 2331	Foundations 1 and 2	6 (3+3)
CSE 2421 and 2431	Systems 1 and 2	7 (3+4)
CSE 3341	Principles of Programming Languages	3
CSE 2501 or PHILOS 2338	Social, Ethical, and Professional Issues in Computing or Computing Ethics for a Just and Diverse World	1 or 4
CSE 3901 or 3902 or 3903	Project: Design, Development, and Documentation (Web Applications or Interactive Systems or Systems Software)	4
CSE 3231 or 3241	Introduction to Software Engineering or Introduction to Databases	3
CSE 3421 or 3461	Computer Architecture or Introduction to Networking	3
CSE 3521 or 3541	Introduction to Artificial Intelligence or Introduction to Computer Graphics	3
CSE 5911 or 5912 or 5913 or 5914 or 5915	Capstone Experience (Software Applications or Game Design and Development or Computer Animation or Knowledge-Based Systems or Information Systems)	4
	Total Major Core	42-45
Required Non-Major Courses		
ECE 2020		3
ECE 2060		3
MATH 2568		3
MATH 3345		3
STAT 3470		3
Science/Math Elective	Choice from list (see Degree Audit for list)	8
	Total Required Non-Major Courses	23
Required Technical / Directed / Targeted Electives; Career Courses		
CSE courses 3000-level or higher*		>= 9
Approved non-CSE courses 2000-level or higher*		<= 8
	Total Required Technical Electives	17
	Total Required Major and Non-Major Credit Hours:	80-83

Degree requirements and course offerings are subject to change. Last updated on: 03/22/2023

Additional information:

*Technical electives:

- At most 2 hours of CSE 4251-4256 may be counted toward technical electives
- At most 2 hours of CSE 4193, 3 hours of CSE 4998, or 6 hours of CSE 4999, with no more than 6 hours total of CSE 4193, 4998, and 4999 combined, may be counted toward technical electives
- Non-CSE technical electives may be satisfied by completing an approved minor or through select courses (see list). Minors or courses not listed may be petitioned. More information is available at https://cse.osu.edu/current-students/undergraduate/majors/bachelors-science-computer-science-engineering-bs-cse

**Application to the major:

- **An application to the major must be submitted online at https://advising.engineering.osu.edu/current-students/applying-your-major during the term in which admission requirements are being completed**

***Graduation application:

- **An application to graduate must be submitted online at https://graduation.engineering.osu.edu no later than the second Friday of the semester prior to the graduation term**

	Autumn		Spring	
Year 1	Engr 1100	1	CSE 2221 (need *C or better*)	4
	Engr 1181	2	Engr 1182	2
	Math 1151	5	Math 1172	5
	Physics 1250	5	GE-Writing	3
	CSE 1223	3	GE Launch Seminar	1
		16		15
Year 2	CSE 2231	4	CSE 2331	3
	CSE 2321	3	CSE 2421	4
	Stat 3470	3	ECE 2060	3
	Math or Science Elective	4	Math 3345	3
	GE-Social & Behavioral	3	GE-Diversity	3
		17		16
Year 3	CSE 2431	3	CSE 32X1	3
	CSE 390X	4	CSE 34X1	3
	ECE 2020	3	CSE 35X1	3
	Math 2568	4	CSE 2501 or PHILOS 2338	1 or 4
	GE-History	3	[GE-Theme if not PHILOS 2338	4]
			Math or Science Elective	4
		17		17-18
Year 4	CSE 3341	3	CSE 591X	4
	Technical Elective	3	Technical Elective	3
	Technical Elective	3	Technical Elective	3
	Technical Elective	3	Technical Elective	2
	GE-Lit/VPA	3	GE-Theme	4
		15		16

THE OHIO STATE UNIVERSITY

Effective Term: Summer 2024

Bachelor of Science in Computer Science and Engineering
Computer Science and Engineering
Individualized Specialization Option

The Individualized Option provides students the opportunity to select a combination of technical electives that may not fit with one of the other options.
Students are expected to consult with an advisor to determine appropriate courses.
Students in this major will complete a minimum of 126 credit hours as outlined below.

General Education Requirements		
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GE Launch Seminar	GENED 1201	1
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Foundations: Social & Behavioral Sciences	***Student Choice***	3
Foundations: Race, Ethnic and Gender Diversity	***Student Choice***	3
Theme**: Citizenship for a Diverse & Just World**	***Student Choice***	4
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CSE 5911 or 5912 or 5913 or 5914 or 5915	Capstone Experience (Software Applications or Game Design and Development or Computer Animation or Knowledge-Based Systems or Information Systems)	4
	Total Major Core	42-45
Required Non-Major Courses		
ECE 2360		3
ECE 2060		3
MATH 2568		3
MATH 3345		3
STAT 3470		3
Science/Math Elective	Choice from list (see Degree Audit for list)	8
	Total Required Non-Major Courses	23
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Year 4	CSE 3341	3	CSE 591X	4
	Technical Elective	3	Technical Elective	3
	Technical Elective	3	Technical Elective	3
	Technical Elective	3	Technical Elective	2
	GE-Lit/VPA	3	GE-Theme	4
		15		16

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Introduction to Analog Systems and Circuits

ECE 2020

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture
Recitation
Lab

Course Description:
Circuit theory and applications of passive components and Op amps. Introduction to analog systems using differential equations and Laplace transforms.

Prerequisites and Co-requisites:
Prereq: Math 1152, 1161.01, 1161.02, 1172, or 1181H; and Physics 1250, 1250H, or 1260, or CHEM 1210 or 1250.

Course Goals / Objectives:
- Master circuit concepts such as voltage, current, charge, resistors, inductors, capacitors, etc.
- Master how to analyze, design and implement circuits using Ohm's Law, Kirchhoff's laws and superposition
- Be competent in Phasor Domain sinusoidal techniques
- Be competent in analyzing, designing and implementing steady state and transient behavior of RC, RL, RLC circuits
- Be competent in Laplace Transform techniques
- Be competent in analyzing, designing and implementing simple active filters based on ideal Op Amps
- Be familiar with how to use modern computer tools for analog simulation
- Be competent in how to use laboratory instruments and laboratory methodology
- Be competent with methodology for critical troubleshooting skills

Course Topics:

- Fundamentals of electric circuits: Charge, Voltage, Kirchhoff's Laws, power and sign conventions, Ohm's law, practical circuit elements
- Circuit Analysis Techniques: Node Voltage / Mesh analysis, superposition, Thevenin and Norton equivalents
- Ideal op amp, feedback, active filters, cascaded active filters
- RC and RL first-order circuits, natural and total response, RC Op amp circuits
- Initial and Final Conditions, Series and Parallel RLC, General solution of second-order circuits
- Laplace transforms, properties, pole – zero diagrams and inverse Laplace transform
- System transfer function – scaling, impulse response, step response, sinusoidal response, s-Domain circuit analysis
- Sinusoidal signals, Phasor domain analysis, impedance transformations
- RC, RL, RLC frequency response vs transient response
- Bode Plots, Passive and Active Filters
- Periodic Waveforms, Average and Complex Power, Maximum power Transfer
- Simulated circuit analysis
- Introduction to Lab Equipment, troubleshooting skills

Designation:

Required
Elective

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Electronics for CSE majors

ECE 2360

Credit Hours:
3.00 - 3.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture
Lab

Course Description:
Electronics course for CSE majors. Basics of circuit analysis and design around embedded systems.

Prerequisites and Co-requisites:
Prereq: Engr 1182.01, 1182.02, 1182.03, 1282.01H, 1282.02H, 1282.03H, or 1282.04H, or 1186 and 1187 and 1188 concurrent; and Math 1152, 1161.01, 1161.02, 1172, or 1181H; and Physics 1250 or 1260; and CPHR 2.00 or above; and enrollment in CSE major.

Course Goals / Objectives:
- Learn basics of analysis and design of modern electronics
- Introduction to electronic circuits lab

Course Topics:

- Course introduction and structure.
- Electronics circuits for ubiquitous computing
- Electronic circuits top-down overview
- Digital, microcontroller, and analog functions in digital circuits
- Lab design and project methods
- Electrical energy via current and voltage; resistor and device abstraction
- Circuit schematic analysis: voltage node method, energy storage and memory preview
- Circuits for digital electronics: inverters, logic, repeaters and amplifiers
- Internet of Things; robot circuits
- Electronics: bottom-up approach
- Linear vs. nonlinear hardware vs algorithms
- Diodes
- MOS transistors inside digital electronics; trillion-component computers
- Physical digital abstractions; bipolar transistors in board design
- Analog energy storage in lumped field: capacitance, inductance, delay, and frequency, LCR abstractions
- I/O interfaces, operational amplifiers

Designation:

Elective