APPROVAL FORM FOR

DEGREE PROGRAMS

MISSISSIPPI STATE UNIVERSITY

NOTE: This form is a cover sheet that must accompany the degree program change proposal. The actual proposal should be prepared in accordance with format requirements provided in the *Guide and Format for Curriculum Proposals* published by the UCCC. Both cover sheet and proposal should be submitted to UCCC Mail Stop 9702 (281 Garner Hall), Phone: 325-9410.

College Bagley College of Engineering **Department:** Electrical & Computer Engineering

Contact Person: Jean Mohammadi-Aragh **Mail Stop:** 9571 **E-mail:** jean@ece.msstate.edu

Nature of Change: Modification **Date Initiated:** 1/15/2025

Current Degree (BS, MS, etc.): BS

Current Major: Computer Engineering

Current Concentration(s): _____

Current Campus(es): ☑ **Starkville** ☐ **Meridian** ☐ **Distance** ☐ **Gulf Coast***

*Gulf Coast campus for Bagley College of Engineering only

New Degree (BS, MS, etc.): _____

Effective Date:

Semester	**Year**
Fall	2025

**Any new program or modification desiring a starting semester other than fall must include a justification

Proposed Major: _____

Proposed Concentration(s): _____

Proposed Campus(es)

☐ Starkville
☐ Meridian
☐ Distance
☐ Gulf Coast*

*Gulf Coast campus for Bagley College of Engineering o

Summary of Proposed Changes:

Add new CSE Systems Programming course to CPE required courses by replacing the requirement for Digital System Design AND Embedded Systems to be Digital System Design OR Embedded Systems

Approved:	Date:
J. Patrick Donohoe — Digitally signed by J. Patrick Donohoe Date: 2025.01.22 15:44:12 -06'00'	01/22/2025
Department Head	
Director of Academic Quality	2/10/2025
Chair, College or School Curriculum Committee	Digitally signed by Dr. T.J. Jankun-Kelly Date: 2025.02.07 16:28:18 -06'00'
Dean of College or School	11 FEB 2025
Chair, University Committee on Courses and Curricula	
Chair, Graduate Council (if applicable)	
Chair, Deans Council	

FOR OIRE USE ONLY

- ☐ Substantive Change to SACSCOC
- ☐ Notification to SACSCOC
- ☐ No significant departure

OIRE Representative Initials _____

PROPOSAL FOR THE MODIFICATION OF THE B.S. IN COMPUTER ENGINEERING

1. CATALOG DESCRIPTION

See table below.

2. CURRICULUM OUTLINE

The changes proposed are as follows:

1. Add one credit hour to ECE 4743 Digital Systems Design to create ECE 4744 Digital Systems Design.
2. Add CSE 3183 Systems Programming to the CPE curriculum in place of ECE 4743
3. Shift the requirement to take both ECE 4724 and ECE 4743 to a choice of taking one of the courses

Table 1. Comparison of Current CPE Degree and Proposed CPE Degree Programs

CURRENT Degree Description	PROPOSED Degree Description
Degree: Bachelor of Science in Computer Engineering Major: Computer Engineering Concentration:	Degree: Bachelor of Science in Computer Engineering Major: Computer Engineering Concentration:
Major Advisor: Ms. Alison Stamps Office: 135 Simrall Engineering Building With the origin of the modern computer dating back to the late 1940's and the growth of computer hardware fueled by the availability of digital integrated circuits starting in the late 1960's, computer engineers have enjoyed a pivotal role in technology that now permeates our entire society. Whether the end product is an integrated circuit, a system of networked embedded computers, or any system that relies on digital hardware or computer software, its development requires the skills of a computer engineer. While computing systems include both hardware and software, it is the optimal combination of these components that is the unique realm of the computer engineer. Today, computer engineers are a driving force in the technological and economic development of the digital age. Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Computer Engineering will: • Be recognized by their peers as fundamentally sound in the application of mathematics, science, computing, and engineering. • Be engaged in the practice of Computer Engineering as innovative problem solvers with a strong work ethic, by identifying and	Major Advisor: Ms. Alison Stamps Office: 135 Simrall Engineering Building With the origin of the modern computer dating back to the late 1940's and the growth of computer hardware fueled by the availability of digital integrated circuits starting in the late 1960's, computer engineers have enjoyed a pivotal role in technology that now permeates our entire society. Whether the end product is an integrated circuit, a system of networked embedded computers, or any system that relies on digital hardware or computer software, its development requires the skills of a computer engineer. While computing systems include both hardware and software, it is the optimal combination of these components that is the unique realm of the computer engineer. Today, computer engineers are a driving force in the technological and economic development of the digital age. Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Computer Engineering. Within a few years of graduation, program graduates completing the baccalaureate degree in Computer Engineering will: • Be recognized by their peers as fundamentally sound in the application of mathematics, science, computing, and engineering. • Be engaged in the practice of Computer Engineering as innovative problem solvers with a strong work ethic, by identifying and implementing solutions using the proper tools, practical approaches, and flexible thinking.

implementing solutions using the proper tools, practical approaches, and flexible thinking.

- Be productive and demonstrate leadership in the practice of Computer Engineering, both individually and within multidisciplinary teams, using effective oral and written communication skills when working with peers, supervisors, and the public.
- Be responsible in the practice of Computer Engineering, relying on sound engineering ethics, a commitment to lifelong learning and a genuine concern for society and the environment.

The curriculum requirements for computer engineering are built around a substantial engineering core curriculum and required courses in electrical engineering and computer science. The requirements in mathematics, the basic sciences, and engineering sciences provide the breadth of exposure required for all engineering disciplines. Basic electrical engineering requirements include circuit theory, electronics and digital devices which are supplemented by upper-level courses in computer architecture, and computer aided design of digital systems. Basic computer science courses include a coordinated sequence providing fundamental knowledge in data structures, algorithms, object oriented programming, software engineering, real-time application and software development tools. These courses are developed across multiple platforms and are based on the Python language. Upper-level courses in data communications and computer networks, algorithms and operating systems are also provided. Students wishing to gain depth of coverage in communications, parallel computing, VLSI, embedded systems or signal processing can achieve this with the availability of technical electives selected from an approved list or in consultation with a faculty advisor. Required courses in communications skills, social sciences and humanities provide studies in non-technical areas that are traditional in a broad-based education. A capstone senior design course requires students to apply newfound knowledge and explore entrepreneurship. Students research and identify a problem and work in teams applying a combination of hardware and software to develop a solution. Critical and final design reviews enable students to develop their professional presentation skills.

Students expecting to graduate from Mississippi State University with a bachelor of science degree in computer engineering, in addition to satisfactorily completing the CPE curriculum requirements, must meet the following minimum GPA requirements for graduation:

- make an overall C average on all hours scheduled and rescheduled at all institutions

- Be productive and demonstrate leadership in the practice of Computer Engineering, both individually and within multidisciplinary teams, using effective oral and written communication skills when working with peers, supervisors, and the public.
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Students expecting to graduate from Mississippi State University with a bachelor of science degree in computer engineering, in addition to satisfactorily completing the CPE curriculum requirements, must meet the following minimum GPA requirements for graduation:

- make an overall C average on all hours scheduled and rescheduled at all institutions attended, including MSU (2.00 or better cumulative GPA)

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- make a C average on all hours scheduled and rescheduled at MSU (2.00 or better MSU GPA)
- earn at least a 2.00 cumulative grade point average on all courses scheduled and rescheduled (average on all attempts) at MSU that are applied toward meeting degree requirements
- earn at least a 2.5/4.0 average on all hours with ECE or CSE course prefixes at all institutions attended, including MSU, that are applied toward meeting degree requirements

The B. S. program in Computer Engineering is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the commission's General Criteria and Program Criteria for Electrical, Computer, Communications, Telecommunication(s), and similarly named engineering programs.

This program is offered through joint efforts of faculty in the Department of Electrical and Computer Engineering and the Department of Computer Science and Engineering.

- make a C average on all hours scheduled and rescheduled at MSU (2.00 or better MSU GPA)
- earn at least a 2.00 cumulative grade point average on all courses scheduled and rescheduled (average on all attempts) at MSU that are applied toward meeting degree requirements
- earn at least a 2.5/4.0 average on all hours with ECE or CSE course prefixes at all institutions attended, including MSU, that are applied toward meeting degree requirements

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CURRENT CURRICULUM OUTLINE	Required Hours	PROPOSED CURRICULUM OUTLINE	Required Hours
EN 1103 English Comp I or EN 1163 Accelerated Comp I EN 1113 English Comp II or EN 1173 Accelerated Comp II	6	EN 1103 English Comp I or EN 1104 Expanded English Comp I EN 1113 English Comp II or EN 1173 Accelerated Comp II	3 3
Fine Arts: see General Education courses	3	Mathematics see Major Core	
Natural Sciences see Major Core		Science see Major Core	
Math see Major Core		Humanities see General Education courses	6
Humanities see General Education courses	6	Fine Arts see General Education courses	3
Social/Behavioral Sciences see General Education courses	6	Social/Behavioral Sciences see General Education courses	6
Major Core Courses Math and Basic Science (31h) MA 1713 Calculus I MA 1723 Calculus II	 3 3	Major Core Courses Math and Basic Science (31h) MA 1713 Calculus I MA 1723 Calculus II	 3 3

MA 2733 Calculus III	3
MA 2743 Calculus IV	3
MA 3113 Introduction to Linear Algebra	3
MA 3253 Differential Equations I	3
IE 4613 Engineering Statistics I	3
CH 1213 Chemistry I	3
CH 1211 Investigations in Chemistry I	1
PH 2213 Physics I	3
PH 2223 Physics II	3
Engineering Topics (76h)	
CSE 1284 Introduction to Computer Programming	4
CSE 1384 Intermediate Computer Programming	4
CSE 2383 Data Structures and Analysis of Algorithms	3
CSE 2813 Discrete Structures	3
CSE 4733 Operating Systems I	3
CSE 4833 Intro Analysis of Algorithms	3
ECE 1013 Foundations in ECE	3
ECE 1022 Foundations in Design	2
ECE 3423 Circuits I	3
ECE 3421 Circuits I Lab	1
ECE 3433 Circuits II	3
ECE 3244 Electronics I	4
ECE 3443 Signals and Systems	3
ECE 3714 Digital Devices and Logic Design	4
ECE 3724 Microprocessors	4
ECE 4724 Embedded Systems	*4*
ECE 4512 Capstone Design I	2
ECE 4522 Capstone Design II	2
ECE 4713 Computer Architecture	3
ECE 4743 Digital System Design	*3*
ECE 4833 Data Communication and Computer Networks	3
CPE technical electives[1] (6h)	6
Professional Enrichment elective (3h)	3
Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4532, ECE 4542, and GE 3513	
Writing Requirement	
GE 3513 Technical Writing	3
Computer Literacy Fulfilled in Engineering Topics courses	
[1] See advisor for approved courses	
Concentration Courses	
Total Hours	128

MA 2733 Calculus III	3
MA 2743 Calculus IV	3
MA 3113 Introduction to Linear Algebra	3
MA 3253 Differential Equations I	3
IE 4613 Engineering Statistics I	3
CH 1213 Chemistry I	3
CH 1211 Investigations in Chemistry I	1
PH 2213 Physics I	3
PH 2223 Physics II	3
Engineering Topics (76h)	
CSE 1284 Introduction to Computer Programming	4
CSE 1384 Intermediate Computer Programming	4
CSE 2383 Data Structures and Analysis of Algorithms	3
CSE 2813 Discrete Structures	3
CSE 3183 Systems Programming	**3**
CSE 4733 Operating Systems I	3
CSE 4833 Intro Analysis of Algorithms	3
ECE 1013 Foundations in ECE	3
ECE 1022 Foundations in Design	2
ECE 3423 Circuits I	3
ECE 3421 Circuits I Lab	1
ECE 3433 Circuits II	3
ECE 3244 Electronics I	4
ECE 3443 Signals and Systems	3
ECE 3714 Digital Devices and Logic Design	4
ECE 3724 Microprocessors	4
ECE 4724 Embedded Systems or ECE 4744 Digital System Design	**4**
ECE 4512 Capstone Design I	2
ECE 4522 Capstone Design II	2
ECE 4713 Computer Architecture	3
ECE 4833 Data Communication and Computer Networks	3
CPE technical electives[1] (6h)	6
Professional Enrichment elective (3h)	3
Oral Communication Requirement Fulfilled in ECE 1013, ECE 1022, ECE 4532, ECE 4542, and GE 3513	
Writing Requirement	
GE 3513 Technical Writing	3
Computer Literacy Fulfilled in Engineering Topics courses	
[1] See advisor for approved courses	
Concentration Courses	
Total Hours	128

3. JUSTIFICATION AND STUDENT LEARNING OUTCOMES

This update supports foundational student learning to be successful in the CSE Operating Systems course and adds flexibility for students to choose an advanced topics pathway based on their interests.

Add CSE 3183 and replace the requirement of taking both ECE 4724 and ECE 4743. Students need a prerequisite course of CSE 3813 to take CSE 4733 Operating Systems. CSE and ECE faculty reviewed the course and concluded that the course should be a requirement of the CPE program. To update the curriculum with this requirement, CSE and ECE faculty reviewed the program and noted that we currently require students to complete both advanced digital devices and microprocessor courses. Rather than require both pathways, faculty concluded the requirement of one pathway was sufficient, and that the technical elective hours could be used to complete the second pathway if so desired.

Add one credit hour to ECE 4743 Digital System Design to create ECE 4744 Digital System Design. ECE 4743 has been taught as a two-credit lecture and three-hour laboratory course for several years, which compresses the topics in the course but keeps the CPE program at 128 hours. It has worked because students who take ECE 4743 also take ECE 4724. With the additional content added to the CPE program through the addition of CSE 3183 and the shift to a choice of whether to pursue advanced digital devices topics or advanced microprocessor topics, adding an additional hour of lecture time and credit will allow for elaborating on the Digital System Design topics to ensure adequate in-depth coverage of the topics for students who elect to take the advanced digital devices pathway.

As a result of this degree program modification, there are no changes to the student learning outcomes. The CPE student learning outcomes are as follows:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

- Will this program change meet local, state, regional, and national educational and cultural needs? **Yes**
- Will this program change result in duplication in the System? **No**
- Will this program change/advance student diversity within the discipline? **No**
- Will this program change result in an increase in the potential placement of graduates in MS, the Southeast, and the U.S.? **No**
- Will this program change result in an increase in the potential salaries of graduates in MS, the Southeast, and the U.S.? **No**

4. SUPPORT

See letters of support from ECE and CSE Departments.

5. PROPOSED 4-LETTER ABBREVIATION

No changes

6. EFFECTIVE DATE

Fall 2025

MISSISSIPPI STATE UNIVERSITY™
JAMES WORTH
BAGLEY
COLLEGE OF ENGINEERING

DEPARTMENT OF
ELECTRICAL AND COMPUTER ENGINEERING
Undergraduate Committee

October 31, 2024

To Whom It May Concern:

On October 25, 2024 the faculty of the Electrical and Computer Engineering Department voted unanimously to support the addition of CSE 3183 Systems Programing to the BS in Computer Engineering with the modification to include adding one credit hour to ECE 4743 to form ECE 4744 and adding flexibility for students to take either ECE 4724 or ECE 4744

Sincerely,

The ECE Undergraduate Committee

406 Hardy Road | 216 Simrall Hall | P.O. Box 9571 | Mississippi State, MS 39762 | P. 662.325.3912 | F. 662.325.2298 | **www.ece.msstate.edu**

Stephen A. Torri
CSE Committee on Courses and Curricula
Computer Science and Engineering
Mississippi State University
665 George Perry Street
Box 9637
Mississippi State, MS 39762

November 26, 2024

Dr. Perkins,

To Whom It May Concern,

On November 22, 2024, the faculty of the Computer Science and Engineering Department voted unanimously to support the addition of CSE 3183 Systems Programming to the BS in Computer Engineering.

Thank you for your attention to this matter.

Stephen Torri

Digitally signed by: Stephen Torri
Reason: I am approving this document
Email: storri@cse.msstate.edu
Date: 11.26.2024

Stephen A. Torri
Committee Member
Associate Professor

Zhiqian Chen

Digitally signed by Zhiqian Chen
Date: 2024.11.26 11:33:16 -06'00'
Adobe Acrobat Reader version:
2023.003.20244

Zhiqian Chen, Ph.D.
Committee Member
Assistant Professor

Kortni Neal
Committee Member
Instructor

Joshua Crowson
Committee Member
Instructor